Demidenko Y.E., Otte M. & Noiret P. (dir.) - *Siuren I rock-shelter. From Late Middle Paleolithic and Early Upper Paleolithic to Epi-Paleolithic in Crimea.*
Liège, ERAUL 129, 2012, p. 65-71.

6 - SMALL MAMMALS FROM PALEOLITHIC SITE SIUREN I

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The Paleolithic site of Siuren I is located near the village of Tankovoe, 13 kilometers south of the town of Bakhchisarai (44^0 58' N; 34^0 08' E). The site is located in a rock-shelter about 43 m in width, 15 m in length and 9-10 m in height (Demidenko 2000).

Before the 1990s fieldwork, the site had previously been excavated twice, in 1879-1880 by K.S. Merejkowski and in 1926-1929 by G.A. Bonch-Osmolowski (see Merejkowski 1881; Bonch-Osmolowski 1934, 1940; Vekilova 1957; Rogachev & Anikovich 1984). In 1994-1997, new excavations were carried out by a joint Ukrainian-Belgian team under the direction of V.P. Chabai and M. Otte (see Demidenko 1999, 2000; Demidenko *et al.* 1998; Demidenko & Otte 2000-2001, 2004). Analyses of new data with the use of information from earlier studies of the site enabled Demidenko to establish the following archaeological and chronological sequence (Demidenko 2000): 1) Final Paleolithic with Shan-Koba industry, dated between 11800 and 10800 BP (the "spots" of the 1st and 2nd horizons of the Upper Layer of the 1920s excavations); 2) Upper Paleolithic episode with Epigravettian industry, dated between 20000 and 15000 BP (2nd horizon of the Upper Layer of the 1920s excavations and some artifacts from level A and the "humus" deposits of the 1990s excavations); 3) Upper Paleolithic episode with Gravettian industry (~24000-20000 BP) (3rd horizon of the Upper Layer of the 1920s excavations and artifacts from level D of the 1990s excavations); 4) Upper Paleolithic episode with Late Aurignacian industry (~27000 BP), correlated with the lower finds from 3rd horizon of the Upper Layer of the 1920s excavations and artifacts from horizon E of the 1990s excavations); 5) the Middle Layer of the 1920s excavation and the Unit F from the 1990s excavation with Late Aurignacian industry (29950 ± 700 BP, OxA-5155 for horizons Fb1-Fb2); 6) the Lower layer of the 1920s excavation and Units G and H from the 1990s excavation include abundant Upper Paleolithic pieces as well as some separate Middle Paleolithic artifacts. The latter are absent only in the uppermost level of Unit G (Ga), based on the 1990s excavations. Most of the archeological material from Units H and G were considered Upper Paleolithic and attributed to the European Early Aurignacian of Krems-Dufour industry type. Demidenko explains the mixture of numerous Upper Paleolithic and some Middle Paleolithic finds in the 1920s Lower layer / the 1990s Units H and G through alternate visits of the rock-shelter by Aurignacian modern *Homo sapiens* and Micoquian Neandertals, in which rich Aurignacian levels enveloped rare Micoquian finds as a result of rapid sedimentation processes (Demidenko 2000). Level Ga has been dated by AMS to 28450 ± 600 BP (OxA-5154) and Unit H by AMS to 28200 ± 400 BP (OxA-8249).

The small mammals assemblage

The small mammals analyzed were found with by sieving and washing during the 1990s excavations. The bones are well-preserved. The angles of teeth were not broken and many mandibles with teeth have been found. Most of the material appears to have been deposited without movement, possibly in burrows. The color of bones is light yellow. The density of the bones in the deposits is rather low. Eleven species belonging to Lagomorpha (one species) and Rodentia (10 species) have been identified (tabl. 1). Unfortunately, rather poor materials from Siuren I present only a very small portion of fossil fauna so conclusions remain very general.

In the lowest level Gd for Unit G, the bones of four species were found, including steppe pika *Ochotona pusilla tanaitica*, pygmy suslik *Spermophilus pygmaeus*, gray dwarf hamster *Cricetulus migratorius* (fig. 1:1), and Altayan vole *Microtus obscurus* (fig. 2). All are typical of open landscapes. The remains of steppe pika belonged to a rather large specimen that permits it to be attributed to subspecies *Ochotona pusilla tanaitica* (fig. 1:2). This subspecies has been described by materials from Crimean sites (Erbaeva 1988). Modern steppe pika inhabits dry steppes and semi-deserts, although it sometimes also inhabits grasslands near rivers. Its current range is located east of the Volga River. During the Pleistocene, the range of steppe pika was significantly broader: steppe pika remains have been found in many sites on the Russian Plain and in the Crimea. During the last glaciation when open periglacial landscapes were widely distributed, *Ochotona pusilla* expanded even to Western Europe (Markova & Kolfschoten 2008). In the Crimea, steppe pika remains have also been recovered from the Upper Paleolithic site of Adzhi-Koba and the Mesolithic rock-shelter of Alimovski.

Species	Levels							
	Fa1	Fb1	Fb2	Ga (sq. 8C)	Gb1	Gb2	Gb1-Gb2	Gd
Lagomorpha								
Ochotona pusilla tanaitica Erbaeva -steppe pika								1
Rodentia								
Spermophilus pygmaeus Pallas pygmy suslik	6				4	1	1	1
Allactaga major Kerr great jerboa		3	1		2		1	
Stylodipus telum Lichtenstein thick-tailed three-toed Jerboa	1							
Apodemus (Sylvaticus) flavicollis Melch yellow-necked mouse				10	2			
Cricetulus migratorius Pallas - gray dwarf hamster								2
Cricetus cricetus L. European hamster			3		2			
Ellobius talpinus Pallas northern mole-vole							2	
Arvicola terrestris L. water vole			3					
Eolagurus luteus Eversmann yellow steppe lemming	2							
Microtus obscurus Eversmann Altayan vole			11	4	4	4	3	1
Microtus sp. vole	3							
Total species	4	1	4	2	5	2	4	4

Table 1 - Species composition of small mammals from Siuren I. Note: Level Fb2 has been dated to 29950 ± 700 BP, OxA-5155 (for level Fb1-Fb2) and level Ga (sq. 8C) to 28450 ± 600 BP, OxA-5154.

The preferred habitats for the dwarf suslik *Spermophilus pygmaeus* are the different kinds of semi-deserts (sand, clay-sand and loess semi-deserts) and dry arid steppes with wormwood, but is also present in deserts. Little suslik habitats are also found in the low mountain steppes belt, but do not extend higher than 400-500 m above sea level.

Cricetulus migratorius now inhabits forest-steppes, steppes and semi-deserts. Its range covered the central and southern parts of Eastern Europe, Caucasus, Middle Asia and Kazakhstan. It also inhabits the Crimea (Flint *et al.* 1970). The Altayan vole *Microtus obscurus* prefers the meadow-steppes.

Thus, all four species described from level Gd indicate open very arid landscapes near the site during the deposition of level Gd. This level could possibly be correlated with the Huneborg stadial of Stage 3, which preceded the Denekamp (Bryansk) interstadial. However, the number of recovered species is undoubtedly incomplete and additional materials could change this interpretation.

In level Gb1-Gb2, five species of rodents have been identified, including little suslik *Spermophilus pygmaeus*, great jerboa *Allactaga major*, East European hamster *Cricetus cricetus*, northern mole vole *Ellobius talpinus* (fig. 3), yellow-necked mouse *Apodemus (Sylvaemus) flavicollis* (fig. 4:1), Altayan vole *Microtus obscurus* (fig. 4:2; fig. 5 and 6). The preferred habitats of four of these species (*Spermophilus pygmaeus, Allactaga major* (fig. 7:2), *Cricetus cricetus* (fig. 7:1), *Ellobius talpinus*) are open steppe-like landscapes.

The great jerboa is a typical representative of arid steppes and semi-desert landscapes. It prefers biogeocoenosis with solid (dense) soils with thin vegetation. It sometimes extends to forest-steppes, using the dry open slopes with thin grass cover. Present-day *Allactaga major* inhabits the Crimean open landscapes. Remains of great jerboa have been found in interglacial and also glacial Pleistocene faunas on the Russian Plain (Markova *et al.* 1995). The East European hamster *Cricetus cricetus* is common today in forest-steppe and in forbs steppe. In the southern part of its range, it prefers areas that are not very dry. In the southern steppe zone of the Russian Plain, the East European hamster inhabits floodplains and wet depressions. The modern range of *Cricetus cricetus* includes the Crimea.

The yellow-necked mouse *Apodemus flavicollis* prefers broad-leaf forests of plains and mountains. In the southern part of its range, the yellow-necked mouse sometimes lives in bushed areas. This species lives today in the Crimea. During the Valdai

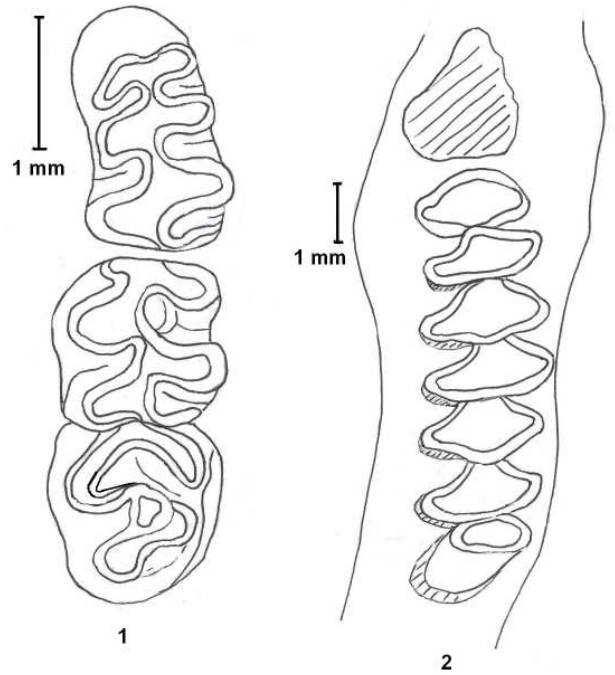

Figure 1 - Small mammal remains from level Gd. 1, lower mandible of *Cricetulus migratorius* with m1, m2, m3; 2, upper mandible of *Ochotona pusilla tanaitica* with M/1-M/3.

Maximum Glaciation, it disappeared from the Russian Plain because of the absence of a forest zone. The mountains with their many local habitats were the refuges for many forest animals during the glacial period, so the Crimean Mountains with some forest and bush vegetation were suitable for *Apodemus flavicollis* (Markova et al. 1995; Markova 1999, 2004a, 2004b, 2004c, 2004d, 2005, 2007).

The Altayan vole *Microtus obscurus* prefers the open meadow-steppe. It is currently distributed in the Crimea and Caucasus Mountains, the Volga River basin and the Urals (Malygin 1983; Zagaradniuk 1991; Markova 2000).

The mammalian materials from level Gb1-Gb2 permit reconstruction of mosaic landscapes near the site. Open steppe-like areas were present on the south slopes; broadleaf forested, bushed and meadow-like environment existed near streams and in depressions. Indicators of cold climate have not been found in this level. In comparison with the fauna from level Gd, it appears that more moderate climate existed during level Gb1-Gb2 (Denekamp Interstadial?).

Only two species were found in level Ga (sq. 8C): Altayan vole *Microtus obscurus* (fig. 8:1; fig 9) and yellow-necked mouse *Apodemus flavicollis* (fig. 8:2-3). The ecology of both species indicates the presence of rather moderate environments near the site with forested or bushed local areas and open meadow-steppe landscapes. The ^{14}C date for this horizon indicates the Denekamp (Bryansk) Interstadial: 28450±600 BP (OxA-5154).

T small mammals from levels and sub-levels of Unit F are described below.

In sub-level Fb2 of level Fb1-Fb2, four species have been identified (tabl. 1; fig. 10; fig. 15). The remains of great jerboa *Allactaga major* (fig. 11:3), East European hamster *Cricetus cricetus* (fig. 12:1), water vole *Arvicola terrestris* (fig. 11:1) and *Microtus obscurus* (fig. 11:2) and *Allactaga major* (fig. 12:2) were found there. All of the species apart from the water vole indicate the prevalence of open landscapes. The water vole *Arvicola terrestris* inhabits the banks of the rivers, and other water reservoirs in the broad areas of Europe from the steppe zone to forest-tundra. It is absent only in tundra and arctic zones today. Thus, the presence of this animal indicates close proximity of a stream near the site.

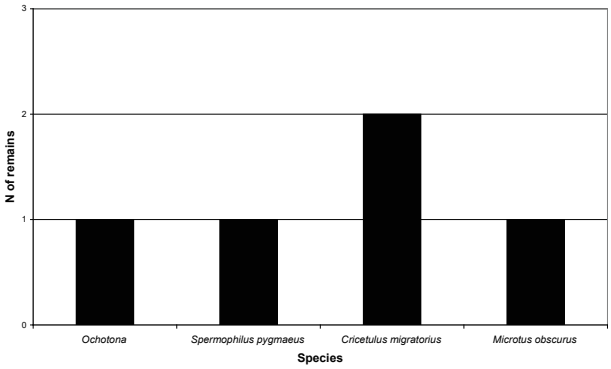

Figure 2 - Small mammals from level Gd.

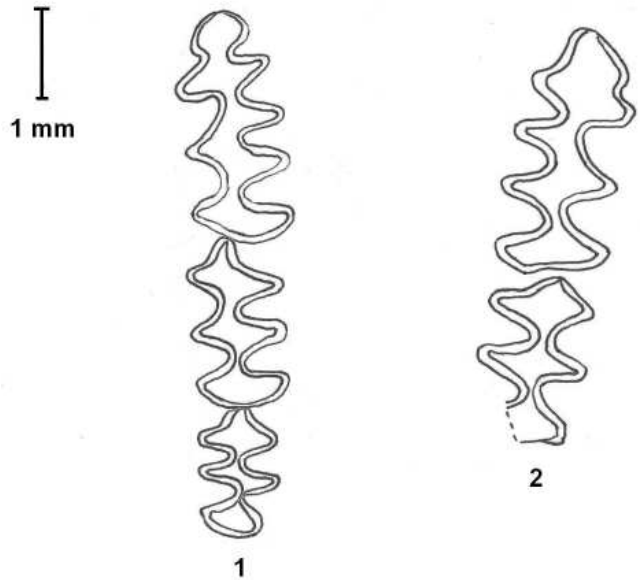

Figure 3 - Small mammal remains from level Gb1-Gb2. 1, lower mandible of *Ellobius talpinus* with m1, m2, m3; 2, lower mandible of *Ellobius talpinus* with m1 and m2.

Only one species was identified in the materials from sub-level Fb1 of level Fb1-Fb2: *Allactaga major*. The ecological habitat of the great jerboa indicates open landscapes (tabl. 1).

The youngest small mammal fauna from the 1990s site were found in sub-level Fa1 of level Fa1-Fa2. Four small mammals were identified in this assemblage (tabl. 1; fig. 13). Little suslik *Spermophilus pygmaeus* (fig. 14:1), thick-tailed jerboa *Stylodipus telum* (fig. 14:2), vole *Microtus* sp. and yellow steppe lemming *Eolagurus luteus* inhabit different types of open landscapes. Yellow steppe

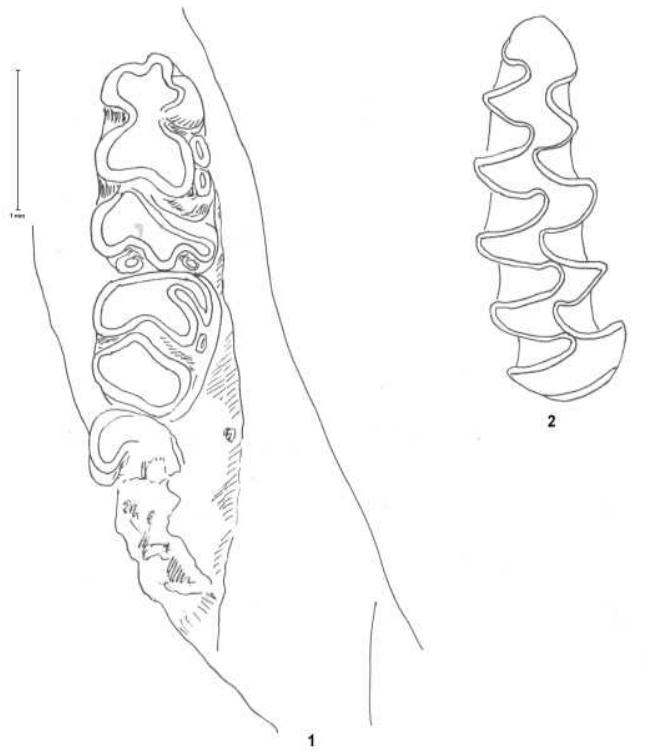

Figure 4 - Small mammal remains from sub-level Gb1. 1, lower mandible with m1, m2 and fragment of m3 of *Apodemus flavicollis*; 2, m1 of *Microtus obscurus*.

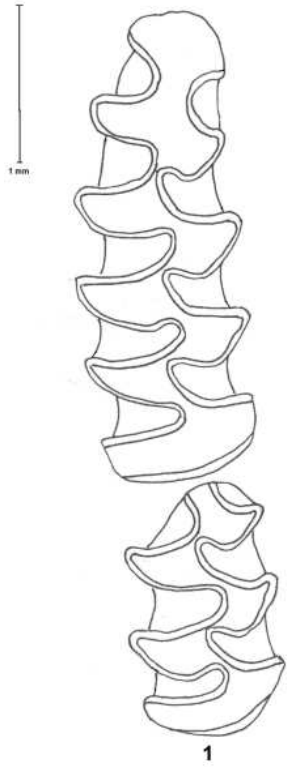

Figure 5 - Small mammal remains from sub-level Gb2. 1, lower mandible with m1 and m2 of *Microtus obscurus*.

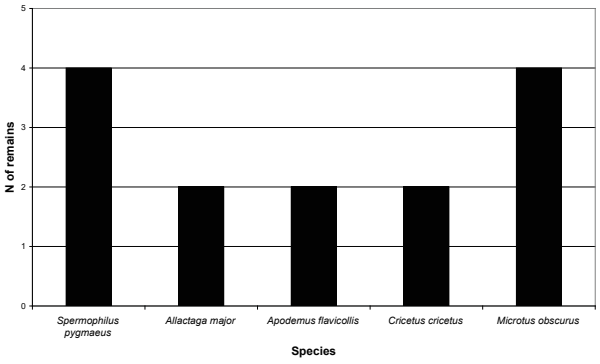

Figure 6 - Small mammals from level Gb1.

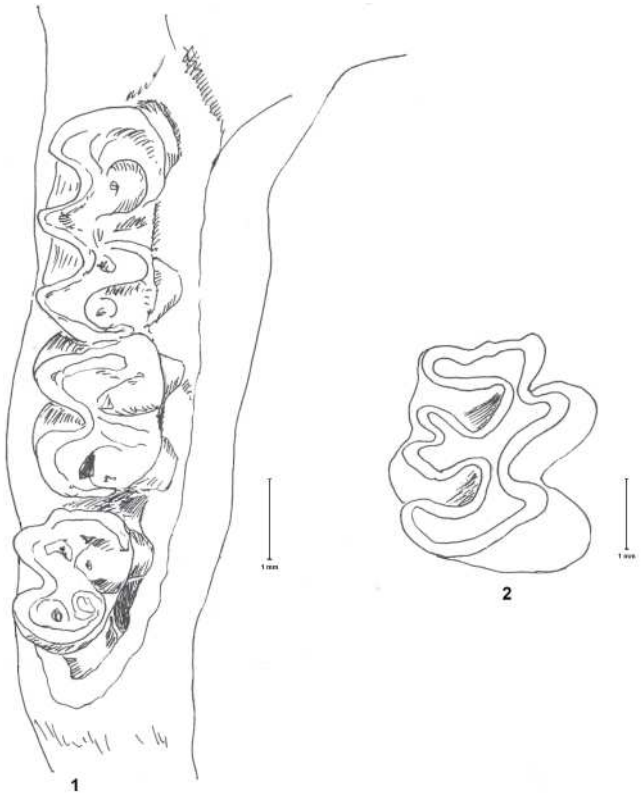

Figure 7 - Small mammal remains from sub-level Gb1. 1, lower mandible with m1-m3 of *Cricetus cricetus*; 2, m2 of *Allactaga major*.

lemming *Eolagurus luteus* is now distributed only in Middle Asia and Mongolia. Recently yellow steppe lemming inhabits semi-deserts, dry steppes and even deserts. During the Valdai Glacial period, the range of *Eolagurus luteus* included the Central and Southern Russian Plain and the Crimea. Yellow steppe lemming was one of the "non-analog" periglacial faunas, and was also typical for steppe interglacial periods. The range of *Eolagurus* is still rather widespread during the Holocene and even in the 19th century, yellow steppe lemming was present in the Lower Volga River drainage basin and in the Kazakhstan deserts.

The modern distribution of thick-tailed jerboa *Stylodipus telum* is found in deserts and desert steppes of different types. It often inhabits old and modern dunes and sandy steppes.

Thus, the presence of the remains of these animals in sub-level Fa1 (the uppermost level of Unit F) shows, first of all, the presence of arid open landscapes near the site. The remains of forest animals were not found in this sub-level, suggesting some aridization during the deposition of this layer.

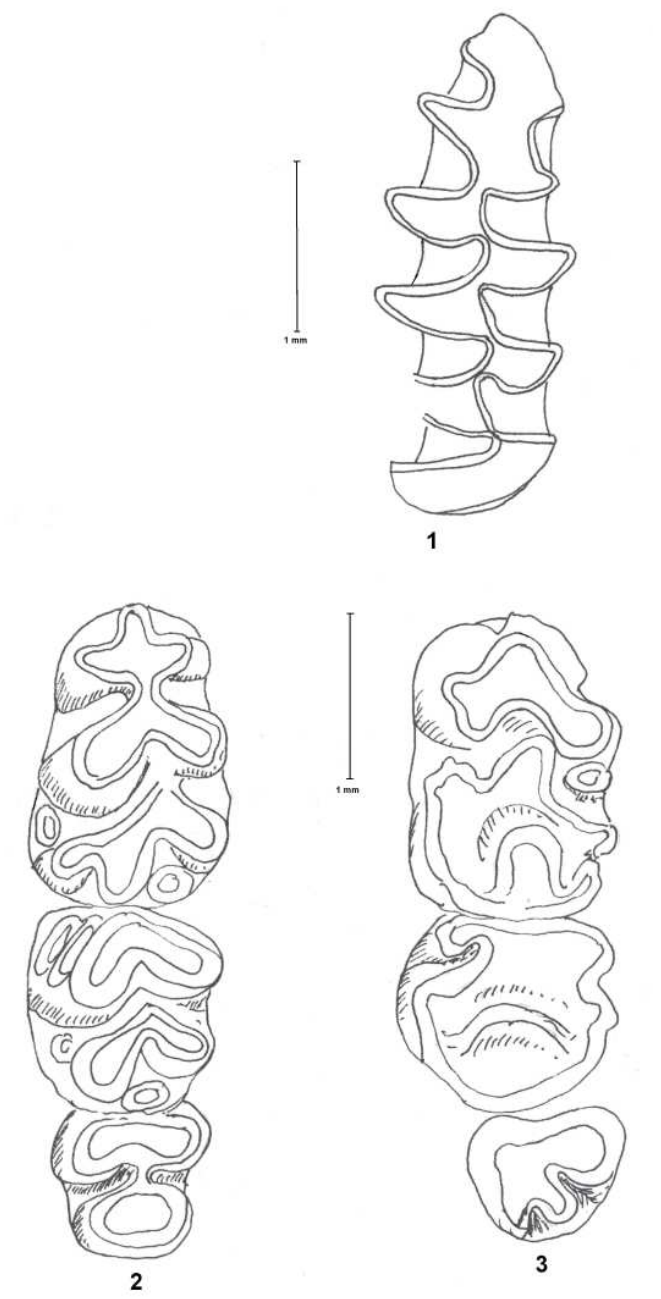

Figure 8 - Small mammal remains from level Ga. 1, m1 of Microtus obscurus; 2, lower mandible with m1-m3 of Apodemus flavicollis; 3, upper mandible with M1-M3 of Apodemus flavicollis.

Conclusions

The small mammals found in the different levels at Siuren I indicate environmental changes during the deposition of levels Gd through Fa, although Unit H, lowermost in the sequence, and level Gc1-Gc2, the richest in archeological finds, contained no small mammal remain. The sequence analyzed is thus unfortunately incomplete.

Species of small mammals from level Gd are now distributed in open arid environments. Forest, subaquatic and cold-adapted animals are not documented in this level. Level Gd could potentially be correlated to the Hüneborg stadial of marine isotope

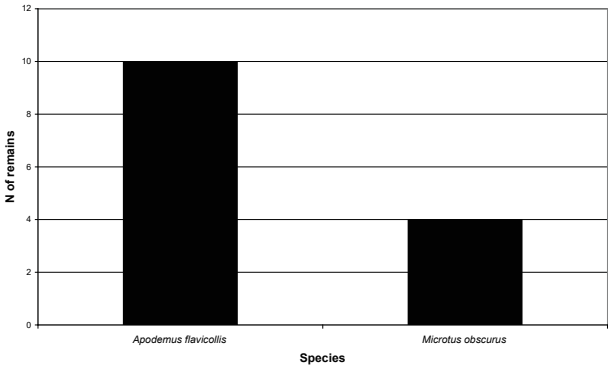

Figure 9 - Small mammals from level Ga (sq. 8C).

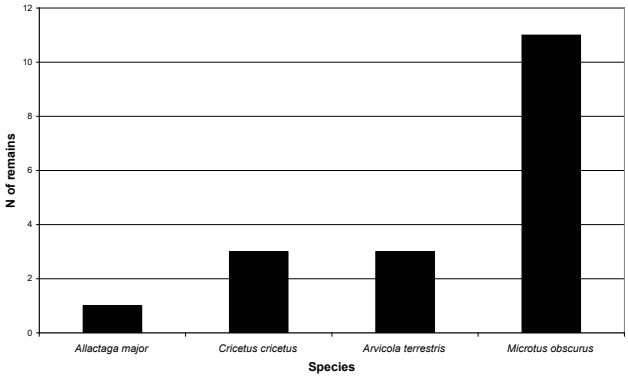

Figure10 - Small mammals from sub-level Fb2.

Stage 3 (ca. 36-33 ky BP) (figs. 15, 16).

Small mammals from different ecological niches were found in the sub-levels of level Gb1-Gb2. The species range indicates rather moderate conditions during the deposition of this level. The theriological materials indicate forest-steppes and meadow-steppes near the site. Level Gb1-Gb2 could possibly be attributed to the Bryansk (Denekamp) interstadial. The uppermost part of horizon G (Ga) has been dated by AMS to 28450±600 BP (OxA-5154), which is consistent with the Bryansk interstadial (figs. 15, 16).

Later, during the formation of the Unit F levels, forest mammals disappear. Most of the species found in these levels indicate arid environments near the site, resembling dry steppes or even semi-deserts (figs. 15, 16). The fauna of Unit F reflect climatic aridization, but the Oxford AMS date of 29000 BP for level Fb1-Fb2 is also coherent with the Bryansk interstadial. The absence of forest mammal remains may be explained by the rather low quantity of small mammal remains found.

In sum, then, the small mammals enable reconstruction of the general environmental conditions near Siuren I during the different phases of deposition in the archaeological sequence. It is quite significant that cold-adapted species are absent in all of the levels in Units G and F. This indicates that the climatic and environmental conditions during human occupations were rather moderate, which may be explained by the more southerly

position of the Crimea. Such conditions were comfortable for Palaeolithic humans and mammalian fauna. Like the small mammal species composition at other Crimean Palaeolithic sites (Kabazi II and V, Buran Kaya III, Karabi Tamchin, Starosele, Chokurcha I), the fauna at Siuren I includes only steppe, semi-desert, forest (in low quantity) and sub-aquatic small mammals.

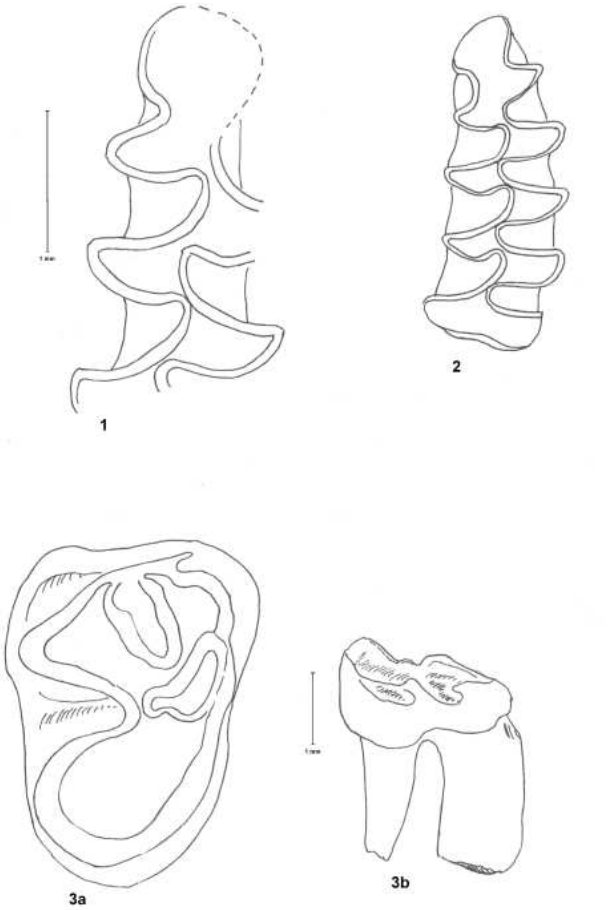

Figure 11 - Small mammal remains from sub-level Fb2. 1, m1 of *Arvicola terrestris*; 2, m1 of *Microtus obscurus*; 3a and 3b, m3 of *Allactaga major*.

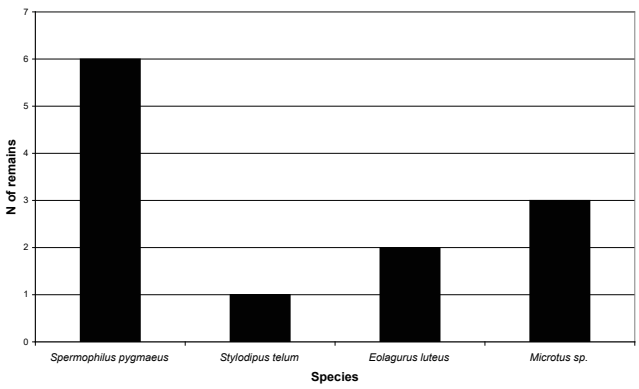

Figure 13 - Small mammals from sub-level Fa1.

The analysis of small mammal fauna from the Crimean Middle and Upper Paleolithic sites suggests that the Crimean Mountains were a refuge during the Late Pleistocene. The influence of ice sheets was rather minor at these latitudes and was resulted mostly in aridization of the landscapes during cold phases (stadials) of the last glaciation.

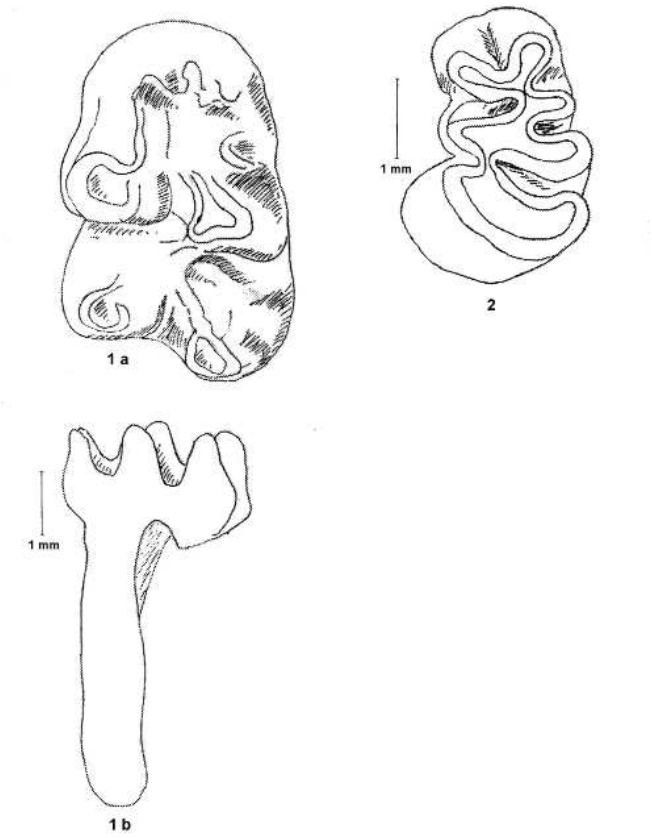

Figure 12 - Small mammal remains from sub-level Fb2. 1a and 1b, m/1 *Cricetus cricetus*; 2, m1 of *Allactaga major*.

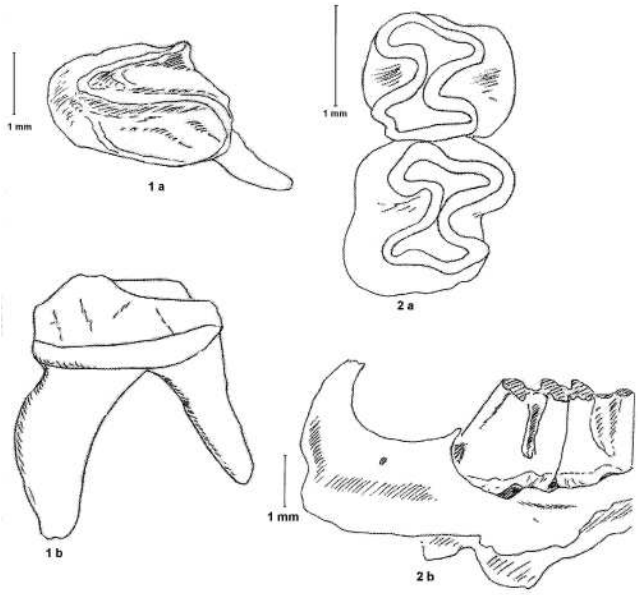

Figure 14 - Small mammal remains from sub-levels Fa1. 1a and 1b, M2 of *Spermophilus pygmaeus*; 2a and 2b, lower mandible with m1 and m2 of *Stylodipus telum*.

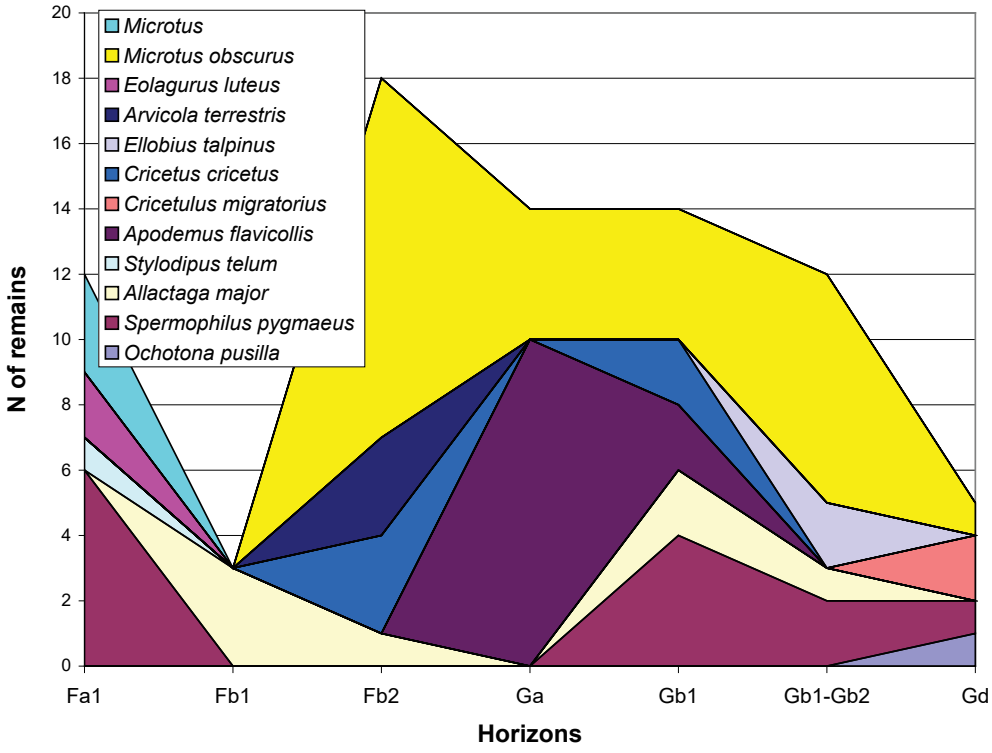

Figure 15 - Species composition of small mammals from Siuren I.

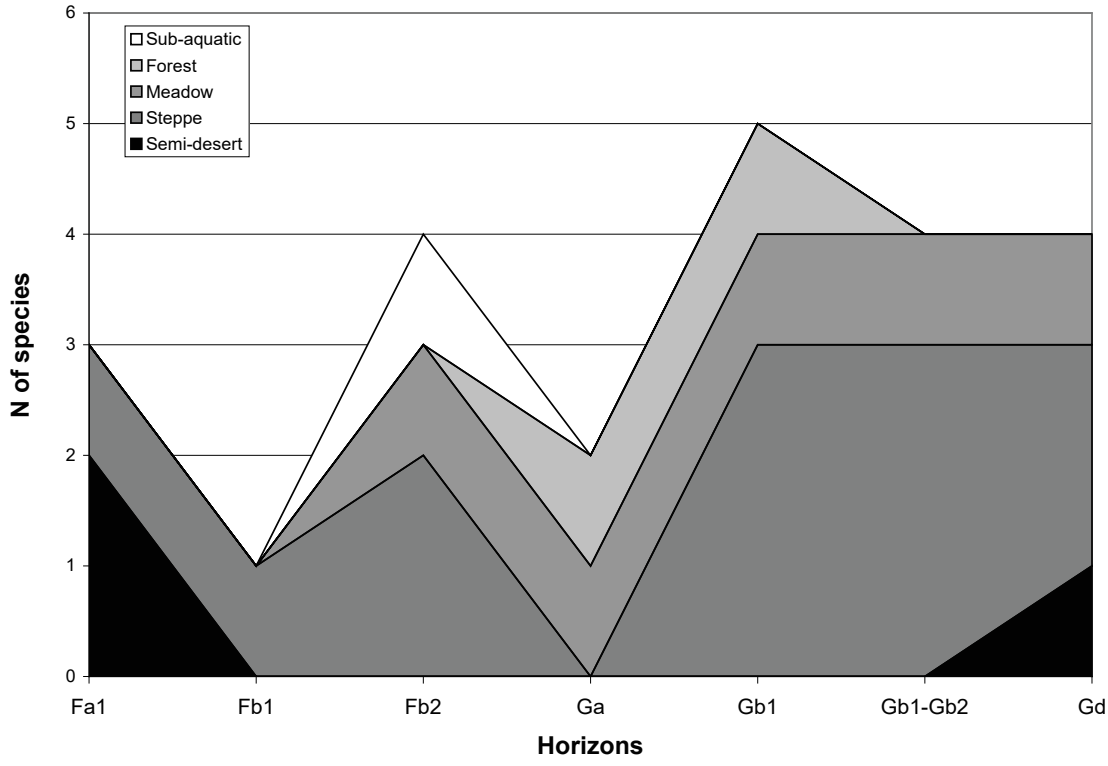

Figure 16 - Ecological groups of small mammals in the different levels of Siuren I.