

**EVALUATIONS OF THE DOMESTICATION PROCESS IN SERBIA - PALEZOLOGICAL REMNANTS AT NEOLITHIC SETTLEMENT OF BELOVODE**

JOVANOVIĆ S\*, SAVIĆ MILA\*, TRAILOVIĆ RUŽICA\*, JANKOVIĆ Ž\* and ŠLJIVAR D\*\*

*Faculty of Veterinary Medicine, Belgrade, \*\*National Museum, Belgrade*

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*During research on neolithic cultural sites in North-eastern Serbia fragmented bones were revealed. Archaeological studies were initiated in order to broaden the data concerning the long, historical tradition of animal breeding, especially those concerning the phenotype and genotype of prehistoric ancestors of domestic animals in the centre of Northeast Serbia. Four phases of neolithic culture were distinguished in the settlement of Belovode according to the stratigraphy, stylistic and typological character. They were chronologically defined to belong to the period of about 5 500-4 800 years B.C. The study of the osseological material, excavated on the site, gave rise to multidisciplinary research concerning the type of animals undergoing the process of domestication. Bovine bone fragments dominated. The position, age and state of the fragments indicated Belovode as a possible centre of ruminant domestication in this region.*

*Key words: domestication, paleozoological remnants, Neolithic Serbia*

INTRODUCTION

Most of the data concerning the relationship between humans and animals in Neolithic cultures developed in Eurasia have been obtained through analysis of fauna remnants excavated at the archaeological sites at Southwest Asia. Connections, including migratory contacts between distant centres of Neolithic culture have been investigated and the relationship among settlements from Southwest Asia to Greece have been well documented (Bokonyi, 1974). However, detailed studies of the domesticated fauna, evolution and domestication occurring in the region of the Central Balkans are missing. Evaluations of the links connecting distant centres of Neolithic culture in Europe and those in the Middle and Far East are very difficult without data from the Central Balkans.

The anthropogenic influences on domesticated fauna in Serbia can be estimated from the existing variability dispersed among autochthonous breeds (Jovanovic et al, 1994, 1999) and compared to data concerning the ancestors and originally domesticated animals obtained through retrospective analysis.

Important information about the development of the domestication process and animal breeding in Europe has been obtained during the evaluation of the

Neolithic fauna excavated at sites in the Central Balkan peninsula and the South ridge of the Pannonian basin (Bokonyi, 1974). It has also been confirmed that early domestication sites in Central Europe and in Southwest Asia were connected by migrations. The agro-pastoral community of the Balkans, placed on the migratory route leading to the East and South, must have played an important role in the development of animal breeding both in Europe and in Asia.

Archaeological investigations in East and Central Serbia have been limited, so far. The site of Belovode near the village of Veliko Laole has a dominating position. It is situated between two important Neolithic centres: Vinča and Rudna Glava. Having in mind that the traces of metallurgy were detected in Vinča and the fact that early prehistoric mining centres have been located in Rudna Glava and Mali Sturac, the site of Belovode is considered to be the missing link between the two cultures and between settlements in Pannonian Basin and those further East and South. The Belovode culture must have played a role in the migratory connections of domesticated animals between central Europe and Asia.

The archaeological site of Belovode settlement has only been partly evaluated. The investigation has already revealed that mining and primary metalwork played an important role in the settlement, so the interest of the scientific community has been attracted and focused on the site (Šljivar, 1996).

#### MATERIAL AND METHODS

Belovode is geographically situated near the village of Veliko Laole, in the district of Petrovac na Mlavi. Intensive excavation at the site started in 1995. The size of the settlement is around 100 ha, but only 153 m<sup>2</sup> at the south section of the site has been evaluated so far.

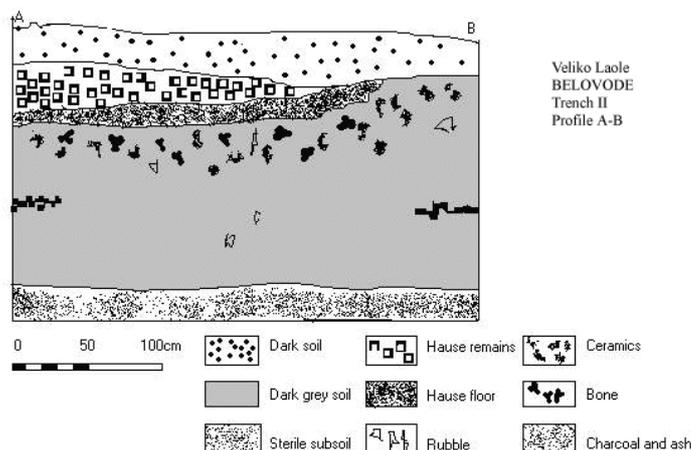


Figure 1. Belovode: Relative findings per excavated layer, trench II, profile: A-B

With the aim of obtaining more precise data concerning the chronology and localization of the archaeological material including the monitoring of assemblages in situ, seven test trenches were dug for prospecting of the site. The trenching revealed that the cultural layer was 2.80 - 3.05 m thick. The approximate thickness of each excavation level was 15 cm.

The excavated material was differentiated immediately after detection. Archaeozoological material was collected, labelled, classified and identified using standard archaeological techniques (Bokonyi, 1970). The bone remnants were packed in bags and the name of the site; date of excavation and the number of the trench were marked on each bag. Yielding sites were classified as pits or as housing/house bases in order to define the separated material.

Almost 30% of the bone remnants collected from 1995 to 2002; have been evaluated so far. The mammal bone fragments were selected and prepared for further examination and analysis. Bone remnants were divided into two age categories: immature and mature according to the existence or not of an epiphyseal border, and from the permanent and decidual teeth ratio (Janković, 1995).

The approximate age of the fauna remnants excavated was determined by radiocarbon ( $C_{14}$ ) dating (Taylor, 1987) and compared to the high chronology test results obtained by evaluation of other artefacts i.e. metalwork, figurines, stone-work etc.

## RESULTS

A total of 3.487 bone fragments, including teeth and horn, have been excavated at the site, so far.

However, preserved skeletons, whole skulls and large fragments are missing from the material yielded up to now from the animal bone material excavated at the south sector of the site.

The fragments from the Belovode collection could be divided into two groups: those originating from the pits and those excavated from the houses and/or house bases (Figure 1) which provided data concerning the consumption of meat, most frequent kills and human predation. Almost 25 % of the total fragment count was excavated from and/or near housing/house bases suggesting that the animals were exploited for human consumption.

The paleozoological material obtained contained bone fragments and no morphologically intact bones of mammal origin were found in the prospected material. Approximately 70 % (2.440) of all fragments were gnawed and damaged and/or unsuitable for differentiation of the species.

Bone fragments of large ruminant origin dominated numerically in the yielded material. After comparative analysis deer and bovine bones were separated. After evaluation of the seven well preserved base fragments of bovine horns, it was concluded that the horns belonged to separate animals showing that different bovine ancestors were present at the site. This finding suggests that bovine species and subspecies undergoing the process of domestication in Central/East Serbia were numerous.

Fragmented cervical vertebrae, ribs and the shafts of long bones were the most frequent finding. A bovine origin was confirmed in case of 439 fragments (approximately 42%). Small ruminant (i.e. ovine or caprine origin), was confirmed for 261 pieces (around 25%) and pig origin in 271 (26%). Morphological evaluation revealed 62 dog bone fragments (6%), while the rest of the fragments belonged to the wild ruminants wild cats, both large and small, and other wild mammals. Horse bones were missing from the material excavated so far.

In addition, there were ten well preserved mammal bone pieces, i. e. vertebra, ribs and mandible, belonging to species not similar to contemporary wild and domesticated fauna. These remnants were separated for further comparative analysis.

An interesting finding was that not a single bird and fish bone was excavated at the site of Belovode. The only remnant of non-mammalian origin detected in the material was one shell.



Figure 2. Horn fragments excavated at the site of Belovode

Many mandible fragments were found among remnant bones of the Belovode paleozoological collection. The study of pieces revealed that different mandibles were broken/cut in a similar pattern, suggesting that animals were methodically prepared for consumption.

The age of the animals at the moment of death was estimated from the teeth collected at the site and from epyphyseal ossification lines. It was concluded that

great majority (92 %) of bone remnants excavated from the 7 trenches were from adult animals.



Figure 3. Jaw fragments excavated at Belovode

The structure of the bone fragments collected was surprisingly well preserved and morphologically intact suggesting good health of adult animals.

The mean chronological age of the bones was approximately 5100 years B.C. and it was confirmed that the layers excavated had not been polluted with animal remnants from the later periods. The established age of the animal remnants confirms that the approximate period of cultural development of the Belovode settlement occurred 5500-4800 years B.C. spanning a period of 700 years.

#### DISCUSSION

Archaeological investigations in Serbia started at the beginning of the 19<sup>th</sup> century. The research interest was focused on the valleys of the Danube, Sava and Lower Morava rivers. The most investigated centre of Neolithic culture is Vinča, together with the other settlements belonging to the Vinča culture (Bokonyi, 1988, Legge, 1990). Cultural and typological association analysis of the Neolithic cultural settlement at Belovode revealed a close analogy to classical variant of the Vinča culture confirming that two sites were culturally connected. The finding of bed and pendant at a relative depth of 2.5 m and 1.8 m and analogy with the

findings at archaeological sites in Bulgaria and Northwest Asia (Knauth, 1977) are evidences for the linking position of Belovode.

The yield of fragmented paleozoological remnants can be considered as a normal excavation finding at a Neolithic settlement (Bokonyi, 1988). Lack of whole skulls made the distinguishing of the species undergoing the process of domestication, and the differentiation of the wild, transitional and domesticated individuals more difficult. Nevertheless, fragmented bone material allowed differentiation of the maturity, gave evidence of selective hunting, predation by man and others and some indication of the pathology.

Bone scattered around the settlement also supported the data concerning the interpolation of species in the neighbouring populations, as stated by Fosse (2002). The predatory data can give more information about the consumption of carnivorous animals, i.e. dogs. Paleozoological material excavated in Belovode was obtained from the closed pits and some from the housing/house bases. The relatively high yield of bone remnants from the house bases is unusual, when compared to the other sites of Vinča culture (Clason, 1979; Bokonyi, 1988) and suggests human predation.

Analysis of the species distribution in the archaeological levels revealed that fallow deer, stag and wild pig bone fragments followed by rare bovine remains dominated within prehistorical collections obtained from the settlements in Southeast Europe. The dominating proportion of bovine bone fragments yielded at the site of Belovode settlement is of great informative value considering the possibility of determining possible centres of bovine and pig domestication and evolution on our territory. The identification of caprine remains is also of great value, suggesting that these animals were not only present but also undergoing domestication at the Neolithic site. The most important evidence for the process of domestication is certainly the predominance of mature bone fragments, since only young animals were suitable for breeding under human control. Morphological comparison suggested that the bones belonged to individuals that were smaller compared to the existing native types of domestic animals. This finding provides some more information concerning the character of animals undergoing early domestication in Neolithic times.

The preliminary observation that most of the excavated cattle remains belonged to mature animals suggests that domesticated animals from Belovode were multipurpose bred, not only for meat. Finding of coarse fabric also supports this theory. According to observations of Willems (1998), further evaluation of bone remnants can provide information about the development of early exploitation traits regarding domesticated animals and give clues concerning the cultural evolution of the agro pastoral communities of the Central Balkan.

Evaluation of the archaeozoological material from Belovode site is a time consuming inter-disciplinary project demanding a complex scientific approach important both for natural and social science.

The unique paleozoological material excavated in Belovode demands further evaluation and identification using modern methodology in order to reveal the extent of genetic differentiation of domesticated stock compared to the transitional and wild ancestors (Vigne, 2000; Bollongino, 2002). Further investigations

should give more information concerning the evolution, domestication, genetic variability and distancing of domesticated animals compared to the wild ancestral populations. Studies on the Belovode animal remnants should also bring information about the connections between European and South-eastern domestication sites and migratory events occurring in prehistoric civilizations.

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#### Address for correspondance:

Dr Slobodan Jovanović  
Department of Animal Breeding and Genetics,  
Faculty of Veterinary Medicine  
Bul JA 18,  
11000 Belgrade, Serbia & Montenegro  
e-mail: stocarstvo@vet.bg.ac.yu

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**PROUČAVANJA PROCESA DOMESTIKACIJE U SRBIJI – PALEOZOOLŠKI OSTACI  
U NEOLITSKOM NASELJU BELOVODE**

JOVANOVIĆ S, SAVIĆ MILA, TRAILOVIĆ RUŽICA, JANKOVIĆ Ž i ŠLJIVAR D

SADRŽAJ

Ovaj rad je deo multidisciplinarnog projekta čiji je cilj proučavanje neolitskog perioda u centralnoistočnom delu Srbije. Cilj arheozološke studije je da se na osnovu proučavanja osteološkog materijala upotpune podaci za retrospektivnu analizu fenotipskih i genotipskih odlika životinja domesticiranih na našim terenima tokom neolita. U radu je opisan postupak prikupljanja, obeležavanja i obrade arheozološkog materijala koji potiče iz neolitskog lokaliteta Belovode, čija je starost procenjena na vreme od 5500-4800 godina stare ere. Kako se radi o dugoročnom projektu arheološki materijal se prikuplja i obrađuje po redosledu slojeva od najmlađeg do najstarijeg, zbog uklapanja u sve faze Vinča kulture i izrade preglednih grafikona.