

BABEȘ-BOLYAI UNIVERSITY CLUJ NAPOCA
FACULTY OF BIOLOGY AND GEOLOGY
GEOLOGY DOCTORAL SCHOOL

ARCHAEOZOOLOGICAL DATA CONCERNING THE
STOICANI-ALDENI CULTURE WITH AN ATTEMPT OF
PALEOENVIRONMENTAL RECONSTRUCTION

PH.D THESIS

SUMMARY

Scientific advisor

Prof. Dr. Vlad CODREA

Ph. D. Student

Mariana-Ioana Prociuc

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Keywords archaeozoology, faunal remains, neo-eneolithic, slaughtering, mammals, domestic, wild, cut marks, paleoenvironmental

Introduction

Archaeozoology, as science, studies the faunal remains collected from archaeological excavations and they are closely related to the community members. The quality of conservation and the quantity of the material depends on many factors: anthropogenic factors (animal butchery and preparation) and post-depositional, physical, chemical and biological factors which modify sedimentary layers and thus modifying the initial position of these bones.

The results of an archaeozoological study mainly refers to various activities practiced by the community (gathering, fishing, hunting, breeding), data about species spreading in certain historical periods, about paleoenvironmental through marker species and its possible changes in time. Also it can get information about animals' paleopathology, bone tools manufacture, inter-trade, funerary practices and/or religious rituals.

1.Geology of Bârlad Plateau

From geological point of view, Bârlad Plateau, belong to Scythian Platform (Săndulescu, 1984). The opinions about the age and the lithology of the platform basement are diverse and controversial, in spite of numerous boreholes already drilled, none of them intercepted the platform basement. Therefore, the interpretations vary by authors. In Săndulescu's (1984) opinion this platform is younger then the East European one, of which is part the Romanian sector, known as Moldavian Platfom. In Paraschiv's (1970, *fide* Ionesi, 1994) opinion the

platform could mean nothing else but a deeper block of the Moldavian Platform (a south-west area of East European Platform).

In the Bârlad area, Ștefănescu (1985) claim that the platform would extend below the eastern edge of the Carpathian Orogen and the basement would be a Proterozoic one, but he does not provide any additional details about the geological age. The boreholes drilled in Ukraine (BELOV et al., 1987) shown that the oldest rocks are Vendian black shales, while metamorphic rocks were never drilled.

In the Bârlad area, the basement is covered by four sedimentary megacycles (Codrea *et al.*, 2013): Devonian, Permian-Triassic, Jurassic-Cretaceous-Eocene, Late Badenian- Romanian (*i.e.* Miocen-Pliocen).

On such substrate, it had been accumulated the last deposits, the Quaternary ones, described as terrace deposits of various rivers, plus the soil formation processes.

In this surroundings controlled by different factors, including the geological setting, the resulted relief and the specific climate from one specific period of Holocene, the communities of Stoicani-Aldeni Culture settled down. In general the area of Moldavian Platform was an area of cultural concentration. Here, the Neolithic communities settled down, being encouraged by the soil fertility, easy access to water sources and the abundance of the fauna supported by the woody lands.

2. Previous research

2.1. Previous archaeozoological research regarding the Neolithic cultures from east and south-east Romania

Many settlements belonging to Cucuteni and Gumenița Culture, contemporaneous to Stoicani-Aldeni Culture and with a major influence in its formation, have been archaeozoological investigated. For these settlements spreaded in east and south-east area of the country, archaeozoological data, help us to understand the paleoeconomy of these communities and its variation according to geographical position for each one settlement.

2.1.1. Cucuteni Culture Settlements

This culture settlements are very numerous, but the most studied from archaeozoological point of view are the following: in Moldova Plain, Mitoc - *Valea lui Stan*, Liveni, Trușești, Bălțați, Cucuteni-Băiceni, Hoisești, Scânteia, Valea Lupului; in Moldova Subcarpathians, Pometea, Târpești, Traian- Dealul Fântânilor, Ghelăiești and Poduri-Dealul Ghindaru; in Sucevei

Plateau, Fetești, Mihoveni and Preuțești; in Bârlad Plateau, Crețești and in the Siret valley the Fulgeriș Settlement (Bejenaru & Stanc, 2013)

2.1.2 Gumelnița Culture Settlements

The settlements belonging to Gumelnița Culture are numerous as the Cucuteni Culture settlements, but only some of them have archaeozoological studies: Carcaliu, Luncavița, Hârșova, Taraschina and Năvodari. From this point of view, the level of knowledge of Cucuteni Culture is higher than Gumelnița Culture.

2.2 Previous archaeozoological research regarding the Stoicani-Aldeni Culture

The first archaeozoological analyses for Stoicani-Aldeni Culture were made by Necrasov & Bulai (1970) and the faunal remains were collected from Drăgănești settlement. These data consist of a list with identified species and the number of the remains for each species. The identified taxa are: *Bos Taurus*, *Sus domesticus*, *Ovis aries/Capra hircus*, *Canis familiaris*, *Cervus elaphus*, *Capreolus capreolus*, *Bos primigenius*, *Sus ferus*, *Lepus europaeus*, *Meles meles*, *Canis lupus*, *Vulpes vulpes*, *Equus caballus*.

More information about the archaeozoology of Stoicani-Aldeni comes from the analysis of the faunal remains from Lișcoteanca and Suceveni, which were studied by Haimovici and which I.T. Dragomir uses in the monography of Stoicani-Aldeni Culture (1983). Faunal remains from Lișcoteanca belongs to *Bos taurus*, *Sus domesticus*, *Ovis aries/Capra hircus*, *Canis familiaris*, *Bos primigenius*, *Sus ferus*, *Cervus elaphus*, *Capreolus capreolus*, *Meles meles*, *Equus caballus*. The results of the analysis show that the number of the domestic mammals exceeded 88% at Lișcoteanca and 95% at Suceveni. As MNI the situation is the same, the domestic mammals have 77% at Lișcoteanca and 83.2% at Suceveni. These results underline show how important was the breeding activity for these communities.

Between the domestic mammals the cattle are predominant with 43.5% at Draganesti vs. 71% at Suceveni and 48% at Liscoteanca. These are followed by the sheep/goat with 13.9% at Suceveni vs. 32% at Liscoteanca. The pig ranks the third place as NR with 6.8% remains at Liscoteanca, 8.5% Suceveni and 18.1% at Draganesti (Haimovivi, 1998).

The last settlement analyzed is Mălăieștii de Jos (Prahova District) (Franculeasa *et al.*, 2012, the results were explained by Andrian Balasescu. The identified species are *Bos taurus*, *Ovis aries*, *Ovis aries/Capra hircus*, *Sus domesticus*, *Lepus europaeus*.

3. Genesis, periodization, chronology, economical life, spiritual life of Stoicani-Aldeni Culture.

3.1. Genesis

This culture is a cultural facies, formed by the mixture between the greatest neighboring cultures Cucuteni and Gumelnița, located between Eastern Carpathians and Danube, as result of Cucuteni A₁ ingress in the south of Moldavia, Moldavian Republic and Ukraine. Another culture with influences in the Stoicani-Aldeni composition is the Petresti Culture, from south-west Transilvania.

3.2. Periodization

The evolutionary stages correspond chronologically to the three living levels from Suceveni and they are named Suceveni level I, level II and level III.

3.3. Chronology

The best chronological framing, ~4700-4500BC--~4300 BC, that most of archaeologists are accepting is the framing used by Dragomir in his book about Stoicani-Aldeni.

3.4 Economical life

The main activities practiced are agriculture, animal breeding, hunting, fishing and harvest, pottery manufacturing and the wood, stone, bones, fabric, animal skins handling.

4.4. Spiritual life

The lace of cemeteries and the discovery of isolated graves did not clarified the issue about the rites/Rituals of burials. The skeleton orientation from isolated graves is NE-SW, thus the skeleton have been discovered in the crouched position, with the knees slightly bent and the arms hugged.

4. Materials and methods

4.1. Material

The material submitted for this study was collected from Fruntiseni site (Vaslui), which belongs to Stoicani-Aldeni Culture.

The analyzed sampling includes anatomical elements resistant to distruction, with a strong mineralization, as bones, teeth, horns and shells. The faunal remains collected from the

site are household waste. On many bone fragments have been observed traces of human interventions (skinning cut marks, jointing cut marks, burning marks, grinding or manufacturing marks to obtain tools).

4.2. Methods

4.2.1. Sampling

The sampling involves, first of all, the dig of a section with the expected dimensions. On the field the remains are carefully unearthed, cleaning the soil with spatula, professional adjacent instrumentation (usually dental) and brush. The material is stored in bags or boxes that record the exact place where the sample was collected. Also, during the sampling we collect all the fragments because these can provide significant details in the species identification or taphonomical analysis.

4.2.2. Preparation

The material preparation consists of washing, restoration (if necessary), marking and storing it in good condition in places protected by sudden thermal variations.

4.2.3. Anatomical and taxonomical identification

This step is performed in the laboratory by identifying anatomical elements, taxon, symmetry, age and gender. Bone remains are classified as invertebrates and vertebrates, then distributed to classes according to the general characteristics, mollusks, reptiles, birds and mammals.

4.2.4 Osteometry is for registration the metric bone dimensions. The measured dimensions help us to compare the contemporaneous osteological materials, but also to understand the evolution of domestic and wild species through time. For this method we use the calipers, tape, compass and osteometrical box (Balasescu, 2004).

The measurements taken must be carried out by the same procedures at international standards (Driesch, 1976; Desse *et al.*, 1986), which are based on the delimitation of the three dimensions (length, width, thickness or height).

4.2.5. Wither high estimation is the most used information and it is in a direct relationship with the long bones. The bones used for wither high estimation are the long bones (metapodals, humeri and tibia), or short bones (astragalus and calcaneum). In a sample the

chances of long bones to be discovered entire are minimal because these can be broken as results of marrow recovery, the use of bones as raw material for tools or burnt.

For cattle wither high were used the Matolcsi's coefficients (1970), for pig Teichert's coefficients (1990), for sheep and goat Talkin's coefficients (1961), Teichert's coefficients (1965) and Schramm's coefficients (1976) and for dog Harcourt's coefficients (1074).

4.2.6. Age at death. The age at death can be estimated on the stage of bones development (epiphysis merge), the replacement of the temporary teeth with the permanent dentition and for mammals that already have the permanent dentition on the teeth wear. Dental age is based on the state of the progressively replacement of decidual teeth with the permanent teeth (Schmid, 1972; Silver, 1975; Grigson, 1982.) and for the mammals with permanent dentition observing the teeth wear (Chaix & Meniel, 2001).

4.2.7. Sexing. This estimation is based on morphological criteria, related to the pelvis morphology, horns, tusks/canines, long bones size and morphometric criteria regarding the metric data for long bones (El Susi, 1996).

4.2.8 Number of faunal remains (NR). This method consists in counting all the bones for each species, after classify the bone by species or classes. The results are expressed as a percentage on which we can perform various statistics. The disadvantage of the method is the high fragmentation ratio giving a high number of fragments.

4.2.9. Minimum number of individual (MNI), widely used, is determinate on the most common skeletal elements, taking into account the side of the bone (left/right), age and sex. This method is efficient for elucidating the economical aspects of animal husbandry and animal economy, thus, is necessary to know the number of individual and not the bones number preserved in the sediments or collected during excavation (Cavaleriu & Bejenaru, 2009).

4.2.10 Taphonomy refers to natural and anthropogenic factors that occur on a dead animal causing disorganization and dispersion of the body elements. The human actions mark the bones surface with skinning cut marks (on skull and limbs), evisceration marks, jointing marks, burnt or manufacturing, and the natural actions are related to carnivores and rodents, or climatic factors which lead to the degradation of the bones.

5. Fruntișeni Settlement

Frunțișeni archaeological site, point Fântâna babei Ștefana is located at 500 m from the village Frunțișeni (Vaslui), on the south-eastern hill Pârlitura. The site existence in this area has been announced by two locals in 2006, these two gathering from the perimeter of the site some pottery fragments which were later handed to the specialists from The Museum "Vasile Pârvan" in Bârlad.

By the summer of 2013, regular field work conducted in the area, allowed the recovery of large quantities of pottery, fragments of female anthropomorphic statuettes, stone and bone tools have enabled specialists to attribute to - based on specific typologies - the site the Culture Stoicani- Aldeni. The excavation is carried out from a section (S1) with dimensions L = 20 m and L = 2m, oriented EV. The orientation section was imposed by both the availability perimeter and slope orientation.

The faunal remains sample consists of 1283 bone fragments assigned to wild and domestic mammals, but also to mollusks, reptiles and birds (Table 1). Almost all the bones were found as fragmentary piece, thus there are few complete bones. From a total of 1150 pieces belonging to mammals, only 939 were taxonomically identified. Out of total a number of 82 pieces show a different processing stage from chaîne opératoire.

The quantification step revealed different proportion of MNI, thus the domestic mammals are predominant (Table 1). On first place is *Capra hircus* (37 MNI), *Sus domesticus* (25 MNI), *Ovis aries* (16 MNI), *Bos taurus* (13 MNI) and *Canis familiaris* (1MNI).

Bos taurus (cattle) ranks the first place as NR (176), but on the fourth place as MNI (13). The skull skeleton contains fragmentary mandible and upper jaw fragments with teeth (13%), isolated teeth (9.7%) and horns (1.7%). The post-cranial skeleton is better represented, but gathers only fragmentary bones which did not allow us to estimate the withers high. Many of these species bones have cut marks on their surface as results of slaughtering process, skinning, and carcasses dismemberment, jointing and defleshing. The slaughtering ages were estimated on teeth wear and bones fusions. This curve underlines that most of these individuals, young specimens, were slaughtered for meat (infantile, juvenile and sub adult) and the adults were raised for their secondary product (milk and strength) and breeding.

Ovis aries (sheep). This taxa occupies the third place in the site's paleoeconomy with 16 identified individuals. The skull bones (isolated teeth, mandibles and upper jaw with teeth) are less than the post-cranial bones. A complete astragalus and a calcaneum allowed us estimating

the withers high using the Teichert's coefficients (1975), for the astragalus the calculated value is 63.9 cm and for calcaneum the value is 72.2 cm.

The slaughtering curve calculated for these individuals shows that most of individuals (infantile and juvenile) were killed for the fresh meat, the sub adults, adults and mature specimens were grown for their secondary products (milk, wool) and for breeding, to supply their livestock.

Capra hircus (goat) taxon is described by 37 MNI. Most of the individuals were identified because of a great number of mandibles and horns. The skull skeleton is better represented than the post-cranial skeleton. Thus, 35% are mandibles with teeth, 14% are horn, 10% isolated teeth and 2% are skull fragments. The horns type is scimitar, *aegagrus* type, specific for females and very common for the Neolithic period in the east and south-east Romania. A complete metacarpal allowed wither high estimations (Schramm's coefficients, 1967) of 60.8 cm. The killing curve exhibits that the young specimens (infantile, juvenile) were slaughtered for meat and the subadults, adults and mature were grown, as in the case of *Ovis aries*, for milk and wool and breeding for livestock supply.

Sus domesticus (pig) occupies the second place in the paleoeconomy ranking with 25 identified individuals. The skull skeleton contains mandibles and upper jaws (36%), skull fragments (2%). Few complete bones (astragalus and calcaneum) afford the withers high estimation (Teichert's coefficients, 1990), thus the appreciated values are 75.5 cm and 65.9 cm for astragalus, and 73.2 for calcaneum. The assessed slaughtering curve, exhibit that the specimens were killed when they reached the maximum body mass. A reasonable explanation for that small number of subadults and adults individuals is that they were raised for livestock supply.

Canis familiaris (dog) has 3 remains assigned to 1 individual (one right fragmentary mandible, one right maxilla and a complete femur). The identified specimens were estimated as adults due to the presence of the permanent dentition on maxilla and mandibles and different use wear stages observed on teeth. The complete femora allowed us to estimate the withers high around 48.6 cm using Harcourt's (1974) coefficients.

Bos primigenius (aurochs) reaches the third place in the wild mammals rank. The bone number allowed us to identify 3 adults/mature individuals. All the bones are complete merged. The low number of bones entails insufficient information about this taxon from Neolithic period.

Cervus elaphus (red deer) conquers the first place in the wild mammals rank with the 8 identified individuals. The skull skeleton consists of mandibles with teeth, isolated teeth and fragments of horns. Some complete bones enabled the wither high estimation following the Godynicki's coefficients for metacarpal and Wilkens's coefficients for calcaneum, thus for metacarpal the value is 127.63 cm and for calcaneum we have three values 137.8 cm, 108,55 cm and 128.05 cm.

Capreolus capreolus (roe deer) is situated on second place, together with *Sus ferus* regarding the identified individuals (4). Due to the teeth wear and the completed merge of the bones we estimated the individuals as adults.

Sus ferus (wild boar). We estimate 4 individuals as mature 2 male and 2 female, the difference between the two them is based on the tusk characteristics. The complete bones afford the withers high estimation according to Teichert's coefficients, therefore the values for astragalus are 92.4 cm and 91.28 cm and for metacarpal the value is 100.9 cm.

Lepus europaeus (rabbit) has 7 remains assigned to 2MNI. It is possible that this species might be hunted for meat or for its fur which was used for clothes.

Meles meles (badger) has only 2 remains assigned to 1MNI. In some cases the presence of this animal in the settlement could be random since he could dig a tunnel as shelter post sedimentation, and he could die there.

Vulpes vulpes (fox) has only one bone assigned an ulna. This taxon together with *Meles meles* is present in almost all the settlements.

Canis lupus (wolf). To this taxa were assigned 3 bone fragments (one right mandible, one o left fragmentary mandible and an ulna) allocated to 1 individual. We can claim that this species was killed for fur or because he threatened people's animals.

Sus domesticus/Sus ferus is the note for the Suinae remains that could not been distributed to one specific taxa. For the same reason we use the notation for *Bos taurus/Bos primigenius* regarding the Bovidae remains and *Ovis aries/Capra hircus* for sheep/goath.

6. Slaughtering season

Concerning the slaughter season of specimens of *Capra hircus*, the most individuals were slaughtered in winter, early spring and in summer. This analysis creates the image of a seasonal slaughtering with a maximum during winter and early spring. For individuals of *Ovis aries* the

slaughtering in winter are few, less than 15%, most can be done in the second year of one's life (in spring). In both cases slaughtering spring situation could be explained by sacrificing males who dominate numerically the herd, or other reasons could be the preferences for tender meat, lack of feed for feeding, lack of food supplies for community members.

Estimated seasonality is interesting Neolithic period, especially since studies to address this issue for Romania, communities Stoicani-Aldeni contemporary cultural issues are non-existent.

7. Morphometrical description of the species

Cattle. In the sample I found both the domestic form (*Bos taurus*) and the wild one (*Bos primigenius*) which is the ancestor of domestic nowadays cattle.

The differences between the two species were established based on metric data, as wild forms exceeding the maximum dimensional levels of domestic cattle. For the talus dimensions, there is only one individual of the species *Bos primigenius* species. By comparison with the existing data for these species in sites Gumelnița, individuals rated "f" (female) correspond to the dimensions of females of *Bos taurus*, and the "m" (male) falls within the ranges for males of this species (Bălășescu *et al.*, 2005).

Humeri metric data belong to the variation of domestic cows; distal width measurements taken for humerus show a striking sexual dimorphism. The data have allowed the interception of *Bos primigenius* individuals and is setting separating limits for the two species of cattle. From dimensionally point of view the two humeri identified belongs to *Bos primigenius* females.

The proximal metacarpal dimensions, 40-50 mm, most likely originate from sub-adult individuals. The bones being fragmented, the proximal epiphyses of metacarpals may originate from the distal unfused bones. The analysis allowed the interception of an individual female of *Bos taurus*.

Metric data of proximal radius allowed the interception of an individual of *Bos primigenius*, female, two male of *Bos taurus*. The individuals, noted with Bt, dimensions may enter the field of females variation, but the remains may originate from immature specimens.

Sheep/Goat

Ovis aries is present in most archaeological sites, its percentages are highly variable but below those of *Bos taurus*. If a species does not arise in an osteological material that does not

necessarily mean it was not present, when taking into account that in all prehistoric settlements the remains of sheep and goat were present. Separating the sexes in sheep shall be based on the morphology of the pelvis, especially on the ilium (Prummel & Frisch, 1986; Hatting, 1995).

The values obtained for humeri of sheep of Frunțișeni site, are retrieved among the values of Gumelnița sheep. There is a humerus belonging to Gumelnița site Bd (distal width) of 32 mm and BT (trochlear width) of 32 mm which was awarded to a male / castrate due to the massiveness and extremely large size compared with the remains of skeletal elements.

Frunțișeni's sheep have the same conformation as the Gumelnița and Cucuteni ones, involving relatively gracile specimens. The average of the width of distal humeri (Bd) for Gumelnița specimens is 29 mm, the average of the width of proximal radius (BP) 29 mm and the width of the proximal metacarpus (BP) 21 mm (Bălășescu et al., 2005). The average of the dimensions for individuals belonging to Cucuteni Culture are higher by 1 mm, the average of the width of the distal humerus (Bd) is 30 mm, the average of the width of the proximal radius (BP) 30 mm and the average of the width of the proximal metacarpus (BP) 23 mm (Cavaleriu & Bejenaru, 2009).

Capra hircus. The horns of this species are better represented than the sheep, in the majority of Neolithic sites in Romania. All these fragments are part of the type sword, straight (scimitar) that are present predominantly in females (Kobryn et al., 1991) but can also be found in males. The size of horns, minimum and maximum diameters have enabled a chart and I surprised sexual dimorphism in the species. Within Stoicani-Aldeni samples have been no horn fragment sheep belonging to sheep, it is possible that these specimens have been unhorned, or in the published works content have not been mentioned.

The dimensions obtained for females from Frunțișeni are overlapping the values for Boian and Hamangia material. A question mark appears next to an individual whom we note that male (m), because its dimensions are smaller than those of Hamangia and Boian. In the absence of more actions this individual remains the question, although it may be a male specimens smaller than Hamangia and Boian.

The dimensions obtained goats humeri are higher than those obtained in the same element in sheep, but they are similar to materials Gumelnița Cucuteni cultures, but the closeness of cultural values Hamangia.

Pigs. The difference between domestic species (*Sus domesticus*) and the wild one (*Sus ferus*) is very difficult to be found for young animals that do not have the bones complete merged, because the wild boar is considered the ancestor of the domestic pig.

For adult individuals who have the bones differentiation is exactly as in the cattle case, using metric data. The faunal remains from Fruntișeni site belonging to boar are few, and did not allow full measurement.

Bones of *Cervus elaphus* and *Capreolus capreolus* provided few and incomplete metric data. This inconvenient occurs due to advanced fragmentation of the material.

8. Cut marks

The cut marks must be understood as accidents produced during butchery, generated by the edge of tools that come into contact with the bone surface. In most cases, many of these marks are masked by the increased fragmentation of the bones or by weathering (temperature, air humidity) and biological factors (bacteria, fungi, plants roots, carnivores) which interfere with the taphonomic process affecting the bone surface and cause mistaken observations.

The presence or absence of a taxon at a site must be considered in relation to the biogeographical setting and the site functionality. In addition, the cultural parameters or the choice of the hunter might influence the profile of the represented specimens.

After a careful study of bones surface and the comparisons with other historical period (Seetah, 2006; Lemke, 2013) I defined 5 types of cut marks: point insertion, scoop, split, chop and slice.

A point insertion mark is a straight line deeper on one side and shallower on the opposite and is situated on the insertion areas of muscle or tendons.

A scoop mark is often related to meat remnants or muscle removal that was tightly attached to the bone and presents difficulties for their removal. During this action of moving away the cutting tool breaks away a small portion of the bone surface as bone flakes.

The split types observed on the skulls and on long bones were used for soft tissue extraction (brain or marrow).

A chop is a large, substantial mark cutting deep into a bone and was observed on all types of bones belonging to large or medium-sized animals, mainly located on the bone articulations or

very close to them. Because of their position on the bone they are the result of gross disarticulation or jointing.

Lastly, a slice is a straight line which appears as a scratch greater than 5 mm in length. Slice marks are often perpendicular or oblique to the bone length, on diaphysis, but they also appear on mandibles on the buccal side as result of skinning or on the autopodial bones. The skinning process starts often from the skull, to metapodials, and in some cases up to the first or second phalanx.

This archaeological study highlighted the skeletal regions which were preferred by prehistoric communities for meat production at this Neolithic site in Romania. The results of this study of anatomical elements, the absence of skull parts and vertebrae and the abundance of stylopodial and zeugopodial elements illustrate the differential transport of carcasses. The less nutritious portions of carcasses remained at animal kill sites whereas the more nutritious portions were transported to the settlement site and defleshed and the bones were thrown away as food refuse (Bunn & Kroll, 1986)

We noticed that the cut marks are concentrated on meaty limbs of both smaller and larger animals. The main activity is focused on Units 3, 4 and 5. The cut marks clustered on the shaft, including isolated or multiple sets of parallel marks, could be the result of slicing with a sharp stone tool edge (Bunn & Kroll, 1986) or the result of social learning (Blasco *et al.*, 2013).

Moreover, the distribution of cut marks on different skeletal parts provides evidence of specific butchery across cultures and over time (Yellen, 1991). Due to the high number of marks observed on the bones, we presume that this community did not have specialist butchers (Dewbury & Russell, 2007).

9. Paleopathology

Based on the material from Frunțișeni we identified and illustrated 4 cases of pathology.

Dystrophies (or pathologies induced) were observed on bones belonging to *Bos taurus* species. A left metatarsus, has the articular surface incompletely developed on one of the condyles and on the other is almost nonexistent. This corresponds to an inflammatory arthritis caused by the use of animal for traction / force.

Another situation brings to the fore the proximal phalanx of the adult individual of *Bos Taurus*, that both distal and proximal medial presents exostosis, which were observed also on a

metatarsus belonging to the same species, all in an adult individual. These exostosis (bony growths) have an inflammatory cause produced by the use of the animal for its strength, as in the previous case (Stevanović et al., 2015; Marković et al., 2014).

The most impressive paleopathology appears on a pelvis *Bos taurus*, another adult individual suffering from osteoporosis.

Inflammation has been identified on a goat mandible, an adult specimen, showing a periostitis between M1 and M2. It may have been triggered by the type of food consumed. Infection from this area produced a special wear to M1 in contact with M2.

Very interesting is the fact that they have identified a phalanx of *Cervus elaphus* arthritic carving caused by bone fragments trapped between the joints (Bartosiewicz, 2008).

10. Bone tools

In this assemblage we identified 82 tools pieces or processing at different stages from the process. Most of the parts come from mammals, but there are two pieces attributed to birds.

The raw material comes from both domestic mammals (*Bos taurus*, *Ovis aries* / *Capra hircus*) and from the wild (*Cervus elaphus*, *Capreolus capreolus*).

Bevel-ended tools. The typological category best represented in this context, with 11 pieces inventoried, of which 7 on the colum support and 4 on flat support. The raw materials used to make them are tibias (5) and metacarpals (1) of *Ovis aries* / *Capra hircus*, ulna (1) of *Bos taurus*, ulna (1) of *Cervus elaphus* and shaft of long bones and undetermined (3).

Points. This category summarize 10 pieces, seven of which on flat support and four on volume support. For their making were used: the tibia (2), metacarpals (1) and metapod (1) of *Ovis aries* / *Capra hircus*, a tibia *Capreolus capreolus*, a bird tibiotars, shafts of long bones (3), the spinous process of a vertebra belonging to a great mammals.

Spatulas. The three identified spatulas are made of ribs of *Bos taurus* (1) and large mammals (2).

Horn

Cervus elaphus horn has been sporadically exploited, settlement and identified two finished pieces and two supports. The first piece is particularly interesting, because it seems to illustrate a process for recycling. It is a range of *Cervus elaphus* horn, whose volume was

anatomically preserved. The piece is fractured proximal to the level of the perforations carried out by a process in which they were combined percussion and rotation.

The hard materials animals industry in the settlement of Frunțișeni includes a total of 29 pieces, attributed mainly to the category of finished parts. Only two pieces of corn may be considered holders / debris. It is obvious that we are dealing with abandoned after fracturing tools, which are in different stages of wear.

11. Animal paleoeconomy of Stoicani-Aldeni communities

11.1. Harvest

Harvesting shellfish is best documented in an archaeological site because of remains recovered during the excavation. The amount depends on the community's access to other food resources and the existence of an important water course proper growth and development of the genus *Unio* individuals, the only remains recovered during the excavation. Although the food yield is low, important is that the access to this resource is fast, if the conditions above are satisfied.

Unio taxa were probably gathered for consumption, because I have not noticed any traces of processing on the valve. The fact is that they were found in the pit with the rest of osteological material studied.

11.2 Fishing

Fish remains recovered from the site of Frunțișeni are a opercular and a fragment of a flipper. The two bones most likely come from *Cyprinus carpio* (determinations made by Valentin Radu) and by their size it is a medium sized specimen. Snippets are really few, but here comes the traditional method of excavation used.

Ichthyologic material shortage makes me think that this fish arrived at the site after a commercial trade. This cannot be proved, but it is not excluded, especially as demonstrating that trade for that period, to the gears of flint (Crandell, 2012).

11.3 Hunting

The hunted animals as shown by the results of the analyzes are deer and wild boar which means that between neo-Neolithic settlements environment was favorable for these species, both being indicative of forested areas.

Hunting, especially when they involved large specimens, involves a number of risks assumed by community members, plus the technological tools used so the possibility of a specialist hunter is great.

Regardless to the importance and the number of wild specimens' remains is common ground that hunting is as old as man, was successfully practiced since ancient times and helped the paleoeconomy of the settlement.

11.4 Livestock is well documented in all the Neolithic sites of Romania. It is one of the most important activities practiced reflecting substantially the communities paleoeconomy. The large number of remains discovered in sites certifies that this activity has a primary role in the activities.

Fruntîşeni species described are cattle (*Bos taurus*), sheep (*Ovis aries*), goats (*Capra hircus*), pig (*Sus domesticus*) and dog (*Canis familiaris*).

12. Paleoenvironmental reconstruction

Environmental assessments range from wildlife sites identified in all Stoicani-Aldeni Culture, to which we added environmental characteristics of domesticated mammals to illustrate better environmental image.

Wild mammals were properly grouped their ecological characteristics:

- forest species : *Cervus elaphus* (red deer), *Sus ferus* (wild boar);
- forest border species: *Bos primigenius* (aurochs), *Capreolus capreolus* (deer), *Lepus europaeus* (rabbit);
- steppe species: *Equus caballus* (wild horse);
- euritope species (ubiquiste): *Canis lupus* (wolf), *Vulpes vulpes* (fox), *Meles meles* (badger).

The analysis shows that the most numerous are forest species, followed by the tree line and ranks last in the euritope can thus assume that Neolithic wooded areas were much higher than the current ones.

Conclusions

This synthesis aims to illustrate more precise relationship between the Neo-Eneolithic human, exactly the Stoicani-Aldeni community with the animals. I took into consideration older studies of existing sites Drăgănești, Lișcoteanca, Malaiesti Suceveni and more recently Mălăieștii de Jos. Available data for the first three sites are limited to listing identified species, without being described other aspects of the situation for animals. It is true that Stoicani-Aldeni materials are very few compared to other Neolithic cultures contemporaneous like Cucuteni or Gumelnița.

The modern methods as applied in archeozoology helped me to achieve results that have greatly enriched the knowledge about Stoicani-Alden paleoeconomy and the actions on providing food and exchanging products.

From the total remains determined, 1283, two fragments belong to birds, two to fish, two to reptiles, 127 to molluscs and to the mammals were awarded 1150 fragments. Of the 1.150 mammals remains 939 were determined as species. Thus, taxonomic terms were highlighted four classes: one invertebrate, Mollusca, and four vertebrate: Pisces, Reptilia, Aves and Mammalia. Taxonomic diversity is the highest ever encountered in a site Stoicani-Aldeni, this situation is given by the sample size.

The mollusks belong to gender *Unio*. The fish were assigned an individual *Cyprinus carpio*, fragments of reptiles to *Emys orbicularis* and birds were named Aves. Among mammals have been identified both domestic species (*Bos taurus*, *Ovis aries*, *Capra hircus*, *Sus domesticus*, *Canis familiaris*) and wildlife (*Bos primigenius*, *Cervus elaphus*, *Capreolus capreolus*, *top Ferus*, *Lepus eropaeus*, *Meles meles*, *Vulpes vulpes*, *Canis lupus*).

The high number of domestic animals shows that the main activity was the animal husbandry, with a great impact in paleoeconomy. Animal husbandry is practiced, in particular for obtaining the meat and the secondary products offered by these species, especially in the case of ovicaprinelor and cattle.

Hunting ranks a second place as importance and was practised for meat supplement. Since it requires knowledge, skill and specific tools most hunted species are deer and wild boar. The large number of remains of deer compared to other wild species indicate that deer have spreaded much larger than the present and represent a source of active hunting. Given that the two species are environmental indicators (markers) and the abundance of remains in the sample, one can say that the forested area around the site was much larger than the present.

Harvesting shellfish is not negligible. Although the amount of the bivalve meat supplied is small, the amount of the protein is sufficiently high nutrition.

Wither height calculated on various bones are obtained: for *Ovis aries* of 63.9 cm and 72.2 cm; *Capra hircus* 60.8 cm; *Sus domesticus* 75.7 cm, 65.9 cm and 75.69 cm; *Canis familiaris* 48.6 cm, *Cervus elaphus* 137.78 cm 108.55, 128.05 and 127.63 cm; *Sus ferus* 92.4 cm, 91.28 cm and 100.9 cm. *Canis familiaris* data is the first data about its physiognomy in Stoicani-Aldeni sites.

Increased hunting of wild and domestic animals for consumption is based on traces of skinning, disarticulation and fleshing observed 137 fragments of both categories of animals, most of them concentrated in areas that support a large amount of meat. Many of these traces can be masked by the fragmentation of advanced materials or taphonomical conditions.

The principle of cutting consumption is step by step from skinning animals with fur (leather), head removal from the rest of the carcass and its portioning to get smaller portions, just good cooking.

The identified tools, 29 as finished tools, are made of bone and horn and belong to different typologies: bevel-ended, points, spatulas.

As seen from the above an archaeozoological study may present aspects of a community. If the number of remains and the number of individuals capture the relation between human and animal, and it is necessary their association with other artifacts recovered from the sites.

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