MORPHOMETRIC ASPECTS FOR *SUS SCROFA DOMESTICUS* IDENTIFIED IN SETTLEMENTS OF IVTH-XTH CENTURIES FROM EASTERN AND SOUTH-EASTERN ROMANIA

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Abstract. The paper represents a comparative study of pig (*Sus scrofa domesticus*) remains from settlements dated in IVth-Xth centuries from eastern and south-eastern Romania. The morphological characters were studied in attempt to get further insight into pig size in studied assemblages. Our results show that the pigs exploited in settlements from east and south-east of Romania were primitive. No clear chronological variation in size of pigs has been noted in the examined characteristics.

Keywords: biometry, pig, skeletal remains, IVth-Xth centuries, eastern and south-eastern Romania.

Rezumat. Aspecte morfometrice pentru *Sus scrofa domesticus* identificat în aşezări de secole IV-X din estul şi sud-estul României. Lucrarea este un studiu osteometric comparativ bazat pe resturile osoase aparţinând porcului domestic (*Sus scrofa domesticus*) identificat în aşezări din perioada secolelor IV-X din estul şi sud-estul României. Rezultatele noastre evidenţiază pentru zona studiată prezenţa unei forme mai primitive de porc. Variaţii cronologice semnificative în ceea ce priveste talia la greaban a porcului de-a lungul secolelor IV-X nu au fost observate.

Cuvinte cheie: biometrie, porc domestic, resturi scheletice, secole IV-X, estul şi sud-estul României.

Introduction

During archaeological diggings a great number of fauna remains are recovered providing information about the human relations and the various species of animals, either domestic or wild. These information permits to estimate different occupations (fishing, hunting, animal breeding) within the human communities, as well as the techniques of farming of the different species. Also animal biologic data are obtained (comparative anatomic analysis of the remains, morphological data of animals, paleopathologic data), ecological data (concerning the spread of some animal species and their various distribution in time) and also information concerning the paleomedium and its possible changes in time.

The study of skeletal variability is very important in archaeozoology in order to understand the morphological evolution of a species, variation and osteometric differences between wild boar (*Sus scrofa ferus*) and domestic pig (*Sus scrofa domesticus*), withers height estimation and possible morphological changes of species in time.

Material and Methods

A total 24 archaeozoological assemblages from Moldavia and Dobrudja have been analysed (Fig. 1, Table 1). Given that the material is quite fragmented, we focus on width dimensions of bones. Measurements were taken with a vernier caliper according to von den Driesh (1976) for the following anatomical elements: mandible, maxilla, scapula, pelvis, calcaneum, astragalus, humerus, radius, femur, tibia, metapodials and phalanges.

Some of the metric data come from literature (Table 1). The age estimation is based on fusion of post-cranial bones epiphyses and degree of occlusal surface erosion of the teeth. Unfused epiphyses and incompletely ossified (i.e. from juvenile animals) were excluded from the study. Teichert index was used to estimate the withers height of pig (Udrescu *et al.*, 1999).

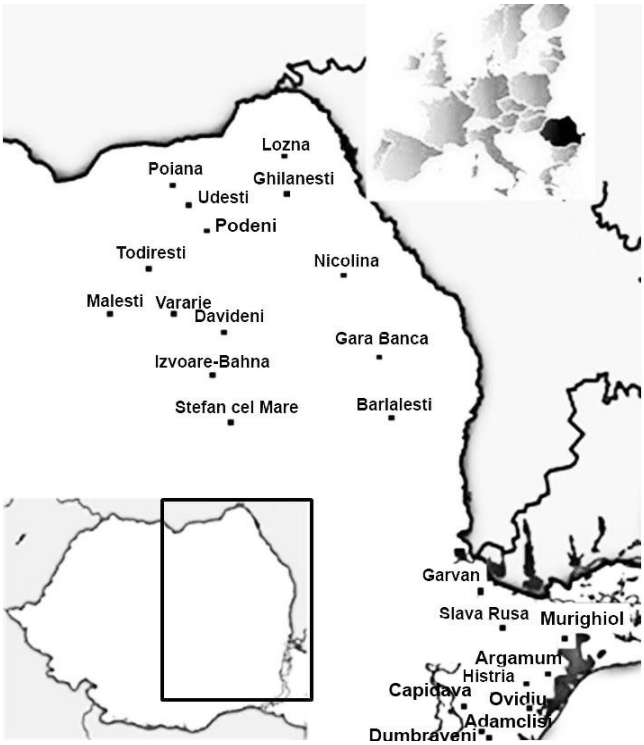

Figure 1. Map showing the location of sites that have been archaeozoologically analysed.

Results and Discussion

The archaezoological samples include 16113 domestic mammal remains and 19.58% of them belong to pigs (Table 1).

High frequencies of pig remains are found in the sites of Vărărie (45.45%) and Udești (43.81%). This could offer us an image on relative importance of pig in VIIth-IXth centuries (settlements situated in the Sub-Charpatian territory) opposite for the IIIth-Vth centuries where were observed lowest frequencies of pig: Bârlălești (7.28%), Nicolina (8.57%), Gara Banca and Ghilănești (in settlements situated in the Moldavian plain zone) (Table 1, Fig. 2). In the samples from Slava Rusă the pig remains represent 16.75% of domestic species.

Most of bone remains belong to axial skeleton; in cephalic skeleton tooth rows and mandibular symphisis were measured. High degree of fragmentation of the bones and high proportion of the young individuals in the samples are reasons why the number of measurements is relatively low (Tables 2-6).

Table 1. Quantification of mammal remains from archaeological sites in the period of the IVth-Xth centuries, from the eastern and south-eastern Romania (NISP = number of identified specimens).

Archaeological sites (County)	References	Historical period	Domestic mammals (NISP)	*Sus scrofa domesticus* (NISP)
Gara Banca (Vaslui)	Stanc, 2006	IIIth-Vth centuries	1731	215
Podeni (Suceava)	Haimovici *et al*., 1992	IIIth-Vth centuries	1019	214
Nicolina (Iasi)	Stanc, 2006	IVth -Vth centuries	933	80
Todireşti (Suceava)	Stanc, 2006; Ungurianu, 2001	IVth-VIth centuries	274	46
Davideni (Neamţ)	Haimovici, 1987; Haimovici, 1992	Vth-VIIth centuries	176	28
Stefan cel Mare (Bacau)	Haimovici, 1987	VIth-VIIth centuries	92	20
Izvoare Bahna (Neamţ)	Haimovici, 1984	VIth-IXth centuries	53	14
Udeşti (Suceava)	Haimovici & Carpus, 1982	VIIth centuries	703	308
Lozna –Străteni (Botoşani)	Haimovici, 1986	VIIth-VIIIth centuries	659	184
Vărărie (Neamţ)	Haimovici, 1987	VIIth-VIIIth centuries	77	35
Măleşti (Neamţ)	Haimovici, 1987	VIIth-VIIIth centuries	164	59
Poiana (Suceava)	Stanc, 2006	VIIIth-IXth centuries	798	243
Ghilăneşti (Botoşani)	Ungurianu, 2000	VIIIth-Xth centuries	186	26
Bârlăleşti (Vaslui)	Haimovici, 1984	IXth-Xth centuries	907	66
Gara Banca (Vaslui)	Haimovici, 1986	IXth-Xth centuries	851	92
Histria (Constanţa)	Haimovici, 2007	Vth century	518	63
Murighiol (Tulcea)	El Susi, 2008	IVth-VIIth centuries	2244	708
Slava Rusă (Tulcea)	Stanc, 2009	IVth-VIth centuries	4001	670
Garvăn – Dinogeţia (Tulcea)	Haimovici, 1991	IVth-VIth centuries	96	24
Ovidiu (Constanţa)	Haimovici, 2007	IVth-VIth centuries	78	0
Argamum (Tulcea)	Stanc, 2006	Vth-VIIth centuries	38	3
Capidava (Constanţa)	Haimovici *et al*., 2006	IVth-VIth centuries	142	16
Adamclisi (Constanţa)	Stanc, 2006; Haimovici, 2001	Vth-VIIth centuries	190	25
Dumbraveni (Constanţa)	Haimovici, 2000	IXth-Xth centuries	183	16

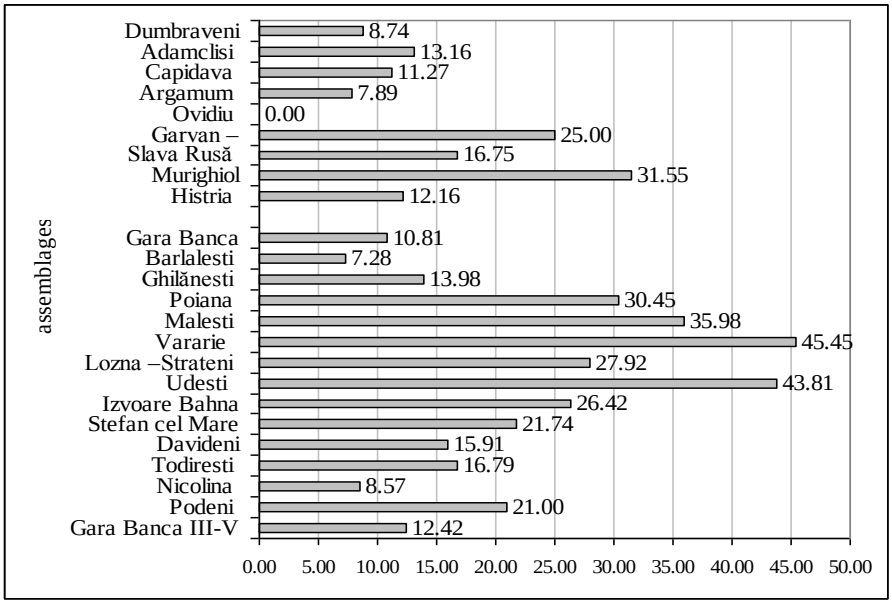

Figure 2. Pig proportions: % NISP calculated from the total domestic mammals.

In the samples without whole bones, the withers height was not estimated. In the sample of Gara Banca the withers height estimation was based on two metacarpal IV and one metacarpal III. We obtained the following values of withers height (using Teichert index): 67.61 cm, 73.92 cm and 72.7 cm (mean = 71.41 cm). At Poiana settlement the withers height was assessed based on metacarpal IV, metatarsus III and two astragalus: 73.9 cm, 78.3 cm, 73.4 cm and 74.9 cm (mean = 75.1 cm).

The pig withers height from Slava Rusă sample was estimated on five astragalus and one calcaneus; the calculated values are: 84.6 cm, 77.48 cm, 69.06 cm, 68.17 cm, 68.53 cm, 64.71 cm (mean 72.09 cm). At Adamclisi were recorded the next values for withers height: 78.37 cm and 81.6 cm. The specimens of Poiana settlement have higher withers height than those of Gara Banca, while the value of this parameter at Podeni (calculated using an astragalus) was estimated for 57 cm and it is below the lower limit of variability in other settlements. In Udești a mean of withers height by 80 cm was recorded. Existence in the withers high-class pigs and primitive characters (Udești, Poiana, Slava Rusă, Adamclisi) could suggest the crossing with wild boars.

Molar measurements, particularly, are less affected by sex, age and intra-population variation than other bones, therefore are probably more suitable for comparing populations from different sites. The lower third molar width has proven useful in this purpose (Davis, 2008). Aspects regarding the variation of pig size in time could be provided by the distribution of measurements of the lower third molar in some samples (Fig. 3). Large measurements of the lower third molar were revealed in Histria (35 mm) and Gara Banca (IXth-Xth centuries) assemblages (33 mm); the small values were showed in samples from Todirești (28 mm) and Poiana assemblages (30 mm). The measurements of the lower third molar from Gara Banca (IIIth-Vth centuries), Podeni, Nicolina, Davideni and Ghilănești could reveal individuals similar in size, though the sample size are not significant.

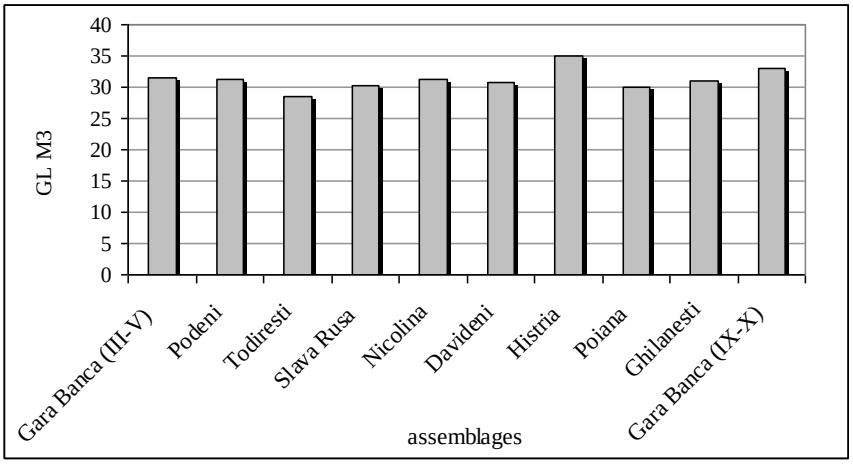

Figure 3. Length variation (in mm) for the pig lower third molar
(GL M3- great length of the lower third molar).

Table 2. Metrical data (in mm) for pig mandible (n - number of examined specimens; m - mean value of measurements, range - variation interval; LG sym - length of symphysis; GL M3 - great length of the lower third molar, GL M1-M3 - length of the lower molar row).

Variable / Assemblage	LG sym.	GL M3	GL M1-M3
	n; range; m	**n; range; m**	**n; range; m**
Gara Banca (III-V)	-	3; 30.5-32; 31.5	-
Podeni	4; 60-82; 65.5	16; 28-33; 31.25	-
Todiresti	1; 64; -	3; 27-28; -	-
Slava Rusa	-	6; 29-32; 30.33	-
Nicolina	1; 62; -	4; 30-33; 31.25	-
Davideni	1; 52; -	6; 28-35; 30.66	1; 30.66; -
Vararie	1; 69-73; -	-	-
Udeşti	3; 62-70; 66.5	-	-
Poiana	-	6; 27-32.5; 30.08	-
Ghilăneşti	2; 52-65; -	1; 31; -	-
Gara Banca (IX-X)	2; 60-65; -	1; 33; -	-

Table 3. Metrical data (in mm) for pig maxilla (n - number of examined specimens; m - mean value of measurements; range - variation interval; GL P1-M3 - great length of the upper premolar-molars row; GL M3 - great length of the upper third molar, GL M1-M3 - length of the upper molar row).

Variable / Assemblage	GLP1-M3	GL M1-M3	GL M3
	n; range; m	**n; range; m**	**n; range; m**
Gara Banca (III-V)	1; 113.5; -	1; 62.5; -	2; 30-30.5; -
Podeni	-	-	2; 29-32; -
Slava Rusa	-	-	4; 29-33.7; 30.42
Davideni	-	-	1; 31; -
Ghilanesti	-	1; 60; -	1; 29; -
Poiana	-	-	3; 29-32.5; -
Gara Banca (IX-X)	-	1; 54; -	3; 26-30; 26.66

Table 4. Metrical data (in mm) for pig flat bones (n - number of examined specimens; m - mean value of measurements, range - variation interval; GLP - greatest length of the processus articularis (glenoid process); LG - length of the glenoid cavity; SLC - smallest length of the collum scapulae; LA - length of the acetabulum including the lip).

Variable / Assemblage	GLP	LG	SLC	LA
Scapula	**n; range; m**	**n; range; m**	**n; range; m**	**n; range ; m**
Podeni	2; 29-31; -	2; 27-28; -	2; 18-19; -	-
Davideni	1; 34; -	1; 29; -	-	-
Adamclisi	1; 32; -	2; 25-29; -	2; 18-20; -	-
Gara Banca (IX-X)	1; 33; -	-	1; 22; -	-
Pelvis	**n; range; m**	**n; range; m**	**n; range; m**	**n; range ; m**
Podeni	-	-	-	1; 31; -
Slava Rusa	-	-	-	6; 27.3-30; 28.73
Davideni	-	-	-	2; 32-34; -
Garvan D (IV-VI)	-	-	-	1; 34; -
Ghilanesti	-	-	-	1; 30; -
Gara Banca (IX-X)	-	-	-	3; 29-33; 31.33
Poiana	-	-	-	3; 25.5-31; 28

Table 5. Metrical data for pig short bones (n - number of bones examined; m - mean value of measurements, range - variation interval; GLl - greatest length of the lateral half; GLm - greatest length of the medial half; Bd - greatest breadth of the distal end).

Variables / Assemblage	GLl	GLm	Bd
Calcaneu	**n; range; m**	**n; range; m**	**n; range; m**
Podeni	1; 65; -	-	-
Slava Rusa	1; 66.5; -	-	-
Astragalus	**n; range; m**	**n; range; m**	**n; range; m**
Slava Rusa	-	5; 36.8-46; 39.82	5; 19.2-26; 23.2
Adamclisi	-	1; 42.5; -	1; 25; -

Table 6. Metrical data (in mm) for pig long bones (n - number of bones examined; m - mean value of measurements, range - variation interval; Bd - greatest breadth of the distal end; BFd - greatest breadth of the facies articularis distalis; Bp - greatest breadth of the proximal end; SD - mallest breadth of diaphysis).

Variable / Assemblage	Bd	BFd	Bp	SD
Humerus	**n; range; m**	**n; range; m**	**n; range; m**	**n; range; m**
Podeni	5; 34-37; 35.2	5; 28-33; 29.6	-	-
Slava Rusă	2; 35-39.5; -	3; 30-39.5; 34.83	-	-
Nicolina	1; 38; -	1; 32; -	-	-
Davideni	1; 38; -	-	-	-
Adamclisi	1; 36; -	1; 30; -	-	-
Garvăn D (IV-VI)	1; 36; -	-	-	-
Poiana	2; 36-42; -	2; 27.5-32; -	-	-
Gara Banca (IX-X)	3; 34-35; 34.66	-	-	-
Adamclisi	-	2; 28-30; -	-	-
Radius	**n; range; m**	**n; range; m**	**n; range; m**	**n; range; m**
Podeni	1; 30; -	-	6; 23-27; 25.5	-
Davideni	-	-	2; 24-28; -	-
Garvan D (IV-VI)	-	-	1; 30; -	-
Ghilănești	-	-	1; 25; -	-
Todirești	-	-	1; 29: -	-
Femur	**n; range; m**	**n; range; m**	**n; range; m**	**n; range; m**
Gara Banca (IX-X)	-	-	1; 41; -	-
Poiana	-	-	1; 47; -	-
Tibia	**n; range; m**	**n; range; m**	**n; range; m**	**n; range; m**
Davideni	2; 26-30; -	-	-	-
Poiana	2; 27.5-28; -	-	-	-
Gara Banca (III-V)	2; 27-29; -	-	-	-
Slava Rusă	6; 24-29.5; 27.53	1; 29.5; -	-	-
Metapodials	**n; range; m**	**n; range; m**	**n; range; m**	**n; range; m**
MC IV	-	-	-	-
Poiana	3; 15.5-17.5; 16.5	-	-	2; 12-14; -
Gara Banca (III-V)	2; 16-16; -	-	-	2; 14-14; -
Metatars II	-	-	-	-
Poiana	1; 8.5; -	-	-	-
Metatars III	-	-	-	-
Poiana	1; 14; -	-	-	1; 11; -
Metacarp III	-	-	-	-
Adamclisi	1; 15; -	-	-	1; 12; -

Variable / Assemblage	Bd	BFd	Bp	SD
Mc V	-	-	-	-
Slava Rusă	1; 10.5; -	-	-	-
Phalanx 1	-	-	-	-
Poiana	1; 16; -	-	2; 14-14; -	2; 11-12; -
Phalanx 2	-	-	-	-
Dumbrăveni	-	-	1; 15; -	1; 12; -

Conclusions

The fluctuations in the role of pig in the economy of populations living in different areas, is quite relative if we consider the possible effects of quantification biases caused by differences in bones fragmentation, rate of recovery and methodology between different sites. Our results show that the pig populations exploited in settlements from east and south east of Romania were primitive in terms of morphometric patterns. No clear chronological variation in the pig size has been noted in the examined characteristics.

Acknowledgments

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