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Review of the oldest evidence of domestic fowl *Gallus gallus* f. *domestica* from the Czech Republic in its European context[1]

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Abstract. An analysis of pre-La Tène period osteological finds of domestic fowl within the Czech Republic is reported. The oldest evidence, a part of a female skeleton, comes from the site at Ostrov-Zápy (Prague – east district) dated to the end of the Bronze Age (end of Štítary culture, Hallstatt B3, which corresponds to the second half of the 9th century BC). Other skeleton remains come from the Rubín site (Louny distr.) dated to the Hallstatt D period. These and other pre-La Tène period archaeological finds are analysed in the Bohemian and European context. The origin of domestic fowl in Central Europe, as well as ritual aspects and size are discussed together with detailed morphometric characterization.

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I. INTRODUCTION

Domestic fowl *Gallus gallus* f. *domestica* has been and still is an integral constituent of an assortment of domestic animals in most human cultures. Recently a review of the oldest finds in the Czech Republic was published in a regional journal (PETŘÍČKOVÁ 2002). However new finds move the span of its occurrence further into the past in the Czech Republic and subsequently throughout Central Europe. These finds as well as a revision of all available pre-La Tène finds from the Czech Republic are the subject of the present paper.

II. MATERIAL AND METHODS

Osteological material subjected to revision was obtained from various sources (museums and institutes, see below in the list of sites and finds). Abbreviations: sin. – sinistra, dex. – dextra, dist. – distal, BP – before present, BC – before Christ, AD – Anno Domini, C. – culture, min. – minimal, max. – maximal, MNI – minimal number of individuals, NISP – number of identified specimens, feat. – feature, distr. – district., pers. com. – personal communication. Measuring methods and acronyms for measurements after DRIESCH (1976). All measurements are given in millimeters (mm). Anatomical terminology after BAUMEL and WITMER (1993).

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[1]This paper was presented at the 3rd Symposium of Environmental Archaeology „Archeozoological research in Poland and Middle-East Europe. Data – methods – interpretations". Katowice-Koszęcin, 26-29th November 2008.

III. GENERAL BACKGROUND

Current understanding of the origin of domestic fowl

According to the traditional conception *Gallus gallus* is not autochthonous to Europe and originally came to Central Europe from Asia later than other domestic animals, which were imported or domesticated during the Neolithic expansion (see ZEUNER 1963; WEST & ZHOU 1988). The zoological origins was analysed in detail by e.g. ZEUNER (1963), HERRE and RÖHRS (1983), CRAWFORD (1984), STEVENS (1991), and PETŘÍČKOVÁ (2002). The presumption that the only ancestor of domestic fowl was Red Junglefowl *Gallus gallus*, aside from the morphological and ethological support, has been recently confirmed by molecular genetic studies (FUMIHITO et al. 1996; LIU et al. 2006). The wild ancestor currently lives in south-western Asia where it is presumed to have been originally domesticated. Since the evidence for domestic fowl from China is 8000 years old, domestication must have happened prior to this time, i.e. earlier than in the 6th millennium BC (WEST & ZHOU 1988). Chinese finds are not always acknowledged without reserves (BENECKE 1994a), nevertheless fowl is mentioned from several Chinese Neolithic sites (WEST & ZHOU 1988). Presumably, fowl was originally used for cock-fighting known from India reputedly over eight thousand years ago (STEVENS 1991). Domestic fowl could have spread to Europe from Asia either south across Persia and the Balkans or (as suggested by WEST and ZHOU 1988) north via China, Mongolia and Russia. The remains of domestic fowl in Europe have evoked great attention: summaries of the finds have been given and the domestication process has been discussed by WEST and ZHOU (1988), BENECKE (1993, 1994a,b), BOEV (1995), MLÍKOVSKÝ (2002), GOTFREDSEN and MAKOWIECKI (2004).

Within Europe, several fossil Pleistocene wild fowl species have been described and even finds of recent *Gallus gallus* were published (see HARRISON 1978; BOEV 1995; MLÍKOVSKÝ 2002).

Although this relatively thermophilic bird presumably could not survive the last Ice Age in the northern part of Eurasia (WEST & ZHOU 1988), a possible glacial refuge is situated in southern Ukraine and the Caucasus region (BOEV 1995). Paleontological and archaeological finds from Greece, Bulgaria, Moldavia, Ukraine, Georgia, Armenia and Romania were perceived as evidence for the polyphyletic origin of European domestic fowl and for local domestication in these regions (BOEV 1995). Also N. I. BURČAK-ABRAMOVIČ and S. MEŽLUMJAN (1986) suggest local domestication of wild fowl in Armenia. Independent domestication in Asia and the Mediterranean is not rejected even by UMANSKAJA (1972) and others (see MLÍKOVSKÝ 2002). More recently MLÍKOVSKÝ (2002) states that wild fowl probably vanished in Europe at the beginning of the Ice Age (Würm III) and occured in a new domestic form in the subboreal (i.e. ca. Bronze Age). Genetic studies (FUMIHITO et al. 1996) support a monophyletic origin of all domestic breeds. On the contrary, results of genetic studies by LIU et al. (2006) support the theory of a polyphyletic (polytopic) origin, albeit within the species *Gallus gallus* and within southwestern and southern Asia. The latest work (KANGINAKUDRU et al. 2008) concludes that "the domestication of chicken has occurred independently in different locations of Asia including India (...) from *G. gallus spadiceus*, *G. gallus gallus* as well as from *G. gallus murghi*."

The oldest European evidence

According to WEST and ZHOU (1988) the main period for domestic fowl expansion in Europe is the Iron Age, however, the oldest osteological finds come from the Neolithic and the early Bronze Age (Greece, Ukraine). Further evidence of *Gallus gallus* f. *domestica*, *Gallus gallus* and *Gallus* sp. from the Palaeolithic to the Bronze Age in Romania, Ukraine and the Caucasus region is summarised by BOEV (1995). Some Neolithic/Eneolithic finds from Eastern Europe are quoted by BENECKE (1994a) and MLÍKOVSKÝ (2002), for example a femur of Neolithic *Gallus* sp. from the Moscow region (3000-2600 BC; KARCHU 1990). BURČAK-ABRAMOVIČ and S. MEŽLUMJAN (1986) state that domestic fowl existed in the ancient Armenia in the beginning of the second millenium BC.

Recently a number of domestic fowl bones from the Neolithic and Eneolithic periods (4 sites, MNI = 9, NISP = 12) were published from Bulgaria by BOEV (2004, 2006, 2009a,b). However, compared to the amount of evidence from the Iron Age and later, these early finds are very modest and incoherent (compare for example finds from various horizons from the Ukraine; UMANSKAJA 1972).

One of the potential initial sites of domestic fowl expansion in Europe is Greece. In general this species is known in Greece from the 5th till the 8th century BC (see BOEV 1995). In antique Greece the domestic fowl is called "Persian bird" (for example by ARISTOPHANES; see RICHTER 1967; UMANSKAJA 1972; NAUERTH 1986; BENECKE 1994b), which could mean that the Greeks became familiar with it via the Persians (i.e. approximately in the 6th century BC when the Persian Empire originated). Moreover, Persians were probably the source of domestic fowl imports to Egypt, where the first osteological find comes from the late 5th - early 6th century BC (MACDONALD 1993). In the 5th century BC the domestic fowl is a common feature of the Greek countryside, being connected with Asclepiad – the god of physic, herald and custodian of time, banisher of darkness, being used for cock-fighting, and was the subject of magic ritual practices. The production of meat and eggs at this time was secondary (RICHTER 1967; NAUERTH 1986; T. VÍTEK pers. com.). Nevertheless if the osteological finds are dated and interpreted correctly, the fowl was present in Greece much earlier (late Neolithic – Bronze Age; WEST & ZHOU 1988).

The oldest Central European evidence

Domestic fowl in Central Europe are currently known from the Hallstatt period C and D phase (Ha C-D) and contemporary cultures, i.e. since the 8th century BC (absolute data of the culture phase after BOUZEK 2004; JIRÁŇ et al. 2008; VENCLOVÁ et al. 2008). From this period there is a number of proven finds (AMBROS 1970; WEST & ZHOU 1988; BENECKE 1993, 1994a,b; NEUMAIER 1996; GOTFREDSEN & MAKOWIECKI 2004). Fowl become more common in the La Tène period. By the Early Middle Ages it is a standard part of archaeozoological assemblages as well as a staple in the diet of the human inhabitants. BENECKE (1993) documents a gradual increase of fowl bones in archaeological sites since the Iron Age, through the Roman Period up to the Early and High Middle Ages. The situation is similar within Bohemia (PEŠKE 1994a).

Potentially the oldest finds from Central Europe are mentioned by TEICHERT and LEPIKSAAR (1977) from the Late Bronze Age cult cave in Kyffhäusergebirge and from the transition period of the Late Bronze Age and Early Iron Age Wüste Kunersdorf site (TEICHERT 1968). These sites are not included in later summarising studies (WEST & ZHOU 1988; BENECKE 1993, 1994a,b; NEUMAIER 1996) since they were classified as potentially contaminated and therefore considered unreliable (N. BENECKE, e-mail com.). Currently the earliest reliable evidence is therefore considered from the Hallstatt C-D sites (Table 30 in BENECKE 1994a). In neighbouring Poland the oldest published domestic fowl comes from the Lusatian culture (i.e. 700-400 BC; WOLSAN & NADACHOWSKI 1992; GOTFREDSEN & MAKOWIECKI 2004) and in Slovakia from the Hallstatt C-D period (AMBROS 1984).

Oldest actual evidence from the Czech Republic

A tibiotarsus from the Bronze Age Velatice culture site at Lovčičky in the Czech Republic is described in the literature (ŘÍHOVSKÝ 1982; JACKENHÖVEL & OSTOJA-ZAGÓRSKI 1987; BENECKE 1993, 1994a). Although ŘÍHOVSKÝ (1982) mentions domestic fowl, the original (unpublished) source (KRATOCHVÍL 1971) states that the find has to be taken cautiously and that a different kind of galliform bird cannot be excluded. It may be a species of wild fowl (*Tetrao urogallus*, *Tetrao tetrix*, *Bonasa bonasia*). The current state of knowledge, a detailed critical analysis of the up-to-date finds and some new finds are described by PETŘÍČKOVÁ (2002). According to her the finds prior to the Iron Age are probably the result of contamination or error. As reliable she considers finds from the Hallstatt D period sites at Prague-Michle (PEŠKE 1976; note: LUTOVSKÝ and SMEJTEK 2005 date the find to LtA period), at Poříčany (Ha D2-3; distr. Kolín; PETŘÍČKOVÁ 2002) and the Těšetice site from the Horákov culture

(Ha C-D; distr. Znojmo; PODBORSKÝ 1965; AMBROS 1970, without metric data). J. PETŘÍČKOVÁ does not mention a find of burned bone from the Prague-Kobylisy site (feature 15/74; PEŠKE 1988, also used by BEECH 1995), which is ranked to Bylany culture (i.e. Hallstatt C-D1), however, feature 15/74 was disturbed by another Early medieval feature (FRIDRICHOVÁ 1988, pp. 75-76) and we do not know the exact position of the find in the context, which lowers the reliability of the material. Other finds from the Hallstatt/La Tène boundary (Ha D/Lt A; 4 sites in total) have been summarised by BEECH (1995; for dating of the Radovesice site see also PEŠKE 1993). Since the origin of fowl expansion in Europe is a complicated and current problem, detailed documentation of each new "old" find is very important. This detailed study brings new or newly analysed Czech finds contemporary to or older than the cases mentioned above and includes an update of the Těšetice finds.

IV. OVERVIEW AND ANALYSIS OF NEW FINDS FROM THE CZECH REPUBLIC

(A) Radiocarbon-dated finds:

(1) **Hostivice-Palouky** (Prague – west distr.; excavation I. PLEINEROVÁ 2001); see PLEINEROVÁ 2003; KOVAČIKOVÁ 2010: 3 bones.

C o n t e x t. Feature 160 (unspecified settlement pit), bag no. 1312, depth: 0 cm – bottom.

D a t i n g a c c o r d i n g t o a p p e n d a n t f i n d s. The site is multicultural. Although there were also La Tène and Slavic finds in the relevant area, feature 160 is situated in the centre of Knovíz area. Feature 160 is, according to the ceramics, from the later Bronze Age (Knovíz culture, i. e. Hallstatt A), without other ceramic contamination (PLEINEROVÁ 2003 and pers. com.).

R a d i o c a r b o n d a t i n g (pelvis):

^{14}C Date: 1273±29 BP

δ^{13}C: -19.0

cal.:

% area enclosed	age ranges	relative area under probability distribution
68.3 (1 sigma)	686-725AD	0.552
	738-771AD	0.448
95.4 (2 sigma)	663-781AD	0.973
	790-809AD	0.027

Belfast, UB-7292

D e s c r i p t i o n o f f i n d s. The finds of *Galliformes* from feature 160, mentioned also by KOVAČIKOVÁ (2010), include the proximal half of the tibiotarsus (sin.), part of the furcula (clavicula dex.) and pelvis (dex.). Revision shows that only the pelvis belongs to *Gallus gallus* f. *domestica*, the tibiotarsus was redetermined as *Tetrao tetrix* and furcula merely to *Galliformes*.

The pelvis may belong to an adult individual of smaller size: DiA = 7.1 mm, max. height of foramen obturatum = 7.3 mm, max. length of foramen obturatum = 12.1 mm.

(2) **Prague castle-Lumbeho zahrady (Lumbe garden)** (Jelení ulice, plot number 381, Prague; excavations Z. SMETÁNKA, L. HRDLIČKA, and V. MOUCHA 1972): tarsometatarsus.

C o n t e x t. An Eneolithic feature 1/72 (unspecified settlement pit) rich in finds (Funnel Beaker culture, Salzmünde phase). The archaeological situation is described by SMETÁNKA (1975) and SMETÁNKA et al. (1980). The key report (reg. number 7044/72, Institute of Archaeological of the Academy of Sciences of the Czech Republic, Prague), potentially explaining the possibility of contamination, is lost. The osteological find is mentioned already by PEŠKE (1973) as a part of the

Salzmünde osteological assemblage. Considering the archaeological age and insufficient information later interpreted as probable contamination (KYSELÝ 2002a).

R a d i o c a r b o n d a t i n g:

^{14}C Date: 775±30 BC

δ^{13}C: -21.0

cal.:

% area enclosed	age ranges	relative area under probability distribution
68.3 (1 sigma)	1226-1234AD	0.189
	1238-1271AD	0.811
95.4 (2 sigma)	1216-1280AD	1.000

Belfast, UB-7293

D e s c r i p t i o n o f t h e f i n d. Tarsometatarsus (dex.) belongs almost certainly to a female. GL = 75.3 mm, Bp = 12.2 mm, SC = 5.9 mm, Bd = 13.1 mm.

(3) **Rubín** (a hillfort at the summit of Rubín hill, Dolánky cadaster, Louny distr.; excavations J. BUBENÍK, 1984-1985; see BUBENÍK 1997): about 2/3 of a domestic fowl skeleton.

C o n t e x t. Feature 7/84-85A (unspecified settlement pit), trench I, sector C, bag no. 78b/85 (contained one fowl bone) and 78a/85 (the rest of the skeletal elements). The feature was dated to Hallstatt D. Upper part of the feature was cut by a possible early medieval feature (BUBENÍK 1991 and BUBENÍK pers. com.). The fowl bones were found much deeper than the later cut (i.e. at a depth of 160-185 cm, grey infill), which excludes contamination.

D a t i n g a c c o r d i n g t o a p p e n d a n t f i n d s. In the given context only Hallstatt pottery was found (Ha D). Dating was completed on the base of a large amount of pottery by M. CHYTRÁČEK (unpubl.).

R a d i o c a r b o n d a t i n g:

^{14}C Date: 2380±30 BP

δ^{13}C: -19.0

cal.:

% area enclosed	age ranges	relative area under probability distribution
68.3 (1 sigma)	510-430BC	0.452
	420-390BC	0.230
95.4 (2 sigma)	720-690BC	0.028
	540-390BC	0.926

Poznań, no. 1294/05 (Poz-13922)

D e s c r i p t i o n o f t h e s k e l e t o n. About two thirds of the skeleton of an adult individual. Sex is in the standard determined according to the presence of a spur on the tarsometatarsus. The tarsometatarsus from Rubín shows only a rough spot in place of the spur (Fig. 2). Such rough spots usually occur on subadult males (with an already fused epiphysis, but with an unfused spur core). However it may also occur on females (DE CUPERE et al. 2005, SERJEANTSON 2009). Since its occurrence on females is very rare, the Rubín case most probably was a male. The broken tibiotarsus does not contain medullar bone. Metrics – see Table I. Photo: Fig. 1 and 2.

P r e s e r v e d s k e l e t a l e l e m e n t s: neurocranium, sternum, pelvis (sin. and dex.), synsacrum, coracoid (sin.), scapula (dex.), humerus (sin. and dex.), radius (sin.), ulna (sin. and dex.), femur (sin.), tibiotarsus (sin., dist. half), fibula (sin. and dex.), tarsometatarsus (sin. and dex.), 3x vertebrae thoracales, costae (fragments), phalanx indet. In total 24 bones.

N o t e. The find was incorrectly included in the evaluation of medieval material from the site (in KYSELÝ 2000 and MLÍKOVSKÝ 2003a, b).

Table I

Metric data of newly described pre-La Tène finds of domestic fowl *Gallus gallus* f. *domestica*. Legend: measurements (in mm) and abbreviations after methodology by DRIESCH (1976), with exception: BG f.o.m. = width of foramen occipitale magnum, GH = greatest height of neurocranium (between the most outer points of base and roof), D = min. depth of diaphysis; a. = approximately.

Ostrov-Zápy (feat. 176): skeleton of female

element	measurement	dextra	sinistra	not sided
coracoid	GL	48.4	48.1	
	Lm	45.7	45.7	
	BF	10.6	10.6	
	Bp	12.3	12.4	
humerus	GL	65	65.4	
	Bp	17.4	17.6	
	SC	6.3	6.3	
	D	4.7	4.6	
	Bd	13.6	13.6	
ulna	GL	63.3	63.2	
	Bp	8.1	7.8	
	Dip	12.3	12.2	
	SC	3.7	3.7	
	D	5.1	5.1	
	Did	8.6	8.7	
radius	GL	57.6	57.3	
	SC	2.4	2.3	
	D	1.9	2	
	Bd	6.3	6.3	
carpometacarpus	GL	34.6		
	Bp	10.4		
	Did	6.8		
pelvis	DiA	7.5	7.8	
femur	GL		71.4	
	Lm		66.3	
	Bp		14	
	Dp		9.6	
	SC		5.9	
	D		5.6	
	Bd		13.2	
	Dd		11.2	
tibiotarsus	GL	95.6		
	Dip	16.6	17.8	
	SC	5.2	5.5	
	D	4.3	4.4	
	Bd	10.2	10.2	
	Dd	10.5	10.3	
tarsometatarsus	GL		65.9	
	Bp		12.1	
	SC	5.6	5.4	
	D	3.3	3.4	
	Bd	11.7		
sternum	LM			a. 111
	LC			82.9

Table I cont.

Rubín (feat. 7/84-85A): skeleton of male

element	measurement	dextra	sinistra	not sided
cranium	BG f.o.m.			6.2
	GH			19.1
	SBO			10.9
coracoid	GL		49.5	
	Lm		48.1	
	BF		9.6	
	Bp			
scapula		11.8		
humerus	GL	68.1		
	Bp	19.3		
	SC	6.9		
	D	5.4		
	Bd	15.1		
ulna	GL	66.7		
	Bp	8.5		
	Dip	12.6		
	SC	4.4		
	D	5.9		
	Did	9.6		
radius	GL		59.3	
	SC		2.6	
	D		2.3	
	Bd		6.8	
pelvis	DiA		7.5	
femur	GL		76.4	
	Lm		71.7	
	Bp		14.8	
	Dp		9.9	
	SC		6.6	
	D		6.2	
	Bd		14.4	
	Dd		12.2	
tibiotarsus	Bd		10.5	
	Dd		11.2	
tarsometatarsus	GL		71.6	
	Bp		12.3	
	SC		6.3	
	D		3.5	
	Bd		12.4	

Těšetice (feat. cf 47): humerus

element	measurement	dextra	sinistra	not sided
humerus	GL	66.9		
	Bp	19.2		
	SC	14.9		
	D	6.6		
	Bd	5.2		

Fig. 1. Skeletal elements of domestic fowl from Rubín. Scale: 1 piece = 1 cm.

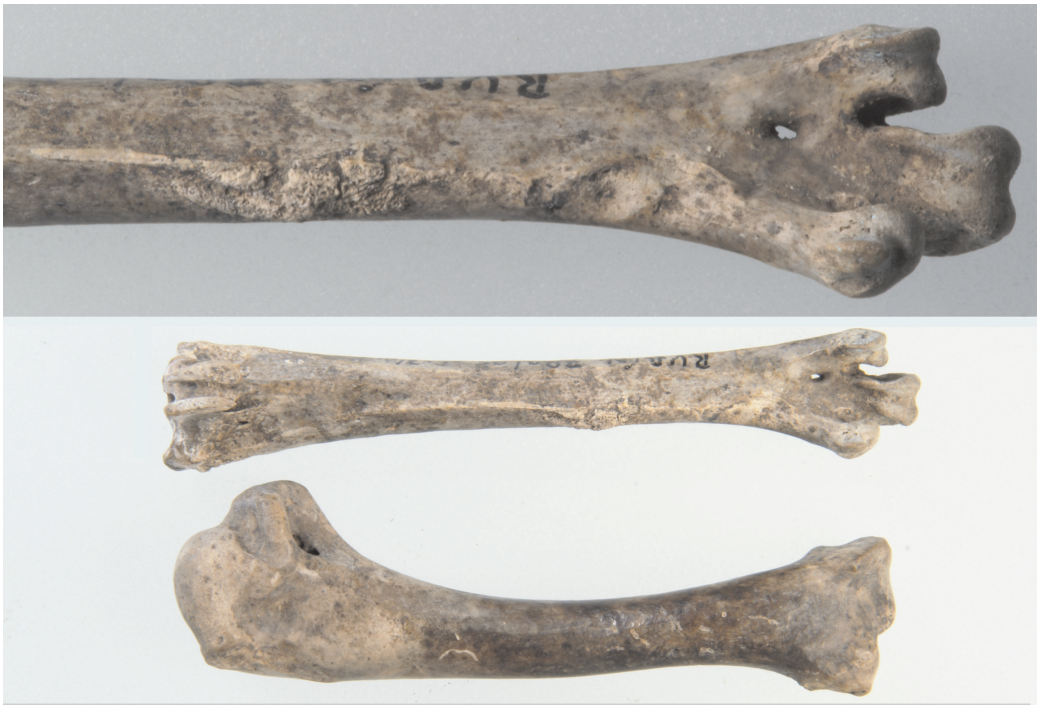

Fig. 2. Details of tarsometatarsus (above) and humerus (bottom) from Fig 1.

(B) Nonradiocarbon-dated finds:

(4) **Litovice** (position „U panské zahrady", Prague – east distr.; excavation I. PLEINEROVÁ, 2003): coracoid.

C o n t e x t. Feature 59 (unspecified settlement pit). Bag no. 170.

D a t i n g a c c o r d i n g t o a p p e n d a n t f i n d s. Found in Eneolithic (Funnel Beaker Culture?) pit (I. PLEINEROVÁ 2005 and pers. com.), but unstandard colour of the bone and large size of the individual indicate that it is contamination from Modern times.

D e s c r i p t i o n o f t h e f i n d. Completely preserved coracoid dex., GL = 64.7 mm, Lm = 60.4 mm, BF = 15.8 mm.

(5) **Ostrov-Zápy**[2] (Prague – east distr.; excavation J. ŠPAČEK, 1999): around two thirds of a domestic fowl skeleton.

C o n t e x t. The skeleton was found in feature 176 (probably a storage pit with secondary use as a cesspit). The bones were found at a depth of 1 m, the feature was closed and undisturbed by later interference. The field context excludes the possibility of the skeleton being buried in later periods, since a greater part of the skeleton is present, also accidental contamination from previous cultures layers or features can be excluded, especially since these are not present in the discussed area (J. ŠPAČEK, pers. com.).

D a t i n g a c c o r d i n g t o a p p e n d a n t f i n d s. Completed by J. ŠPAČEK and J. HRALA (unpubl.) on the base of a large pottery assemblage. The feature belongs to the final phase of Štítary culture up to the transition to the Bylany culture (Hallstatt B3, i.e. end of the Bronze Age), no pottery from other periods was present. Hallstatt B3 is currently dated to the second half of the 9th century BC (after BOUZEK 2004 and JIRÁŇ et al. 2008).

D e s c r i p t i o n o f t h e s k e l e t o n. The bones are fully developed and epiphysis fused, only fusion of the pelvis and synsacrum was not fully completed. It is a young adult. The spur on the tarsometatarsus is missing, but in place of the spur there is a rough spot, which is present on the left side only. This state can potentially occur both on females and males (DE CUPERE et al. 2005; SERJEANTSON 2009). The strongly developed medullar bone on the Ostrov-Zápy femur (evaluated after the description by DRIVER 1982 and SERJEANTSON 1998, 2009), visible on the cross section, clearly shows that it was a female which died before laying eggs. (The diameter of medullar hollow is 1.1 mm only compared to minimum diaphysis width 5.9 mm). The fact that the described hen was just getting ready to produce eggs at the time of death indicates that it died in spring or early summer (see Discussion). There are two transversal cuts on the outside of the sternal end of the coracoid. Metrics – see Table I.

P r e s e r v e d s k e l e t a l e l e m e n t s. Mandibula (sin.), sternum, pelvis (sin. and dex.), synsacrum, part of furcula, coracoid (sin. and dex.), humerus (sin. and dex.), radius (sin. and dex.), ulna (sin. and dex.), carpometacarpus (dex.), femur (sin.), tibiotarsus (sin. and dex.), tarsometatarsus (sin. and dex.), 2x costae. In total 20 bones (Inventory number of the Èelákovice museum collections: P3191)

N o t e. The find was presented to the public during an exhibition in Čelákovice (Prague – east distr.) town museum (ČERVINKA et al. 2000) and mentioned in a publication by KYSELÝ (2002b). Later it was incorrectly interpreted as taxonomically inaccurately identified (PETŘÍČKOVÁ 2002). The material was probably lost during the floods in 2002, therefore it could not be photographically documented and ^{14}C dated.

(6) **Těšetice** (position „Vinohrady" by Těšetice, Znojmo distr.; excavations V. PODBORSKÝ, 1956-1958; see PODBORSKÝ 1965): humerus and ?coracoid.

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[2]referred to also as Zápy-Ostrov or Ostrov.

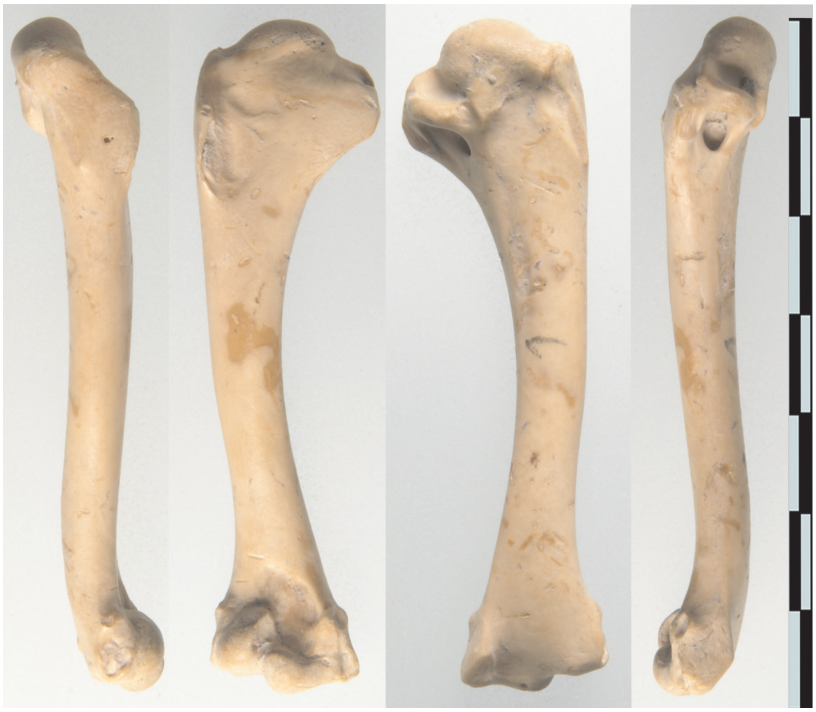

Fig. 3. Humerus of domestic fowl from Těšetice (the same bone from four aspects). Scale: 1 piece = 1 cm.

C o n t e x t. Feature cf. 47 (sunken hut).

D a t i n g a c c o r d i n g t o a p p e n d a n t f i n d s. A feature assigned to Horákov culture, i. e. Hallstatt C-D; see PODBORSKÝ 1965. The site contained finds from earlier cultures (Neolithic to middle Bronze Age), however the features containing the fowl bones were not contaminated and the site was not settled by cultures later than the Horákov culture (V. PODBORSKÝ, e-mail com.). Later contamination can therefore be excluded.

D e s c r i p t i o n o f t h e f i n d s. Completely preserved humerus (dex.). On the connection between diaphysis and dist. epiphysis two diagonal cuts from medial dorsal direction; also a coracoid potentially belongs to domestic fowl (sin., only dorsal part preserved). Metrics – see Table I, Photo: Fig 3.

N o t e. C. AMBROS in PODBORSKÝ (1965) mentions bird bones from three features: three fowl bones and three other bird bones from feature 47, one fowl bone from feature 46 and one fowl bone from feature 36. A revision of the material resulted in six bird bones assigned to „feature 47“, from which only one bone (humerus) was redetermined as domestic fowl. Potentially also a fragment of coracoid may belong to fowl. The rest of the bones belong to wild birds. Therefore there must have been an error in the original determination or the revised extra material comes from other features (36a or 46).

(7) **Toušeň-Hradiš ko** (Prague – west distr.; excavation J. ŠPAČEK, 1980): two tibiotarsus fragments

C o n t e x t. Tibiotarsus no. 1: trench XVI/1980, west part, depth 100 cm, tibiotarsus no. 2: trench XVI/1980, depth 120 cm; both layers out of sunken pits.

D a t i n g a c c o r d i n g t o a p p e n d a n t f i n d s. Hallstatt D; one bone found in deeper, i.e. older (Řivnáč C., Eneolithic) layer but considered to be an admixture from the upper Hallstatt layer (J. ŠPAČEK, pers. com.).

D e s c r i p t i o n o f t h e f i n d s. Tibiotarsus dex. dist. quarter (no. 1) (P5668): Bd = 9.5 mm, Dd = 9.4 mm, D = 3.9 mm. Tibiotarsus sin. dist. half (no. 2) (P5756): Bd = 9.6 mm, Dd = 9.7 mm, D = 4.6 mm.

(8) **Trmice** (Ústí nad Labem distr.; excavation KOUTECKÝ, 1990): radius.

C o n t e x t. Feature 25 (sunken hut).

D a t i n g a c c o r d i n g t o a p p e n d a n t f i n d s. A feature assigned to the later phase of the Jordanów Culture (Eneolithic), see ZÁPOTOCKÝ 1996.

D e s c r i p t i o n o f t h e f i n d. Completely preserved radius sin., GL = 61.3 mm.

N o t e. Slag ? burnt to the bone. Preliminary examination by R. KYSELÝ, after the flood of 2002 the material was not found, revision not possible.

(9) **Tuchoměřice** (Prague – west distr.; excavation P. SANKOT, 2000): 2 bones.

S i t u a t i o n. L. KOVAČIKOVÁ and J. ŠAMATA (2000) mention in their report two domestic fowl bones from feature 11 (sunken hut): radius (south part of the feature, depth: 0 cm – bottom) and furcula (north part of the feature, depth 0 cm – bottom. These bones however were not found in the relevant bag during the reexamination of the find, so they could not be verified.

D a t i n g a c c o r d i n g t o a p p e n d a n t f i n d s. The feature was assigned to Řivnáč Culture (middle Eneolithic). Dated by M. ZÁPOTOCKÝ on the basis of a sufficient amount of pottery. Contamination by other cultures not in evidence.

N o t e. Different find (from different context) from Tuchoměřice cadaster was presented as Late Hallstatt-Early La Tène in CLASON (1966) and BENECKE (1994a).

V. DISCUSSION

Domestic fowl origins in Europe are still a subject worthy of discussion (see AMBROS 1970; WEST & ZHOU 1988; KARCHU 1990; BOEV 1995; MLÍKOVSKÝ 2002; PETŘÍČKOVÁ 2002). The finds prior to the Iron Age from the eastern and south-eastern Europe are especially problematic. In some cases the situation is complicated by the wide time span and inexact determination (for example *Gallus* sp.) and by possibly incorrect dating. Revision and specification of the dating and exact determination could answer many questions. However, in spite of the fact they were not dated by the radiocarbon method, a relatively large number of new finds from Bulgaria and comparatively large variability in size of the registered individuals (BOEV 2004, 2006, 2009a,b) again seem to support the concept of the existence of domestic fowl in the Balkans within the Neolithic-Eneolithic period (earliest finds from ca. 4500 BC; BOEV 2009b). In light of this information, the noticeably later (i.e. ca. 3500 years later, see below) first occurrence of domestic fowl from the contiguous Central European region is strange. The following discussion concentrates on the Czech and Moravian finds only.

The Czech finds analysed here are subjected to a different rate of reliability. The newly described Eneolithic and Bronze Age finds (Prague castle-Lumbeho zahrady, Hostivice-Palouky, Tuchoměřice, Trmice, Litovice) consist of individual bones (NISP 1-3) and the ^{14}C dating undertaken for the first two indicates later contamination. The find from Litovice is probably contamination and the finds from Tuchoměřice and Trmice could not be revised due to their loss and remain oldest (specifically Eneolithic) potential finds in the region. The osteological find from Lovčičky presented in the literature as middle Bronze Age (ŘÍHOVSKÝ 1982; JACKENHÖVEL & OSTOJA-ZAGÓRSKI 1987; BENECKE 1993, 1994a) also could not be found despite intensive effort and therefore its zoological determination remains uncertain.

While that the finds mentioned above cannot be considered as reliable, in my opinion reliable finds within the Czech Republic come from Ostrov-Zápy dated to the end of the Bronze Age (Hall-

statt B3), Rubín (Hallstatt D) and Těšetice (Hallstatt C-D). The two first cases of larger parts of skeletons can hardly be an accidental contamination by some rodent or other factor. The reliability of dating in the Rubín case is supported by absolute ^{14}C data. The find from Ostrov-Zápy could not be subjected to radiocarbon analysis, but its presence in an intact feature without any ceramic contamination suggests that it belongs to this particular cultural phase and corresponding absolute dating. There is no relevant reason to presume contamination even in the Těšetice case. In Central Europe and subsequently throughout the north-western half of Europe, the Ostrov-Zápy find belongs to the earliest evidence of the *Gallus gallus* f. *domestica* and possibly may be the earliest (see the introductory analysis). Its absolute dating after appendant ceramics corresponds to the second half of the 9th century BC (absolute dating of Hallstatt B3 after BOUZEK 2004 and JIRÁŇ et al. 2008).

The direction from which the domestic fowl was imported into Europe is still unresolved (e.g. PETŘÍČKOVÁ 2002). One possibility is the route from the southwest in context of the Phoenician colonisation of the Iberian Peninsula in the 11th-6th century BC (see BENECKE 1994a). Another possibility is the route across the Balkans from Anatolia and Greece. A third possibility is a northern route: north from the Black sea across Ukraine, where numerous finds from the 11th-8thcenturies BC (site Sobkivka; PIDOPLIČKO 1956; BENECKE 1994a) add support to this hypothesis. Import over the Black sea cannot be excluded either (BOEV 1995). None of these possibilities can be completely excluded or proven. Evidence of possibly the first fowl in the Czech Republic (Ostrov-Zápy) corresponds with the period of Kimeri invasion into Central Europe (Ha B3; BOUZEK 2004), who imported sophisticated equestrian art, some form of shamanistic belief, contributed to the spread of iron and reached north into Poland (BOUZEK 2006). Therefore import via this ethnic migration could be possible, or at least it could be one of the ways that fowl appeared in Bohemian lands.

The author of the article was not present at the excavations and it was not possible to reconstruct later whether the individual bones from Ostrov-Zápy and from Rubín were originally articulated. However it is evident that in both cases the bones belong to a single individual. Originally there could have been a complete skeleton present in the feature (since mainly small and fragile bones are missing, which could easily be neglected or their preservation is more at risk: phalanges, vertebrae, ribs). The presence of an almost completely preserved or complete skeleton in combination with cuts could indicate that the individual from Ostrov-Zápy was not an item of common consumption, but the subject of some form of ritual practise (possibly including consumption). Nevertheless other finds from the same feature (no. 176) at Ostrov-Zápy (osteological as well as ceramic) do not show any significant peculiarities or ritual factors and therefore also the domestic fowl skeleton itself could be the result of consumption without ritual behaviour. Among others, a part of a juvenile tibiotarsus was found here, which could also belong to a domestic fowl, but exact species determination is not possible. However, the presence of cuts makes it improbable that a naturally dead animal was thrown into the pit. In feature 176 there was also minimally one human bone (phalanx).

Symbolic, magic and ritual significance of fowl and eggs within antique Europe is obvious (NAUERTH 1986) and is not limited to Greece. For example, eggs of domestic fowl were placed into a kurgan in Konstantinovka (Katakombnaja culture; after HARDING (2000), associated to Br A, i.e. earlier Bronze Age) as sustenance for the deceased person (LIBEROV 1959). Deposits of fowl and eggs is a frequent feature in some pre-Christian cultures, mainly on Slavic-Avaric cemeteries (osteozoologically evaluated by AMBROS 1970) and on other sites (FILIP 1948; MLÍKOVSKÝ 2003a; SMETÁNKA 2003; PROFANTOVÁ 2007, 2009; KYSELÝ pers. obs.). Ritual and symbolic significance also extends into the Christian period.

In the period before eggs are layed the so called medullar bone is deposited within the marrow cavities of bird bones including hens (visible mainly in the long bones of the hind limb), which serves as a calcium source for the creation of the egg shell. This process causes a filling of the marrow hollow, as observed in the find from Ostrov-Zápy (see above). Nevertheless egg production was not a priority in the relevant period. According to BENECKE (1993) fowl in the Iron and Roman Ages were used mainly for meat production. The production of eggs was interpreted as less important because fewer females were found than males by a ratio of three to one at the older La Tène He-

uneburg site. Although some recent breeds of hens produce eggs all year-round, the primitive prehistoric breeds presumably respected the original seasonal egg laying, as in the case of the wild ancestor (seasonal laying in spring is presumed by MLÍKOVSKÝ (2003a) even for later early medieval finds). Judging from the presence of medullar bone it is possible that the hen from Ostrov-Zápy died in the relevant period (i.e. in spring or in the beginning of summer).

PEŠKE (1994a) and PETŘÍČKOVÁ (2002) identically evaluate the fowl from Hallstatt period Bohemia as a breed with a size comparable to hens from Slavic-Avaric graves or slightly smaller, i.e. a small up to dwarf breed. Also the finds newly described in this article belong to a physically small type of fowl. For detailed comparison of sizes and proportions, published archaeological finds from the Czech Republic and surrounding areas (mainly Slovakia) were selected, from which large data-

Table II

Table of periods, sites and *Gallus* metric data sources for the Figs 4-11

Period (corresponding to Figs 4-9)	Sites (data source)	Depicting the data in graphs (n = sample size for statistical analysis, listed according to graphs order); notes on the sex
Recent	Red Junglefowl (KUROČKIN & ANOROVA 1977)	in Figs 4-7 and 9 as individual data; female + male
Final Bronze Age (Hallstatt B3)	Ostrov-Zápy (this study)	in Figs 4-11 as individual data; female; in Figs 4 and 10 measurements from left as well as right sides
Hallstatt C, D	Rubín, Těšetice (this study), Prague-Michle (PEŠKE 1976)	in Figs 4-7 and 10-11; as individual data; Figs 4, 6 and 7 include male from Rubín; Fig. 6 includes female from Prague-Michle; Fig. 5 includes the find from Prague-Michle with undetermined sex
LaTène	Manching (BOESSNECK et al., 1971), Palárikovo (AMBROS 1985), Nebojsa (AMBROS 1970), Radovesice (PEŠKE 1993)	data from Manching used only in Figs 4-6 as a min-max span and arithmetic mean (n = 7, 10, 11); the rest as individual data in Figs 4, 5, 6, 10 and 11
Roman/Migration Period	Mlékojedy (PEŠKE 1994b), Vlíněves – feature no. 9958/2008 (grave) (unpubl.)	Mlékojedy in Figs 5, 6 and 11, Vlíněves in Figs 4, 5, 7-10 as individual data; both tarsometatarsi from Mlékojedy belong to males
Slavs-Avars burials	Nové Zámky, Štůrovo, Dvory (AMBROS 1970)	in Figs 4-6 as min-max span and arithmetic mean (n = 32, 24, 24); in Figs 7-11 as individual data; only sex determinable finds included
Early Middle Ages (Great Moravian empire)	Mikulčice (MLÍKOVSKÝ 2003a)	in Figs 4-6 as min.-max. span and arithmetic mean (n=144, 146, 278); in Figs 10-11 as individual data; data from subadult individuals (also presented by the author) excluded; in Fig. 11 only sex determinable finds included
Postmedieval	Olomouc-Žerotínovo náměstí (KRATOCHVÍL 1985; 1500-1550), Prague-Náměstí republiky (KYSELÝ 2002c; 17th century)	Prague-Náměstí republiky in Figs 4, 5, 6, 10, 11 as individual data (all tarsometatarsi belong to males, in Figs 6 and 11); Olomouc-Žerotínovo náměstí in Figs 4-6 as a min-max span and arithmetic mean (n = 70, 55, 21)

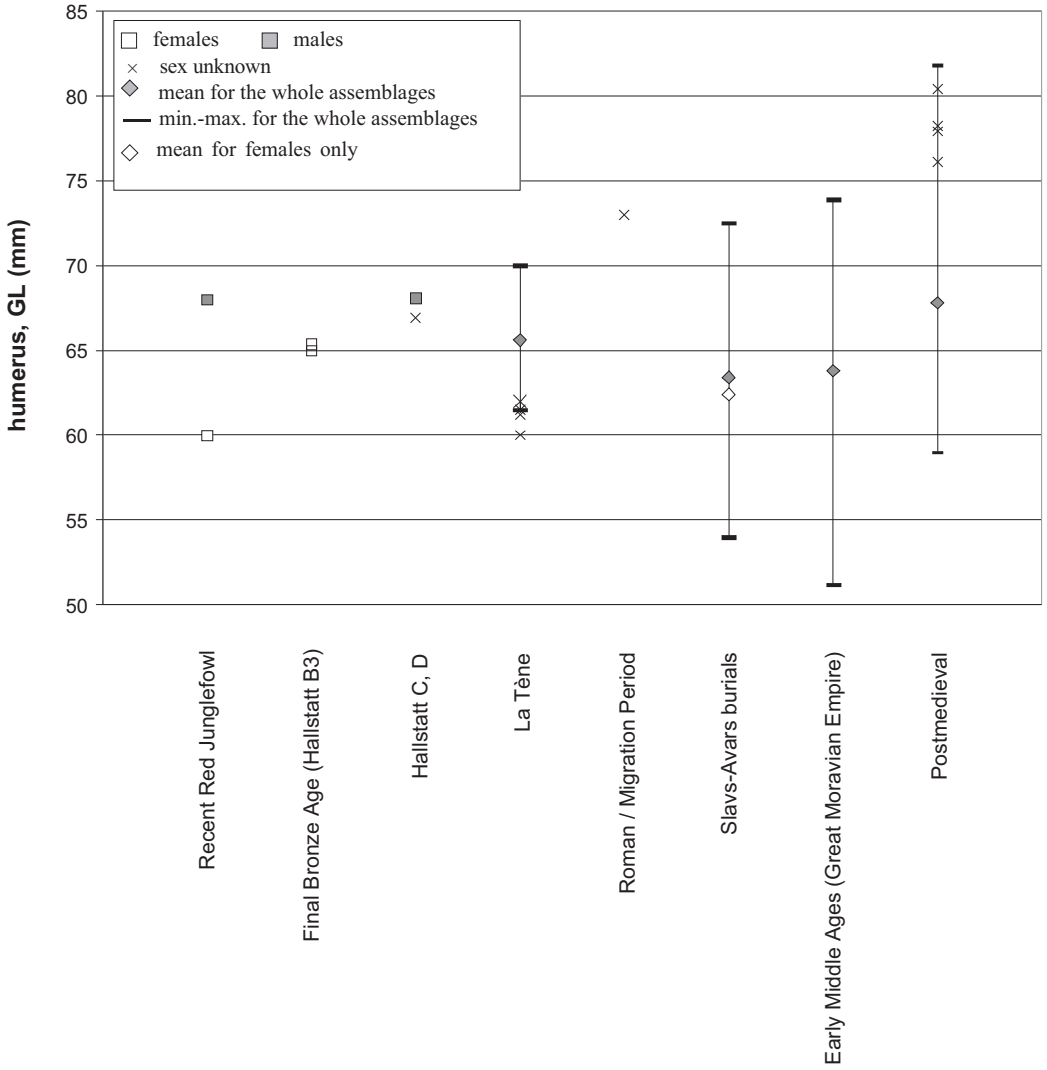

Fig. 4. Max. length of *Gallus* humerus (Y axis) in different periods (X axis). For sites and source data see Tab. II.

sets from La Tène and especially from the Early Middle Ages (Mikulčice; MLÍKOVSKÝ 2003a) and post-medieval time (Olomouc; KRATOCHVÍL 1985) are already available. Comparison is completed after selected sizes and indexes (for specification see Figs).

Comparison of sizes (Figs 4-6) shows that the earliest find, i.e. the female from Ostrov-Zápy, corresponds well with average sizes recognised in the La Tène period, in Slavic-Avaric graves, in the Great Moravian period and is also comparable with the wild ancestor, the Red Junglefowl. Individuals from the Roman Period seem to be slightly larger. Finds from the 17th century AD from the

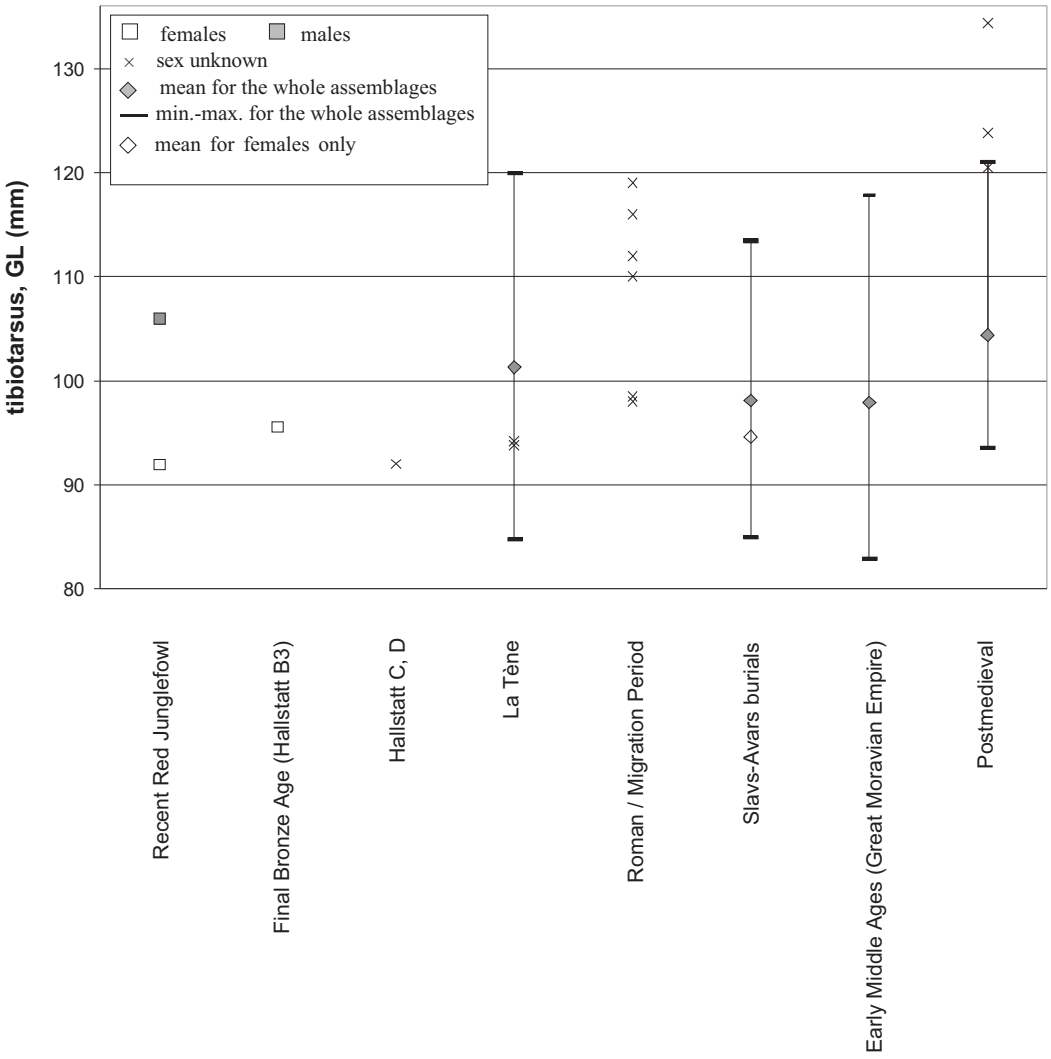

Fig. 5. Max. length of *Gallus* tibiotarsus (Y axis) in different periods (X axis). For sites and source data see Tab. II.

Náměstí Republiky (Prague; KYSELÝ 2002c) already clearly show larger sizes, which in the first half of the 16th century AD (Olomouc-Žerotínovo náměstí; KRATOCHVÍL 1985) is not so apparent. The independent existence of a larger breed besides "the standard one" is described by PEŠKE (1994c) in evaluation of material from High medieval castles (Krašov and Tetín; 13th-15th century AD), but without concrete metric data. Nevertheless, since the Early Middle Ages there must be two breeds taken into consideration in the given region: *medievalis* with a size corresponding with pre-La Tène finds, and a dwarf breed *minimum*, reaching only very small dimensions (MLÍKOVSKÝ 2003a). The existence of two size groups of fowl in Early Middle Ages (the site of Budeč) is proclaimed also by PEŠKE (1985). However, it is uncertain if the dwarf breed arose only from the Mid-

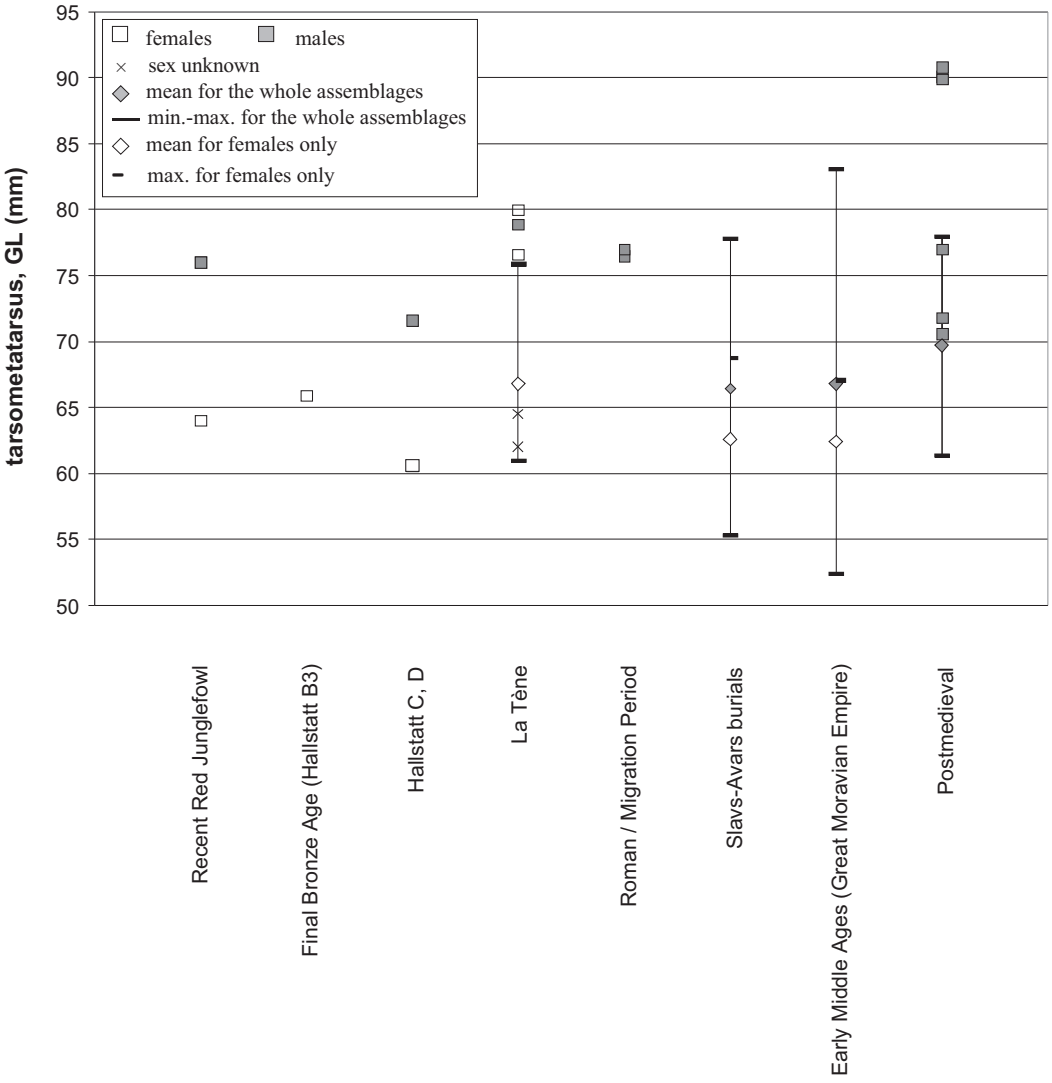

Fig. 6. Max. length of *Gallus* tarsometatarsus (Y axis) in different periods (X axis). For sites and source data see Tab. II.

dle Ages, because BOEV (2009b) mentioned large size variability and the presence of a small type (comparable to a bantam) as early as in the Balkan Neolithic (ca. 4500 BC). Although the pre-La Tène finds belong to one size type, the individuals were not of the same size (see for example the tarsometatarsus size in context of pre-La Tène finds; Fig. 6). But lack of data precludes the evaluation of general variability.

The body proportions measured by three selected indexes (rates of absolute bone lengths from completely preserved skeletons; Figs 7-9) could be evaluated within the framework of the newly de-

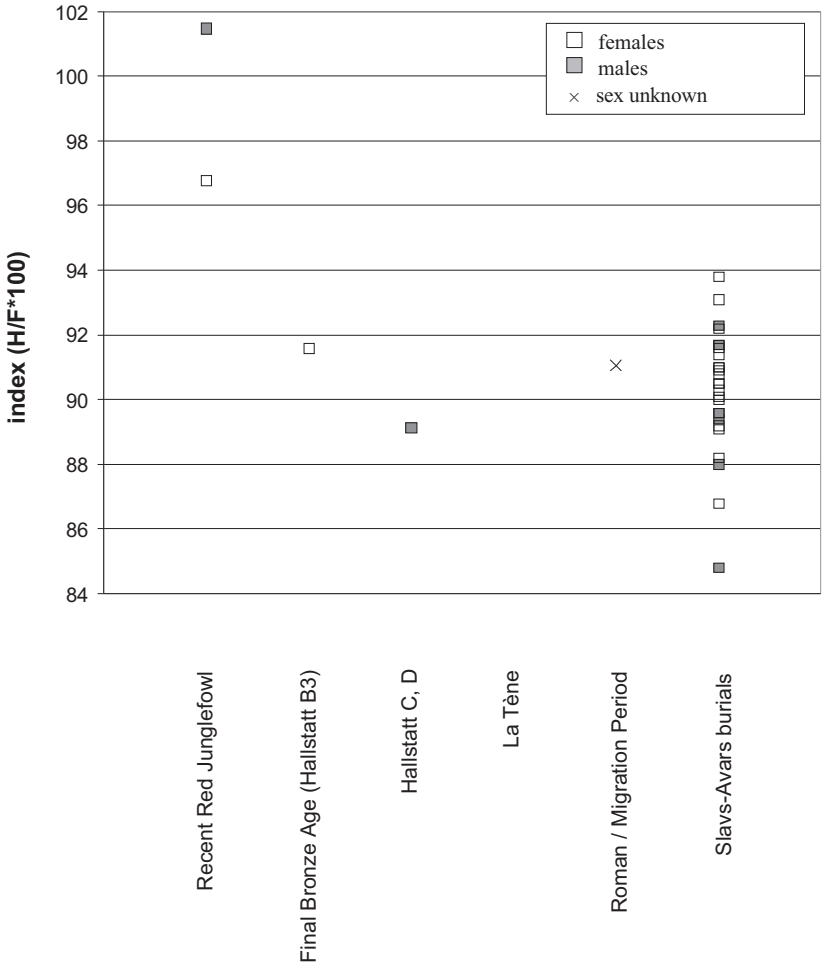

Fig. 7. Rate of humerus max. length (H) and femur max. length (F) of *Gallus* skeletons (index on the Y axis) in different periods (X axis). For sites and source data see Tab. II.

scribed finds only in the case of Ostrov-Zápy and partially in the the case of Rubín. Rich material from Slavic-Avaric graves was used for a comparison (AMBROS 1970). The size proportions of the hen from Ostrov-Zápy is clearly different from the Slavic-Avaric hens (and also from an individual from the Migration period). The find from Ostrov-Zápy has a relatively shorter tibiotarsus (compared to ulna and femur; Figs 8-9). This discovery may correspond with the reduction of flying ability during the domestication process – in such case the older find from the end of the Bronze Age would belong to a more primitive hen (i.e. with more developed distal part of the wing important for

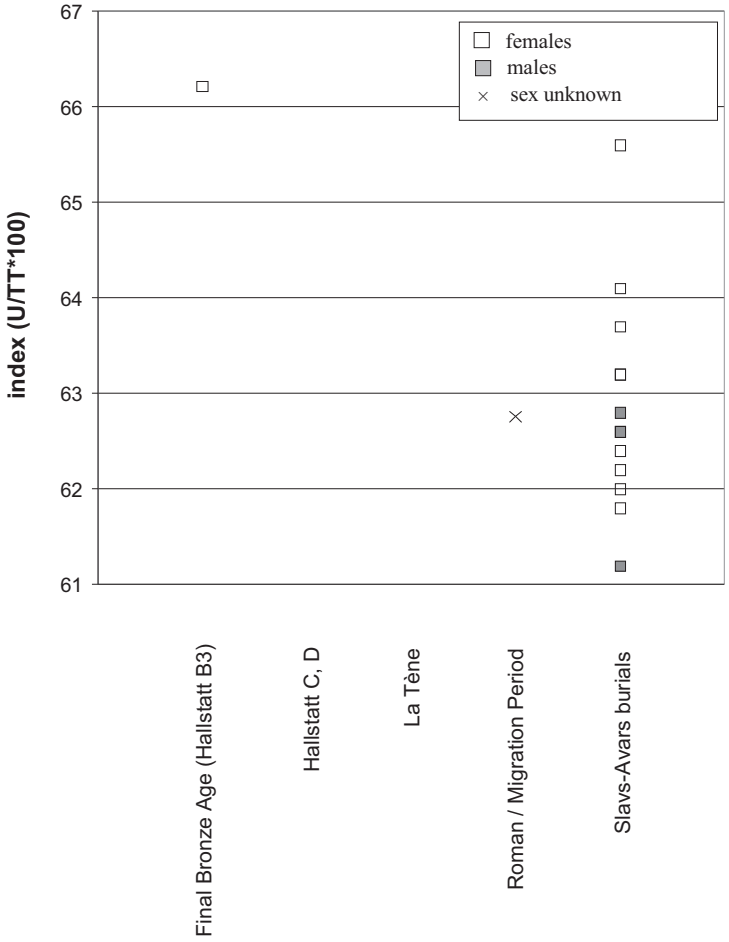

Fig. 8. Rate of ulna max. length (U) and tibiotarsus max. length (TT) of *Gallus* skeletons (index on the Y axis) in different periods (X axis). For sites and source data see Tab. II.

flying). Relatively longer wing (here according to the comparison of humerus and femur length; Fig. 7) is apparent also in the wild ancestor, the Red Junglefowl *Gallus gallus.* At the same time the distal part of the hind limb is strikingly longer in the wild form, obviously the original state of adaptation for running (compare tibiotarsus and femur in Fig. 9), which discriminates the wild ancestor from the find at Ostrov-Zápy as well as from medieval finds. The body proportions of medieval finds correspond with modern breeds (specifically with N. Hampshire, Leghorn, Vlaška; see AMBROS 1970).

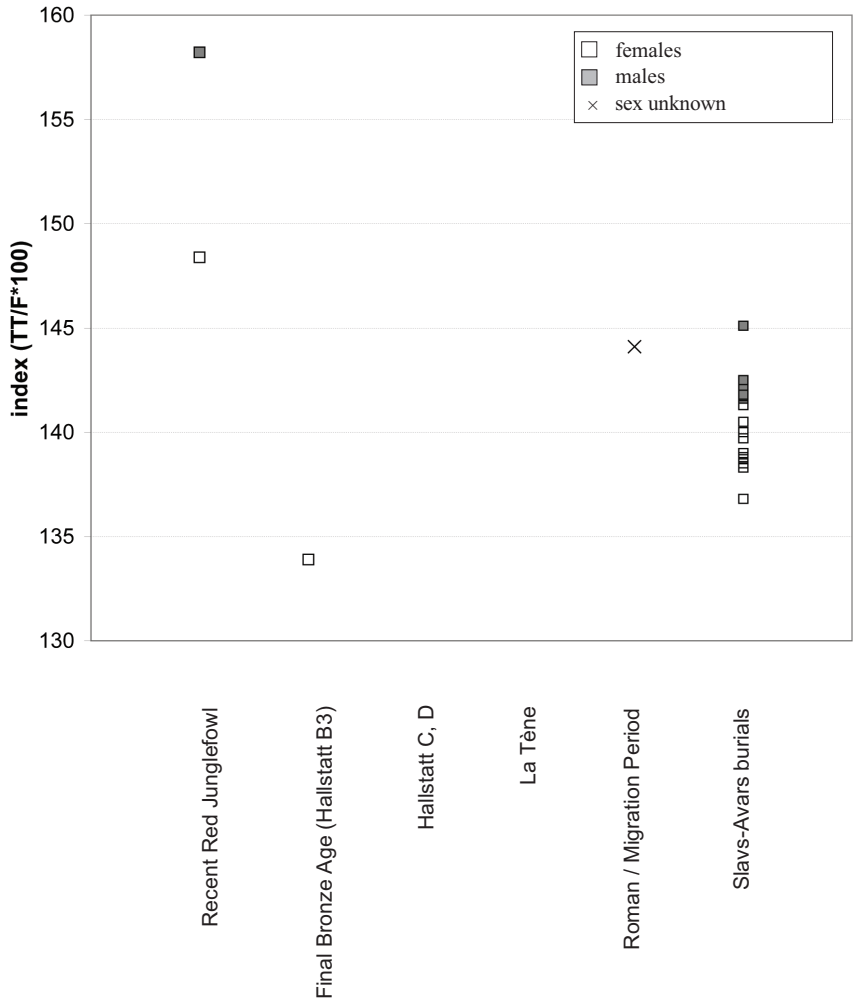

Fig. 9. Rate of tibiotarsus max. length (TT) and femur max. length (F) of *Gallus* skeletons (index on the Y axis) in different periods (X axis). For sites and source data see Tab. II.

Comparison of bone robustness (reflected by rate of bone width and length depicted against absolute bone length; Figs 10 and 11) shows that pre-La Tène finds do not fully correspond with averages observed for Early Middle Age finds from the Czech Republic and Slovakia (especially the comparison of tarsometatarsus with Slavic-Avaric skeletons in Fig. 11) and stand more to the edge of the graphically depicted distribution of the data combination for individual sexes, although the differences are not extreme.

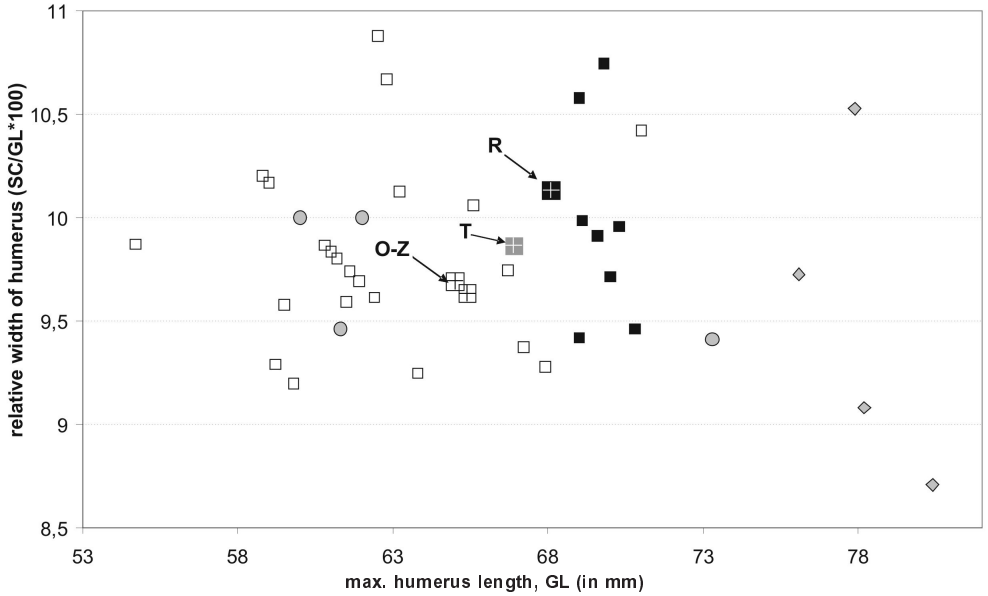

Fig. 10. *Gallus gallus* f. *domestica*: relative humerus width (Y axis: shaft width and max. bone length ratio index SC/GL*100) in comparison with the max. humerus length (X axis).
Legend: empty signs = females, black signs = males, gray signs = sex unknown; circles = La Tène and Migration Period, squares = Slavs-Avars burials, diamonds = Modern Ages, large combined signs = Final Bronze Age and Hallstatt: O-Z = Ostrov-Zápy (female, left and right side), R = Rubín (male), T = Těšetice (sex unknown). For sites and source data see Tab. II.

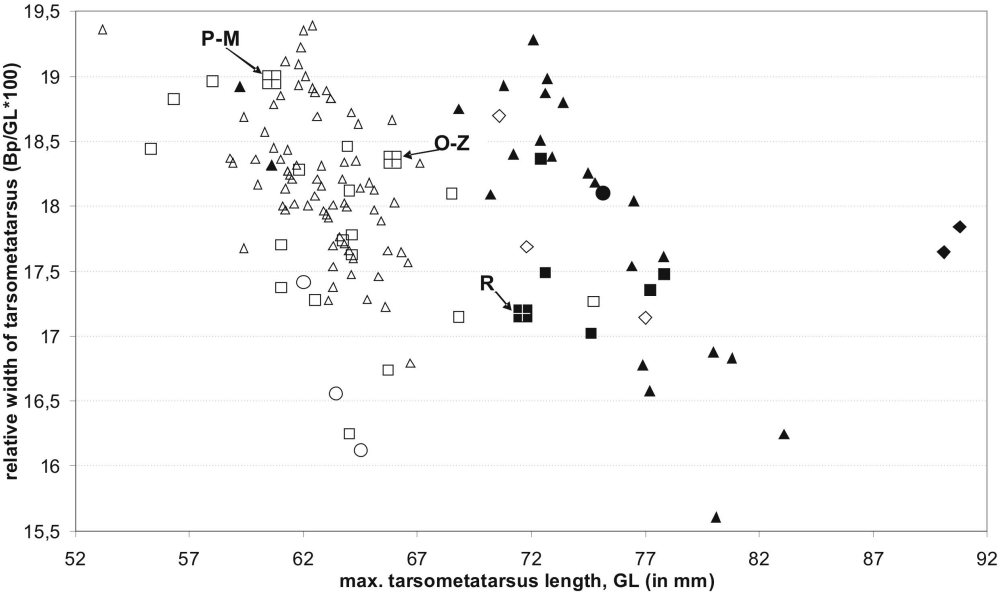

Fig. 11. *Gallus gallus* f. *domestica*: relative tarsometatarsus width (Y axis: proximal width and max. bone length ratio index Bp/GL*100) in comparison with the max. tarsometatarsus length (X axis).
Legend: empty signs = females, black signs = males; circles = La Tène and Roman Period, squares = Slavs-Avars burials, triangles = Middle Ages, diamonds = Modern Ages, large combined signs = Final Bronze Age and Hallstatt: O-Z = Ostrov-Zápy (female), R = Rubín (male), P-M = Prague-Michle (female). For sites and source data see Tab. II

VI. CONCLUSIONS

Revision of the earliest finds of domestic fowl from the Czech Republic indicate that the oldest occurrence of this bird is represented by a female skeleton from feature 176 at the site Ostrov-Zápy (Prague – east distr.) dated to the end of the Bronze Age (Ha B3, which according to current knowledge corresponds to the second half of the 9th century BC). In the opinion of the author, this find appears to be the oldest evidence of domestic fowl within Central Europe, respectively throughout the northwestern half of Europe. Other new pre-La Tène period (Hallstat D) evidence from the Czech Republic, dated also by the radiocarbon method, comes from feature 7/84-85A at the Rubín site (Louny distr.). Other bones dated to the Hallstat C or D period were found in Prague-Michle, Těšetice (Znojmo distr.), Poříčany (Kolín distr.) and Toušeň-Hradiš ko (Prague – west distr.). However other potential finds from the sites at Lovčičky (Vyškov distr.) and Prague castle-Lumbeho zahrady (Prague) dated to the Eneolithic or Bronze Age, which have been published and discussed earlier, and new similarly dated finds from Tuchoměřice (Prague – west distr.), Litovice (Prague – east distr.), Hostivice-Palouky (Prague – west distr.) and Trmice (Ústí nad Labem distr.), as well as the Hallstatt C-D find from Prague-Kobylisy cannot be considered credible due to a lack of data, impossible verification or non-conformable ^{14}C dating. The summary of the finds is given in the Tab. II and Figs 12,13.

The character of the Ostrov-Zápy and possibly the Rubín finds may reflect ritual practices, which might have played a greater role in the first period of contact between the central Europeans and domestic fowl rather than in later periods. The period of its occurrence raises the possibility that fowl was imported to Central Europe by Cimmerian tribes. The hen from Ostrov-Zápy died (was killed) in the spring.

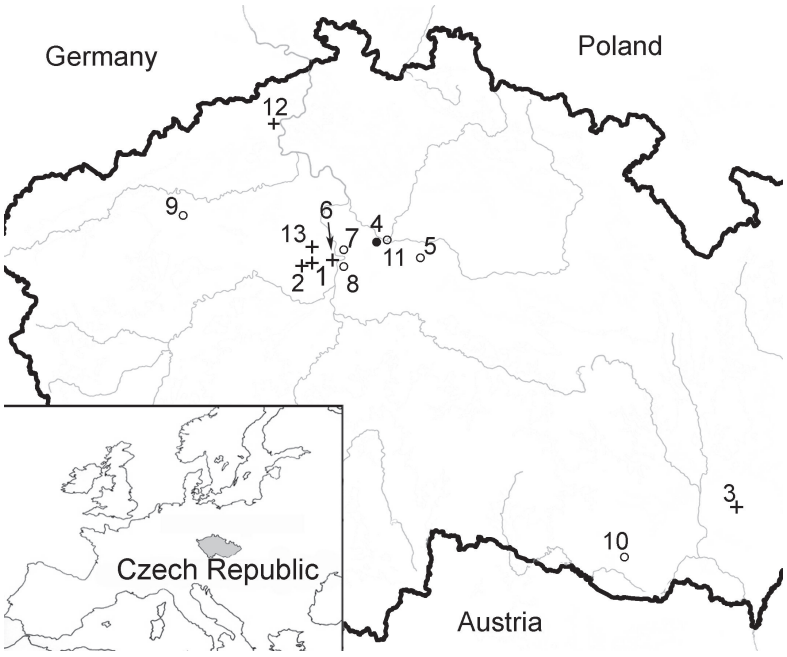

Fig. 12. Map of Czech pre-La Tène sites with the *Gallus gallus* f. *domestica* finds mentioned in text and in Fig. 13 (ordered alphabetically): 1 – Hostivice-Palouky, 2 – Litovice, 3 – Lovčičky, 4 – Ostrov-Zápy, 5 – Poříčany, 6 – Prague castle-Lumbeho zahrady, 7 – Prague-Kobylisy, 8 – Prague-Michle, 9 – Rubín, 10 – Těšetice, 11 – Toušeň-Hradišťko, 12 – Trmice, 13 – Tuchoměřice.
● – HaB3 (Final Bronze Age), ○ – HaC-D, + – unconfirmed pre-Hallstatt finds. Bold line – outline of the Czech Republic, gray lines – rivers. The map made by R. KYSELÝ.

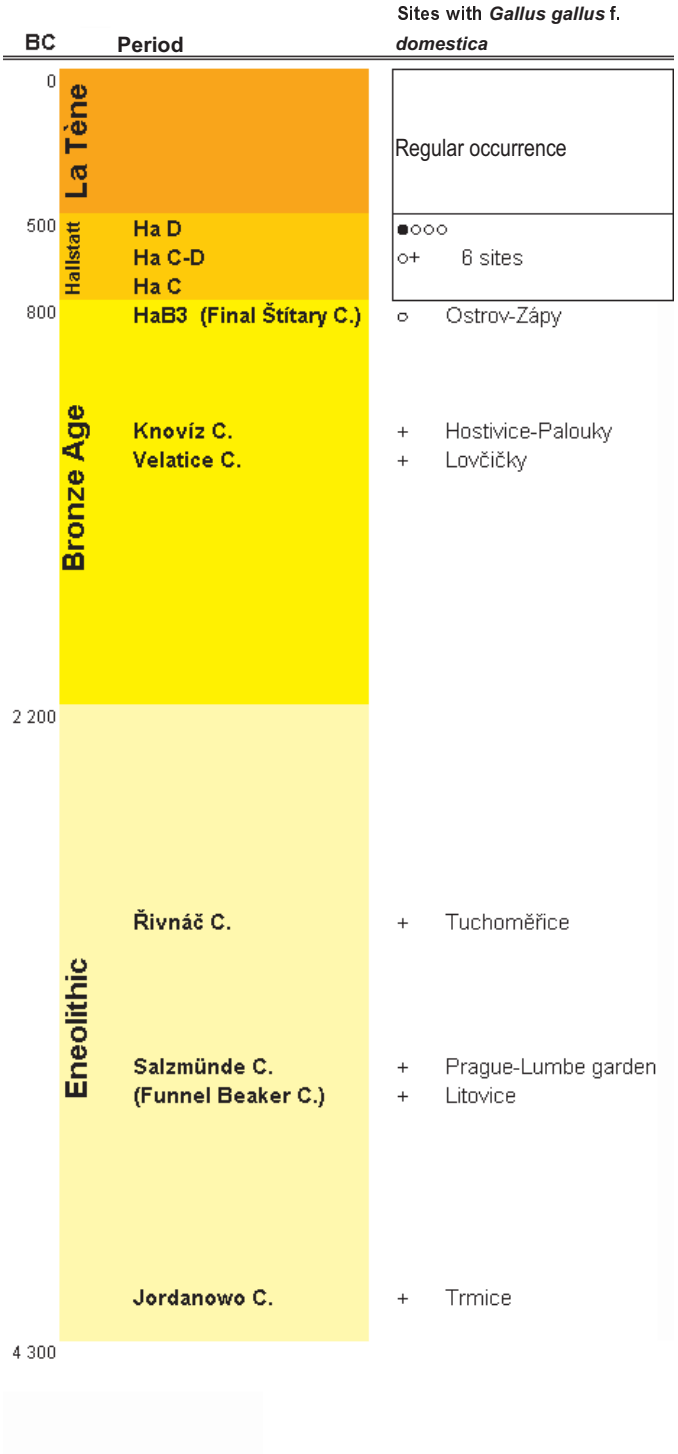

Fig. 13. Summary of the pre-Roman *Gallus gallus* f. *domestica* finds in the Czech Republic in the time scale.
+ – rejected by the author as unreliable; ○ – not rejected finds; ● – confirmed by ^{14}C dating.

Comparison with data published earlier shows that the size of the pre-La Tène fowl corresponds with the size in later periods (La Tène, Early Middle Ages), i.e. it is of smaller (but not dwarf) size. Earlier publications show evidence of a larger breed within Bohemia from the 17th century AD (and possibly in the high medieval period), on the other hand significantly dwarf breed already existed in parrallel with the "normal sized" breed in the Early Middle Ages. Body proportions of Ostrov-Zápy fowl do not correspond to later fowl finds from Slavic-Avaric graves nor to common present-day breeds since the ulna bone from Ostrov-Zápy find is relatively longer (compared to tibiotarsus), which could be a primitive feature. On the contrary the relatively short tibiotarsus (compared to femur) is different from the wild ancestor, which may be related to the reduction of the original cursorial way of life.

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