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Changes in prehistoric landscapes: archaeozoological data on Poduri *tell* (Bacau County, Romania)

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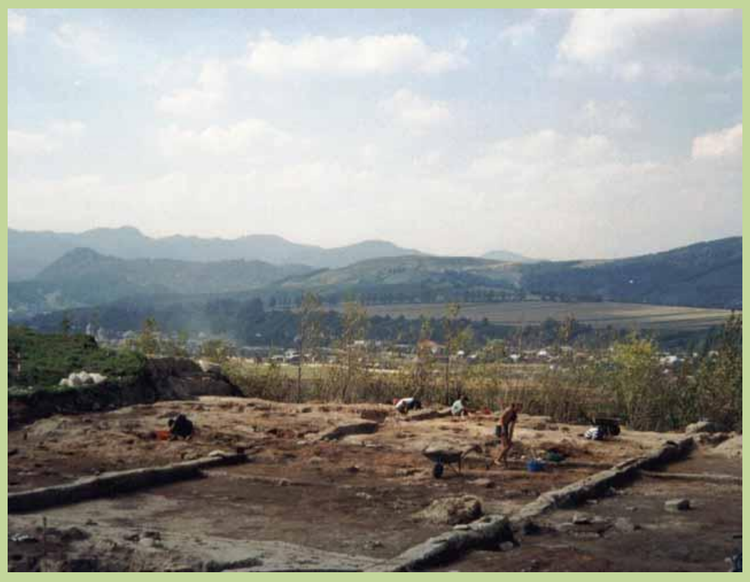


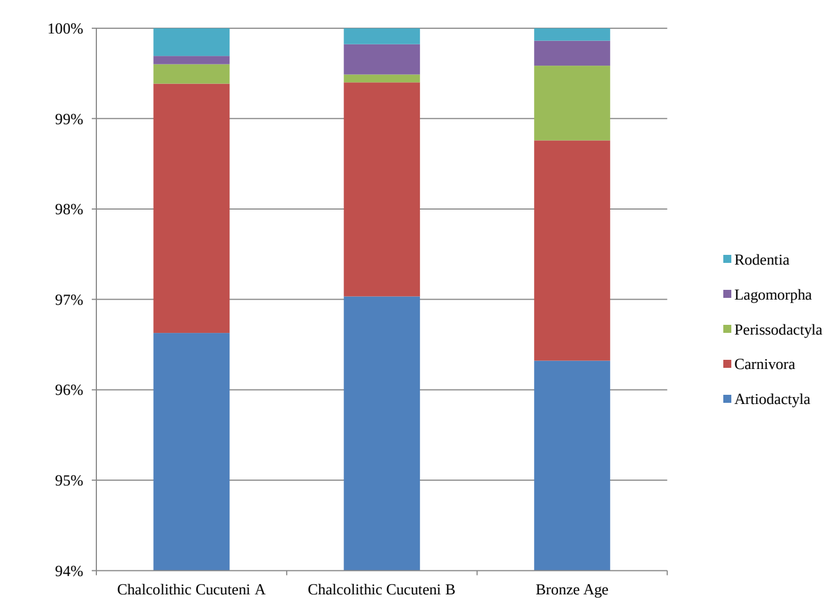
The *Tell* of Poduri-Dealul Ghindaru is located in the county of Bacau, in eastern Romania (46°27′59″ N, 26°32′10″ E; Figure 1). The site stands at 429 m above sea level on a 30 m-high terrace on the right bank of the Tazlau Sarat river and has a known extent of *c*. 1.2 ha.

Research at Poduri-Dealul Ghindaru began in the 1979-1996 period, under the direction of the archaeologist Dan Monah. Later, in 2000-2007, extensive archaeological work was carries out, under the direction of the archaeologists Dan Monah and Gheorghe Dumitroaia. Excavators studying the stratification over some 27 campaigns have identified levels belonging to the Precucuteni and Cucuteni Chalcolithic cultures and to the Early Bronze Age (Monah *et al*., 2003). The first chalcolithic inhabitants of Precucuteni culture settled at Poduri-Dealul Ghindaru around 5820 BP, which corresponds to the period 4780-4619 cal. BC. The Cucuteni *A* level has been dated between 4665-4050 cal. BC. (Monah *et al*., 2003).

Figure 1. Map showing the location of the Tell of Poduri-Dealul Ghindaru in eastern Romania.

Table 1. Frequency of mammalian taxa from Poduri-Dealul Ghindaru (NISP=number of identified specimens).

Order	Species	Chalcolithic Cucuteni *A* (Cavaleriu & Bejenaru, 2009)		Chalcolithic Cucuteni *B* (Oleniuc, 2010)		Bronze Age (Bejenaru, unpublished data)	
		NISP	%	NISP	%	NISP	%
Artiodactyla	*Bos taurus* (cattle)	1895	58.1	3465	38.6	1109	50.8
	Ovis aries/Capra hircus (sheep/goat)	519	15.9	3029	33.7	552	25.2
	Sus scrofa domesticus (pig)	339	10.4	1402	15.6	292	13.3
Carnivora	*Canis familiaris* (dog)	57	1.7	134	1.4	36	1.6
Perissodactyla	*Equus caballus* (horse)	-	-	-	-	18	0.8
Total domestic mammals		**2810**	**86.2**	**8030**	**89.5**	**2007**	**92.4**
Artiodactyla	*Bos primigenius* (aurochs)	43	1.3	76	0.8	11	0.5
	Cervus elaphus (red deer)	170	5.2	359	4	56	2.5
	Capreolus capreolus (roe deer)	53	1.6	89	0.9	17	0.7
	Dama dama (fallow deer)	1	0.03	4	0.05	0	0
	Alces alces (elk)	0	0	2	0.02	0	0
	Sus scrofa ferus (wild boar)	133	4.08	304	3.3	59	2.7
Rodentia	*Castor fiber* (beaver)	10	0.3	12	0.1	3	0.1
	Sciurus vulgaris (red squirrel)	0	0	4	0.05	0	0
Lagomorpha	*Lepus europaeus* (hare)	3	0.09	30	0.3	6	0.2
Carnivora	*Canis lupus* (wolf)	0	0	3	0.03	1	0.05
	Vulpes vulpes (fox)	1	0.03	7	0.07	1	0.05
	Ursus arctos (bear)	24	0.7	16	0.1	7	0.3
	Martes sp. (marten)	2	0.06	6	0.06	1	0.05
	Mustela putorius (polecat)	1	0.03	2	0.02	1	0.05
	Meles meles (badger)	2	0.06	1	0.01	0	0
	Felis silvestris (wild cat)	0	0	14	0.1	0	0
Perissodactyla	*Equus caballus* (horse)	7	0.2	8	0.09	-	-
Total wild mammals		**450**	**13.8**	**937**	**10.4**	**163**	**7.5**
Total identified mammals		3260	100	8967	100	2170	100
Mollusca+Fish+Aves		60		38		13	
Total identified remains		3320		9005		2183	



The proportions of domestic mammals show a progressive increase in time, from 86% in Cucuteni *A* to 92% in Bronze Age, which indicates the importance of animal husbandry (Table 1).

Figure 2 indicates a change in the proportion of cattle / sheep and goat during the end of the Chalcolithic. The predominance of cattle is typical for the Cucuteni *A* sites (Haimovici, 1987), while in the Cucuteni *B* assemblage, sheep and goat remains are more numerous indicating that this group contributed more to the subsistence economy. Probably, the expansion of open fields, with characteristic vegetation and dry climate, favoured sheep and goat husbandry more than cattle breeding. It is considered that during the 5th-4th millennium BC, in the range of Cucuteni culture, the annual average temperature was about 2ºC higher than today (Dolukhanov, 1997).

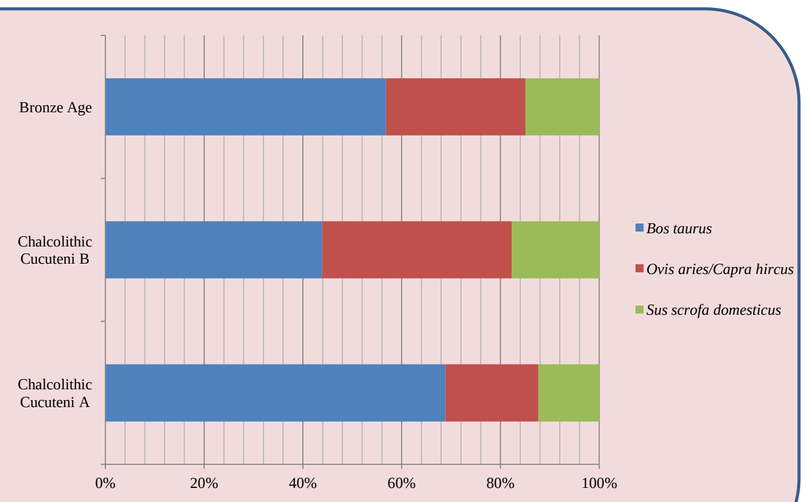


Figure 2. Frequencies of cattle, sheep/goat and pig remains (% NISP).

The proportion of wild mammals is low and decreases from 13% in Cucuteni *A* level to 7% in Bronze Age (Table 1). As game species, red deer (*Cervus elaphus*) is dominant. Wild boar (*Sus scrofa ferus*) comes second in number of identified specimens. We have to mention that in many other Cucuteni *A* assemblages red deer is also the most frequent game species (Haimovici, 1987).

The identified wild mammals were grouped corresponding to ecological characteristics in: forest species (*Cervus elaphus, Dama dama, Alces alces, Sus scrofa ferus, Ursus arctos, Felis silvestris, Sciurus vulgaris* and *Castor fiber*), forest-skirts (transitional zones between forest and steppe) species (*Capreolus capreolus, Lepus europaeus* and *Bos primigenius*), and eurytopic species (*Canis lupus, Vulpes vulpes, Mustela putorius, and Meles meles*). Forest species are dominant in all the assemblages, in similar proportions to the forest-skirts and eurytopic species (Figure 3).

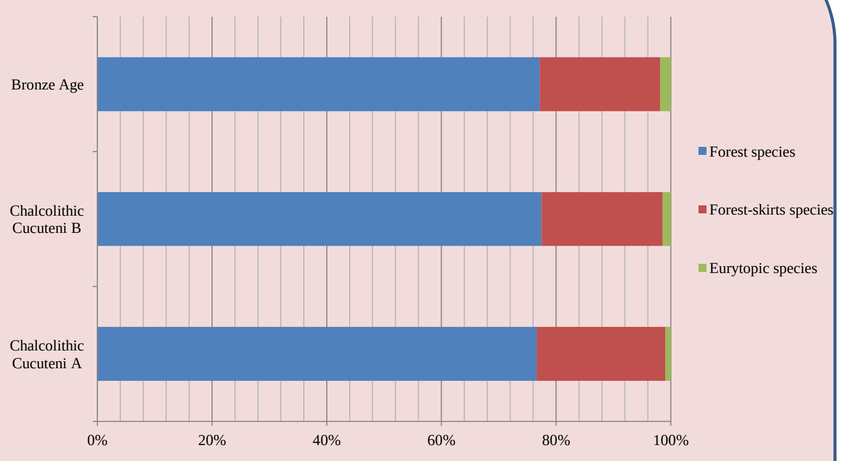


Figure 3. Distribution of wild mammal remains according to the ecological characteristics of species (% NISP).

The temporal taxonomic variability of the animal resources used in the Cucuteni settlement of Poduri-Dealul Ghindaru is shown in Table 1. Similar proportions among the main mammal groups are evident in the three assemblages (Figure 4).

Artiodactyls, the main group, served different economic (food, clothing, raw materials for tool manufacture) and ceremonial purposes. However, we have to remark a higher percentage of lagomorphs, in the Cucuteni *B* assemblage, that could be correlated with an expansion of open fields, with characteristic vegetation and dry climate. The horse, representing the perissodactils, has a low frequency in the Cucuteni *A* sample; it was very probably a rarely hunted wild species. Many authors consider that the domesticated form was not yet widespread in Europe at Chalcolithic time and appeared later in Europe, in the Bronze Age (Benecke & Von den Driesch, 2003).

Conclusions

Relative large assemblages of animal remains were recovered from excavations in the *Tell* of Poduri-Dealul Ghindaru, being chronologically assigned to the Chalcolithic (Cucuteni *A*, Cucuteni *B*) and Bronze Age.

The majority of animal remains are from mammals, and only few pieces from birds, fish and molluscs. The Chalcolithic settlements of Poduri-Dealul Ghindaru have a relative large faunal spectrum, especially in Cucuteni *B* (17 wild mammal species).

The subsistence economy was dominated in all three settlements by domestic mammals, especially cattle, a pattern similar to other Chalcolithic and Bronze Age sites in the region. However, a change in the economy appear to the end of Chalcolithic period (in Cucuteni *B*), when sheep and goat became more important, probably in correlation with a drier natural environment.

A Chalcolithic community with economic specialization in cattle husbandry is proposed for phase *A* of the Cucuteni culture. In this phase, the frequency of pig is lower (10%) than in the next periods. The NISP percentage for pig is higher towards the end of Chalcolithic, with a value of 15% and again lower in the early Bronze Age level, with a value of 13%. We may suppose that as result of an increasing mobility of people, pig production became less efficient in the early Bronze Age compared to husbandry in herding of other species such as sheep/goat

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