

ARCHAEOZOOLOGICAL AND ARCHAEOBOTANICAL FINDINGS FROM THE EXCAVATIONS AT NÁRODNÍ AVENUE IN PRAGUE

ZDEŇKA SŮVOVÁ — PETR KOČÁR — ROMANA KOČÁROVÁ —
— TOMASZ CYMBALAK

Extensive archaeological excavations, which were conducted at the Národní Avenue in Prague, allows for a broad study of various phases of the city development, from the pre-location settlement at the end of the early Middle Ages, through the medieval proto-town and the developed city to the advanced Central European metropolis of the modern period. The analyses of archaeozoological and archaeobotanical assemblages reveal not only the information about the changes in the former inhabitants' diet during the studied timeline, but also allows to compare the materials from different sectors of the excavated area or the finds obtained with the use of different field methods (i.e. hand-collected vs. floated samples). The results also enrich our information about the animal husbandry and the plant use, the former environment in the area and its vicinity, the introduction of new domestic species, import of exotic goods, and even about the methods of the archaeological research.

ARCHEOZOOLOGICKÉ A ARCHEOBOTANICKÉ NÁLEZY Z VÝZKUMU NA NÁRODNÍ TŘIDĚ V PRAZE

Rozsáhlý archeologický výzkum uskutečněný na Národní třídě v Praze nám poskytl jedinečnou příležitost ke studiu různých fází městského vývoje. Především jsme sledovali předlokační osadu v závěru raného středověku, středověké protoměsto a město a vyspělou středoevropskou metropoli novověkého období. Analýzy archeozoologických a archeobotanických souborů nám zprostředkovaly informace nejenom o stravě tehdejších obyvatel v průběhu studovaného časového úseku, ale umožnily nám rovněž srovnání různých ploch v rámci zkoumané oblasti nebo srovnání materiálu různého původu (ručně vybírané vs. plavené vzorky). Kromě toho analýzy obohatily naše vědomosti o chovu zvířat a pěstování rostlin, o životním prostředí v lokalitě a jejím okolí v minulosti, o introdukci nových domestikovaných druhů a importu exotického zboží i o metodách samotného archeologického výzkumu.

Key words — Prague — archaeological excavation — interdisciplinary cooperation — environmental analysis — archaeozoology — archaeobotany — medieval and post-medieval city

Klíčová slova — Praha — archeologický výzkum — interdisciplinární spolupráce — environmentální analýzy — archeozoologie — archeobotanika — středověké a raně novověké město

At the end of 2013, the main, field phase of the extensive rescue archaeological excavation situated in the southern forefield of the now defunct medieval fortification of the Old Town of Prague was completed. The results of interdisciplinary collaboration have given us a new insight into the form of settlement and the former conditions of life in this part of the city from prehistoric times to the industrial era. In this paper, we present the original analysis of animal bones and other environmental samples collected during the excavation. The presented contribution is based on the updated results of environmental analyses (KOČÁR/KOČÁROVÁ/KUTEK 2017) carried out within the post-excavation part of the research of the National Heritage Institute, Territorial Specialist Workplace in Prague (no. 2013/33) related to the preparation of the final report and is an extended version of the article published recently (SŮVOVÁ/CYMBALAK/KAPUSTKA 2018).

Location, extent, and circumstances of the project

The fieldwork research, involving six separate archaeological excavations (2007/13, 2012/33, 2013/33, 2016/33; CYMBALAK 2015; CYMBALAK 2017b; CYMBALAK/DEJMAL 2014a, b; CYMBALAK/PODLISKA 2008; CYMBALAK/MUSÍLEK 2017), was carried out due to a construction project 'Národní Palace'/DRN. The new, multifunctional building was build in the north-western part of the New Town and its area corresponds approximately to one quarter of the building block delineated by Voršílská Street, Ostrovní Street, Mikulandská Street, and Národní Avenue (Fig. 1). During six months of intensive fieldwork, an area of c. 1600 m² was archaeologically investigated. For the purposes of the final report and the analyses presented here, 11 to 13 horizons were established. Average depth of anthropogenic layers documented on the site was 2.5 m (occasionally up to 3.5 m). The archaeological situation on the site, which have been precisely excavated and documented both vertically and horizontally, shows the complicated development of this part of Prague from prehistoric to modern times. The changes of the historical core of the Prague agglomeration on the right bank of the Vltava River in the Middle Ages and in later periods have been particularly evidenced here (CYMBALAK 2015; CYMBALAK/DEJMAL 2014a; CYMBALAK/DEJMAL 2014b; CYMBALAK/MUSÍLEK 2017; ŽÁKOVSKÝ ET AL. 2017).

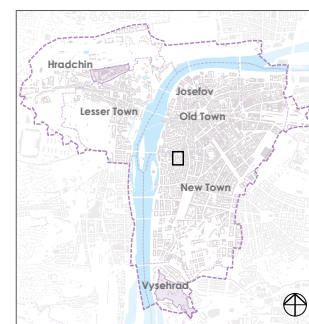
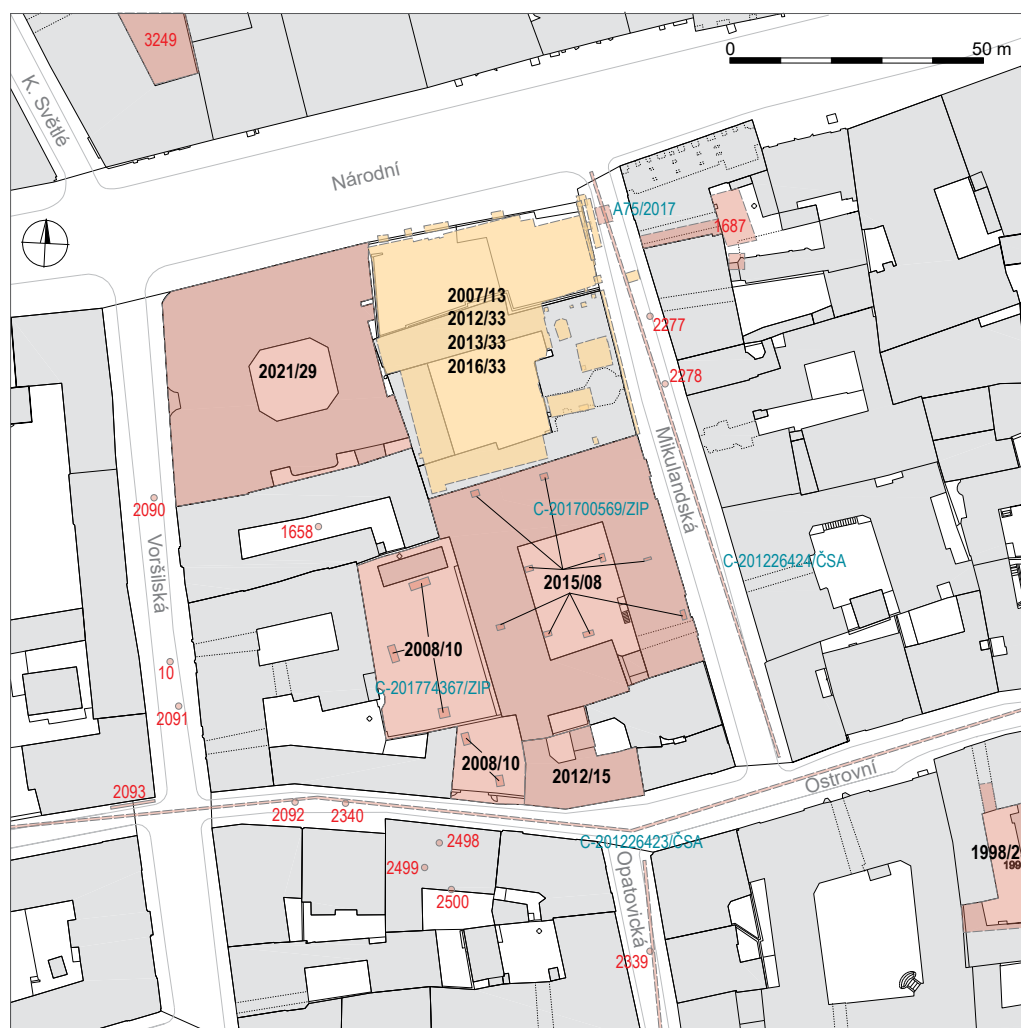


Fig. 1. Prague 1-New Town, the neighborhood of Národní Avenue and Mikulandská Street. Cut out of the map of the state of archaeological terrain in the Prague Monument Reservation (miniature above on the right). **Yellow** – the area of rescue archaeological research within the new building of ‘Národní Palace – DRN’; **red** – places of other research nearby; **light gray** – today’s buildings. The state of the research by 2005 according to L. HRDLÍČKA (2005; 2009), 2009–2022 events marked with the number of archaeological research of National Heritage Institute in Prague and presented according to field documentation (**black**), **blue** – numbers of AMČR and MHMP (according STAREC ET AL. 2020). Processed by E. Ditmar, S. Babušková, 2017, 2022.

Short characteristic of the site from archaeological and historical perspective

The earliest traces of human activity on the site date to the prehistoric period (a single settlement pit and relics of an aboveground building with dimensions 14 × 8 m dated to the later Bronze age – the so called Únětice culture, ca. 2000 BC.). The Protohistoric period (end of the 3rd – beginning of the 4th century AD.) is represented by a single, only partly preserved, Germanic / Early Roman crossbow-shaped fibula with a long rectangular foot (CYMBALAK/DEJMAL 2014b; CYMBALAK 2017a).

More intensive use of the place is documented only for the very end of the Early Middle Ages (end of 11th – beginning of 13th century) and it is related to demographic growth and area expansion of the pre-located Prague agglomeration as the largest centre of the sovereign domain in the period before the foundation of the Old Town (mid-13th century). After a temporary decline in some of the activities of the local inhabitants (the disappearance of the original dwellings) caused by the foundation of the Old Town and construction of its town walls, the area was soon occupied and used in other ways (the appearance of area connected with working with open fire – a metallurgical district). A little later, but before the foundation of the New Town of Prague in 1348, we can trace here the proto-urban settlement (the first houses located near the road, which were soon replaced by brick buildings according to the detailed plan). Among the local inhabitants were specialised craftsmen, whose presence is evidenced, among other things, by the environmental traces described in this paper.

In the course of the excavations the middle and rear parts of the burghers' plots were investigated however, with a few exceptions, the field works didn't touch the front sections. The plots were filled with many pits of various functions, settlement layers, cobbled and paved surfaces, cess pits, and wells. We can see a continuity in the settlement and buildings development from prehistoric and early medieval times to the present day (CYMBALAK 2015; CYMBALAK 2017b; CYMBALAK/DEJMAL 2014a; CYMBALAK/DEJMAL 2014b; CYMBALAK/MUSÍLEK 2017; ŽÁKOVSKÝ ET AL. 2017).

Fig. 2. Prague 1-New Town, the area of the new building 'Národní Palace – DRN'. The overall plan of rescue archaeological research, designating: **Yellow** – excavated area; **orange** – survey probes from 2007 and 2012; **red** – selected general sections GR14 and GR23; **pink, blue** – demolished buildings at Národní Avenue; **gray** – preserved wall on the ground floor of the Schönkirch Palace (No. 135/II in Mikulandská Street). (Processed by E. Dítmar and J. Švach, 2017; graphic design by S. Babušková, 2022.)

Environmental research methodology

Due to the large amount of the archaeozoological material (over 50 000 specimens), we present a detailed analysis only of those assemblages, that are related to the contexts recorded on the two main sections of the site (Fig. 2). General section GR 14 (Fig. 3) run through the site in E–W direction, it was 43.7 m long, and recorded 10 settlement horizons documented in 12 trenches, with the maximal depth of the stratigraphy measuring 3.8 m. General section GR23 (Fig. 4) was connected perpendicularly to GR14, and run through the site in N–S direction. The section was 47.5 m long, and recorded 11 settlement horizons documented in 16 trenches. Such selection allows us to present a short overview of a representative assemblages and related specific phenomena that are characteristic for environmental samples from the individual



settlement horizons on the site. These assemblages are supplemented by a group of bones and bone artefacts that were selected from archaeological contexts during excavation. This group was extracted from places where a high fraction of organic material was detected (in further text as the assemblage EN). The results of archaeobotanical analyses, which illustrate the character of the local natural environment and activities of the local inhabitants, forms an indispensable integral part of the paper.

The bone material was obtained by two different methods. First, a standard collection of bones from every context during excavation in the entire area. These contexts were recorded on the main sections GR14 and GR23. The second method involved using flotation of the contexts in which a high presence of organic material was detected (mostly fills of cess pits and wells or pits and layers rich in organic waste).

Archaeozoological analysis

Archaeozoological assemblages located in the area of the capital city help to reveal details about the diet of its former inhabitants, animal husbandry, the introduction of new species or the environment from which the animals came. In all the assemblages from the historical periods, the remains of domesticated ungulates played crucial role, but their mutual ratio differed not only depending on local conditions, but also changed over time (Kovačiková et al. 2019).

In the Early Middle Ages in Prague, there are contexts in which the remains of the domestic pig has outnumbered the finds of cattle and sheep/goats (for example, in the 10th–12th centuries at Prague Castle – see Kovačiková/Kyselý/Trojánková 2014; or in the 8th–11th centuries on Malostranské Square – Kovačiková et al. 2019). Different ratios were also documented, i.e. at Klementinum in 11th–12th century (Burian 2016), where the bones of the sheep/goat taxon were the most numerous, followed by almost equally represented pig and cattle remains. Horses, domestic fowl and red deer were found at all these locations. However, a richer spectrum of hunted species was found only on Malostranské Square. Other taxa included dogs, cats and geese.

Assemblages dated from the 12th century to the half of the 13th century differ from the above-mentioned analyses. In several places, among the domesticated species, finds of cattle predominate, followed by pigs and sheep/goats. Such situation was visible at Republiky Square (Kyselý 2002a), in Týnská Alley (Sůvová 2007) or in Liboc, which could have functioned as an agricultural supply area of Prague (Sůvová v tisku/in print). The exception in this scheme is the case of Prague Castle, where the pig finds were the most represented (Kovačiková/Kyselý/Trojánková 2014). However, the situation of Prague Castle has a specific relation to the way, how it was provisioned. Bones of horses, dogs, cats, domestic fowl and geese are a common part of the assemblages. A larger spectrum of hunted species was found only at Prague Castle, in other cases these finds were rather occasional.

The indicated development continued in the Later Middle Ages – the most numerous, sometimes predominant taxon was cattle, the remains of pigs were often found in the second place, and the bones of sheep and goats in the third place (Liliová Street – Kočárová et al. 2008; Týnská Alley – Sůvová 2007; Klementinum – Burian 2016; Křižovnická Street – Kovačiková et al. 2019). In some cases, the importance of pigs declined even more and, on the contrary, the popularity of sheep and goats increased and came in the second place (Old Town Square – Havrda et al. 2017; Pařížská Street, Rybná Street – both Kovačiková et al. 2019). The exception is the assemblage from Liboc (Sůvová v tisku/in print), where the most numerous were the bones belonging to horses, usually found only in small quantities in other localities or completely absent. The bones of domestic carnivores were relatively rare, but the remains of birds (especially domestic fowl and geese) tend to be more numerous than in previous time phases. Apart from Liboc and Pařížská, the assemblages still contain an admixture of hunted animals – 1–2 species of hunted mammals and birds were found in Týnská, Rybná and Old Town Square, while the assemblages from Klementinum, Křižovnická and Liliová contained 4–6 species.

In the Early Modern era, a continued displacement of pig finds and an increase in the importance of small ruminants was observed. In Týnská Alley (Sůvová 2007), finds of sheep/goats ranked second after the remains of cattle, and pigs occupied the third position. At Republiky Square (Kyselý 2002b), sheep/goat remains were almost as numerous as cattle bones, while pig bones were few. Similarly they were completely absent in the cesspit on Karmelitská Street (Kočár et al. 2007a). For this cesspit, the remains of the crayfish, songbirds or other fish species

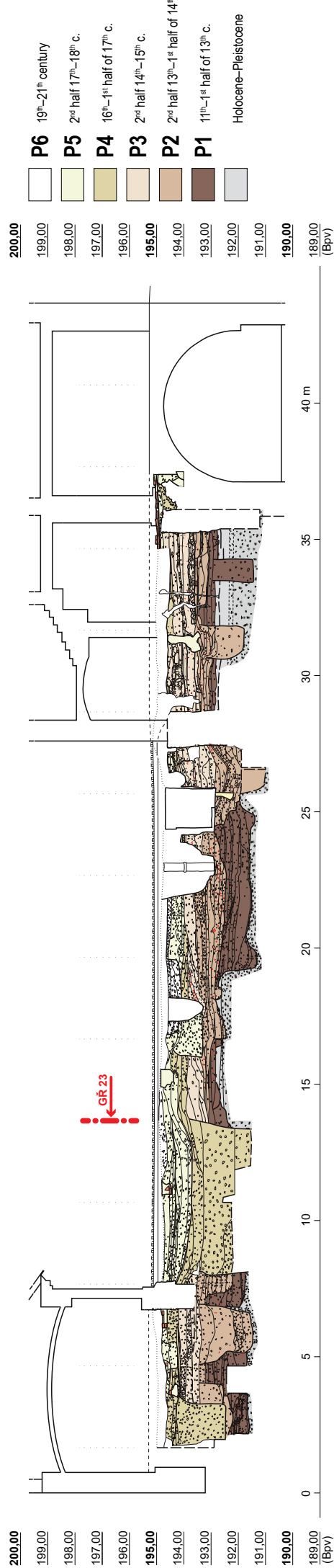


Fig. 3. Prague 1-New Town, Mikulandská plot numb. 843, No. 135/II. The west-east general section GR14 with marked settlement horizons (edited by E. Ditmar, N. Trachtová-Hladíková and T. Cymbalak, 2017).

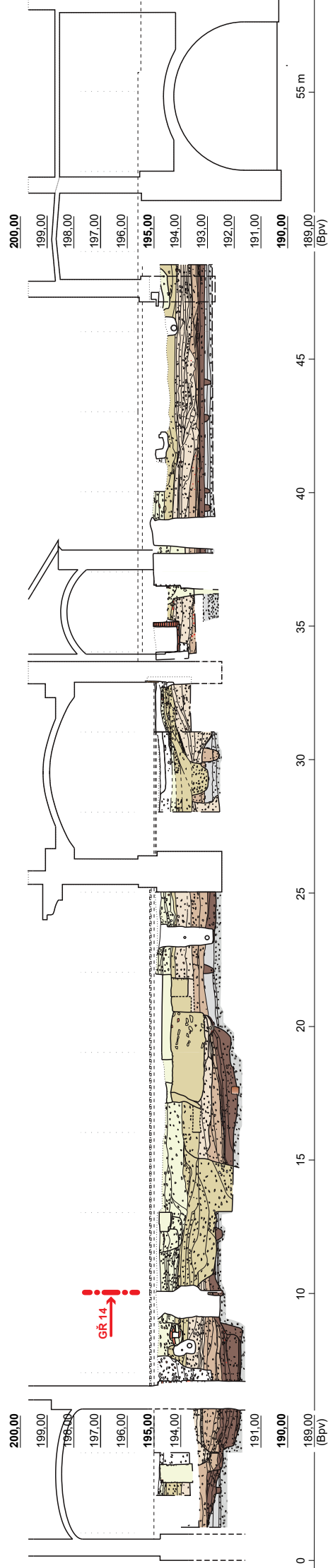


Fig. 4. Prague 1-New Town, Mikulandská plot numb. 843, No. 135/II, former plot numb. 841. The north-south cross-section of GR23 with marked settlement horizons (edited by E. Ditmar, N. Trachtová-Hladíková and M. Kalíšek, 2017).

Table 1. Archaeozoological finds from the excavation at the Národní Avenue in Prague – number of fragments of the hand-collected material divided into three assemblages (GR14, GR23 and EN). **P1** – 1st–half of 13th century; **P2** – half of 13th–half of 14th century; **P3** – half of 14th–15th century; **P4** – 16th–half of 17th century; **P5** – half of 17th–18th century; **P6** – 19th–20th century (edited by Z. Šúrová, 2017).

species	species/ taphonomy	druh/ tafonomie	GR14						GR23						EN					
			P1	P2	P3	P4	P5	P6	P1	P2	P3	P4	P5	P6	P1	P2	P3	P4	P5	
<i>Esox lucius</i>	northern pike	štika obecná																	2	
<i>Cyprinidae</i>	cyprinids	kaprovití																	1	
<i>Cyprinus carpio</i>	common carp	kapr obecný			1														8	
<i>Gadidae</i>	cods	treskovití																	1	
<i>Pisces indet.</i>	undeterm. fish	neurčené ryby				1													15	
<i>Anseriformes</i>	geese and ducks	vrubozobí		2		3	1												7	
<i>Anas platyrhynchos/domesticus</i>	mallard/dom. duck	kachna divoká/ domácí	1	1			1	3+1cf.			1	1	1						7	
<i>Anser domesticus</i>	domestic goose	husa domácí	1	5	9	15	7+1cf.		2	1	13	5+1cf.	3+1cf.		2				8	
<i>Galliformes</i>	gallids	hrabaví	1	9	1	2	1		1		1	1				2			30	
<i>Gallus domesticus</i>	domestic fowl	kur domácí	3	27	10	18	12	2	2	5	27	12	2		1	1			77	
<i>Meleagris gallopavo</i>	domestic turkey	krocan domácí					1						1+1cf.						19	
<i>Perdix perdix</i>	grey partridge	koroptev polní																	7	
<i>Tetrao tetrix</i>	black grouse	tetřevěk obecný		1cf.															5	
<i>Tetrao urogallus</i>	western capercaillie	tetřev hlušec									1								4	
<i>Columba domestica</i>	domestic pigeon	holub domácí																		
<i>Falconidae</i>	falconids	sokolovití									1									
<i>Passeriformes</i>	singing birds	pěvci																	3	
<i>Aves indet.</i>	undeterm. bird	neurčení ptáci		9	6	4	2			1	8	2			2		1		49	
<i>Rodentia</i>	rodents	hlodavci																	1	
<i>Sciurus vulgaris</i>	red squirrel	veverka obecná																	1	
<i>Lepus europaeus</i>	european hare	zajíc polní	3		1	2	5			1	6	6	3						43	
<i>Canis familiaris</i>	domestic dog	pes domácí	4	5					1	1	9								14	
<i>Felis catus</i>	domestic cat	kočka domácí	1	5			1												3	
<i>Equus caballus</i>	domestic horse	kůň domácí	11	16+1cf.	2	4	6		8	3	10	4		1		1				
<i>Sus scrofa</i>	wild boar	prase divoké		3+1cf.	1cf.		1				1	1				2			1	
<i>Sus domesticus</i>	domestic pig	prase domácí	30+1cf.	221	66	40+1cf.	38	10	45	37	114	26	13	2	37	25	9	2	26	
<i>Cervus elaphus</i>	red deer	jelen evropský	1			1	1	1	3			2	1						7+1cf.	
<i>Capreolus capreolus</i>	roe deer	srnec obecný		1		1	1						2		1					
<i>Ovis/ Capra</i>	sheep/goat	ovce/koza	56+1cf.	122+2cf.	92+1cf.	180	166+2cf.	34+1cf.	44+1cf.	31	141	63	61+3cf.	2+1cf.	35	22	14	5	55	
<i>Ovis aries</i>	domestic sheep	ovce domácí	2	9	4	15	17				20	1	8		3	1	2	1	2	
<i>Capra hircus</i>	domestic goat	koza domácí	1	5	1	1	3		2		3	1	2		1	2				
<i>Bos taurus</i>	domestic cattle	skot domácí	114+3cf.	290+6cf.	161+3cf.	242+3cf.	183+1cf.	36	73+2cf.	79+1cf.	286+3cf.	68+2cf.	74	4	47+1cf.	34+1cf.	7+1cf.	11+1cf.	66+1cf.	
	large ungulate	velký kopytník	81	245	163	153	126	29	79	94	280	72	54	2	57	25	6	7	112	
	medium-s. mammal	středně vel. savce	31	122	98	91	90	19	53	21	98	34	31		19	13	9	8	45	
	small mammal	malý savce		1				1	1							1		5		
	undeterm. mammal	neurčení savci	36	130	52	37	52	14	42	15	81	15	8		23	30	19		46	
	total	celkem	382	1239	672	814	719	151	359	290	1104	317	269	12	229	160	71	43	672	
	total weight (g)	celková hmotnost (g)	8706,1	19428,5	10041,1	14994,9	11801,3	2049,1	6850,4	6946,6	19554,4	4777,3	4091,5	182,3	3405,4	2101,2	540,3	692,3	4977,5	
	average weight (g)	průměrná hmotnost (g)	22,8	15,7	14,9	18,4	16,4	13,6	19,1	24,0	17,7	15,1	15,3	15,2	14,9	13,1	7,6	16,1	7,4	
	determined	určeno	234	732	353	528	449	88	184	159	637	194	176	10	128	91	36	28	400	
	determined (%)	určeno (%)	61,3	59,1	52,5	64,9	62,4	58,3	51,3	54,8	57,7	61,2	65,4	83,3	55,9	56,9	50,7	65,1	59,5	
	butchery	porcování	73	405	284	341	254	41	58	92	345	97	93	2	39	32	11	23	222	
	butchery (%)	porcování (%)	19,1	32,7	42,3	41,9	35,3	27,2	16,2	31,7	31,3	30,6	34,6	16,7	17,0	20,0	15,5	53,5	33,0	
	burning	opálení	7	22	6	2	1	0	4	3	1	0	0	0	28	10	0	2	3	
	burning (%)	opálení (%)	1,8	1,8	0,9	0,2	0,1	0,0	1,1	1,0	0,1	0,0	0,0	0,0	12,2	6,3	0,0	4,7	0,4	
	gnawing	otisky zubů	46	82	32	37	21	2	34	23	54	11	9	0	29	9	1	1	9	
	gnawing (%)	otisky zubů (%)	12,0	6,6	4,8	4,5	2,9	1,3	9,5	7,9	4,9	3,5	3,3	0,0	12,7	5,6	1,4	2,3	1,3	

were documented among the floated samples. At Republiky Square bones of a turkey, were confirmed, which suggest the early modern imports. For a more complete picture of the Medieval and Post-medieval management of kitchen waste and the animals themselves, it would be appropriate to compare these results with a larger number of sites constituting the agricultural supply base of the town.

The archaeozoological assemblage was analysed by standard methods (see e.g. REITZ/WING 2008), using both comparative osteological collections and relevant atlases (COHEN/SERJEANTSON 1996; SCHMID 1972, etc.). Where possible, undetermined mammal bones were categorised according to their size into large ungulate (size of cattle), medium mammal (size of a sheep) and small mammal (size of a rabbit). For quantification of the archaeozoological material, three common methods were used: number of fragments (respectively NISP), weight of fragments and minimum number of individuals (MNI, for further information about the quantification methods in archaeozoology see e.g. KYSELY 2004); although in this article NISP method was preferred.

Altogether, 7379 hand-collected finds of animal bones and other archaeozoological materials were analysed with a total weight of 119136.6 g and an average weight of 16.1 g. The assemblage GR14 contained 3977 finds, GR23 contained 2351 finds and EN contained 1175 finds (see Table 1). Several archaeological contexts belonged to two assemblages at once and were analysed in both cases. Another 10804 finds were gained by floating of the environmental samples (Table 2).

Based on the dating of the archaeological contexts, the assemblages were divided into six subsequent periods:

- 1) pre-location settlement (P1) further in the text) – 11th–half of 13th century;
- 2) proto-urban agglomeration (P2) – half of 13th–half of 14th century;
- 3) Medieval city (P3) – half of 14th–15th century;
- 4) Early Modern city (P4) – 16th–half of 17th century;
- 5) Later Early Modern city (P5) – half of 17th–18th century;
- 6) Industrial city (P6) – 19th–20th century.

In objects with high concentration of organic material (EN), only phases P1 to P5 were represented, with both sets of selected general sections (GR) containing finds from all periods. Nevertheless, the youngest period (P6) was in both cases underrepresented and was analysed only marginally. The same problem with the low number of finds involved the periods P3 and P4 of the assemblage EN.

Material obtained by conventional exploration versus ‘floated’ material

As we can see in the Table 1 (assemblage EN) and Table 2, the hand-collected and the floated archaeozoological material obtained from the same archaeological situations differ significantly. Except for the possibly intrusive elements, such as beetles, rodents or frogs, floated species spectrum involved also small animals – crayfish and fish, birds or juvenile mammals. Not only bone and tooth fragments were recorded, but also finds of carapaces, fish scales and eggshells. Altogether, at least 24 new animal species were discovered in the floated samples in comparison to the hand-collected assemblage. Moreover, many burnt fragments were discovered, especially in the periods P1 and P2. For the proportion of animal remains in both assemblages see Figs 5 and 6.

For the oldest period P1, the hand-collected assemblage contained mainly the remains of the domestic ungulates (cattle, sheep/goat, pig) with the occasional finds of domestic birds and roe deer. Thanks to the floated samples the species composition was extended by at least seven fish species (eel, pike, salmonid?, catfish, perch, and two cyprinids), singing birds, but also by hare and domestic cat.

In the period P2, the dominant part of the hand-collected assemblage was made by the finds of domestic ungulates including horse, which were supplemented by the remains of domestic fowl and wild boar. The floated material also revealed the finds of crayfish, nine species of fish (eel, pike, salmonid, perch, flatfish, and four cyprinid species), singing birds and hare.

	species	species	druh	P1	P2	P3	P4	P5
intrusion	<i>Dermaptera</i>	earwigs	škvoři					2
	<i>Diptera</i>	dipterans	dvoukřídílí				1	17
	<i>Coleoptera</i>	beetles	brouci		1			11
	<i>Anura</i>	frogs	žáby		2	1	3	2
	<i>Crocidura suaveolens</i>	lesser shrew	bělozubka šedá					2
	<i>Rodentia</i>	rodents	hlodavci	21	5	5	18	59
	<i>Microtus</i> sp.	vole	hraboš			1		
	<i>Mus musculus</i>	house mouse	myš domácí	1		1	2	8
	<i>Rattus</i> sp.	black/brown rat	krysa/potkan	2				
human activity	<i>Rattus norvegicus</i>	brown rat	potkan					1
	<i>Astacus</i> sp.	crayfish	rak		8		313	54
	<i>Bivalvia</i>	bivalves	mlži					6
	<i>Pisces</i> indet. (bones)	undet. fish (bones)	neurč. ryby (kosti)	86	84	10	126	438
	<i>Pisces</i> indet. (scales)	undet. fish (scales)	neurč. ryby (šupiny)	23	9	4	2	5
	<i>Anguilla anguilla</i>	european eel	úhoř říční	1	1			2
	<i>Esox lucius</i>	northern pike	štika obecná	3	6	2	15	28
	<i>Salmonidae</i>	salmonids	lososovití	1cf.	1		4	5
	<i>Cyprinidae</i>	cyprinids	kaprovití	43	9	2	59	106
	<i>Abramis brama</i>	bream	cejn velký	3				3
	<i>Alburnus alburnus</i>	bleak	ouklej obecná				1	1
	<i>Barbus barbus</i>	barbel	parma říční		1		5+1cf.	
	<i>Cyprinus carpio</i>	common carp	kapr obecný		1		39	97
	<i>Leuciscus</i> sp.	chub/dace	jelec		1		6	19
	<i>Phoxinus phoxinus</i>	minnow	stěvle potoční	1	1			
	<i>Scardinius</i> sp.	rudd	perlín				1cf.	
	<i>Tinca tinca</i>	tench	lín obecný				1	
	<i>Silurus glanis</i>	wels catfish	sumec velký	1				2
	<i>Percidae</i>	percids	okounovití	3	2		13	1
	<i>Perca fluviatilis</i>	perch	okoun říční	2	1		1	1
	<i>Gadidae</i>	cods	treskovití					4
	<i>Clupeidae</i>	herrings	sleďovití				32	1
	<i>Pleuronectidae</i>	flatfish	platýsovití		5		11	2
	<i>Aves</i> indet.	undet. bird	neurčení ptáci	48	74	15	278	779
	<i>Anser domesticus</i>	domestic goose	husa domácí					1
	<i>Galliformes</i>	gallids	hrabaví				3	8
	<i>Gallus domesticus</i> (eggs)	dom.fowl (eggs)	kur domácí (skořápky)	1	6		87	215
	<i>Gallus domesticus</i> (bones)	dom.fowl (bones)	kur domácí (kosti)	5	2		3	16
	<i>Coturnix coturnix</i>	common quail	křepelka polní					1cf.
	<i>Perdix perdix</i>	grey partridge	koroptev polní					1
	<i>Passeriformes</i>	singing birds	pěvci	2	17	1	51	184
	<i>Mammalia</i> indet.	undet. mammal	neurčení savci	2 808	1 558	262	372	1 837
	<i>Lepus europaeus</i>	european hare	zajíc polní	4+3cf.	2			11
	<i>Canis familiaris</i>	domestic dog	pes domácí					4
	<i>Felis catus</i>	domestic cat	kočka domácí	1				
	<i>Sus domesticus</i>	domestic pig	prase domácí	12	10+1cf.	1	10	71+2cf.
	<i>Ovis/Capra</i>	sheep/goat	ovce/koza	23	4	4cf.		3
	<i>Bos taurus</i>	domestic cattle	skot domácí	17+1cf.				3
		large ungulate	velký kopytník					9
		medium-s. mammal	středně velký savec	4	3		16	55
		small mammal	malý savec	3	1	1		4
		total	celkem	3123	1816	310	1474	4081
		burnt fragments	opálené fragmenty	348	219	17	15	26

Table 2. Archaeozoological finds from the excavation at the Národní Avenue in Prague – number of fragments of the floated material. **P1** – 11th–half of 13th century; **P2** – half of 13th–half of 14th century; **P3** – half of 14th–15th century; **P4** – 16th–half of 17th century; **P5** – half of 17th–18th century (edited by Z. Sůvová, 2017).

In the P3 period, only a few records of domestic ungulates, hare and songbirds were recorded in the hand-collected assemblage. Although the float samples contained only a small number of archaeozoological finds, the medieval assemblage also included fish (pike and cyprinids).

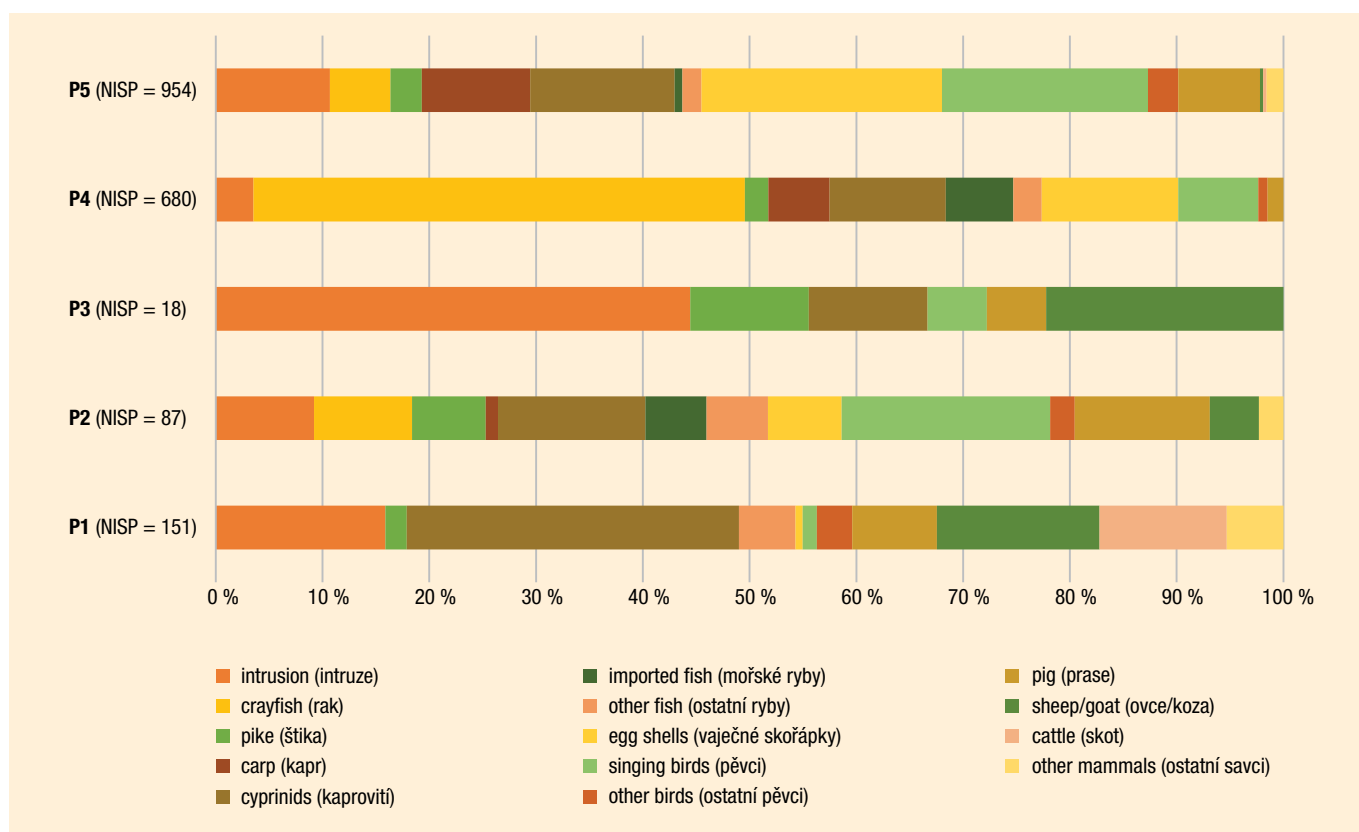


Fig. 5. Prague 1-New Town, Národní Avenue/Mikulandská Street. Floated archaeozoological material – composition of the main animal groups. **P1** – 11th–half of 13th century; **P2** – half of 13th–half of 14th century; **P3** – half of 14th–15th century; **P4** – 16th–half of 17th century; **P5** – half of 17th–18th century (edited by Z. Sůvová, 2017).

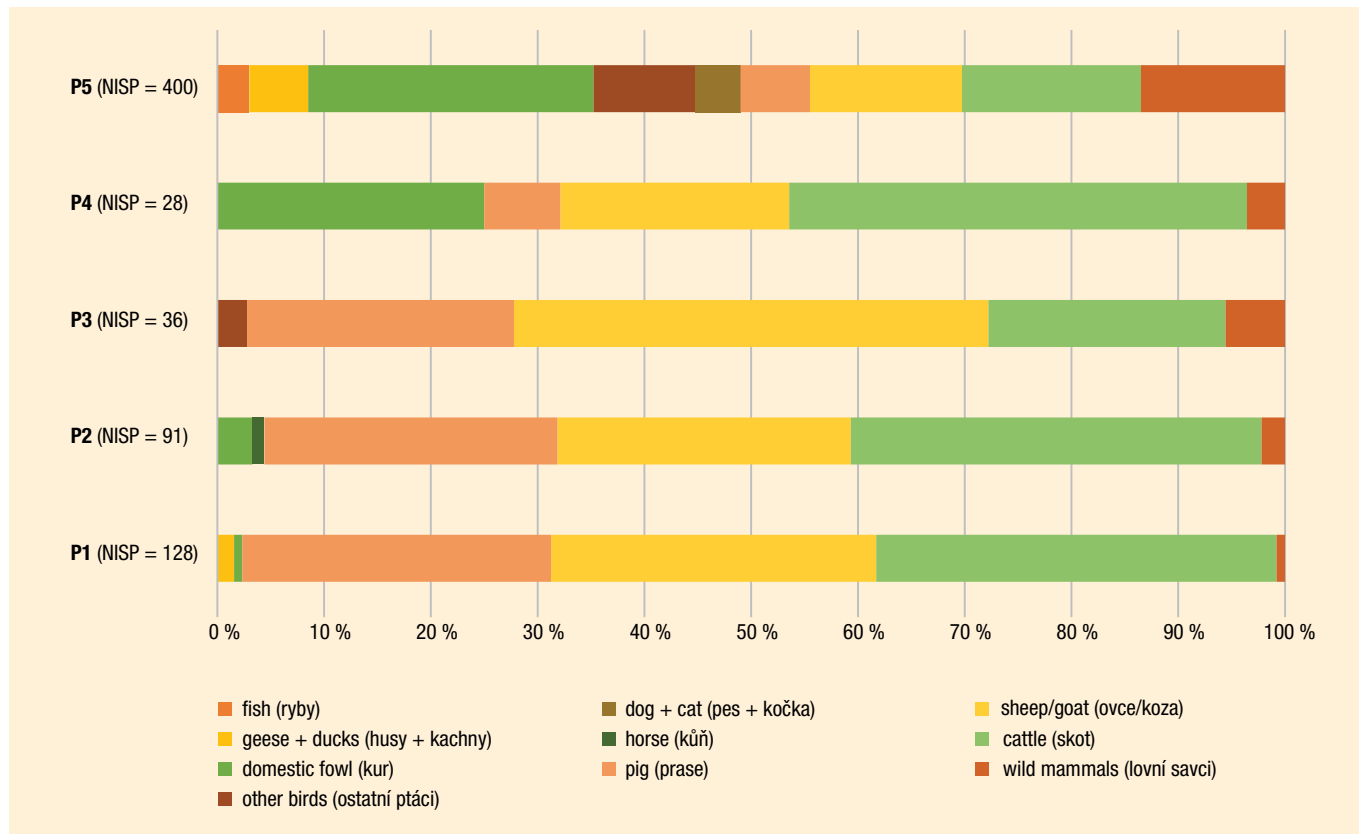


Fig. 6. Prague 1-New Town, Národní Avenue/Mikulandská Street. Hand-collected material (assemblage EN) – composition of the main animal groups. **P1** – 11th–half of 13th century; **P2** – half of 13th–half of 14th century; **P3** – half of 14th–15th century; **P4** – 16th–half of 17th century; **P5** – half of 17th–18th century (edited by Z. Sůvová, 2017).

The hand-collected assemblage of the period P4 also wasn't numerous and contained the bones of domestic species (ungulates and fowl). On the other hand, the floating of the environmental samples brought many archaeozoological finds – rich remains of crayfish, 11 fish species (pike, salmonids, perch, herrings, flatfish, and six cyprinid species), singing birds or neonatal specimens of pig.

The youngest period P5 was the most abundant in both hand-collected and floated materials. The hand-collected assemblage contained the remains of some larger fish (pike, carp, cod), many bird species and of course the records of domestic and wild mammals; while the floated material contained nine additional fish species (eel, salmonids, catfish, perch, herring, flatfish, and three cyprinids), the finds of bivalves (veleurb?) and crayfish or bones of newborn mammals (cattle, pig, dog).

Comparison of the hand-collected assemblages

As expected, the EN assemblage originating from organic-rich situations and selected for environmental sampling was different from the two GR controls. The species composition (Figs 6–8) is generally dominated by domestic ungulates (cattle, pigs, sheep/goats), which traditionally figure as the main source of animal protein, with an overall contribution of 88.9 to 96.9 % of NISP in all periods of our assemblages, except for the P5 period of the EN assemblage (37.5 %).

Looking closer at the proportion of the main domestic ungulates (cattle, pig, and sheep/goat – Table 3), cattle seems to be the most important taxon in all three sets. On the other hand, the extent of its importance differs – during the periods P1 and P2, its percentage in EN (38.7 %, respectively 41.2 % of the NISP of these three taxa) is lower than in GRs, while in P5 the percentage is similar in all three assemblages (44.7 to 46.0 %). Comparing the two sets of GR, except for P5, the proportion of cattle is also comparable in P3 (50.0 and 51.0 %), while during P1 and P4 its percentage is higher in GR14 and during P2 in GR23 (see Table 3 for percentage ratios).

For the percentage of sheep/goats, an almost identical trend can be observed in both GR files, with a decrease between P1 (28.8 respectively 28.1 %), and P2 (21.1 and 20.9 %, respectively) and a recurrent increase in P3 (29.9 respectively 28.9 %) and a continued increase during P4

species/phase	GR14						GR23						EN				
	P1	P2	P3	P4	P5	P6	P1	P2	P3	P4	P5	P6	P1	P2	P3	P4	P5
<i>Sus domesticus</i> (NISP) prase domácí	30 +1cf.	221	66	40 +1cf.	38	10	45	37	114	26	13	2	37	25	9	2	26
<i>Sus domesticus</i> (%)	14,9	33,7	20,1	8,5	9,3	12,3	26,9	25,0	20,1	16,1	8,1	22,2	29,8	29,4	27,3	10,0	17,3
<i>Ovis/Capra</i> – total (NISP) ovce/koza	59 +1cf.	136 +2cf.	97 +1cf.	196	186 +2cf.	34 +1cf.	46 +1cf.	31	164	65	71 +3cf.	2 +1cf.	39	25	16	6	57
<i>Ovis/Capra</i> – total (%)	28,8	21,1	29,9	40,7	45,9	43,2	28,1	20,9	28,9	40,4	46,0	33,3	31,5	29,4	48,5	30,0	38,0
<i>Bos taurus</i> (NISP) tur domácí	114 +3cf.	290 +6cf.	161 +3cf.	242 +3cf.	183 +1cf.	36	73 +2cf.	79 +1cf.	286 +3cf.	68 +2cf.	74	4	47 +1cf.	34 +1cf.	7 +1cf.	11 +1cf.	66 +1cf.
<i>Bos taurus</i> (%)	56,3	45,2	50,0	50,8	44,9	44,4	44,9	54,1	51,0	43,5	46,0	44,4	38,7	41,2	24,2	60,0	44,7
total dom. ungulates NISP	208	655	328	482	410	81	167	148	567	161	161	9	124	85	33	20	150

and P5; while in the EN file the percentage of sheep/goats is higher during P1 and P2 and lower during P5 than in GR (see Table 3 for the representation).

Concerning the percentage of pig, in all three assemblages, we can see the decreasing trends during the periods P2 to P5, although the exact values differ. For the period P1, its percentage in GR14 (14.9 %) was significantly lower than in both other assemblages (26.9 %, respectively 29.8 %). The opposite situation could have been seen in P2, where the percentage of pig was highest in GR14 (33.7 %). In P3, the values of both GRs were identical (20.1 %), while in P4 the percentage in GR23 (16.1 %) was higher than in GR14 (8.5 %). For the period P5, the percentage of pig is similar again in both GRs (9.3 %, respectively 8.1 %), whereas in the EN assemblage (17.3 %) is higher than in GRs.

Horse remains were found mainly in the GR assemblages (0.6 to 4.7 % of the NISP): in periods P1 to P5 in GR14 and P1 to P4 in GR23, respectively. On the other hand, in the assemblage EN only one horse bone was recorded in P2. The proportion of mammals hunted ranged from 0.6 to 1.8 % in GR14. Similar values were found in the medieval phases P1 to P3 of the GR23

Table 3. NISP of the main domestic ungulates from the hand-collected assemblages (GR14, GR23, EN).

P1 – 11th–half of 13th century;
P2 – half of 13th–half of 14th century;
P3 – half of 14th–15th century;
P4 – 16th–half of 17th century;
P5 – half of 17th–18th century;
P6 – 19th–20th century
 (edited by Z. Sůvová 2017).

Fig. 7. Prague 1-New Town, Národní Avenue/Mikulandská Street. Hand-collected material (assemblage GR14) – composition of the main animal groups.
P1 – 11th–half of 13th century; **P2** – half of 13th–half of 14th century; **P3** – half of 14th–15th century; **P4** – 16th–half of 17th century; **P5** – half of 17th–18th century (edited by Z. Sůvová, 2017).

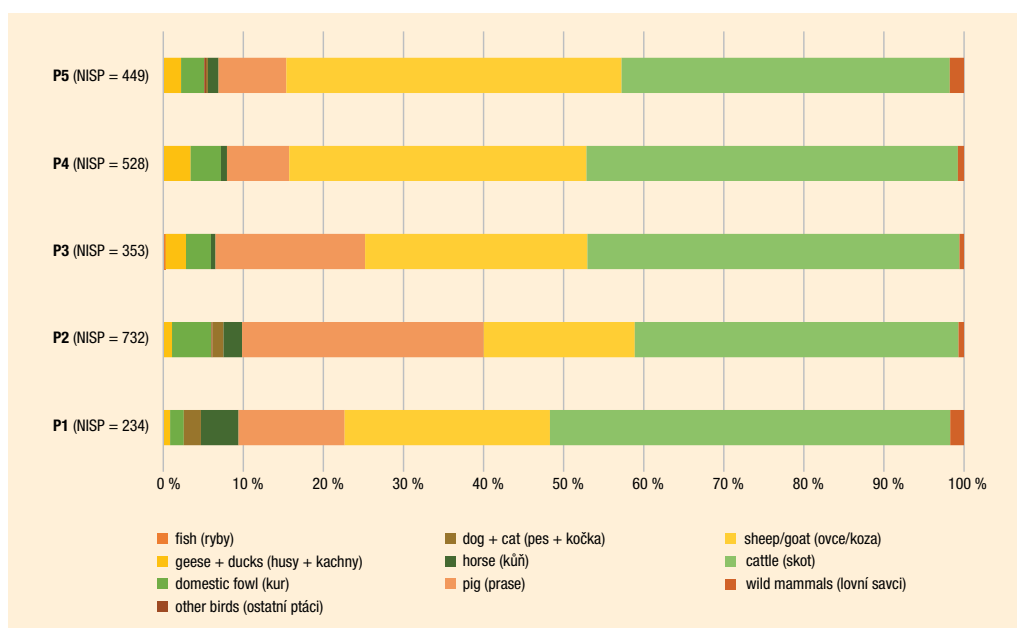
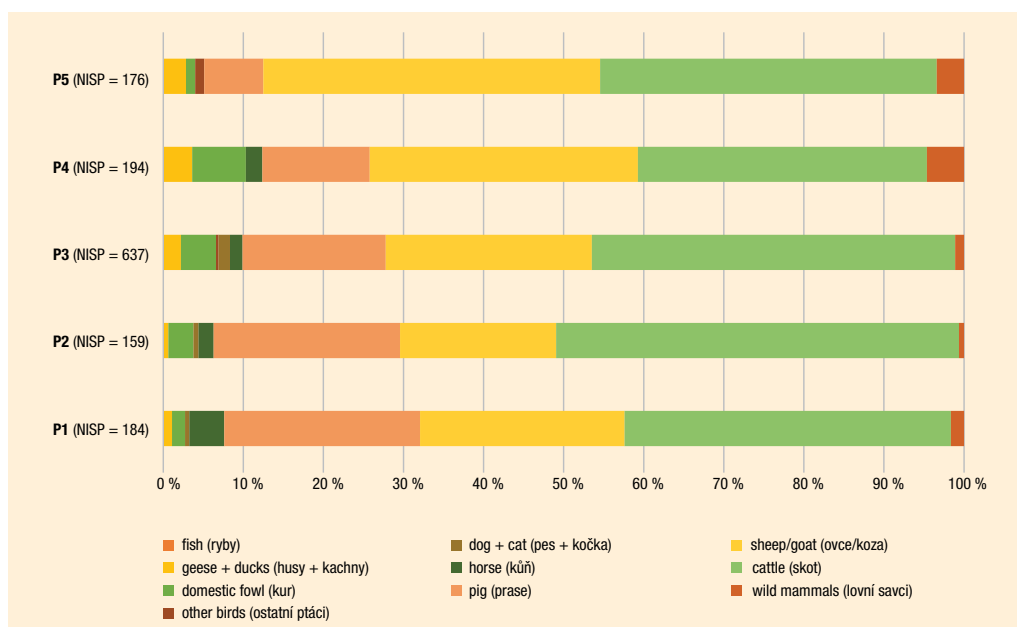


Fig. 8. Prague 1-New Town, Národní Avenue/Mikulandská Street. Hand-collected material (assemblage GR23) – composition of the main animal groups.
P1 – 11th–half of 13th century; **P2** – half of 13th–half of 14th century; **P3** – half of 14th–15th century; **P4** – 16th–half of 17th century; **P5** – half of 17th–18th century (edited by Z. Sůvová, 2017).



assemblage, while in the early modern phases P4 and P5 the representation was several times higher (4.6 and 3.4 %). This trend intensifies in the EN with the medieval periods P1 and P2 containing only sporadic finds of wild mammals (0.8 and 2.2 %), while the youngest period P5 (13.5 %) was exceptionally rich in hunted animals finds, especially hare.

The finds of bird bones were recorded in all assemblages. The trend was the same for both GR files: the representation increased during the P1 to P4 period (from 2.6 to 7.2 % and from 2.7 to 10.3 %, respectively) and decreased in the P5 period (5.3 and 5.1 %). For the Medieval periods P1 and P2 of the assemblage EN, the percentage of birds was at similarly low level (2.3 and 3.2 %), whereas in P5 an extraordinary high value (41.8 %) was observed. The occurrence of fish bones was noticed only in several instances, with the considerable presence entirely in the case of P5 of the EN assemblage (3.0 %).

Focusing on the proportion of finds with traces of butchering and working (see Table 1), the values for the P1 period were similar in all three sets (16.2 to 19.1 %). While in both GR assemblages the representation significantly increased in P2 (32.7 %, respectively 31.7 %) and remained above 30 % till P5, the EN assemblage remained in the lower values in P2 and P3 (20.0 and 15.5 %) and did not increase significantly until the period P4. Interestingly, during P3 and P4 the

percentage differed between both GRs as well – with the values of 42.3 and 41.9 % for GR14 and 31.3 and 30.6 % for GR23.

The percentage of the burnt finds was generally higher in the EN assemblage than in GRs, especially in the periods P1 and P2. Despite of the fact, that the burnt fragments were scarce in both GRs, they were relatively more frequent in GR14 than in GR23 during the periods P1 to P5. The trend of decreasing proportion of bones with tooth impressions in the P1 to P5 periods was similar in all three sets (see Table 1 for values).

Changes during the studied periods

A closer look at the species composition of all hand-collected assemblages shows that they were traditionally dominated by the classical domestic ungulates: cattle, sheep/goat and pig. As their total percentage slightly decreased from 91.4 to 88.4 % (of total NISP) during the periods P1 to P4, between the phases P4 and P5 the significant drop to 70.3 % was recorded, mainly related to the high occurrence of wild mammals and birds in the assemblage EN.

Within these major domestic ungulates, cattle was the most abundant taxon in all periods, with a proportion ranging from 45.1 to 49.7 % (of the total NISP of these three ungulate taxa in all hand-collected communities). This also means, that no big changes in the percentage of cattle were recorded during the studied interval and that the differences within these domestic ungulates were observed mainly in the remaining two taxa.

Sheep and goat remains ranked second in most phases. For the period P1 the value of 29.3 % was calculated. Between P1 and P2, the drop in the percentage of sheep/goat was recorded (to 21.8 %), which moved the remains of sheep/goat temporarily to the third position. In P3, the representation increased again to 30.0 % and this increasing trend continued in the following periods (P4 = 40.3 %, P5 = 44.2 %). In P5, the proportion of sheep/goats was almost as high as the number of cattle remains (45.1 %).

The tendencies in the percentage of pig remains were contrary to the sheep/goat trend. The increase between P1 and P2 was recorded, and the percentage of pig finds rose from 22.6 to 31.9 %. After this peak, the relative amount of pig remains decreased to 20.4 % in P3 and to 10.4 % in P4 (the value for P5 was 10.8 %). In general, for both Medieval and Post-Medieval assemblages from the Czech Republic cattle seems to be the most numerous taxon. In the Later Middle Ages, in cases of urban assemblages, pig remains usually came second (KOČÁROVÁ ET AL. 2008), while in the modern period sheep/goat was preferred to pig (KYSELÝ 2002b). In our case, small ruminants gained more importance even before the beginning of the Early Modern era which is not unusual in the environment of the Prague agglomeration (e.g. HAVRDA ET AL. 2017).

The proportion of horse bones appears to follow a downward trend with a decrease from 3.5% (of the total NISP) in P1 to 0.6 % in P5 (P2 = 2.0 %, P3 = 1.2 %, P4 = 1.1 %). Low number of horse finds is typical for urban areas (PŮLPTYL 1988) and the decrease of their amount can relate to the shift from the pre-locational settlement to the city. The presence of the domestic carnivores (dog and cat) was recorded in all periods except for P4. Their representation ranged from 0.9 % in P3 to 1.8 % in P5. No obvious trend was observed.

As for hunted mammals, their abundance is relatively low in the periods P1 to P4 (0.8 to 1.9 %), with the lowest value in P2 and the highest in P4. However, the unusual rise of the percentage share to 6.6 % was recorded during the youngest phase P5. As the number of wild mammals from other Post-Medieval sites hardly reach 2 % (cf. KYSELÝ 2002b), the relatively high percentage in P5 is quite unusual.

The amount of the bird remains increased during the whole timeline. The highest increase in bird significance was noticed between the Medieval phases P1 and P2 (from 2.6 to 5.5 %) and between the Early Modern phases P4 and P5 (from 8.7 to 18.5 %). The percentage of the bird remains in the period P3 was 6.3 %. Both the relative number of domestic fowl (P1 = 1.5 %, P5 = 11.9 %) and geese with ducks (P1 = 1.1 %, P5 = 3.6 %) was growing during the studied periods, whereas the occurrence of other birds was significant only during the phase P5 (4.0 %). The domestic fowl was the most important bird especially in the Middle Ages, whereas during the Early Modern era its number was caught up with the goose remains (cf. KYSELÝ 2002b), which obviously is not our case.

As regards the occurrence of bones with traces of butchering, we find the increasing trend in the studied period. The increase was recorded especially between the periods P1 and P2,



Obr. 9. Prague 1-New Town, southern part of the Mitrovic Palace (former house No. 137, plot No. 841 by Národní Avenue). Set of marine bivalve shells (**A** – oyster edible – *Ostrea edulis*, **B** – oyster virgin – *Crassostrea virginica*, **C** – blue/Mediterranean mussel – *Mytilus edulis/galloprovincialis* and land snail, **D** – garden snail – *Helix pomatia*), found within the context G06-023 (17./18.–19. century). Foto by F. Malý, 2014.

where the percentage of the finds with butchery marks rose from the average value of 17.5 % to 31.3 % (from the total number of finds in all hand-collected assemblages). During the following periods, further increase was recorded: 34.7 % in P3 and 39.3 % in P4. On the other hand, in P5 the percentage decreased again to 34.3 %, partially due to the increased presence of the small animal remains in the assemblage EN. The trend towards an increasing proportion of butchery and other cooking-oriented works seems to be related to the increasing butchering of animal carcasses during the study interval.

Opposite tendency – a decrease over the studied timeline – can be observed in the case of burnt bones. The decline was more rapid during the medieval period – as in P1 the average percentage of the bones with burning marks made 4.0 % of the hand collected finds, the values for P2 was 2.1 % and for P3 0.4 %. Moreover, the trend continued in the Early Modernity, with the percentage of 0.3 % in P4 and 0.2 % in P5.

For the percentage of bones with gnawing, the decreasing trend was discovered as well. As in the previous cases, considerable change was discovered between two oldest periods: in P1 11.2 % and in P2 6.7 % of the finds. Other values supported a hypothesis about the continued decrease over the following phases: 4.7 % in P3, 4.2 % in P4 and 2.3 % in P5. Together with the declining percentage of the burnt bones, this trend suggests that the kitchen waste was being moved to more enclosed buildings during the studied timeline – it was less accessible to dogs and there was a lesser need to dispose it by fire.

Main trends in the assemblage of floated material are difficult to track because of variety of finds. The component of presumed intrusive finds (insect, rodents, frogs) occurs in all periods, although in different diversity. The crayfish assemblage was documented in the Medieval phase P2 and in both Early Modern phases, with a significant occurrence in P4, where the crayfish feasting was apparently recorded. An important part of the floated assemblage was made by fish remains in all periods. Cyprinid fish were the most represented. The remains of common carp, an evidence of pond fish farming, were recorded in P2 and in both Early Modern phases, where the importance of carp increased. Other cyprinids were an important component in every period, especially in the oldest phase P1. The northern pike – and probably also salmonids and European perch – were stable elements of the fish diet during the whole studied timeline. Possibly imported fish were found in the periods P2 (*Pleuronectidae* – flatfish), P4 (*Pleuronectidae* and *Clupeidae*, flatfish and herring) and P5 (both previous ones and *Gadidae* – cod). Tendencies toward the increasing in the amount of the egg-shells were discovered in all of the phases. The capture of small birds, was recorded in all periods, with a considerable occurrence in the phases P2 and P5.

Occurrence of the Medieval and Post-Medieval imports

The pond fish farming of common carp in Bohemia can be track back to the 10th and 11th centuries, but it began to appear more frequently in secular contexts only in the mid-14th century (ANDRESKA 1987). Our Medieval finds (P2 of floated material, P3 of GR14) reflected its rare occurrence in the proto-urban agglomeration and in the medieval city.

As far as the presence of non-native species in modern times is concerned, the situation is quite clear in the case of the domestic turkey. It was found only in the period P5 – with the occasional remains in both GRs and with more numerous finds in the assemblage EN. Written records date the arrival of Turkey to Bohemia to the 16th century, earliest archaeozoological finds were not discovered until the 17th century (KYSÉLÝ 2016).

One find of brown rat was also recorded in the phase P5 (floatated material; Fig. 10), but as these rodents inhabit underground burrows, it could be intrusive and therefore younger. Nevertheless, their regular occurrence in Bohemia was reported from the 18th century onwards (ANDĚRA/HORÁČEK 1982).

In the case of *Pleuronectidae*, *Clupeidae* and *Gadidae* (flatfish, herring and codfish), only vertebrae were found – the absence of cranial elements supports our hypothesis that the remains were from decapitated and conserved, imported fish. As it is stated in historical sources (i.e. WINTER 1913), fish of these families belonged to favourite imports of our ancestors. In the case of the cod remains, recorded in the early modern phase P5 (both floatated and EN assemblages), we can be sure, that they belonged to imported goods. On the other hand, the origin of *Clupeidae* (herring) in the periods P4 and P5, and the origin of *Pleuronectidae* (flatfish) in the phases P2, P4 and P5 are not so clear. Until the 19th century (HANEL/LUSK 2005), two species of these families – Pomeranian flatfish (*Alosa alosa*) and flounder (*Platichthys flesus*) – rarely migrated from the North Sea through the Elbe and Vltava rivers to Prague, where they could have been caught.



Fig. 10. Prague 1-New Tow, Národní Avenue/Mikulandská Street. Post-medieval floatated material from the Národní Avenue in Prague – finds of crayfish carapaces and fish, singing bird and burnt bones (photo by Z. Sůvová, 2017).

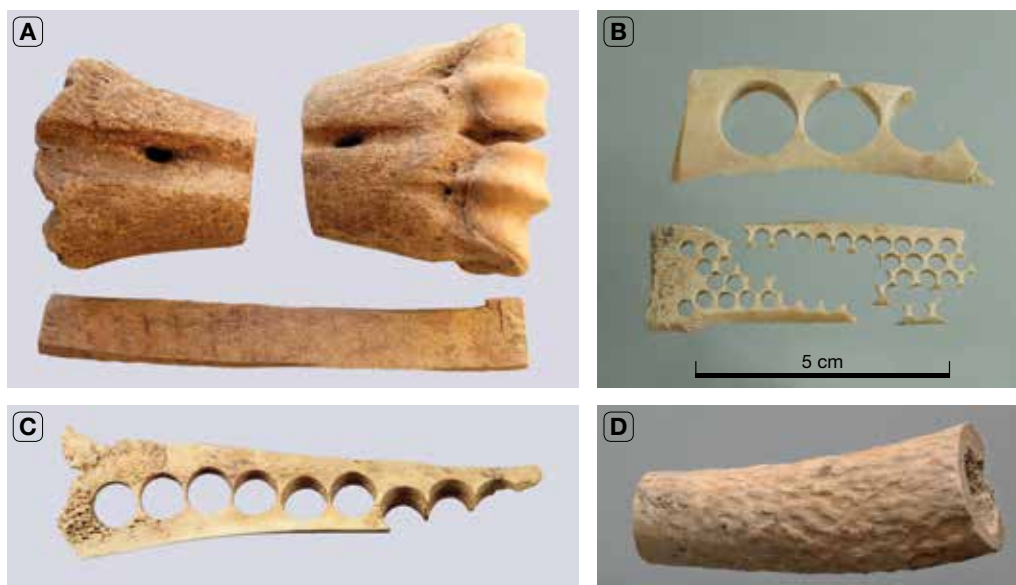


Fig. 11. Prague 1-New Town, Národní Avenue/Mikulandská Street. Production waste from the bone and antler industry. **A–C** – contain fragments of cattle metapodia: the proximal and distal ends of the bones were cut transversely, the straight and massive diaphysis was split into plates from which bone beads, buttons and other artifacts were made; **D** – part of a processed deer antler (photo by Z. Sůvová and M. Kalíšek, 2017).

BOTANY

Methodology

Altogether 315 samples have been taken for archaeobotanical analysis. Samples of the standard size 10 litres were selected for wet sieving or flotation; the samples from the infill of the vessels were smaller. A total of 2676.9 liters of the sediment were sieved through flotation.

Flotation of samples from dry archaeological contexts is important from a methodological perspective. For these samples a modified version of the 'Ankara' type flotation tank (PEARSALL 1989) was used with the sieves of 0.25 mm in diameter, commonly used mainly on dry prehistoric sites outside towns. Damp samples were separated by the same set of sieves.

The plant remains (mainly seeds and fruits) were selected and classified under a stereoscopic microscope. The macro-remains were selected from the total amount of the samples with the exception of the extremely rich samples, which were divided in a rough fraction above 2 mm (HF) and the fine fraction 0.25–2 mm (JF). HF was sorted in the complete volume. In JF, at least 50 pieces of macro-residue were collected while the rest were not analyzed.

Plant macro-remains were identified using the comparative plant seed collection and the basic literature for plant macro-remains identification (ANDERBERG 1994; BERGGREN 1969; BERGGREN 1981; CAPPERS/BEKKER/JANS 2006). The NISP method was used to quantify plant macro-remains.

From each sample 50 fragments of wood and 50 pieces of charcoal were selected for further determination. Charcoal and wood fragments were counted and analysed by an episcopic microscope (50×, 100× a 200× magnification). The fragments were weighted on standard analytic scales. Wood and charcoal was identified according to the literature of the subject (SCHWEINGRUBER 1978).

RESULTS AND DISCUSSION

Archaeobotanical macroremains analysis

The results of archaeobotanical macro-remains analyses in the environment of the Medieval to Early Modern Prague agglomeration are strongly influenced by the type of archaeological contexts sampled. Situations with a predominance of macro-remains of local vegetation can be studied relatively rarely; they are found especially in the fillings of water reservoirs and water-courses (KAŠTOVSKÝ ET AL. 1999; POKORNÁ ET AL. 2014; ČULÍKOVÁ 2010). Only rarely have plant macro-remains studies discussed wetland contexts of the foreland of the agglomeration (KOZÁKOVÁ ET AL. 2015). Somewhere in the middle of this gradient of synanthropy are anthropogenic deposits of waste layers in roads, public areas and on the surface of urban plots (ČULÍKOVÁ 2001b; KOČÁROVÁ ET AL. 2008). Terminated layers of extensive city fortification ditches (BENEŠ ET AL. 2002) or objects of the “city dump” situated in the case of the Old Town on the Alšovo embankment near the Vltava (BENEŠ ET AL. 2001) have a distinctly synanthropic character. On the other hand, we can study the purely anthropogenic spectrum of plant macro-remains, often almost without the presence of local vegetation remains, in the fillings of waste and faecal objects (in the broad sense; ČULÍKOVÁ 1987; ČULÍKOVÁ 1995; ČULÍKOVÁ 2007; ČULÍKOVÁ 2008; KOČÁR ET AL. 2007a; KOČÁR ET AL. 2007b) or in the fillings of individual ceramic vessels (KOČÁROVÁ/STAREC 2000). Thus, the genesis and taphonomy of individual plant macrofossil assemblages largely determines the results of these analyses (e.g. in waste pits we find assemblages with a predominance of cultivated and other useful plants).

A limiting factor in understanding the economic and ecological changes in the city based on plant macro-remains is also the uneven distribution of samples over time or across different types of sampled situations. Research in the area of the Prague agglomeration has long been focused on wet, pre-location Early Medieval contexts in the area of Prague Castle, Hradčany and Malá Strana (ČULÍKOVÁ 1998a; ČULÍKOVÁ 1998b; ČULÍKOVÁ 2001a; ČULÍKOVÁ 2001b; ČULÍKOVÁ 2005; KOČÁR/KOČÁROVÁ 2013) or the traditionally analysed in the Czech archaeobotanical environment, the Late Medieval and Early Modern waste pits with a huge species diversity of plant remains, but a very unclear taphonomy (on the obsession of Czech archaeobotanists with waste pits see KOČÁR ET AL. 2014). In contrast, less attention has been paid to common dry layers sedimenting on public areas and plots, which host species and quantitatively less numerous assemblages of plant remains, however, from the possibility of interpretations point of view, no less important (spatial information) and often containing different groups of plant macro-remains (e.g. charred macro-remains of field crops and weeds associated with them).

In order to filter out this component of sample variability and monitor truly valid questions of environmental and economic changes in the urban environment, e.g. chronological changes in the city's vegetation, changes in the economic character or the sanitary situation in the city, it is necessary to have available systematically sampled urban contexts with large number of excavated samples of diverse nature (dry and wet situations, waste pits, after-fire sites, ...). Only a small number of such ideal sites or contexts have been published so far from the Prague agglomeration (e.g. systematically sampled sediments of the plot in Liliová Street in the Old Town of Prague, no. 248, KOČÁROVÁ ET AL. 2008). The systematically sampled plot from Národní Avenue is one of these few examples.

From the archaeobotanical samples 15571 pieces of the plant macro-remains, mostly seeds and fruits and their fragments, were recovered by fine wet sieving/flotation (sieve with the smallest mesh diameter 0,25 mm) and 12060 large macro-remains (shells, drupes, large seeds and fruits) by the rough wet sieves (sieve with the smallest mesh diameter 2 mm; Table 4 and 5). In total, circa 165 plant taxa were identified.

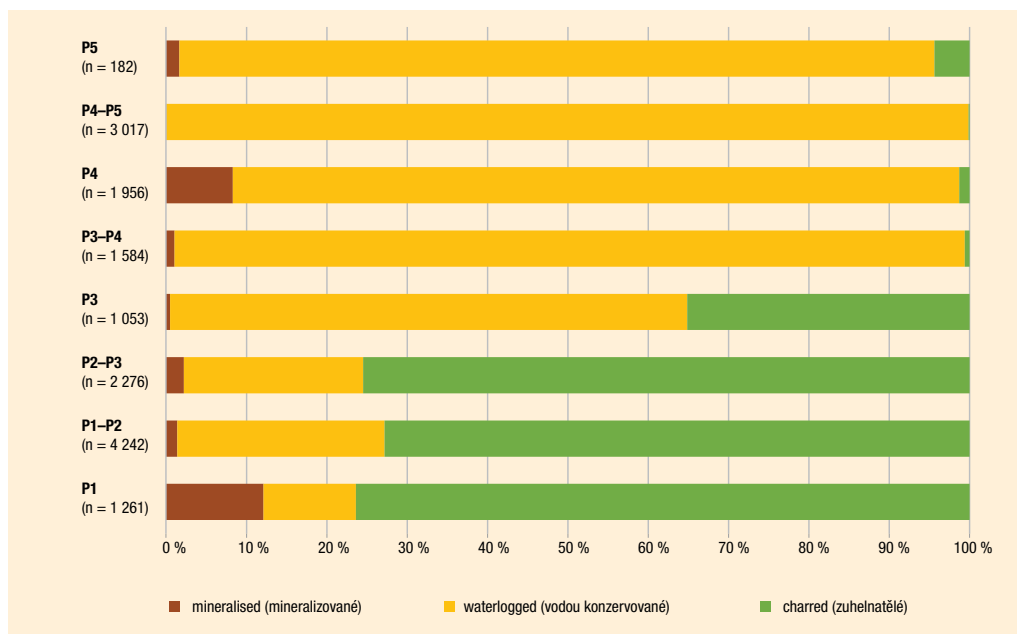


Fig. 12. Prague 1-New Town, Národní Avenue/Mikulandská Street, results of the archaeobotanical macroremains analysis – the rate of individual groups of macroremains by the form of preservation in chronological phases of the site (n = 15 571).
P1 – 11th–half of 13th century;
P2 – half of 13th–half of 14th century;
P3 – half of 14th–15th century;
P4 – 16th–half of 17th century;
P5 – half of 17th–18th century
 (edited by P. Kočár, 2017).

Plant macrofossils (Fig. 12) obtained by fine wet sieving/floatation were preserved in charred (6 187 pieces), mineralized (450 pieces) or water-preserved (8 934 pieces) condition. Primary importance for further economic interpretation has the charred and waterlogged plant macroremains obtained from ideal fossilising conditions of permanently waterlogged contexts.

Changes of the fossilising conditions can be observed on the site. In the earlier period mainly the charred plant remains were important, their importance declined with time and they were gradually replaced by the waterlogged macroremains. This situation reflects many factors: 1) changes in the built-up area – from the burnable constructions of the Early Medieval Ages P1 and the proto-town phase P2 to the fire-resistant house constructions (P3 and P4 horizon); 2) the decline of the agricultural activities in the later periods; 3) changes in the cultivation of the field crops on the plots; 4) changes in the sanitary situation of the town. The waste pits from the P3, P4 and P5 horizons enable preservation of large assemblages of waterlogged macroremains, which are very rare in the earlier periods.

The charred plant macroremains assemblage consists mainly of cereal crops and cereal weeds from the processing of the field crops at the excavation site. Concentration of the charred plant macroremains is highest in the earliest chronological phases of the site and descends towards the Early Modern period. This probably reflects the intensity of the agricultural activities or activity connected with the field crop processing on the excavated site. Archaeobotanical data indicate

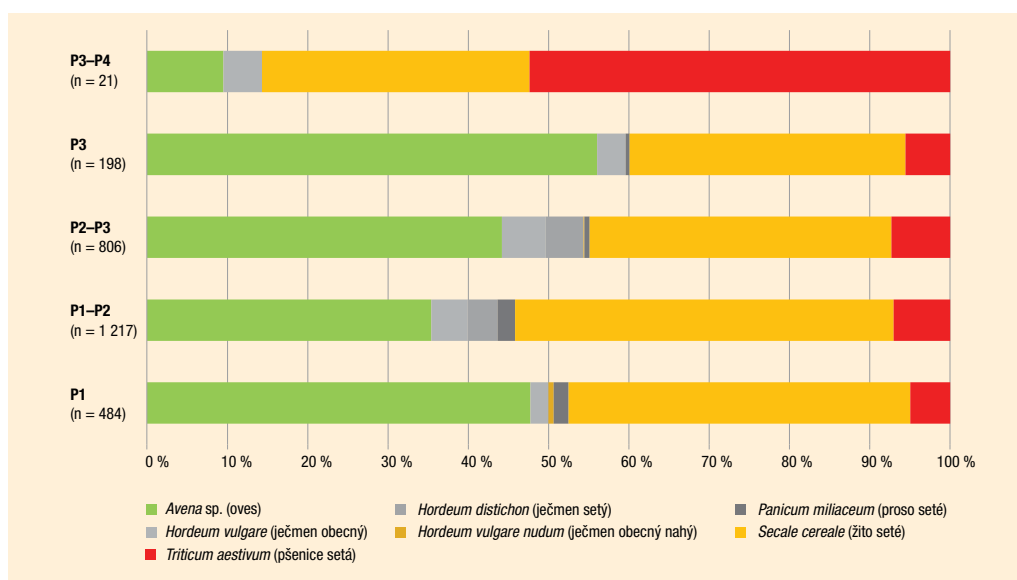


Fig. 13. Prague 1-New Town, Národní Avenue/Mikulandská Street, results of archaeobotanical macroremains analysis, composition of macroremains of cereals (n = 2 726).
P1 – 11th–half of 13th century;
P2 – half of 13th–half of 14th century;
P3 – half of 14th–15th century;
P4 – 16th–half of 17th century;
P5 – half of 17th–18th century
 (edited by P. Kočár, 2017).

Table 4. Results of the archaeobotanical macroremains analysis of finely floated samples (sieve 0.25 mm).
P1 – 1st–half of 13th century; **P2** – half of 13th–half of 14th century; **P3** – half of 14th–15th century;
P4 – 16th–half of 17th century; **P5** – half of 17th–18th century.; **P6** – 19th–20th century (edited by P. Kočár).

	P1	P2	P3	P3-4	P4	P5	P6	úř	?	Σ
<i>Abies alba</i> – jedle bělokorá	1					17				18
<i>Adonis arvensis</i> – hlaváček letní	7	2			1					10
<i>Agrostemma githago</i> – koukol polní	123	29	9	1	5	1			3	171
<i>Alua genevicensis</i> – zběhovce lesní	2	1	1			1				5
<i>Anagallis arvensis/bemina</i> – drchnička rolní/modrá	1									1
<i>Anethum graveolens</i> – kopřivka						1				1
<i>Anthemis arvensis</i> – rmen rolní						1				1
<i>Apium graveolens</i> – mrkvička						1				1
<i>Atriplex patula</i> – lebeda rozkladitá									1	1
<i>Atriplex sp.</i> – lebeda	2	3	1	1						3
<i>Avena sp.</i> – oves	695	352	111		4	1				1163
<i>Avena sativa</i> – oves setý	6	4			1					11
<i>Bromus arvensis</i> – světlý rolní	14	3	3							20
<i>Bromus secalinus</i> – světlý stoklasa	70	7	6						1	84
<i>Bromus sterilis</i> – světlý hluchý	1									1
<i>Bromus sp.</i> – světlý	2	4	3							9
<i>Buglossoides arvensis</i> – kamejka rolní	38	43	1	1	1	1			1	86
<i>Bupleurum rotundifolium</i> – prorostlík okrouhlolistý	57	5	1							63
<i>Calystegia sepium</i> – opletník rolní						1				1
<i>Camelina microcarpa</i> – lníčka drobnoplodá	1	1								2
<i>Cannabis sativa</i> – konopí seté	5		1			56				62
<i>Caulis platycarpus</i> – dělovce velkoplodý	1				1	3			1	6
<i>Carex echinata</i> – ostřice jezta	3	2				1				6
<i>Carex flava/flacca</i> – ostřice rusa/chabá	3	1			1					5
<i>Carex hirta</i> – ostřice srstnatá	14	12	1	4	4	1	2			38
<i>Carex leporina</i> – ostřice zaječí	3	2								5
<i>Carex pallens</i> – ostřice klasnatá	3			1	3					7
<i>Carex spicata</i> – ostřice klasnatá	6	2			1					9
<i>Carex vesicaria</i> – ostřice měchýřkatá					2					2
<i>Carex sp.</i> – ostřice	1									1
<i>Carum carvi</i> – kmín kořený				1	2				3	6
<i>Castanea sativa</i> – kaštanovník setý						7				7
<i>Centaurea cyanus</i> – chrpa modrá	34	11	2							47
<i>Cerasus avium</i> – třeseň ptačí	2					2			3	7
<i>Cerasus avium</i> subsp. <i>juliana</i> – třeseň ptačí srdcovka		1				15			43	59
<i>Cerasus avium</i> subsp. <i>durancia</i> – třeseň ptačí chrupka		3		2		13			16	34
<i>Cerasus vulgaris</i> – višně obecná						4			16	20
<i>Cerasus sp.</i> – třeseň/višeň	12	19	9	1	51	42			52	186
<i>Cerealia</i> – obilniny	316	84	45		1	2			1	449
<i>Cirsium arvense</i> – pcháček oset	1		1							2
<i>Convolvulus arvensis</i> – svlačec rolní	10	3	1		1					15
<i>Cornus mas</i> – dřín obecný	4									4
<i>Coriandrum sativum</i> – koriandr setý						21			1	22
<i>Corylus avellana</i> – liska obecná	34	20	1		1	5			1	62

	P1	P2	P3	P3-4	P4	P5	P6	úř	?	Σ
<i>Cucumis melo</i> – meloun cukrový						2			1	3
<i>Cucumis sativus</i> – okurka setá					13	3			3	19
<i>Daucus carota</i> – mrkev obecná	8				1					9
<i>Echinochloa crus-galli</i> – ježatka kuří noha	13									13
<i>Echium vulgare</i> – hadinec obecný	1	1								2
<i>Eleocharis palustris</i> – bahnička mokřadní	2	1	6		1	1				11
<i>Eleocharis sp.</i> – bahnička	1									1
<i>Elytigia repens</i> – pír plazivý		2								2
<i>Euphorbia helioscopia</i> – prýšec kolovrátec	1	8								9
<i>Euphorbia esula</i> – prýšec obecný						1				1
<i>Fagopyrum esculentum</i> – pohanka obecná						4				4
<i>Fallopia convolvulus</i> – opletka rolní	50	25	2		1		1		1	80
<i>Ficus carica</i> – fíkovník smokvů	8	7	12	85	456	107	38	3	24	740
<i>Foeniculum vulgare</i> – fenýkl obecný										1
<i>Foeniculum officinale</i> – fenýkl lékařský	136	4	333	97	3	55			193	821
<i>Fumaria officinalis</i> – zemědělní lékařská	1	1								2
<i>Galeopsis ladanum</i> – konopice široolistá										1
<i>Galeopsis tetrahit/bifida/pubescens</i> – konopice polní/dvoulanná/přítla	5	2				2				9
<i>Galium aparine</i> – svízel přítla	21	4	3		1					29
<i>Galium molugo</i> – svízel povázka	1		1							2
<i>Galium spurium</i> – svízel pochybný	213	62	24		3			1		303
<i>Geranium dissectum</i> – kakost dlanitosečný				2						2
<i>Glacium comiculatum</i> – rohatec růžkatý	13	2	5							20
<i>Hordeum vulgare</i> – ječmen obecný	66	44	7		1					118
<i>Hordeum distichon</i> – ječmen dvouřadý	45	38								83
<i>Hordeum vulgare nudum</i> – ječmen obecný nahý	3	1								4
<i>Humulus lupulus</i> – chmel otačivý	15	1		1						16
<i>Hyoscyamus niger</i> – blin černý		3								4
<i>Hypericum perforatum</i> – třezalka tečkovaná	9									9
<i>Chelidonium majus</i> – vlašovičník větší					5					5
<i>Chenopodium album</i> – merlík bílý	255	179	28	13	221	8	47			751
<i>Chenopodium cf. ficifolium</i> – merlík fíkolistý?		3								3
<i>Chenopodium glaucum/rubrum</i> – merlík sivý/červený	1	3		1	1					6
<i>Chenopodium hybridum</i> – merlík pochybný	23	57	2		40					122
<i>Chenopodium murale</i> – merlík zední	7	4			1					12
<i>Chenopodium polyspermum</i> – merlík mnohosemenný	31	23	3	2	1	1	1		1	62
<i>Chenopodium sp.</i> – merlík	42	2								44
<i>Juglans regia</i> – ořešák královský						8			1	9
<i>Juniperus communis</i> – jalovec obecný					3	26				29
<i>Lamium amplexicaule</i> – hluchavka objímavá		2								2
<i>Lapsana communis</i> – kapustka obecná	2				2					4
<i>Lens esculenta</i> – čočka jedlá	50	8	9							69
<i>Lepidium ruderale</i> – řeřicha rumní	2									2
<i>Leucanthemum vulgare</i> – kopretina zahradní	1		2							3
<i>Linum usitatissimum</i> – len setý	5	1	2		1					9
<i>Lolium temulentum</i> – illek mámiivý	6	1								7
<i>Lycopersicon esculentum</i> – illek rajče						9				9

>>>

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	P1	P2	P3	P3-4	P4	P5	P6	ú.ž.	?	Σ
<i>Malus domestica</i> – jablono domácí	2			11	55	115			47	230
<i>Malus/Pyrus</i> – jablono/hrušeň						378			9	387
<i>Malva neglecta</i> – sléz přehlížený		2								2
<i>Malva cf. pusilla</i> – sléz nízounků?	6	1								7
<i>Malva sylvestris</i> – sléz lesní	26	1	2							29
<i>Malva sp. – sléz</i>	113	302	15			2			1	433
<i>Medicago lupulina</i> – tolice dětelová	11						1		1	13
<i>Medicago sp. – tolice</i>	4									4
<i>Medicago falcata</i> – tolice srovitá	2									2
<i>Melampyrum arvense</i> – černýš rolní	1		1							2
<i>Melampyrum pratense</i> – černýš luční	3	1	1							5
<i>Mespilus germanica</i> – mišpule obecná			1			71			2	74
<i>Morus nigra</i> – morušovník černý		1		52	2	184			4	243
<i>Neslia paniculata</i> – řepinka latnatá	28	7	21	2	5	2	5		2	72
<i>Panicum miliaceum</i> – proso seté	38	5	1	1	16	25				86
<i>Papaver somniferum</i> – mák setý	1			3		13			4	21
<i>Papaver rhoeas/dubium</i> – mák vlčí/pochybný	4						1			5
<i>Persica vulgaris</i> – broskvoň obecná	1	1			2					4
<i>Persicaria lapathifolia</i> – rdesno blešník	17	4				4				25
<i>Persicaria maculosa</i> – rdesno červivec	1									1
<i>Physalis alkekengi</i> – mochnýš židovská		24		60	85	331			46	546
<i>Picea abies</i> – smrk ztepilý							1			1
<i>Piper nigrum</i> – pepřovník černý						4			3	7
<i>Pisum sativum</i> – hrách setý	21	7	1	2						31
<i>Pisum/Vicia</i> – hrách/vikev	21	17		4		1			1	44
<i>Plantago lanceolata</i> – jitrocel kopinatý	3	1								4
<i>Poaceae</i> – lipnicovitě (trávy)	43	9	1	1						54
<i>Polygonum arvense</i> – chrupavník rolní							1			1
<i>Polygonum arenastrum</i> – truskavec obecný	9	9								18
<i>Portulaca oleracea</i> – štrucha zeňá	9	7								16
<i>Prunella vulgaris</i> – černohrávek obecný	1	1								2
<i>Prunus domestica prunellaefolia</i> – pravá švestka				1		4				5
<i>Prunus insititia bisacuminata</i> – sliva									4	4
<i>Prunus insititia juliana</i> – sliva maloplodá	6					1			1	8
<i>Prunus insititia</i> – sliva	15				1	1			1	18
<i>Prunus spinosa spinosa</i> – trnka obecná	1	1		1		4			12	19
<i>Prunus spinosa virgata</i> – trnka obecná									1	1
<i>Prunus spinosa</i> – trnka obecná	3	1				3			1	8
<i>Prunus sp. – silvoň</i>	9		2	4	7	29			12	63
<i>Prunus communis</i> – hrůška obecná	1				6	158			13	178
<i>Quercus sp. – dub</i>	1	3								4
<i>Ranunculus acris</i> – pryskyřník prudký	2	1	1			12			1	17
<i>Ranunculus repens</i> – pryskyřník plazivý	2	1				3				6
<i>Raphanus raphanistrum</i> – ředkev ohnice	1					34			6	41
<i>Rhinanthus cf. alectorolophus</i> – kokrhel luštnec	2									2
<i>Reseda luteola</i> – týř barvířský	1		1						0	2
<i>Ribes cf. rubrum</i> – rybíz červený						15				15
<i>Rosa sp. – růže</i>						13			1	14

	P1	P2	P3	P3-4	P4	P5	P6	ú.ž.	?	Σ
<i>Rubus caesius</i> – ostružiník ježink	62		2	3	13	4			7	91
<i>Rubus fruticosus</i> agg. – ostružiník křovitní agg.	48	4	5	7	17	7	2		3	93
<i>Rubus idaeus</i> – ostružiník maliník	314	98	69	961	425	211	7	2	104	2191
<i>Rumex acetosella</i> – štovík menší	10	1				1				12
<i>Rumex crispus</i> – štovík kadeřavý	1									1
<i>Rumex obtusifolius</i> – štovík tupolistý	1									1
<i>Sambucus ebulus</i> – bez chebčí	11	40	30		40	18	2	33		174
<i>Sambucus nigra</i> – bez černý	489	85	78	19	281	50	1	4		1007
<i>Scleranthus annuus</i> – chmerek roční	1	1				1				3
<i>Schoenoplectus lacustris</i> – skřípínek jezerní	2									2
<i>Schoenoplectus tabernaemontani</i> – skřípínek Tabernaemontanův	1									1
<i>Secale cereale</i> – žito seté	780	303	68		9			3		1163
<i>Setaria pumila</i> – bér sivý	14	12	5		1	3				35
<i>Setaria viridis/verticillata</i> – bér zelený/přeslenitý	4									4
<i>Setaria viridis</i> – bér zelený	3									3
<i>Siene vulgaris</i> – silenka nadmutá	3	1								4
<i>Sinapis arvensis</i> – hořčice rolní	430	19	3							452
cf. <i>Sinapis/Brassica</i> – hořčice/brukev?	8					1				8
<i>Solanum nigrum</i> – lilék černý	3					9				4
<i>Sorbus aria</i> – jeřáb muk										9
cf. <i>Sparaganium</i> sp. – zevar?						1				1
<i>Stachys annua</i> – čistec roční	24	10	2		3					36
<i>Stachys arvensis</i> – čistec rolní	2	2					2		1	7
<i>Stellaria graminea</i> – pláčinek travolistý	3			1						4
<i>Thlaspi arvense</i> – penizek rolní	7	2			1	3	4			17
<i>Trifolium</i> sp. – jetel	36	3								39
<i>Tritolium arvense</i> – jetel rolní	4	6								10
<i>Tritolium pratense</i> – jetel luční	14	1								15
<i>Tritolium repens</i> – jetel plazivý	8		2							10
<i>Triticum aestivum</i> – pšenice obecná	110	59	11		14				1	195
<i>Triticum cf. dicoccon</i> – pšenice dvouzrnka?					1					1
<i>Typha latifolia</i> – orobínek široolistý		1								1
<i>Urtica dioica</i> – kopřiva dvoudomá	3									3
<i>Urtica urens</i> – kopřiva žahavka					1					1
<i>Vaccaria hispanica</i> – kravinec španělský					1					1
<i>Vaccinium myrtillus</i> – brusnice borůvka						1				1
<i>Valerianella dentata</i> – kozlíček zubatý	1				2					3
<i>Viburnum opulus</i> – kalina obecná									1	1
<i>Vicia tetrasperma/hirsuta</i> – vikev čtyřsemenná/chlupatá	67	33	2							102
<i>Vicia tetrasperma</i> – vikev čtyřsemenná		2								2
<i>Vicia</i> sp. – vikev	14	13	1							28
<i>Viola arvensis</i> – violka rolní	4	8	79	227	149	910	1	1		1879
<i>Vitis vinifera</i> – réva vinná	122	43	11	16	2	1				195
<i>Indeterminata</i> – neurčeno	5523	2258	1052	1566	1974	3074	114	11	1199	16771
Σ										

Table 5. Results of archaeobotanical macroremains analysis of roughly floated samples (sieve 2 mm).
P1 – 11th–half of 13th century;
P2 – half of 13th–half of 14th century;
P3 – half of 14th–15th century;
P4 – 16th–half of 17th century;
P5 – half of 17th–18th century;
P6 – 19th–20th century
(edited by P. Kočár).

	P1	P2	P3	P4	P5	P6	?
<i>Anethum graveolens</i> – kopr vonný					1		
<i>Apium graveolens</i> – miřík celer							1
<i>Amygdalus communis</i> – mandloň obecná					1		
<i>Armeniaca vulgaris</i> – meruňka obecná					4		
<i>Avena sp.</i> – oves	686	361	111	4	1		
<i>Avena sativa</i> – oves setý	6	4		1			
<i>Cannabis sativa</i> – konopí seté	5		1		89		
<i>Carum carvi</i> – kmín kořený				3			3
<i>Castanea sativa</i> – kaštanovník setý					7		
<i>Cerasus avium</i> – třešeň ptačí	2				2		3
<i>Cerasus avium</i> subsp. <i>juliana</i> – třešeň ptačí srdcovka		1		3	1605		43
<i>Cerasus avium</i> subsp. <i>durancia</i> – třešeň ptačí chrupka		3		6	796		16
<i>Cerasus vulgaris</i> – višně obecná				3	928		16
<i>Cerasus sp.</i> – třešeň/višně	12	19	9	83	125		52
<i>Cerealía</i> – obilniny	316	84	45	1	1	1	1
<i>Cornus mas</i> – dřín obecný	4			3	18		
<i>Coriandrum sativum</i> – koriandr setý					27		1
<i>Corylus avellana</i> – líska obecná	34	21	1	1	42		2
<i>Corylus avellana domestica</i> – líska obecná velkoplodá					13		
<i>Cucumis melo</i> – meloun cukrový					4		1
<i>Cucumis sativus</i> – okurka setá				13	3		3
<i>Fagopyrum esculentum</i> – pohanka obecná					4		
<i>Ficus carica</i> – fíkovník smokvoň	8	7	12	541	107	41	24
<i>Foeniculum vulgare</i> – fenykl obecný					1		
<i>Fragaria vesca</i> – jahodník obecný	136	4	333	100	55		193
<i>Hordeum vulgare</i> – ječmen obecný	66	44	7		1		
<i>Hordeum distichon</i> – ječmen dvouřadý	45	38					
<i>Hordeum vulgare nudum</i> – ječmen obecný nahý	3	1					
<i>Humulus lupulus</i> – chmel otáčivý	15	1					
<i>Juglans regia</i> – ořešák královský					22		1
<i>Juniperus communis</i> – jalovec obecný				3	30	5	
<i>Lens esculenta</i> – čočka jedlá	50	8	9	2			
<i>Linum usitatissimum</i> – len setý	5	1	2		1		
<i>Lycopersicon esculentum</i> – lilek rajče					9		
<i>Malus domestica</i> – jabloň domácí	2			89	171		47
<i>Malus/Pyrus</i> – jabloň/hrušeň				1	406		9
<i>Mespilus germanica</i> – mišpule obecná			1		74		2
<i>Morus nigra</i> – morušovník černý		1		54	191		4
<i>Panicum miliaceum</i> – proso seté	38	5	1	17	25		
<i>Papaver somniferum</i> – mák setý	1			3	13		4
<i>Persica vulgaris</i> – broskvoň obecná	1	1		2			
<i>Physalis alkekengi</i> – mochně židovská		24		145	331		46
<i>Piper nigrum</i> – pepřovník černý					4		3
<i>Pisum sativum</i> – hrách setý	20	8	1	2			
<i>Pisum/Vicia</i> – hrách/vikev	21	17		4	1		1
<i>Prunus cerasifera</i> – mirobalán					1		
<i>Prunus domestica pruneauliana</i> – pravá švestka				1	218		
<i>Prunus insititia bisacuminata</i> – slíva					8		4
<i>Prunus insititia v. cerea</i> – slíva mirabelka					8		
<i>Prunus insititia v. italica</i> – slíva					4		
<i>Prunus insititia juliana</i> – slíva maloplodá	6				23		1
<i>Prunus insititia</i> – slíva	15			1	5		1
<i>Prunus insititia s. italica v. ovoidea</i> – slíva bluma					4		
<i>Prunus spinosa spinosa</i> – trnka obecná	1	2		3	94		12
<i>Prunus spinosa virgata</i> – trnka obecná					2		1
<i>Prunus spinosa</i> – trnka obecná	3	1			3		1
<i>Prunus sp.</i> – slivoň	9		2	12	30		12
<i>Pyrus communis</i> – hruška obecná	1			8	204		13
<i>Quercus sp.</i> – dub	1	1					
<i>Ribes cf. rubrum</i> – rybíz červený					15		
<i>Rosa sp.</i> – růže					14		1
<i>Rubus caesius</i> – ostružiník ježíník	62		2	16	4		7
<i>Rubus fruticosus</i> agg. – ostružiník křovištní agg.	48	4	5	24	9	2	3
<i>Rubus idaeus</i> – ostružiník maliník	314	98	69	1387	210	11	104
<i>Sambucus ebulus</i> – bez chebdi	11	40	30	40	9	11	33
<i>Sambucus nigra</i> – bez černý	489	85	78	300	13	38	4
<i>Secale cereale</i> – žito seté	772	311	68	9			3
<i>Sorbus aria</i> – jeřáb muk					9		
<i>Triticum aestivum</i> – pšenice obecná	110	59	11	14			1
<i>Triticum cf. dicoccon</i> – pšenice dvouzrnka?				1			
<i>Vaccinium myrtillus</i> – brusnice borůvka					1		
<i>Viburnum opulus</i> – kalina obecná							1
<i>Vitis vinifera</i> – réva vinná	4	8	79	1540	7696	1	504

a decline of the significance of the local field crop processing on the site and its transfer away from the town plots (into mills or other similar facilities). The largest proportion of field crops and weeds in the oldest chronological horizons of the Prague agglomeration was found in many places in Prague, however, it was only rarely published, e.g. in Liliová Street (KOČÁROVÁ ET AL. 2008).

Interestingly, the proportions of identified cereals did not change over a long period of time (Fig. 13). In horizons P1, P2 and P3, the predominance of oats and rye (*Secale cereale*) over other species can be observed. Only in the P4 and P5 horizons the importance of common wheat (*Triticum aestivum*) increases. The proportions of the main cereals found in Late Medieval cities correlate very well with altitude. Towns located in the lowlands show a higher proportion of common wheat, while in higher locations we observe the dominance of rye (KOČÁR ET AL. 2014).

The assemblage of charred plant macro-remains also contained a rich variety of cereal weeds. Diversity of ecological requirements of the weeds (autumn and spring species, species of poor mineral soils and rich calcareous soils, etc) undoubtedly reflects diversity of the sources of the field crops at Prague markets.

Within the waterlogged archaeobotanical material plant remains with diverse ecological requirements were observed. Plant macro-remains from two sources prevailed – local ruderal vegetation and utility (domestic) plants. In smaller scale occurred the meadow species and weeds (derived from processing litter and fodder for the animals).

Changes of the assemblage of waterlogged plant macroremains over time reflect mostly the changes of economic and sanitary situation of the excavated area. Seeds of local synanthropic vegetation were mainly observed in the P1 horizon. In horizons P2 and P3, allochthonous archaeobotanical material (cereal weed seeds) predominates over local (autochthonous) vegetation. In P4 and P5 we observe a significant increase in seeds of utility species and a decrease in plant macro-remains of local synanthropic vegetation and weed seeds.

The species of the local vegetation indicate typical urban areas influenced by human activity – aerated sites, areas abandoned for a longer period, nitrophilous boarders and damp ruderal sites or trampled places. The proportion of the ruderal site types decrease over time as the amount of paved areas in the city increases and sanitation standards improve.

The remains of mineralised plants illustrate the transformation of urban plots surprisingly well. In the earlier Medieval phases (P1, P2, P3) discussed assemblages consists of mostly plant macro-remains of cereal weeds, whereas in the Early Modern periods (P4, P5) mainly of the domestic (utilitarian) plant species. The results also reflect the descending intensity of the field crop processing.

Collection of the domestic species is outstandingly rich and contains 64 representatives. The number of the species and cultivars of domestic plants doesn't change during the Middle Ages and is around 25 for each horizon. The rapid increase to over 50 taxa was observed only in Early Modern period (P4, P5), probably as the result of the change of the fossilising conditions of the excavated contexts (majority of the samples from the damp pits in the latest phase of the site) and the rising of the life standards of the town inhabitants. A number of rare domestic (utilitarian) taxa were observed typical mainly to the Early Modern period. For example common medlar (mispule), apricot, sweet chestnut, almond, myrobalan plum and species documenting long-distance trade with the Mediterranean (common fig) or the distant tropical areas (black pepper). An increase in the diversity of utility species (numerous imports and newly introduced species) is generally observed in all modern waste situations (e.g. BENEŠ ET AL. 2012; ČULÍKOVÁ 1995; ČULÍKOVÁ 2007; KOČÁR ET AL. 2007a; KOČÁR ET AL. 2007b; PREUSZ ET AL. 2015).

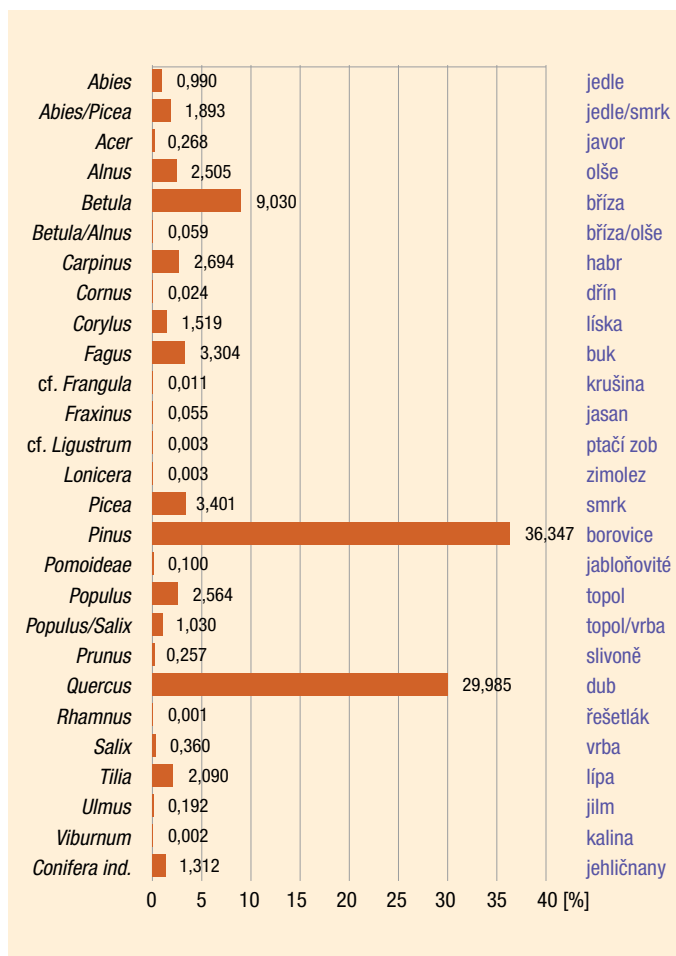
Wood and charcoal analysis

The analysis identified 27 taxa of woods, determined from 10202 fragments of charcoal and 573 fragments of waterlogged timber.

In the charcoal assemblage pine and oak prevailed, followed by fir, birch/alder, spruce, beech and hornbeam (Fig. 14). Other woody plants were represented only in a small amount.

Observed differences in the charcoal assemblage in time indicate changes in the sources of the firewood or charcoal as a result of the depletion of forested areas. The charcoal rate of the main forest dominants with quality firewood or construction timber (oak, beech, fir, pine) increases over time, which is probably caused by the rising rate of the imported (quality) timber. The anthracological assemblage illustrates the decline of the of young stages of forests and alder trees,

Fig. 14. Prague 1-New Town, Národní Avenue/Mikulandská Street, results of charcoal analysis. Weight composition of individual taxa (altogether 1248.8 g; edited by P. Kočár, 2017).



permanent dominance of wood from acidophilous oak forests, and a slight increase of the wood from the forests of higher altitudes (beech, fir-beech and spruce woodlands). These changes reflect descending importance of local lowland forests and the increasing proportion of wood from the forests of middle and higher altitudes.

Analysed fragments of water-preserved wood (xylotomy assemblage) contained mainly fragments of conifers (pine, fir, spruce, fir/spruce, unspecified conifers). Deciduous trees were marginally represented by (i.e.) oak. Comparison of the weight of the xylotomy assemblages of wood in the P4 and P5 horizons indicates a rise of the importance of fir, which can reflect the import (rafting) of construction timber from higher altitude regions of Bohemia.

Conclusions

- 1) Not surprisingly, the floated archaeozoological material enriched the species composition of the hand-collected assemblage with the finds of many small animal remains: invertebrates including crayfish, dozens of fish species, rodents and frogs, singing birds, juvenile domestic mammals, but also fish scales and egg-shells. Thus, floating environmental samples under appropriate conditions is desirable for a better understanding of the diet of earlier inhabitants and animal husbandry.
- 2) The assemblage of hand-collected animal bones from the contexts selected for environmental sampling (EN) differed significantly from the control assemblages (GR14 and GR23). The sampling which prefers the rich in finds contexts is useful for increasing the species diversity, but not for illustrating the general picture of the site.
- 3) Several trends were observed during the studied timeline (late 11th to 19th/20th centuries). Cattle was the most important component of the hand-collected assemblage, with the stable percent representation in every period. The remains of sheep/goat occupied the second position during the pre-locational settlement (P1), while during the proto-urban phases (P2) it was replaced by the pig finds. From the time of the town's foundation in the mid-14th century (P3), the proportion of sheep/goats increased again, while the number of pig finds decreased. The relative number of the horse remains decreased, while the percentage of the bird finds was increasing during the studied periods. Concerning taphonomic characteristics, the tendencies were as follows: increasing trend in the occurrence of bones with butchery marks and decreasing trends for both the finds with burning and gnawing. In general, the trends follow the situation known from other Medieval and Early Modern urban sites in the Czech Republic.
- 4) Medieval and Post-medieval imports were recorded in the archaeozoological assemblage. The common carp was first recorded in the period of the proto-urban agglomeration (P2). The domestic turkey, the brown rat and a codfish (*Gadidae*) were present in the youngest phase P5.

Flatfishes (*Pleuronectidae*) were present since the proto-urban agglomeration (P2) and herrings (*Clupeidae*) from the Early Modern period (P4) onwards.

5) Concerning archaeobotanical analyses, a gradual shift in subsistence and in the sanitary situation was noted on Národní Avenue. The most significant trend was a decline in the importance of ruderal species in the assemblages of waterlogged macro-remains and in the importance of cereal weeds in the assemblage of charred macro-remains. A gradual decrease in the percentage of the charred macro-remains of the field crops was observed as well.

6) Wood and charcoal analysis confirms the increasing importance and quality of the firewood and timber during the studied period. The increasing share of the higher-altitude timber reflects probably the increasing importance of the long-distance wood transport.

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RESUMÉ

V příspěvku jsou popsány a komentovány početné soubory archeozoologického a archeobotanického materiálu získaného během záchranného archeologického výzkumu na Národní třídě čp. 135/II, ppč. 841–843 v Praze. Hlavní část exkavace, vyvolané stavebním projektem „Palác Národní“ a realizované Národním památkovým ústavem v Praze, byla dokončena v roce 2013. Prozkoumána byla plocha ca 1 600 m² s průměrnou mocností vrstev 2,5 m. Byly nalezeny nepočetné stopy lidských aktivit z doby bronzové a římské, intenzivnější využívání lokality se týkalo až závěrečné fáze raného středověku. Od tohoto období můžeme sledovat v podstatě kontinuální osídlení až do současnosti. Studované nálezy byly datovány do širokého intervalu 11. až 20. století, zahrnujícího úsek od raně středověkého předlokačního osídlení přes středověké protoměsto a město až po novověkou industriální metropoli. Pro účely další analýzy byly nálezy rozděleny do následujících časových fází: 1) předlokační osídlení (P1) – 11. až polovina 13. století; 2) protoměstská aglomerace (P2) – polovina 13. až polovina 14. století; 3) středověké město (P3) – polovina 14. až 15. století; 4) raně novověké město (P4) – 16. až polovina 17. století; 5) středně / vyspělé novověké město (P5) – polovina 17. až 18. století; 6) industriální metropole (P6) – 19. až 20. století.

Co se týče archeozoologických nálezů, celkem byly analyzovány čtyři soubory – tři soubory ručně vybíraných zvířecích kostí (jeden z vybraných objektů bohatých na organický materiál a druhé dva z kontrolních, na sebe kolmých generálních řezů), čtvrtý soubor byl získán plavením environmentálních vzorků. Mezi oběma generálními řezy a souborem získaným z bohatých situací byly podle očekávání zjištěny významné rozdíly. V souborech byly nejpočetnější ostatky domestikovaných kopytníků. Bez ohledu na časovou fázi byl nejvýznamnějším druhem skot, následovaný pozůstatky prasete domácího ve fázi protoměstské aglomerace (P2), zatímco nálezy ovčí/koz zaujímaly druhé místo ve všech zbývajících obdobích. Podíl koňských pozůstatků v průběhu sledovaného časového úseku klesal, zatímco počet ptáčích nálezů se zvyšoval. Zajímavé výsledky přinesla i analýza tafonomických charakteristik: podíl kostí se stopami porcování a opracování vykazoval v čase narůstající trend, zatímco podíl nálezů s opálením i s otisky zubů naopak v čase klesal. Tyto skutečnosti souvisejí jednak s porcováním zvířecích těl na menší kusy a s používáním ostřejších nástrojů zanechávajících zřetelnější zásahy, jednak s postupným přesunem kuchyňského odpadu do uzavřených objektů (odpadní jímky apod.) v mladších obdobích. Poměry na lokalitě odpovídají skutečnostem zjištěným v jiných archeozoologických souborech z městského prostředí. Soubor plaveného materiálu obohatil naše druhové spektrum o mnoho nových položek. Doložen byl sběr raků a měkkýšů, rybolov i chov ryb v rybnících a dovoz mořských ryb nebo odchyt drobného ptactva (tzv. čížba). Byla zaznamenána přítomnost středověkých a novověkých importů či imigrantů: kapr obecný se vyskytoval od období protoměstské aglomerace (P2); krocan, potkan či treskovité ryby byly zjištěny v novověkém období P5; platýsovitě ryby pocházely z období P2 i mladších časových fází a sledovité ryby byly objeveny v novověkých obdobích P4 a P5.

Co se archeobotanického souboru týká, studovány byly nálezy hrubé (síto 2 mm) i jemné frakce (síto 0,25 mm) získané plavením/prosíváním mokřých i suchých náleзовých situací. Semena, skořápky, pecky a další rostlinné makrozbytky z Národní třídy odrážejí pozvolný posun ve způsobu obživy i v hygienické situaci na studované lokalitě. Nejvýraznějším trendem byl pokles významu ruderalních druhů v souboru vodou konzervovaných makrozbytků i pokles významu plevelů obilnin v souboru zuhelnatělých makrozbytků. Rovněž bylo pozorováno postupné snižování podílu zuhelnatělých makrozbytků polních plodin. Antrakologická a xylotomární analýza vodou konzervovaného dřeva a dřevěných uhlíků potvrzuje rostoucí význam i kvalitu palivového dřeva a řeziva v průběhu sledovaného období. Rostoucí podíl dřevin vyšších poloh (jedle, buk apod.) odráží pravděpodobně úbytek plochy lesů v okolí lokality a narůstající význam dálkové dopravy dřeva.

Tab. 1. Archeozoologické nálezy z výzkumu na Národní třídě v Praze. Počet nálezů ručně vybíraného materiálu rozdělených do tří souborů (GR14, GR23 a EN). **P1** – 11. až polovina 13. století; **P2** – polovina 13. až polovina 14. století; **P3** – polovina 14. až 15. století; **P4** – 16. až polovina 17. století; **P5** – polovina 17. až 18. století; **P6** – 19.–20. století.

Tab. 2. Archeozoologické nálezy z výzkumu na Národní třídě v Praze. Počet nálezů plaveného materiálu. Data **P1–P6** viz tab. 1.

Tab. 3. NISP hlavních hospodářských kopytníků z ručně vybíraných souborů (GR14, GR23 a EN). Data **P1–P6** viz tab. 1.

Tab. 4. Výsledky archeobotanické makrozbytkové analýzy jemně plavených vzorků (síta 0,25 mm). Datace **P1–P6** viz tab. 1.

Tab. 5. Výsledky archeobotanické makrozbytkové analýzy hrubě plavených vzorků (síta 2 mm). Datace **P1–P6** viz tab. 1.

Obr. 1. Praha 1-Nové Město, okolí Národní třídy a Mikulandské ulice. Výřez z mapy stavu archeologických terénů v Pražské památkové rezervaci (miniatura nahoře vpravo). **Žlutě** – areál záchraného archeologického výzkumu v rámci nové budovy „Palác Národní – DRN“; **červeně** – místa dalších výzkumů v okolí; **světle šedě** – současná zástavba. Stav výzkumu do roku 2005 podle L. HRDLÍČKY (2005; 2009), 2009–2022 akce označené číslem archeologických výzkumů NPÚ v Praze a prezentované podle terénní dokumentace (**černě**), **modře** – čísla podle databáze AMČR, akce č. A75/2017 dle STAREC ET AL. 2020.

Obr. 2. Praha 1-Nové Město, areál novostavby „Palác Národní – DRN“. Celkový plán záchraného archeologického výzkumu: **žlutě** – prozkoumaná plocha; **oranžově** – zjišťovací sondy z let 2007 a 2012; **červeně** – vybrané generální řezy GR14 a GR23; **růžově, modře** – bývalá zástavba u Národní třídy; **šedě** – dochované zdi v přízemí Schönkirchovského paláce (čp. 135/II v Mikulandské ulici).

Obr. 3. Praha 1-Nové Město, Mikulandská ppč. 843, čp. 135/II. Západovýchodní generální řez GR14 s vyznačenými sídlištními horizonty.

Obr. 4. Praha 1-Nové Město, Mikulandská ppč. 843, čp. 135/II (býv. parcela č. 841). Severojižní generální řez GR23 s vyznačenými sídlištními horizonty.

Obr. 5. Praha 1-Nové Město, Národní/Mikulandská. Plavený archeozoologický materiál – složení hlavních skupin živočichů. Datace **P1–P6** viz tab. 1.

Obr. 6. Praha 1-Nové Město, Národní/Mikulandská. Ručně vybíraný archeozoologický materiál (soubor EN), složení hlavních skupin živočichů. Datace **P1–P6** viz tab. 1.

Obr. 7. Praha 1-Nové Město, Národní/Mikulandská. Ručně vybíraný archeozoologický materiál (soubor GR14), složení hlavních skupin živočichů. Datace **P1–P6** viz tab. 1.

Obr. 8. Praha 1-Nové Město, Národní/Mikulandská. Ručně vybíraný archeozoologický materiál (soubor GR23), složení hlavních skupin živočichů. Datace **P1–P6** viz tab. 1.

Obr. 9. Praha 1-Nové Město, jižní část Mitrovického paláce (bývalé čp. 137, ppč. 841 u Národní třídy). Soubor schránek mořských mlžů (ústřice jedlá – *Ostrea edulis*, ústřice viržinská – *Crassostrea virginica*, slávka jedlá – *Mytilus edulis/galloprovincialis*) a suchozemského plže (hlemýžď zahradní – *Helix pomatia*), nalezených v rámci kontextu G06-023 (17./18.–19. století).

Obr. 10. Praha 1-Nové Město, Národní/Mikulandská. **A–C** – fragmenty metapodií skotu: proximální a distální konce kostí byly příčně rozříznuty, rovná a masivní diafýza byla rozdělena na destičky, z nichž byly vyrobeny kostěné korálky, knoflíky a další artefakty; **D** – část opracovaného jeleního parohu.

Obr. 11. Praha 1-Nové Město, Národní/Mikulandská. Části metapodií skotu jako odpad po výrobní činnosti.

Obr. 12. Praha 1-Nové Město, Národní/Mikulandská. Výsledky archeobotanické makrozbytkové analýzy, frekvence jednotlivých skupin makrozbytků podle formy zachování v časových fázích na lokalitě (n = 15571). Datace **P1–P6** viz tab. 1.

Obr. 13. Praha 1-Nové Město, Národní/Mikulandská. Výsledky archeobotanické makrozbytkové analýzy, složení makrozbytků obilovin (n = 2726). Datace **P1–P6** viz tab. 1.

Obr. 14. Praha 1-Nové Město, Národní/Mikulandská. Výsledky analýzy uhlíků. Hmotnostní složení jednotlivých taxonů (celkem 1248,8 g).

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Mgr. Tomasz Marian Cymbalak, archaeologist, cymbalak.tomasz@npu.cz

National Heritage Institute in Prague, Department of Archaeology, Na Perštýně 356/12, CZ-110 00 Prague 1

Mgr. Petr Kočár, archaeobotanist, PhD Candidate, kocar@arup.cas.cz

Institute of Archaeology, Czech Academy of Sciences, Letenská 123/4, CZ-118 00 Prague 1

Mgr. Romana Kočárová, archaeobotanist, rkocarova@seznam.cz

Department of Archaeology and Museology at Masaryk University, Joštova 220/13, CZ-662 43 Brno

Mgr. Zdeňka Sůvová, archaeozoologist, zsuvova@gmail.com

Czech Institute of Egyptology, Faculty of Arts, Charles University, Celetná 20, CZ-110 00 Prague 1