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BIOARCHAEOLOGICAL EVALUATION OF THE EARLY NEOLITHIC SITE OF RAPOLTU MARE-SEGHI (HUNEDOARA COUNTY, ROMANIA)

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Abstract

Animal remains and phytoliths deriving from the Early Neolithic site of Rapoltu Mare-Seghi (Hunedoara County, Romania) are used for obtaining data regarding the palaeoenvironment of a Starčevo-Cris community. Bioarchaeological information in this paper is important considering that the beginning of the neolithization in the southwest Transylvania is still poorly documented. Archaeozoological analysis offers information on the settlement palaeoeconomy and phytoliths are reliable markers for the vegetal environment in this area. The most animal remains come from domestic mammals, especially cattle (Bos taurus) and sheep / goat (Ovis aries / Capra hircus); few remains of dog (Canis familiaris) and wild mammals (aurochs – Bos primigenius and wild boar – Sus scrofa) have been also identified. The absence of pig (Sus domesticus) suggests that the Starčevo-Cris community of Rapoltu Mare-Seghi had a high mobility, specific to shepherds. Phytoliths assemblages show the net dominance of grasses, several subfamilies of Poaceae family being attested. ELONGATE DENDRITIC forms are quite well represented, suggesting an anthropogenic accumulation; but it does not just mean that the cereal cultivation was practiced by the Rapoltu Mare-Seghi community. Bioarchaeological data indicate an open environment around the settlement, where people bred especially cattle and sheep/goat flocks.

Keywords*: Animal remains; Phytolith; Early Neolithic; Transylvania*

Introduction

Archaeological research conducted so far indicates that the appearance of the Early Neolithic in south-western Transylvania occurred at the passage between the 7th and 6th millennium BC, following the climate crisis known as the *8.2ka Cold Event* [1]. People of the Starčevo-Cris culture migrated from the south of the Danube and occupied almost all forms of relief in the vicinity of the Mures river [2], being attracted by suitable areas for animal breeding and grazing, and fertile lands for plant cultivation. Hunting and gathering molluscs and wild plants could have supplemented the food resource of these first Neolithic communities established in the Mures valley.

The archaeological site of *Seghi* (Lat. 45° 51'11.1" N, Long. 23° 03' 58.5" E, Alt. 205m), also known by the names Sedi [3] or Siediu, is located at about 3 km north from the city of

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Simeria and at about 1.0km, on the southwest direction, from the village of Rapoltu Mare and from the confluence of the rivers Strei and Mures (Fig. 1). Compared to the Mures river course, the terrace on which the site is located is on the right side, its altitude varying between 6-10m above the river meadow. This archaeological site is known since the second half of the 20th century [3] and subsequent archaeological researches provided information on the chronological and cultural horizons - from the Early Neolithic to the Middle Ages [4].

Fig. 1. Location of Rapoltu Mare-*Seghi* site

The natural environment of the Rapoltu Mare-*Seghi* site is noted by a diversity of raw materials, especially crystalline shales visible on the south edge of the terrace, where traces of exploitation are also observed. Such rocks were considered by geologists as belonging to the "Rapolt crystalline island" [5]. At about 1.0km north from the central part of the *Seghi* site, the area is bordered by the volcanic basket of neogene age named Magura Uroiului, altitude of 389m [6, 7]. Andesite [6] or quartz-trahyandesite of Uroi [7], the rock that forms the volcanic nipple Magura Uroiului, represented an important source of raw material in Roman period, Middle Ages, but also in prehistoric times, as the results of archaeological research indicate [8, 9]. In the north and northeast of the site, at about 1.5-2.0km, there are crystalline shales and travertine deposits, extremely useful as building materials; travertine was identified in different archaeological contexts, from the Early Neolithic to the modern period [10, 11].

In this context of natural resources, we also mention the presence of terrace springs, on the south and east edges of the Rapoltu Mare-*Seghi* site; active at present too, they represented another advantage for the human communities that occupied this settlement over time.

This study evaluates from the bioarchaeological perspective the beginnings of the neolithisation in the southwest of Transylvania, valuing animal and plant remains (i.e. mammal skeletal remains and phytoliths) discovered in the Early Neolithic site of Starčevo-Cris culture from Rapoltu Mare-*Seghi* (Hunedoara County, Romania). Phytoliths, siliceous micro-remains that form in plants, can be preserved both in modern soil and sediments, but also in fossil ones, as well as in archaeological contexts [12, 13]. In this study, the analysis of phytoliths is used to find out information about the environment in which the Early Neolithic community from Rapoltu Mare-*Seghi* lived.

Our study aimed to identify and evaluate animal and plant resources used by the inhabitants of the Early Neolithic settlement at Rapoltu Mare-*Seghi*. Correlating the archaeozoological and archeobotanical data gives an important perspective for knowing the past, a way that has already been applied for some prehistoric sites in Romania, such as those of Costesti [14] and Raucesti [15].

Archaeological Context

During the surface archaeological surveys of the first terrace, on the right bank of Mures River, in an area of about 4000m^2, representative samples of ceramic and lithic materials belonging to the Early Neolithic were found. During a field survey in 2013, in the central area of the site, towards the south edge of the terrace, an archaeological complex, noted C1 (Fig. 2), was identified, with early Starčevo-Cris ceramics along with a rich and diversified fauna material.

Fig. 2. Study area – Rapoltu Mare-*Seghi* site (drone photography, Dr. M.G. Barbu)

Complex C1, which could be a house, is located on a slight slope of the terrace, with an inclination toward the southeast. Although the agricultural works have changed the shape and structure of the complex, it seems that at about 0.40m from the actual level begins the house, possibly of surface, represented by an agglomeration of archaeological materials, such as ceramics, lithic artefacts and animal skeletal remains.

From the top of the C1 archaeological complex, osteological material was collected (i.e. astragalus of *Bos taurus*) for 14C dating at "Horia Hulubei" National Institute of Nuclear Physics and Engineering (IFIN-HH), Bucharest-Magurele. The obtained result gave the following date: 6897±28 BP (Ro-AMS 11–11); the calibrated date (σ = 2) is 5841-5723 cal BC, with a probability of 95.4% (Fig. 3).

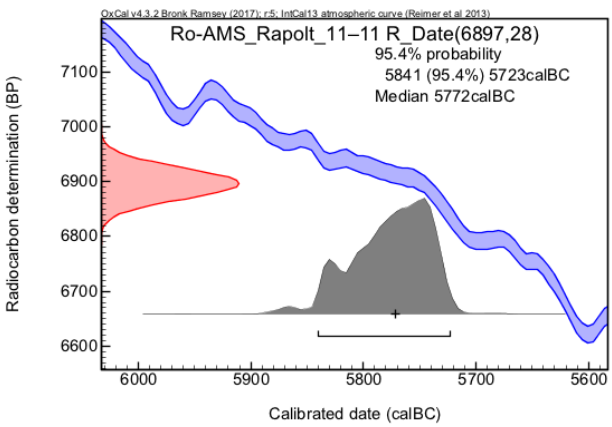

Fig. 3. 14C dating of the C1 archaeological complex

It should be mentioned, however, that the obtaining a bone sample from the fauna material recovered on the soil surface, as well as the existence of a single 14C data from C1, prevent us from making more detailed observations regarding the absolute chronology of the complex; the 14C data from C1 rather indicates the end stage of the complex.

Materials and Methods

Archaeozoology

Animal skeletal remains recovered from the Early Neolithic site of Rapoltu Mare-*Seghi* are of domestic origin, presenting numerous traces of human intervention (cuts and splits of butchery, burn marks), but also traces left by the teeth of other animals (dog most often). We mention that the fauna remains were collected only "by hand", without sediment sieving, which could have been cause the loss of small fragments, with a possible underestimation of the smaller species.

The archaeozoological analysis was carried out within the Faculty of Biology, in "Alexandru Ioan Cuza University of Iasi, respecting the specific methodology, which consisted mainly in anatomical and taxonomic identification, taphonomic evaluation, estimation of age at death, recording and quantification of data [16-18].

Archaeobotany

Five samples of sediment were collected from the cultural layer (Fig. 4). The samples, at most 3 grams each, were subjected to a chemical protocol adapted according to *Lentfer and Boyd* [19], using hydrochloric acid (35%), sodium hexametaphosphate, sodium polytungstate, and hydrogen peroxide. The rinsed and dry extract was poured into ethanol, after which few drops were fixed on a microscopic slide using immersion oil. The nomenclature used is that according to International Code for Phytolith Nomenclature 2.0 [20]. All preparations were observed with a transmission optical microscope (400×). For each sample, a sufficient number of phytoliths (over 280) were identified to obtain a statistically valid result, with the exception of a single sample (RPT 1), in which only 40 phytoliths were identified.

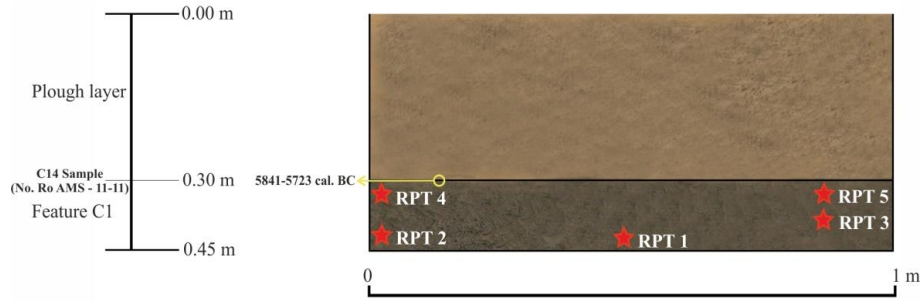

Fig. 4. Profile of the cultural layer from which the sediment samples (RPT 1 – RPT 5) were collected

Results and Discussion

Archaeozoology

From the C1 complex, 133 skeletal remains were collected, all of mammals; their degree of identification (number of identified remains x 100/total number of remains) is about 47%. As is shown in Table 1, the most remains come from domestic mammals (94%): cattle (*Bos taurus*), sheep/goat (*Ovis aries*/*Capra hircus*) and dog (*Canis familiaris*). Cattle have the highest frequency, being followed by sheep/goat; pork remains are missing. Only two wild species were identified: aurochs (*Bos primigenius*) and wild boar (*Sus scrofa*). Based on the analysed remains, at least 9 individuals were estimated: four of cattle, two of sheep/goat, and one for each of dog, aurochs and wild boar (Table 1).

The absence of pig remains should not be surprising, given that the analysed sample is small, and previous archaeozoological research has shown that in Early Neolithic sites of Starčevo-Cris culture, the frequency of this domestic species is very low. Thus, for Starčevo-Cris sites in Transylvania an average frequency of pig remains of only 1.23% was estimated [21], indicating that the respective communities had a high mobility, specific to shepherds with herds of cattle and sheep/goat, always in search of lands for animal feed.

The age distribution in cattle (three mature individuals and one immature) and sheep/goat (one immature individual and one mature), according to Schmid [16], indicates a mixt economic strategy associated with primary and secondary products. Due to the small number of remains, it was not possible to carry out a detailed analysis of the age classes. However, we can appreciate that cattle and sheep/goat husbandry were oriented towards meat and milk, with fiber exploitation apparently marginal (no old animals have been identified).

The frequency of the skeletal remains on the anatomical criterion, in cattle and sheep / goat, indicates the presence of all animal body parts (Fig. 5). So, it seems that the inhabitants processed whole animal carcasses in the site rather than selected pre-treated parts.

Table 1. Quantification of animal remains
(NR=number of remains; MNI=minimum number of individuals).

Taxon		NR	%	MNI	%
Bos taurus	Cattle	53	75.71	4	44.44
Ovis aries/Capra hircus	Sheep/Goat	12	17.14	2	22.22
Sus domesticus	Pig	0	0.00	0	0.00
Canis familiaris	Dog	1	1.42	1	11.11
Total domestic mammals		66	94.28	7	77.78
Bos primigenius	Aurochs	3	4.28	1	11.1
Sus scrofa	Wild boar	1	1.42	1	11.11
Total wild mammals		4	5.71	2	22.22
Total identified mammals		70	100	9	100
Unidentified mammals		63			
Total sample		133			

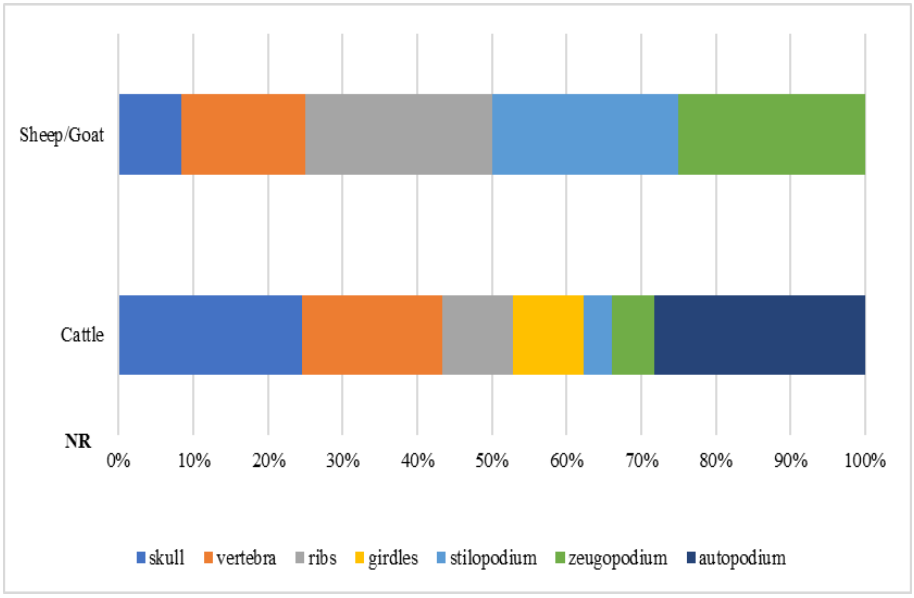

Fig. 5. Skeletal frequency of the sheep/goat and cattle remains

Archaeobotany

In the 5 analysed samples we identified 10 phytolith morphotypes (Fig. 6): RONDEL, BILOBATE, CRENATE, ACUTE BULBOSUS, SPHEROID, BULLIFORM FLABELLATE, ELONGATE ENTIRE, ELONGATE SINUATE, ELONGATE DENDRITIC, BLOCKY. Spicules were also identified in 3 samples. Most of the morphotypes identified in the analyzed samples are attributed to grasses; several subfamilies belonging to the Poaceae family were attested.

The RONDEL type phytoliths clearly dominate in all the samples, their percentage reaching up to 69.1% of the total. Most often they are associated with the subfamily Pooideae [22, 23], plants with C3 metabolism, which develops in temperate environment. Most of the cereals belong to this subfamily. CRENATE type phytoliths also suggest the presence of taxa from the Pooideae subfamily in the studied area. This type of phytolith is present in only one sample, with a low percentage (0.29%).

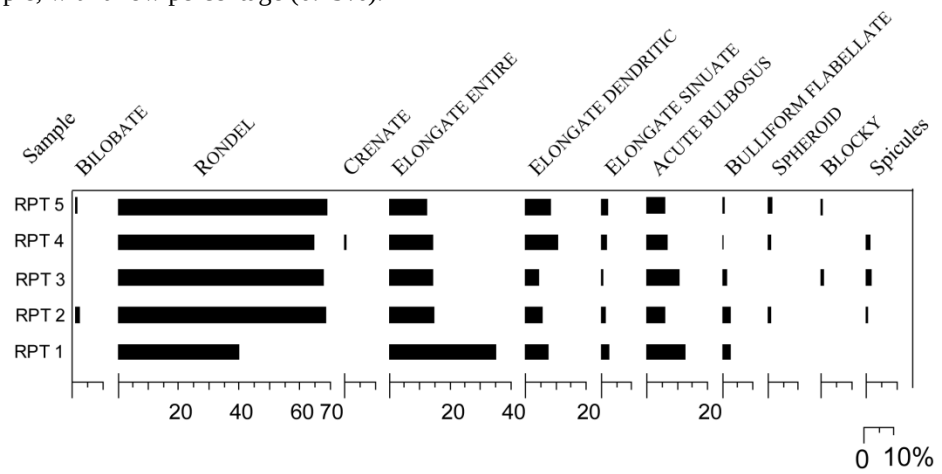

Fig. 6. Phytolith assemblages (%) from Rapoltu Mare-*Seghi* site

We also identified the BILOBATE morphotype. This is generally characteristic to Panicoideae [12, 23], a subfamily that includes plants adapted to a warmer climate, often with C4 metabolism and generally intertropical, excepting millet – wild (*Setaria* sp.) and cultivated (*Panicum* sp.). However, this morphotype may also come from representatives of other subfamilies such as Arundinoideae, Pooideae, Chloridoideae [23]. At Rapoltu Mare-*Seghi*, BILOBATE phytoliths were recorded in 2 samples, their frequency being extremely low (0.32% and 1.06% respectively).

ELONGATE ENTIRE phytoliths are produced by many plants; therefore a taxonomic attribution cannot be made [20]. The percentage of these phytoliths in the Rapoltu Mare-*Seghi* samples exceeds 12%.

The ELONGATE SINUATE morphotype can be associated with several taxonomic categories of plants, such as Poaceae, Cyperaceae, Pinaceae etc. [20]. In the presence of other phytoliths such as ACUTE BULBOSUS, the ELONGATE SINUATE phytoliths can be attributed to the Poaceae family [20, 24]. The ACUTE BULBOSUS morphotype is often used as an indicator of Poaceae [20, 25, 26]. In the samples from Rapoltu Mare-*Seghi*, the ELONGATE SINUATE phytoliths are present in modest percentages (at most 2.5%), but the presence of ACUTE BULBOSUS phytoliths is noted in relatively significant percentages (over 10% in some samples).

ELONGATE DENDRITIC phytoliths are produced in the inflorescences of many cereal species [27]. They can also be produced in the wild grasses [28]. In the site of Rapoltu Mare-*Seghi*, they were identified in all the samples, with frequencies between 5.63% and 11.53% of the total.

The SPHEROID morphotype, considered to be characteristic of dicotyledonous plants [25, 29-31], was observed in three samples, making at most 1.27% of total. BULLIFORM FLABELLATE (at most 2.5%) and BLOCKY (0.58%) morphotypes were also registered in very small percentages.

The assemblages of phytoliths show the net dominance of grasses. Produced abundantly in taxa belonging to the Triticeae and Aveneae tribes [20], the ELONGATE DENDRITIC phytoliths are often used in archaeological contexts as indicator of grass inflorescences [28, 32-34]. This phytolith type was identified in all the samples, the frequencies (between 5.63% and 11.53%) suggesting rather an anthropogenic accumulation.

Poorly represented (slightly over 1%), the BILOBATE phytoliths could indicate the presence of Panicoideae. It could be about spontaneous species like *Setaria* sp., but it could also be about millet (*Panicum* sp.). Of course, it is not excluded that, in the site area, representatives of subfamilies such as Arundinoideae, Pooideae and/or Chloridoideae were present during the Early Neolithic period.

The woody dicotyledonates are attested by the presence of the SPHEROID morphotype, but its frequency suggests a modest presence of these plants.

Therefore, the phytolith spectra indicate the dominance of Poaceae, an open space being thus estimated. Although the frequency of ELONGATE DENDRITIC phytoliths suggests an anthropogenic accumulation, it would be hazardous to consider issues related to the cultivation of cereals by the community from Rapoltu Mare-*Seghi*.

Conclusions

The present bioarchaeological study valorizes animal and plant remains recovered from the Early Neolithic site of Rapoltu Mare-*Seghi*, and the obtained results highlights subsistence patterns concerning both economic resources and also settlement palaeoenvironment.

Although the archaeozoological sample is relatively small (total sample = 133 remains), the analysed animal remains offer information on the palaeoeconomy of the settlement (i.e. practicing largely animal husbandry and very little hunting), and its environment (i.e. open spaces around the settlement for cattle and sheep/goat herds). Given the large proportion of cattle and sheep/goat remains, as well as the lack of pig, we can consider the Starčevo-Cris group from Rapoltu Mare-*Seghi* as one of non-sedentary pastors, periodically searching for new grasslands.

Phytolith analysis shows the dominant presence of grasses, suggesting an open space. The presence of ELONGATE DENDRITIC phytoliths suggesting an anthropogenic accumulation does not necessarily indicate the cultivation of cereals, but rather the consumption of wild grasses by the animals raised by pastoral community. The very modest presence of woody plants, as well as of wild animal remains (i.e. aurochs and wild boar), can indicate a settlement of relatively short duration of a mobile pastoral group.

Both archaeozoological and archaeobotanical data suggest a way of life centred on herding and management of livestock.

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