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EN COUVERTURE
Trois figurines d'ivoire de site prédynastique de Tell el-Farkha

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Ulana Zielińska

Bone material from the Lusatian culture settlement in Witów

Site 1 in Witów is located on an upland promontory at the confluence of the Vistula and Szreniawa rivers. In years 2002–2007 there were performed archeological excavations directed by Anna Gawlik and Piotr Godlewski from the Institute of Archeology of Jagiellonian University. The excavations resulted in the discovery of a fortified settlement attributed to the Lusatian culture (Gawlik, Godlewski 2006, 112–118). Moreover, a multi-cultural character of the site was confirmed, which had been earlier suggested by previous investigations led by J. Marciniak (1963–1965) and J. Rydzewski (1972, 267–294; IA, 1981, 75–77).

Materials and methods

The present study is based on fragments of mammal bones and remains of malacofauna discovered in Witów. This material was collected from an area of about 600 m² (73 archeological features and 23 trenches – excavation units 5×5 meters each). The analyzed material includes 3251 bone fragments, among which 2291 (70.47%) have been identified in relation to species and anatomy.

The features dated to Lusatian culture period produced only 512 animal bones (Table 2). All the features ascribed to the Lusatian culture were settlement pits, dated to Bronze Age Periods III, IV and V, based on the artifacts discovered in their fills.

Material collected from trenches (i.e. outside archeological features) consisted of 1353 fragments, but their scientific value is slight due to the lack of reliable cultural and chronological attribution (Table 3).

Results

a) Species distribution

The remains of mammals are most numerous among the Lusatian culture material, constituting 84.86% of the total. The remains of

Table 1. Vertebrates and invertebrates bone remains distribution with division to classes

	N	%
MAMMALS	1944	84.86
BIRDS	10	0.44
MOLLUSCS	337	14.71
TOTAL	2291	100.00

Table 2. Percentages of domestic and wild animals' bone remains from Lusatian culture features on site 1 in Witów

	N	%
CATTLE	253	49.41
SHEEP/GOAT	194	37.89
SHEEP	6	1.17
GOAT	0	0.00
PIG	25	4.88
HORSE	25	4.88
DOG	5	0.98
DEER	4	0.78
TOTAL	512	100.00

invertebrates, in the form of sweet-water mussel shell fragments, are also numerous (14.71%) (Table 1). In Lusatian culture features, 508 fragments come from domestic mammals (which gives 99.22% of the total), while game is represented only by 4 bone fragments of a deer (Table 2). Cattle bones are most abundant among the remains of domestic animals. The proportion of small ruminants is not considerably lower.

The proportions of horse and pig bones are comparable and low. A dog is represented only by 5 skeletal elements.

The distribution of species was different in the material collected from trenches. Differences in the occurrence and frequency of individual species are noticeable. Among the remains of domestic animals cattle bones are dominant, and the percentage of sheep/goat bones is lower by more than a half. The number of pig bone fragments is, in turn, three times smaller than that of small ruminants. The remains of horse and dog were discovered in considerably smaller numbers. Among wild mammals, only six bones of deer were identified, constituting merely a fraction of per cent of the total.

Species distribution within and outside archaeological features – a comparison

Frequency of the remains of individual species varies depending on the context in which they were discovered. Therefore, separate lists were made for the materials coming from archeological features (pits) and for the bones discovered in cultural layers (trenches). It should be remembered that the material obtained from outside the features could have been redeposited, and its research value is reduced.

The comparison between these two groups of osteological material leads to the conclusion that cattle bones are prevalent both in pits and in layers. The percentage of sheep and goat bones (counted together) is

considerably lower in material from the pits. The share of bone remains of pig and horse in pits amounts to 5%, and is equally low in the material recovered from layers.

The homogeneity of Lusatian materials (both from pits and layers) has been examined statistically. Test results indicate that materials from Lusatian features and from layers are not homogenous ($\chi^2 = 229.22 > \chi^2_{\alpha=0.01} = 18.5$, for $\nu = 7$). The Lusatian pits are characterized by deficit in cattle and a (slight) surplus in small ruminants, while the materials from layers are characterized by a deficit in sheep and goat as compared to cattle (Table 4).

Table 3. Percentages of domestic and wild mammals' bone remains from cultural layers of site 1 in Witów

	N	%
CATTLE	831	61.42
SHEEP/GOAT	326	24.09
SHEEP	13	0.96
GOAT	17	1.26
PIG	102	7.54
HORSE	41	3.03
DOG	17	1.26
DEER	6	0.44
TOTAL	1353	100.00

Table 4. Proportions of mammalian bone remains from Lusatian culture features and from cultural layers

SPECIES	LUSATIAN CULTURE FEATURES		LAYERS	
	N	%	N	%
SPECIES	253	49.41	831	61.42
CATTLE	194	37.89	326	24.09
SHEEP/GOAT	6	1.17	13	0.96
SHEEP	0	0	17	1.26
GOAT	25	4.88	102	7.54
PIG	25	4.88	41	3.03
HORSE	5	0.98	17	1.26
DOG	4	0.78	6	0.44
DEER	4	0.78	6	0.44
TOTAL	512	100.00	1353	100.00

Anatomic composition

For cattle, the presence of almost all parts of skeleton was recorded in the faunal debris found in pits (Table 5 and 6). Most fragments come from head and trunk, which agrees with the number of bones in the skeleton (Lasota-Moskalewska 1997). A significant part of bones comes from the proximal part of the fore limb (4% surplus as compared to the analogical part of the hind limb). The proportions of skeleton elements in distal parts of both limbs are the same. An exceptionally low proportion of

phalanges were recorded. The paucity of horn cores may suggest the occurrence of a hornless form, or may result from the sample being too small.

The remains of sheep and goat contain all elements of skeleton. Most abundant are fragments of the trunk. The proximal part of the fore limb exhibits 10% deficit as compared to the analogical part of the hind limb.

Anatomic composition of the remains of pig displays surplus in head bones, and in the proximal part of the fore limb as

Table 5. Anatomic distribution of game and domestic animals' bone remains from Lusatian culture features on site 1 in Witów

SKELETON PART	CATTLE	SHEEP/ GOAT	SHEEP	GOAT	PIG	HORSE	DOG	DEER
HORN CORE/ ANTLER	2	0	0	0	0	0	0	4
CRANIUM	17	6	0	0	1	0	0	0
MAXILLA	1	0	0	0	0	0	0	0
MANDIBLE	12	9	0	0	8	0	1	0
TEETH	14	1	0	0	7	1	10	0
VERTEBRAE	10	20	0	0	0	0	0	0
STERNUM	0	0	0	0	0	0	0	0
RIBS	91	57	0	0	0	6	4	0
SCAPULA	15	7	0	0	3	0	0	0
HUMERUS	6	5	0	0	2	0	0	0
RADIUS	6	5	0	0	0	0	0	0
ULNA	3	2	0	0	0	1	0	0
WRIST BONES	1	10	0	0	0	0	0	0
METACARPUS	24	11	1	0	1	0	0	0
PELVIS	5	4	0	0	1	0	0	0
FEMUR	11	24	1	0	1	1	0	0
PATELLA	0	0	0	0	0	0	0	0
ASTRAGAL	1	0	2	0	1	0	0	0
HEEL BONE	1	1	0	0	0	0	0	0
TIBIA	4	10	0	0	0	0	0	0
FIBULA	0	0	0	0	0	0	0	0
METATARSUS	23	5	2	0	0	1	0	0
SPLINT BONE	0	0	0	0	0	2	0	0
PHALANX I	6	10	0	0	0	1	0	0
PHALANX II	0	4	0	0	0	1	0	0
PHALANX III	0	3	0	0	0	1	0	0
TOTAL	253	194	6	0	25	15	15	4

compared to the same part of the hind limb. The percentage of distal parts is the same for the fore and hind limbs. No trunk fragments neither phalanges were found. The absence of phalanges among pig debris is quite common owing to their size, but the lack of vertebrae and ribs must be related with getting rid of the carcasses in a manner which remains unclear.

A similar anatomic distribution was found in the faunal remains recovered from layers.

Age of animals

Age analysis of killed domestic animals was conducted only for bone material from archeological features, on account of statistical reasons. The remains of young cattle constitute 3.95% of the total. This result is only slightly below the standard value for archeological materials, which is 5–8% (Lasota-Moskalewska 1997, 213).

For sheep and goat, 5% of bones come from juveniles. This value agrees with the standard one, which is the same as for cattle, i.e. 5–8%.

In the case of pig, the proportion of young individuals is below the standard value (30–35%) and is equal to 12%. This may prove that pigs were kept alive longer to obtain weight gain.

Morphology of animals

100-point scale was used for assessment of cattle morphology (Lasota-Moskalewska 1984, 119–164). 41 measurements of bone fragments from various parts of the skeleton were converted into points. Thirteen values indicate the occurrence of small individuals, while the rest (27) fall between 31 and 70 points, indicating the predominance of medium cattle. Both groups belong to the *Bos taurus brachyceros* type. The withers heights range from 92 to 108 cm. The scatter of the values indicates that there are differences in size also within the short-horn type. The above values conform to the medium form, inhabiting the European Plains (Lasota-Moskalewska 2005).

Only one measurable fragment belonged to small ruminants. The bone was identified as goat metatarsum and its dimensions were converted into points using appropriate coefficients (Schramm 1973). It was found that the withers height is 73.05 cm, which means that the animal belongs to a large form originating from southern Europe and being relatively rare in Poland (Lasota-Moskalewska 2005, 116).

Among the remains of pig, only 3 bones were measurable. The measurements were converted into points using the scale developed by A. Lasota-Moskalewska, H. Kobryń

Table 6. Anatomic distribution of cattle, sheep/goat and pig bone remains from Lusatian culture features on site 1 in Witów

BODY/ANATOMIC PART	CATTLE		SHEEP/GOAT		PIG	
	N	%	N	%	N	%
HEAD	46	18.18	16	8.25	16	64
TRUNK	101	39.92	77	39.69	0	0
FORE LIMB, PROXIMAL PART	30	11.86	19	9.79	5	20
FORE LIMB, DISTAL PART	25	9.88	21	10.82	1	4
HIND LIMB, PROXIMAL PART	20	7.90	38	19.59	2	8
HIND LIMB, DISTAL PART	25	9.88	16	8.25	1	4
PHALANGES	6	2.37	17	8.76	0	0
TOTAL	253	100.00	194	100.00	25	100

and K. Świeżyński (1987, 68). It was established that the remains come from individuals not higher than 80 cm, which suggests that this species was raised in pigpens rather than by free grazing.

Six measurements of horse bones were converted into points using the point scale developed by H. Kobryń (1989, 7–12). The results indicate the occurrence of small (3 values) and medium (2 values) individuals. One value was below the lower limit of the scale, which may point to an individual not higher than 110 cm. Such a short stature is characteristic of the Shetland pony. However, it cannot be excluded that the bone in question comes from the donkey. Its skeleton – apart from the head – does not show any major differences as compared to the skeleton of a small horse.

Marks on bones

Among the marks present on bone surfaces most numerous are those connected with butchery and cooking processes. Almost all of the analyzed bones have chopping-marks on them. Marks are found both on carcasses (rich in meat) and on other bones (cranium, mandible, distal parts of the limbs). Marks of chopping, filleting, and cutting, related to cooking processes, were recorded on several cattle ribs and one tibial bone of a small ruminant.

Considerable part of bones displayed black stains, resulting from direct exposure to fire. Such marks were found on the shafts and bases of bones of cattle and small ruminants, as well as on some horse and dog bones. They can be explained as effects of heating bone marrow for eating, roasting meat over fire, or of an accidental contact with fire.

Signs of having suffered injuries or disorders were extremely rare in the analyzed material. On metapodial cattle bones and on dog's fibula the signs of osteoarthritis

and periostitis were noticed. One rib fragment of a small ruminant displayed signs of a healed fracture. The presence of remains with pathologic changes suggests that crippled or deformed animals were not losing their value as objects of breeding (Lasota-Moskalewska 2005, 301). Moreover, crippled or deformed animals were in a way becoming “exceptional”, just by their distinctness from the remaining population. This, in turn, might significantly influence the selection of animals for ritual practices (Węgrzynowicz 1982, 110, 111). It should be stressed, that the material discovered on the Witów site gives no grounds for such speculations, however a potential role of deformed animals should be kept in mind.

Among the investigated faunal remains, several fragments of bones were found that were subject to craftsmen treatment. Signs of such treatment were discovered on horse splint bone, from which an awl was made, on the antler of deer (an unidentified tool) and on sheep and dog's ulna, which served to produce chisels.

Discussion

Extremely small number of wild animals' bones proves that hunting was practiced to a very limited degree by the inhabitants of Witów settlement. The only representative of game is the deer. Since in the Lusatian materials only the fragments of antlers were discovered and shed antlers most often used to be gathered, it is not certain that the deer was being eaten.

A high percentage of sweet-water molluscs indicates that the population of Witów supplemented their diet with molluscs. Such conclusion is additionally supported by the site's location near the river. This is a certain analogy to the Neolithic economy, where gathering of molluscs is confirmed on most of the known sites. As an example, one can mention the Funnel Beaker culture site in

Kamień Łukawski, where 506 fragments of mussel remains were found (Krysiak, Lasota 1971, 187 and following pages).

In the material studied in the present work, most abundant are mammalian remains and this fact points to the dominant role of animal husbandry. From the presence or absence of species and their abundance within an assemblage one can infer that beef and mutton were eaten most preferably, while pork was consumed only sporadically. On most of the Lusatian culture sites, in the post-consumption remains cattle debris are most abundant, which proves a particular preference towards this species (Piątkowska-Małecka 2003a, 153). The proportion of pig is equal to only a few percent. This picture seems to suggest that a particular attachment to sheep and goat breeding was a manifestation of deeply rooted pastoral traditions. Although Witów site was occupied by sedentary population, herding of small ruminants or even transhumance were probably still important in its economy.

Insignificant proportion of horse remains, along with lack of marks of culinary treatment on horse bones leads to the conclusion that this animal was not consumed by humans. Equally small is the number of dog's bones in the analyzed material. However, one of the ribs displays signs of black burning, either accidental or related with meat consumption. Analogies can be found on several Neolithic sites, where numerous dog's bones with signs of cooking treatment were discovered in the post-consumption remains. One can mention examples from the Rzucewo culture settlements in Niedźwiedziówka and Rzucewo, or from the Funnel Beaker culture settlements in Stryczowice, Ćmielów or Gniechowice (Piątkowska-Małecka, Gubernat 2003, 207–241).

Both cattle and small ruminants were slaughtered and dismembered within the

settlement, which is evidenced by the presence of almost all parts of the skeleton. Low number of phalanges does not exclude the possibility of skinning carcasses in the settlement. Most probably, the population of Witów slaughtered animals for their own needs, utilizing all elements of carcasses.

Proceeding from the osteometric analysis of cattle, the presence of small and medium forms in *Bos taurus brachyceros* type was established. Short-horned cattle was the form most widely spread on the European Plains in all prehistory, from the second half of the Neolithic. A large form, which has not been identified in the studied material, most often (except the Neolithic period) is an import, or may be a result of crossing domestic cattle with aurochs (Lasota-Moskalewska 2005, 66, 67). By converting bone measurements into points it was found that cattle breeding was stabilized and individuals were well-crossed. This proves that the population of Witów was occupied with cattle breeding for a long time and did not trade cattle with people inhabiting the steppe zone, where exclusively large *Bos taurus primigenius* occurred.

The only goat for which the withers height has been determined belongs to the large form. Such form appeared in Greece at the turning of the Neolithic and the Bronze Age. Its remains have been discovered on Magula Pefkakia site, attributed to the Dimini culture (Lasota-Moskalewska 2005, 116). Representatives of the large form measured from 71 to 85 cm at the withers. Large goat became widespread in Europe, and its northern range extended to the Scandinavian Peninsula and the Baltic states: Lithuania, Latvia and Estonia (Lasota-Moskalewska 2005, 116). The presence of large goat in Witów may suggest some economic influences or migrations from the south, although

the material is too small for any binding conclusions.

The osteometric analysis of pig debris revealed only the presence of a domestic form, raised in pigpens.

Horse bones come from small or medium individuals. Medium horses are typical of the studied period. Very small individuals can represent Shetland ponies or domestic donkeys.

The remains of individuals slaughtered after reaching morphological maturity prevail in the studied material, both in the case of cattle and small ruminants. This points to the economic breeding, which means such a breeding in which a correct ratio is maintained between young individuals slaughtered for consumption and those kept for reproduction (Lasota-Moskalewska 1997, 213).

Materiał kostny z osiedla kultury łużyckiej w Witowie

Zaprezentowany materiał kostny pochodzi z badań archeologicznych prowadzonych w latach 2002–2007 na stanowisku 1 w Witowie. Pozyskany został z obiektów osadowych kultury łużyckiej bądź z nawarstwień poza obiektami. Analizie poddano łącznie 3251 fragmentów kostnych, z których 2291 udało się zidentyfikować pod względem gatunkowym i anatomicznym. Najliczniejszą grupę stanowią szczątki ssaków (84,86%) oraz bezkręgowców w postaci muszli małża słodkowodnego (14,71%). Wśród ssaków zdecydowanie dominowały zwierzęta domowe, przede wszystkim bydło oraz drobne przeżuwacze. Materiały z obiektów oraz z warstw nie były homogeniczne – występowały różnice w udziale poszczególnych gatunków. Analiza rozkładu anatomicznego oraz wieku uboju pozwala stwierdzić, że ludność osady w Witowie hodowała zwierzęta na własny użytek, wykorzystując wszystkie elementy tuszy. W badanym materiale dominują szczątki zwierząt zabitych po osiągnięciu dojrzałości morfologicznej, co wskazuje na hodowlę ekonomiczną.

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