AN OSTEOMETRIC ASSESSMENT OF SUINES (*SUS SCROFA FERUS* AND *SUS SCROFA DOMESTICUS*) EXPLOITED IN CHALCOLITHIC SETTLEMENTS FROM EASTERN ROMANIA

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Introduction

Variations and changes in size and shape of an organism are the main techniques used in archaezoology to extract biological information from animal remains in order to understand the morphological evolution of a species. Morphometric technics in archaeozoology have mainly relied on combined uni/multivariate statistics and quantitative morphology based on linear measurements.

Our study is focused mainly on variation and osteometric differences between wild boar and pigs from eastern Romania in Chalcolithic period (transition between Neolithic and Bronze Age): Precucuteni (4800-4500 B.C.) and Cucuteni Cultures (4600-3500 CAL. B.C).

Material and methods

This study is based on suine remains (*Sus scrofa domesticus*, pig and *Sus scrofa ferus*, wild boar) recovered in Chalcolithic assemblages from Romania belonging the following cultures: Precucuteni (Targu Frumos assemblage) and Cucuteni (Poduri, Hoisesti and Fetesi assemblages).

Only bone remains of adult individuals were used; the estimation of age are based on both fusion of post-cranial bones epiphyses and degree of erosion of occlusal surface in teeth. The relevant measurements recorded on different anatomical elements maxilla, mandible, pelvis, astragalus, humerus, cubitus, radius, tibia and phalanges were taken using both traditional and computerised techniques. The descriptive analysis were carried out separately for each analyzed variables. We described the variability using coefficient of variation (CV%), which is dimensionless and allows a comparisons of variability of large and small bones.

To test the homogeneity of the populations, the Kolmogorov-Smirnov test was used on each variable. The measurements of variables are compared using *t-test*. Differences among pig populations were determined by Principal Components Analysis. The statistical analysis was performed by the software PAST, version 2.08b and Excel were (Haber *et al.* 2002; Hammer *et al.*, 2001).
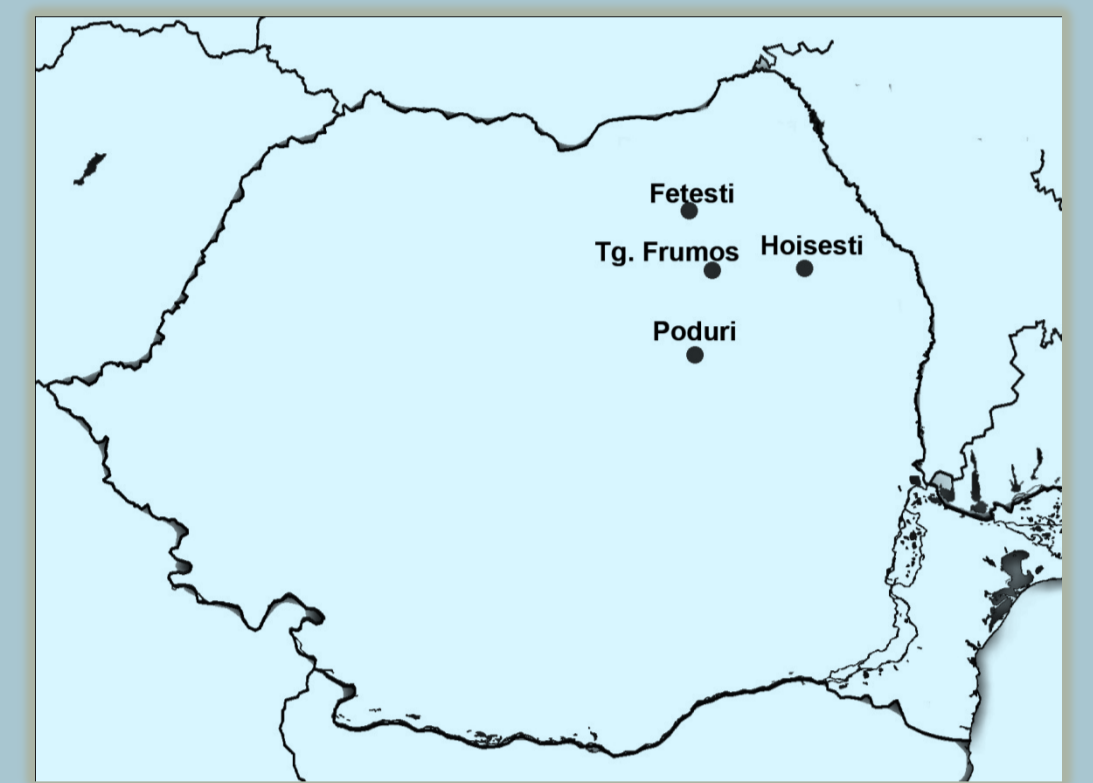

Figure 1. Map of Romania showing the archaeological sites positions

Results

The observed distribution of data were insignificant different from normality for every variable (p>0.05).

The descriptive analysis is presented for every anatomical element in Table 1 and represents an overview of the size in populations investigated.

The average and coefficient of variation for the anatomical elements for the two contexts are comparatively illustrated in figure 2.

In scapula, multivariate analysis was applied. The first two principal components of PCA represent 95% of total variance (PC1 85.3 % and PC2 9.7%) and separated the metrical data of Precucuteni and Cucuteni (Fig. 3). The great contribution in separation of samples from Precucuteni and Cucuteni is made by PC 2 in specially while a great contribution in disciminant between domestic and wild forms has the PC1. Along this axes the top loading are GL and SLC (Fig. 3).
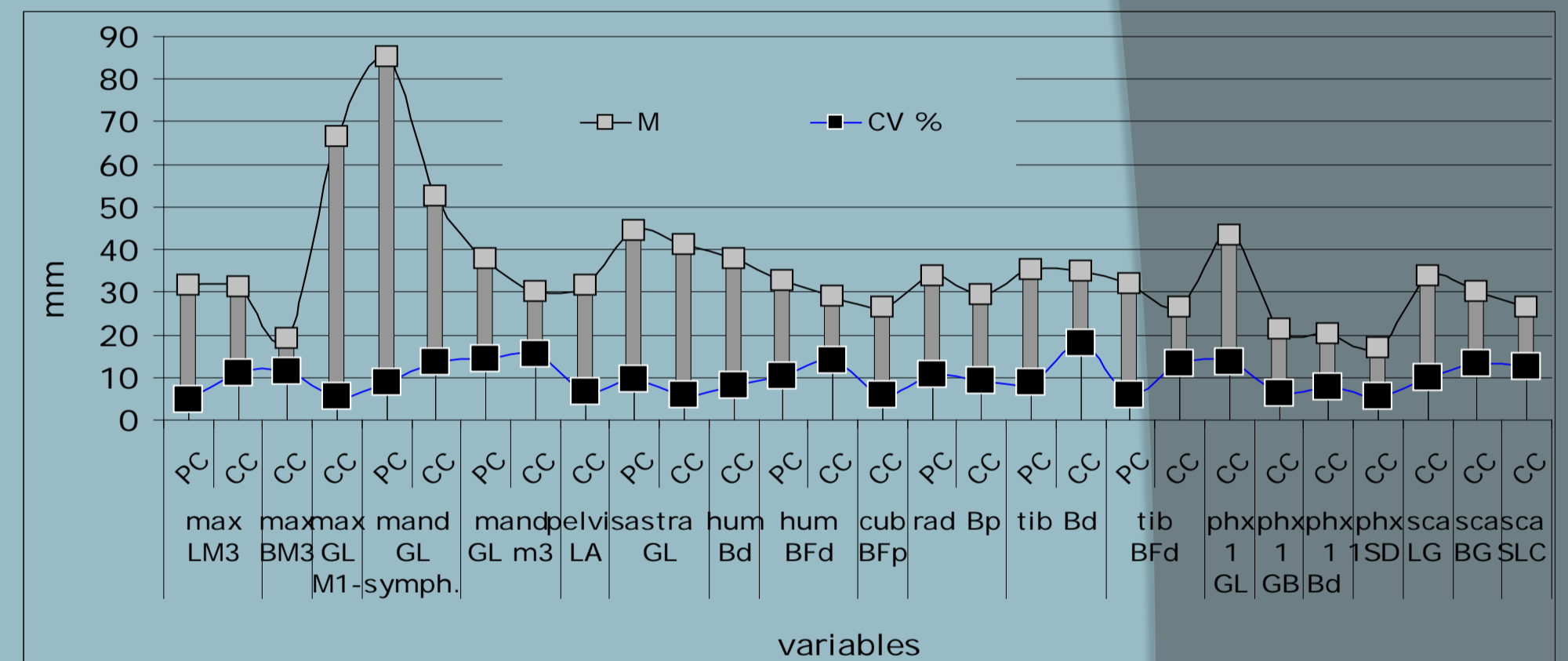

Figure 2: Mean box and coefficient of variation (C%) in pigs

Table 1: Descriptive analysis in pig measuremetns. Abbreviations: n - number of bones examined; SD – standard deviation; CV - coefficient of variation in %, Conf. Level - confidence level a mean of population); GL / GB - greatest length / breadth; Bp / Bd - breadth of the proximal / distal part; BFp / BFd - breadth of the facies articularis proximal / distal; SD Smallest breadth of diaphysis; LM3 and BM3 Length and breadth of the 3 rd molar; LG - Length of the glenoid cavity (scapula) BG - Breadth of the glenoid cavity; Cultures: PC Precucuteni Culture, CC Cucuteni Culture.

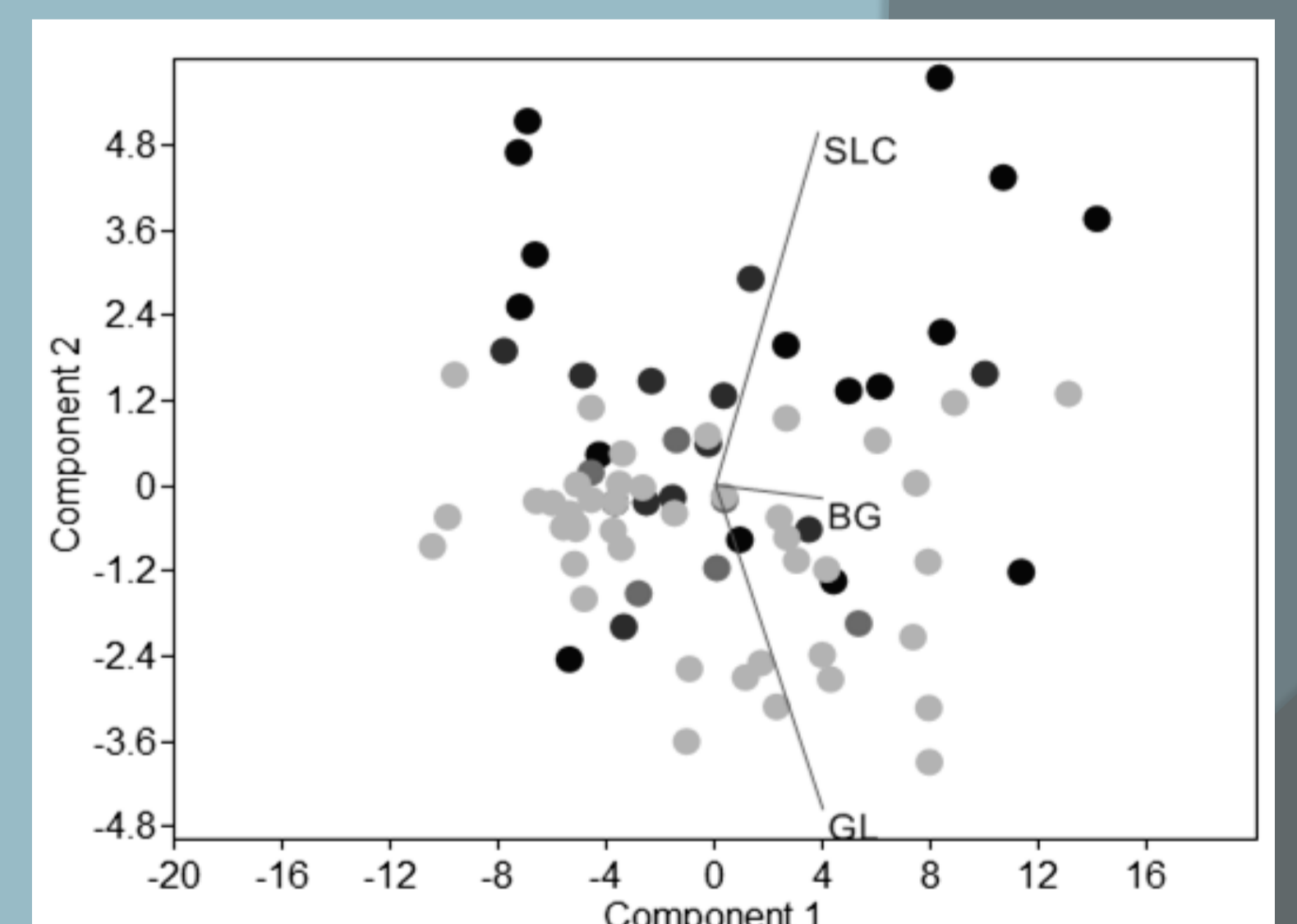| Anatomical Elements and Variable	Culture	Statistic Indices							
		n	M	SE	SD	Min	Max	CL (95.0%)	CV %
maxilla LM3	PC	7	31.71	0.57	1.5	30	34	1.38	4.72
	CC	27	31.29	0.66	3.41	26.5	40.5	1.35	10.91
maxilla BM3	CC	16	18.96	0.54	2.16	16.3	24	1.15	11.38
maxilla GL M1-M3	CC	8	66.46	1.31	3.71	63	72	3.1	5.58
mandible GL symph.	PC	10	85.4	2.41	7.63	72	94	5.46	8.94
	CC	5	52.64	3.17	7.08	47	65	8.79	13.45
mandible GL m3	PC	22	37.86	1.15	5.4	26	44	2.39	14.26
	CC	27	30.18	0.9	4.65	17	36.3	1.84	15.42
pelvis LA	CC	33	31.65	0.36	2.07	26	36	0.73	6.55
astragalus GL	PC	12	44.5	1.24	4.3	35	49	2.73	9.65
	CC	11	41.32	0.74	2.46	37	45	1.65	5.96
humerus Bd	CC	30	37.78	0.56	3.08	28	43.5	1.15	8.15
humerus BFd	PC	7	32.86	1.26	3.34	28	38	3.09	10.16
	CC	26	29.05	0.79	4.03	18	36	1.63	13.86
cubitus BFp	CC	16	26.53	0.4	1.59	24	30	0.85	6
radius Bp	PC	24	33.88	0.74	3.6	27	37	1.52	10.64
	CC	22	29.41	0.57	2.66	24	34.5	1.18	9.03
tibia Bd	PC	38	35.44	0.52	3.19	26.7	39	1.05	9
	CC	19	30.99	1.45	6.33	25	31	3.05	18.09
tibia BFd	PC	11	32	0.56	1.84	30	36	1.24	5.76
	CC	10	26.29	1.1	3.47	21	31.5	2.49	13.21
phalanx 1 GL	CC	16	43.47	1.46	5.84	33	52	3.11	13.44
phalanx 1 GB	CC	16	21.34	0.33	1.31	20	25	0.7	6.15
phalanx 1 Bd	CC	16	20.36	0.4	1.61	17	22.5	0.86	7.89
phalanx 1SD	CC	16	16.81	0.23	0.91	15	18.5	0.49	5.42
scapula LG	CC	12	33.92	0.96	3.33	28	38	2.12	9.82
scapula BG	CC	12	30.13	1.14	3.95	23	35	2.51	13.11
scapula SLC	CC	11	26.51	0.99	3.28	20	30	2.21	12.38

Figure 3. PCA of scapula measurements in *Sus sp.* Cultures: Precucuteni - grey; Cucuteni – black;Variables: SLC - Smallest length of the collum scapulae; BG - Breadth of the glenoid cavity; GL - Length of the glenoid cavity.

Conclusions

➢ The variability in characters emphasizes the presence of pig regional structures whose size varies but that fits the "palustris" type which characterized the Chalcolithic period. An decrease of pig size from Precucuteni Culture to Cucuteni Culture is obvious taking in account radius (Bp) and scapula (BG, SLC).

➢ Separations between pig and wild boar were obtained within Cucuteni sample for tibia (pig: Bd=25-31; wild boar: Bd=38-46), humerus (pig: Bd=28-43.5; wild boar: Bd=50-58) and radius (pig: Bp=24-34.5 and wild boar: Bp=37.5-45). A separation also was recorded in Precucuteni sample for radius (pig: Bp=27-37; wild boar: Bp=38-49) and scapula (pig: BG=21-31; wild boar BG=38-55).

Selective references

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