Chapter
4

Small Mammal Fauna from the Middle Palaeolithic Site Kabazi V. Palaeoenvironmental Reconstruction

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The complex studies of the cultural layers from Kabazi V have also included the analysis of palaeontological remains. In this paper, finds of small-mammals recovered during excavations at this site in 2002-2003 are presented, thus completing the picture suggested by finds recovered in earlier investigations at the site in 1994-1996 (Markova 1999), to which reference will also be made. Simultaneously, archaeologists V. P. Chabai and A. I. Yevtushenko have been studying the archaeological levels identified at the site which yielded artefacts attributed to Middle Palaeolithic industries (Yevtushenko 1998a, 1998b; Chabai *et al.*, 2004).

Kabazi V is situated in the internal ridge of the Crimean Mountains, on the right bank of the Alma River, 100 m above the Alma river channel, and 360 m above sea level (44.84188°N, 34.03340°E). The sequence includes several archaeological levels containing Middle Palaeolithic artefacts. Absolute dates give reason to assume that human occupation at Kabazi V occurred during MIS 3 and was probably not of particularly long duration, as has also been determined for nearby Kabazi II (Chabai et al., 2004). The upper part of the sequence (level III/1A) has provided a date on charred bone of 30,980±220 BP (OxA-X-2134-45), level III/1 has produced an ESR age of 26,000-30,000 BP, and level III/5-3B1 has been dated to 38,780±360 BP (OxA-14726) (Rink *et al.*, 1998; Chapter 3, this volume). Hence, Unit III was formed between the Hengelo Interstadial and the beginning of MIS 2.

Methods of Sampling and Analysis

Palaeontological remains were recovered during excavation using 5 mm and 1 to 1.5 mm screens. Material was then dried in the sun and bone remains selected for analysis. In a second stage, bones belonging to small-mammals were studied under a microscope (SMC 4, ASKANIA), measured, and then drawn. Pieces were then compared to modern small-mammal materials from the Crimean (in collections at the Moscow Zoological Museum, and at the Zoological Institute RAS, S.-Petersburg). The remains were also compared with palaeontological collections of small mammals recovered previously from other Palaeolithic sites in the region.

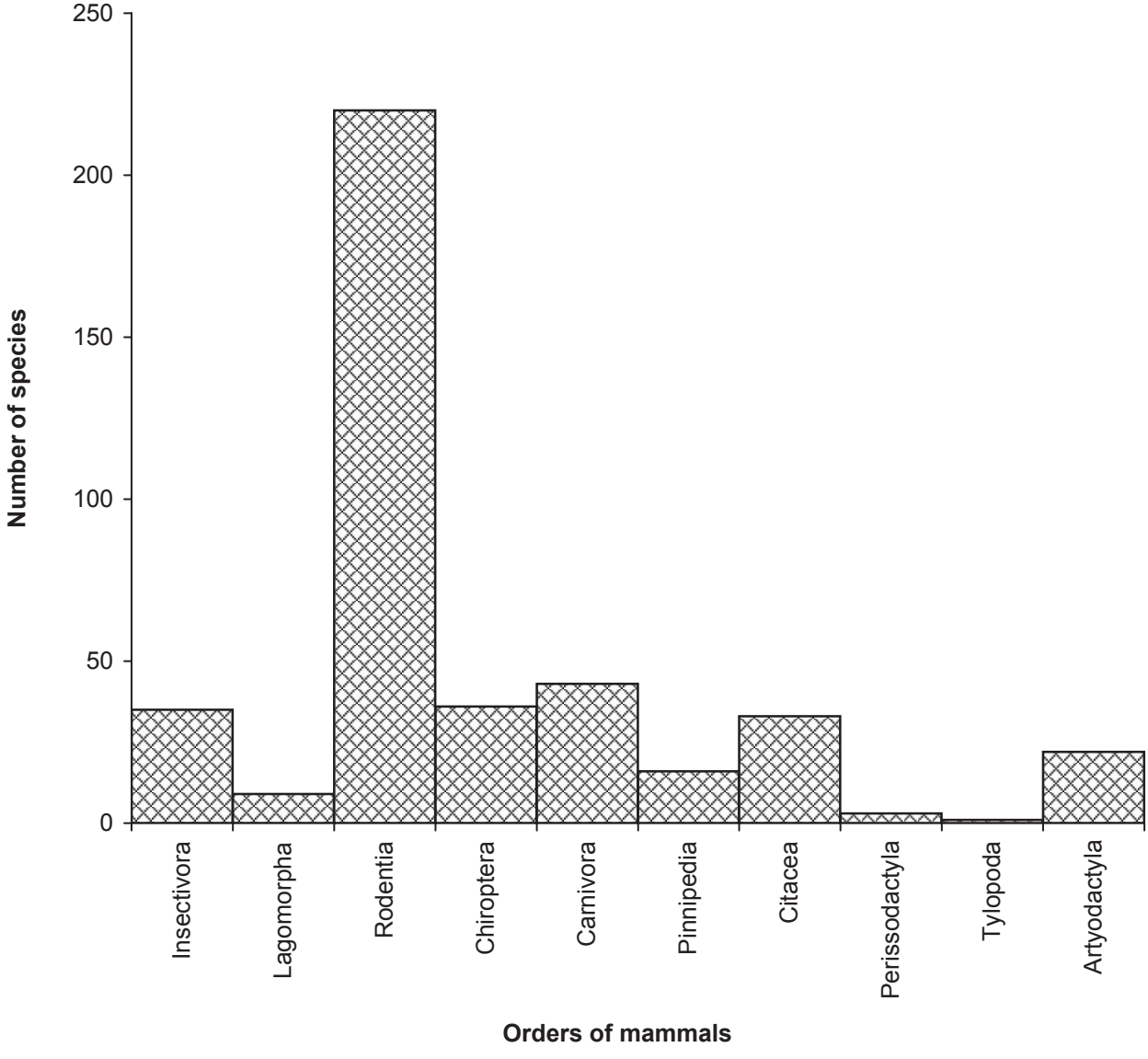


Fig. 4-1 Distribution of modern mammal species of FSU according to different Mammalia orders.

Small mammals belonging to the orders Rodentia, Lagomorpha and Insectivora constitute the principal part of both modern and past faunas, of which in the modern mammal fauna of the former USSR there are about 250 representatives (mostly Rodentia), with only about 160 species corresponding to all other orders (including Chiroptera and marine orders) (Dinets, Rotshild 1998)(Fig. 4-1).

Large mammals usually display very wide ranges, and for this reason are obviously not reflective of the local environment. A significant part of small-mammal species are closely connected with specific environmental conditions, are ecologically specialised, and occur only in certain habitants. Further, rodents and lagomorphs are herbivorous and are trophically closely associated with prevailing plant communities. Hence, these animals serve as a good indication of surrounding vegetation, and help considerably in any reconstruction of past environments.

Material

The bone material from Kabazi V is well preserved. The angles of teeth were not broken, and many mandibles with teeth were found. Bones are light yellow in colour. Some of the finds had clearly become deposited at the place of death, while others show traces of digestion, i.e. deposition involved both bird and animal predators. Saturation of materials in most levels is high.

Small-mammal bone material was recovered from Units II, III and IV at Kabazi V. These units comprise a total of 11 main strata; all differ in thickness and extent, as well as sample sizes. Small-mammal remains were found in 4 Levels of Unit II, in 7 Levels of Unit III, and in 2 Levels of Unit IV (Table 4-1). The total number of remains is high and includes more than one thousand small-mammal bones identified at species level.

	Level II/3	**Level II/3-4**	**Level II/4**	**Level II/4a**	**Sub-Unit III/1**	**Sub-Unit III/2**	**Sub-Unit III/3**	**Sub-Unit III/4**	**Sub-Unit III/5**	**Sub-Unit III/6**	**Sub-Unit III/7**	**Level IV/1**	**Level IV/2**
Bone numbers	74	65	3	41	135	92	96	22	352	38	24	81	37

Table 4-1 Kabazi V. Number of bones identified per level.

Small Mammal Remains from Unit II

Small-mammal material from Unit II was already recovered in 1994-1996, and includes finds from levels II/3, II/3-4, II/4, and II/4a (Table 4-2, Fig. 4-2).

Fauna from Unit II comprised 148 remains that were identified at species level (Markova, 1999). The upper levels of Unit II (II/3 and II/3-4) contained ten species of Insectivora and Rodentia, many of which *(Spermophilus pygmaeus, Allactaga major, Cricetulus migratorius, Lagurus lagurus)* inhabit open landscapes of different types, such as steppe, forest-steppe and even semi-desert. The dominant species *Microtus obscurus* is also indicative of open environments, such as meadows. Several mammals from this sample, including *Talpa* sp., *Apodemus (Sylvaemus) flavicollis*, were shown to be connected with forested and shrubed areas, and two further species *(Arvicola terrestris* and *Microtus oeconomus)* demonstrated the proximity of a water reservoir. On the basis of material from levels II/3 and II/3-4 an alternating landscape was reconstructed featuring open steppe-like, forested and shrub elements.

A small number of remains from only two species from level II/4 were also indicative of meadow-steppe and forested areas.

Lower Levels of Unit II (II/4 and II/4a) yielded the remains of five species that are suggestive of open landscapes. However, some forested areas would also have been situated near the site, as indicated in both levels by the presence of yellow-necked mouse, a species whose preferred habitat are broad-leaved forests.

Thus, during the accumulation of the different levels belonging to Unit II the Kabazi V area would have been characterised by open landscapes of different types with forested areas. The presence of water vole and root vole also indicate that water was present nearby. Cold-adapted animals were not found in Unit II, with the small mammal fauna suggestive of forest-steppe landscapes in the lower Crimean Mountains.

Taxa	Level II/3	Level II/3-4	Level II/4	Level II/4a
Insectivora - insectivores				
Talpa sp. - Eurasian mole	1	·	·	·
Sorex araneus Linnaeus – Eurasian common shrew	1	·	·	·
Rodentia – rodents				
Spermophilus pygmaeus Pallas – little suslik	2	1	·	13
Allactaga major Kerr - great jerboa	1	·	·	·
Ellobius (Ellobius) talpinus Pallas northern mole-vole	·	·	·	1
Apodemus (Sylvaemus) flavicollis Melchior – yellow-necked mouse	·	2	1	·
Cricetulus migratorius Pallas – grey hamster	2	2	·	·
Arvicola terrestris Linnaeus – water vole	1	·	·	·
Lagurus lagurus Pallas – steppe lemming	1	1	·	2
Microtus (Microtus) obscurus Eversmann – Altaian vole	65	56	2	25
Microtus (Pallasiinus) oeconomus Pallas – root vole	·	3	·	·
Total number of species:	8	6	2	4

Table 4-2 Kabazi V, unit II. Small mammal species composition.

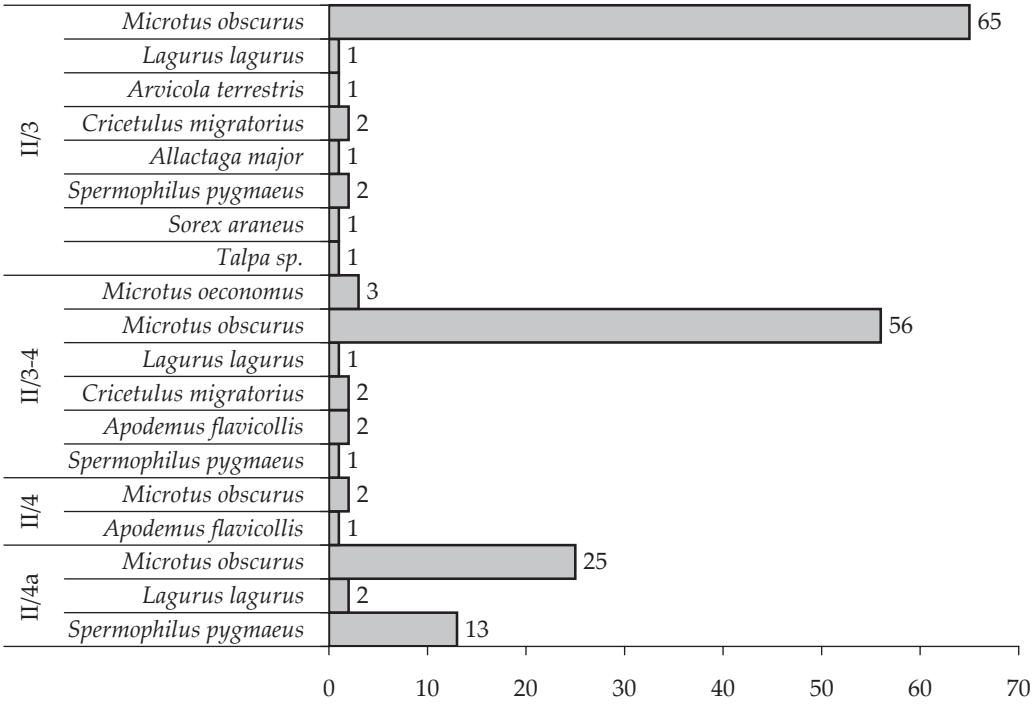


Fig. 4-2 Kabazi V, unit II. Species composition and quantity of small mammal remains.

Small Mammal Remains from Unit III

The highest number of small-mammal remains was recovered from several levels belonging to Unit III. In the seven archaeological levels of this unit a total of 759 remains of Insectivora, Lagomorpha and Rodentia were found. In our analysis we combine the materials from Unit III levels into one sub-unit. For example, the mammals from levels III/5-1, III/5-1A, III/ 5-2-1, III/5-3 were combined to constitute fauna in sub-unit III/5.

Most remains belong to Rodentia (12 species), with one insectivore species and one species of lagomorphs (Table 4-3, Fig. 4-3).

The dominant species in Unit III is the Altaian vole *Microtus obscurus*, remains of which were found in all levels in the highest quantity. Sub-dominants include small suslik, great jerboa, northern mole-vole and water vole (Table 4-4, Fig. 4-4).

Small mammals identified in Unit III are mostly of typical open-landscape species. Among the 14 species recovered, nine belong to animals that inhabit steppe-like environments, with only three species suggestive of forested areas. The altain vole *Microtus obscurus* is related to meadow-steppe, and the water vole Arvicola terrestris inhabits the banks of water reservoirs (Fig. 4-5, *1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11*; 4-6, *1, 2, 3, 4, 5, 6, 7, 8*).

Therefore, it is apparent that steppe, meadow-steppe and hydrogenous species were present in all levels of Unit III (Fig. 4-7).

Meadow-steppes are indicated by only one species *Microtus obscurus*, but this species was absolutely dominant at the site (Fig. 4-5, *1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11*; 4-6, *1, 2, 3, 4, 5, 6, 7, 8, 9*; 4-8, *1, 2, 3, 4, 5, 6, 7, 8, 9, 10*; 4-9, *4, 5*; 4-10, *4, 5, 6*; 4-11, *1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15*; 4-12, *1, 2, 3, 4, 5, 6, 7, 8*).

Taxa	Sub-Unit III/1	Sub-Unit III/2	Sub-Unit III/3	Sub-Unit III/4	Sub-Unit III/5	Sub-Unit III/6	Sub-Unit III/7
Insectivora							
Sorex araneus Linnaeus – Eurasian common shrew	·	·	·	·	1	·	·
Lagomorpha							
Lepus europeaus Pallas – European brown hare	·	·	2	·	·	·	·
Rodentia							
Spermophilus pygmaeus Pallas – little suslik	20	15	13	1	21	2	·
Marmota bobac Müller – bobac marmot	·	·	1	·	1	·	·
Allactaga major Kerr – great jerboa	·	1	·	5	2	1	·
Pygeretmus (Alactagulus) pumilio Kerr – lesser five-toed jerboa	·	2	·	·	·	·	·
Dryomys nitedula Pallas – forest dormouse	1	·	4	·	·	·	·
Apodemus (Sylvaemus) flavicollis Melchior – yellow-necked mouse	6	2	·	1	1	·	·
Ellobius (Ellobius) talpinus Pallas – northern mole-vole	·	·	1	4	62	5	1
Cricetulus migratorius Pallas – grey hamster	·	1	·	·	3	·	·
Arvicola terrestris Linnaeus – water vole	1	5	3	1	20	·	1
Eolagurus luteus Eversmann – yellow steppe lemming	3	7	25	·	2	3	·
Lagurus lagurus Pallas – steppe lemming	·	1	12	·	·	·	·
Microtus (Microtus) obscurus Eversmann – Altaian vole	65	41	33	10	239	27	22
Total number of species:	6	9	9	6	10	5	3

Table 4-3 Kabazi V, unit III, 2002-03 field campaigns. Small mammal species composition.

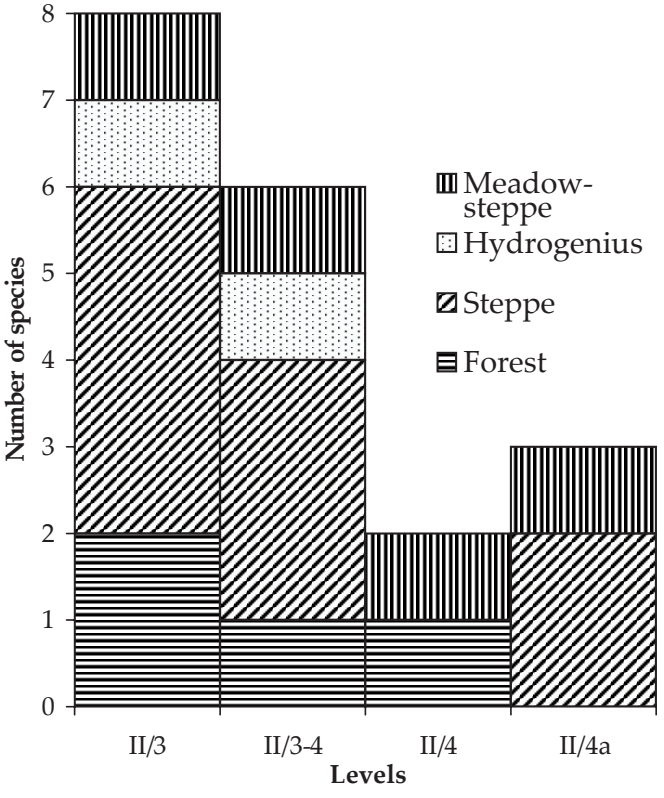


Fig. 4-3 Kabazi V, unit II. Ecological groups of small mammals.

Taxa	Level IV/1	Level IV/2
Chiroptera		
Myotis sp. – mouse-eared bat	1	.
Rodentia		
Spermophilus pygmaeus Pallas – little suslik	6	3
Ellobius (Ellobius) talpinus Pallas – northern mole-vole	6	1
Cricetulus migratorius Pallas – grey hamster	1	1
Microtus (Microtus) obscurus Eversmann – Altain vole	78	32
Total number of species:	5	4

Table 4-4 Kabazi V, unit IV. Small mammal species composition.

Steppe species present the largest group of mammals from Unit III and include yellow steppe lemming *Eolagurus luteus* (Fig. 4-9, *1, 2, 3*; 4-13, *1, 2, 3*; 4-14, *4, 5, 6, 7*; 4-15, *7*), steppe lemming *Lagurus lagurus* (Fig. 4-14, *3, 4*), Northern mole-vole *Ellobius talpinus* (Fig. 4-9, *6*; 4-10, *3*; 4-13, *4*; 4-16, *1, 2, 3, 4, 5, 6, 7, 8, 9*; 4-17, *2*), lesser five-toed jerboa *Pygeretmus pumilio* (Fig. 4-18, *1, 2*), great jerboa *Allactaga major* (Fig. 4-17, *3*; 4-18, *3*; 4-19, *1, 2, 3*; 4-20, *1, 2*; 4-21, *1, 2*), grey hamster *Cricetulus migratorius* (Fig. 4-15, *6*; 4-22, *1*) and others.

A hydrogenous species is the water vole *Arvicola terrestris* which was found in most levels (Fig. 4-8, *12, 13*; 4-10, *2*; 4-13, *2*; 4-15, *1, 2, 3, 4, 5*).

Only few forest species were found in sub-units III/1, III/2, III/3, III/4 and III/5, and include yellow-necked mouse *Apodemus flavicollis* (Fig. 4-10, *2*; 4-13, *5, 6*; 4-14, *1*; 4-20, *3*; 4-22, *2*). Only in sub-units III/6 and III/7 were forest mammals absent (Fig. 4-7). However, the quantity of remains found in these older sub-units is lower than in upper ones (Table 4-4).

On the whole, considerable differences in the quantity of remains are noted from level to level, and this can strongly affect and influence the number of different species distinguished in each. However, and be this as it may, these differences might also reflect climatic changes. Accordingly, conditions may have been drier and possibly colder during sub-units III/6 and III/7, only later becoming milder, i.e. during sub-units III/5-III/4. Level III/1 might be correlated with the Briansk – Denekamp Interstadial (the last part of MIS 3), which is confirmed by ^{14}C dating. A larger number of steppe adapted animals were discovered in sub-units III/2 and III/3 than in sub-unit III/1; the typical steppe mammal *Lagurus lagurus* was found only in the two former sub-units. The semi-desert animal *Pygeretmus pumilio* was recovered only in sub-unit III/2. The appearance of these animals may indicate increasing aridity during the deposition of these levels (stadial conditions), although some forested areas would also have existed at this time. The composition of small mammal species in sub-units III/4 and III/5 are indicative of slightly milder conditions, and possibly corresponds to the Hengelo Interstadial.

Cold-adapted animals were found neither in Unit III nor in the upper part of Unit II, which is characteristic for all Late Pleistocene small-mammal faunas recovered from other Crimean Middle Palaeolithic sites.

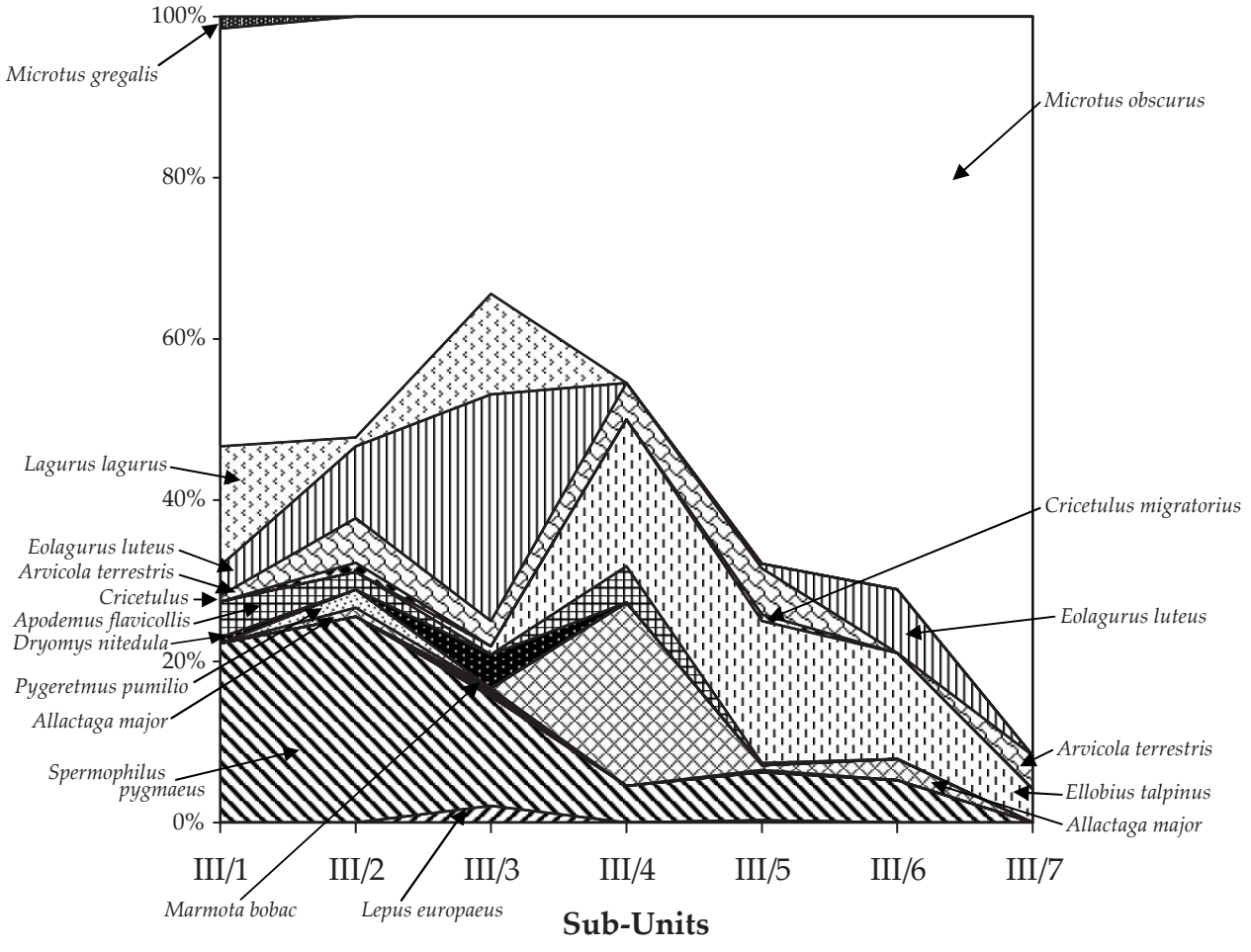
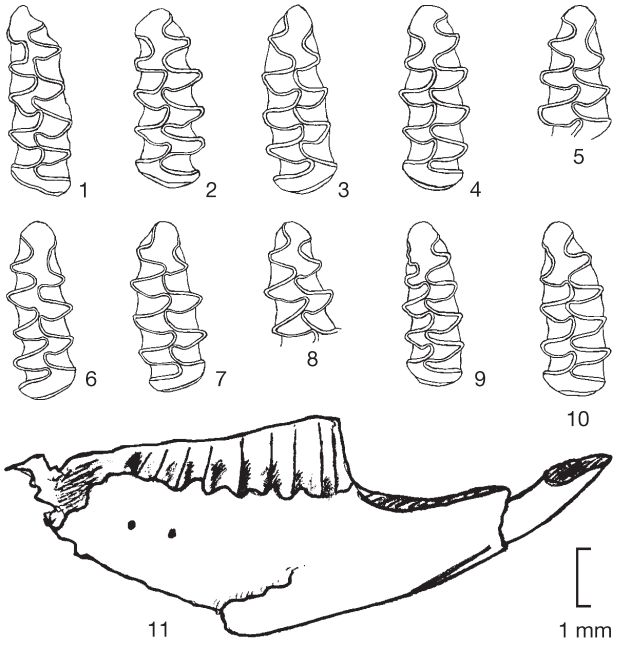


Fig. 4-4 Kabazi V, unit III. Species composition and quantity of mammal remains (%).



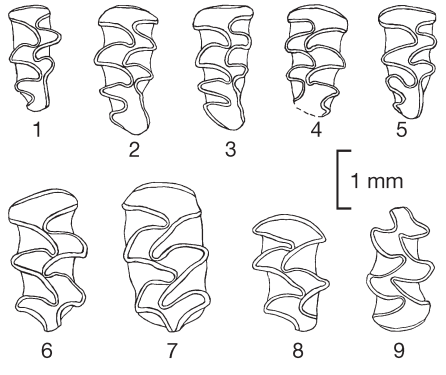


Fig. 4-6 Kabazi V, sub-unit III/1: 1, 2, 3, 4, 5 – M3 of *Microtus obscurus*; 6, 7 – M1 of *Microtus obscurus*; 8 – M2 of *Microtus obscurus*; 9 – m2 of *Microtus obscurus*.

◄**Fig. 4-5** Kabazi V, sub-unit III/1: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 – m1 of *Microtus obscurus*; 11 – lower mandible of *Microtus obscurus*.

Fig. 4-7 Kabazi V, unit III. Ecological groups of small mammals.

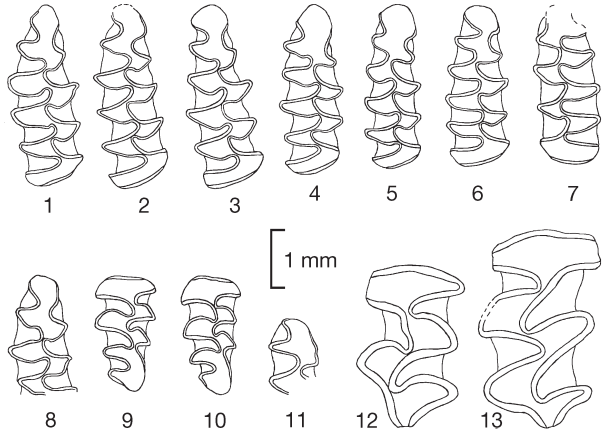


Fig. 4-8 Kabazi V, sub-unit III/2: 1, 2, 3, 4, 5, 6, 7, 8 – m1 of *Microtus obscurus*; 9, 10 – M3 of *Microtus obscurus*; 11 – m1 of *Microtus gregalis* (fragment); 12 – M2 of *Arvicola terrestris*; 13 – M1 of *Arvicola terrestris.*

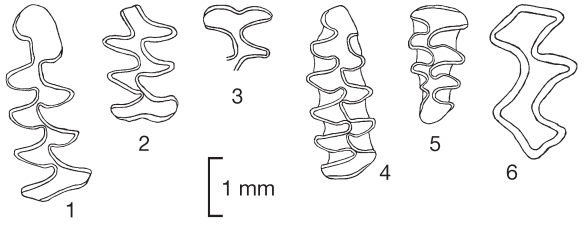


Fig. 4-9 Kabazi V, sub-unit III/3: 1 – m1 of *Eolagurus luteus*; 2 – m2 of *Eolagurus luteus*; 3 – M3 (fragment) of *Eolagurus luteus*; 4 – m1 of *Microtus obscurus*; 5 – M3 of *Microtus obscurus*; 6 – M2 of *Ellobius talpinus.*

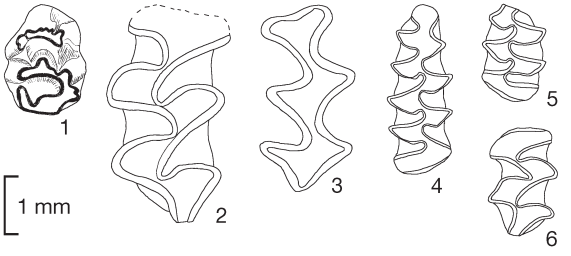


Fig. 4-10 Kabazi V, sub-unit III/4: 1 – M1 of *Apodemus flavicollis*, 2 – m1 of *Arvicola terrestris*; 3 – M1 of *Ellobius talpinus*; 4 – m1 of *Microtus obscurus*, 5 – m2 of *Microtus obscurus*, 6 – M2 of *Microtus obscurus*.

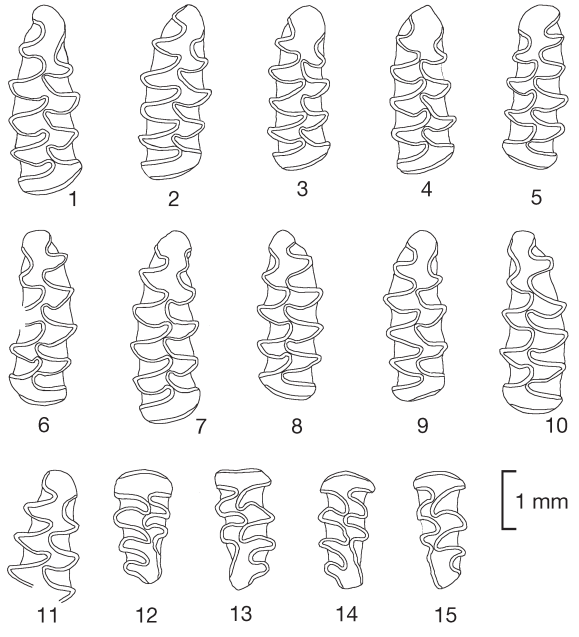


Fig. 4-11 Kabazi V, sub-unit III/5: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 – m1 of *Microtus obscurus*; 12, 13, 14, 15 – M3 of *Microtus obscurus*.

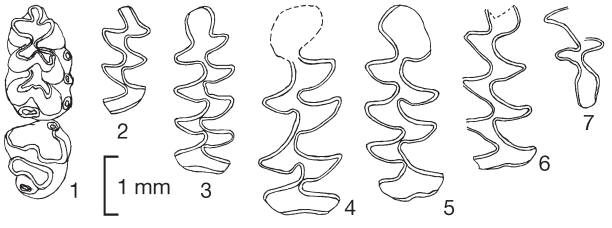


Fig. 4-14 Kabazi V, sub-unit III/2: 1 – m1 and m2 of *Apodemus flavicollis*; 2 – m2 of *Lagurus lagurus*; 3 – m1 of *Lagurus lagurus*; 4, 5, 6 – m1 of *Eolagurus luteus*; 7 – M3 of *Eolagurus luteus*.

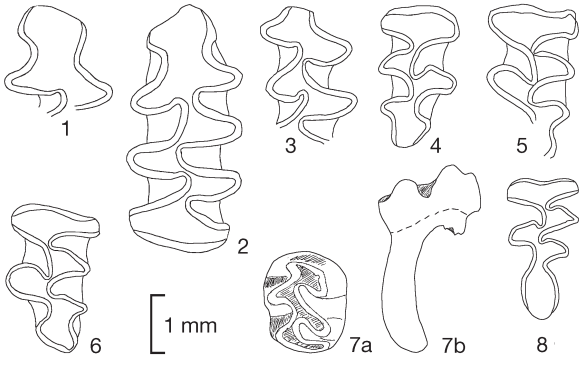


Fig. 4-15 Kabazi V, sub-unit III/5: 1, 2 – m1 of *Arvicola terrestris*; 3 – m2 of *Arvicola terrestris*; 4, 5, 6 – M3 of *Arvicola terrestris*; 7a, 7b – m2 of *Cricetulus migratorius*; 8 – M3 of *Eolagurus luteus*.

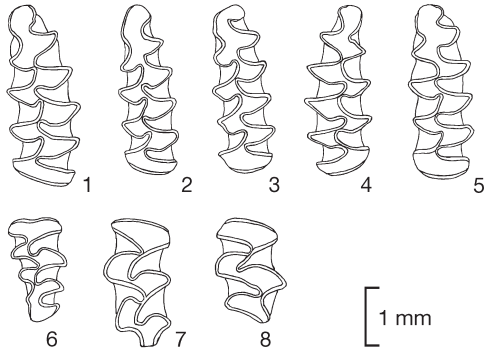


Fig. 4-12 Kabazi V, sub-unit III/5: 1, 2, 3, 4, 5 m1 of *Microtus obscurus*; 6 – M3 of *Microtus obscurus*; 7 – M1 of *Microtus obscurus*; 8 – M2 of *Microtus obscurus*.

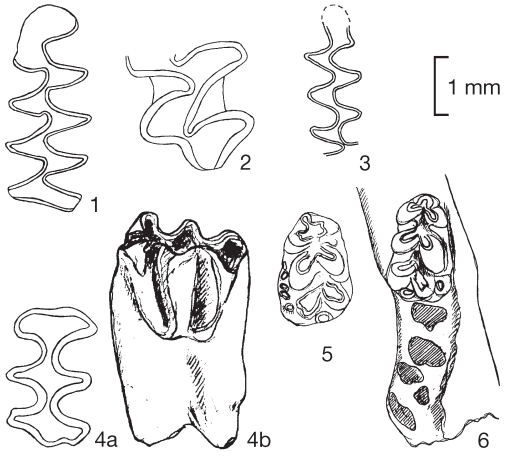


Fig. 4-13 Kabazi V, sub-unit III/1: 1, 3 – m1 of *Eolagurus luteus*; 2 – M1 of *Arvicola terrestris*; 4a, 4b – M1 of *Ellobius talpinus*; 5, 6 – m1 of *Apodemus flavicollis*.

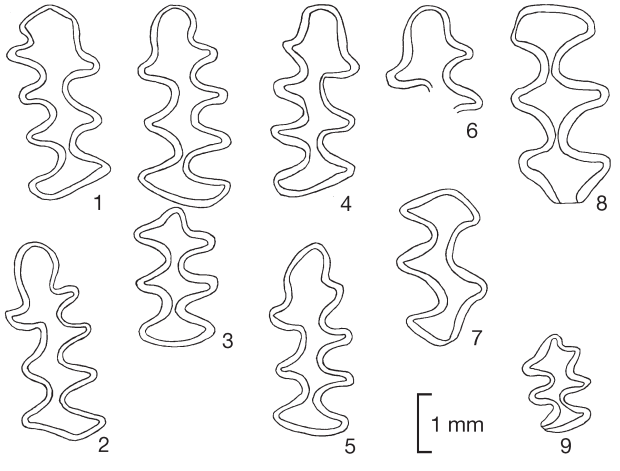


Fig. 4-16 Kabazi V, sub-unit III/5. 1, 2, 4, 5, 6 – m1 of *Ellobius talpinus*; 3 – m1 and m2 of *Ellobius talpinus*; 7 – M2 of *Ellobius talpinus*; 8 – M1 of *Ellobius talpinus*; 9 – m2 of *Ellobius talpinus*.

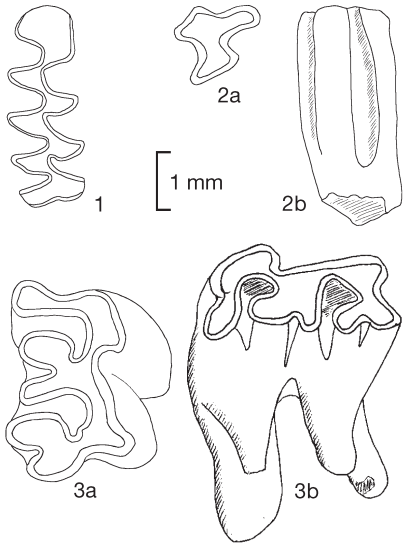


Fig. 4-17 Kabazi V, sub-unit III/6: 1 – m1 of *Eolagurus luteus*; 2a, 2b – M3 of *Ellobius talpinus*; 3a, 3b – M2 of *Allactaga major*.

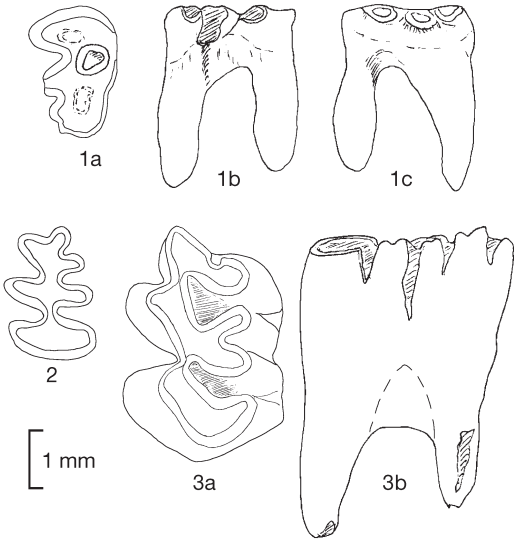


Fig. 4-18 Kabazi V, sub-unit III/2: 1 – m3 of *Pygeretmus pumilio*; 2 – m1 of *Pygeretmus pumilio*; 3a, 3b – m2 of *Allactaga major.*

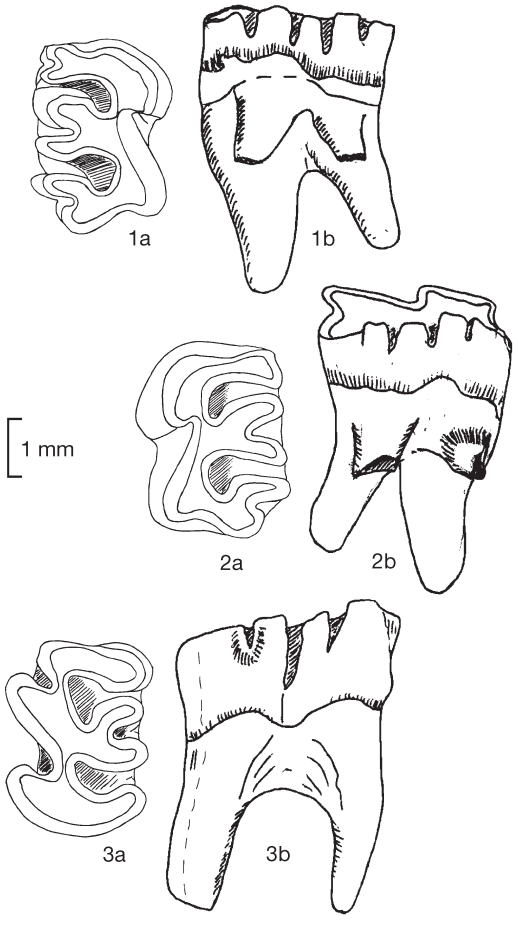


Fig. 4-19 Kabazi V, sub-unit III/4: 1a, 1b – M2 of *Allactaga major*; 2 a, 2b – M2 of *Allactaga major*; 3a, 3b – m2 of *Allactaga major*.

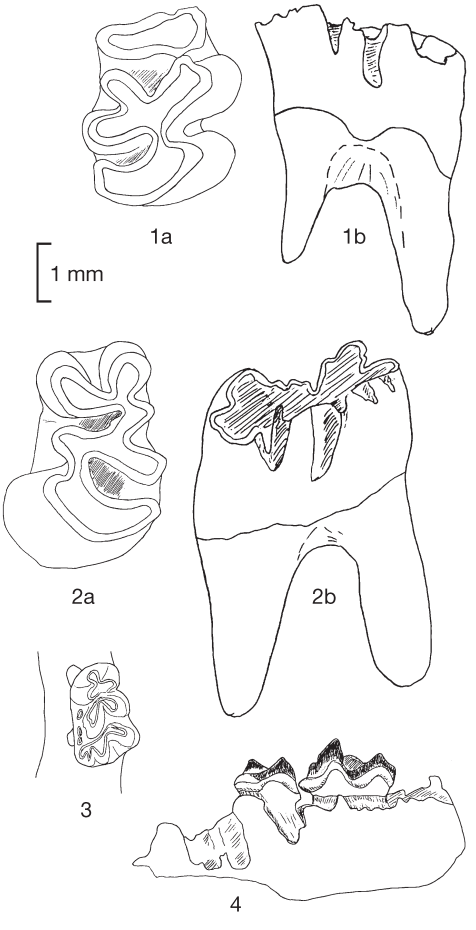


Fig. 4-20 Kabazi V, sub-unit III/5: 1a, 1b – m2 of *Allactaga major*; 2a, 2b – m1 of *Allactaga major*; 3 – m1 of *Apodemus flavicollis*; 4 – lower mandible of *Sorex araneus.*

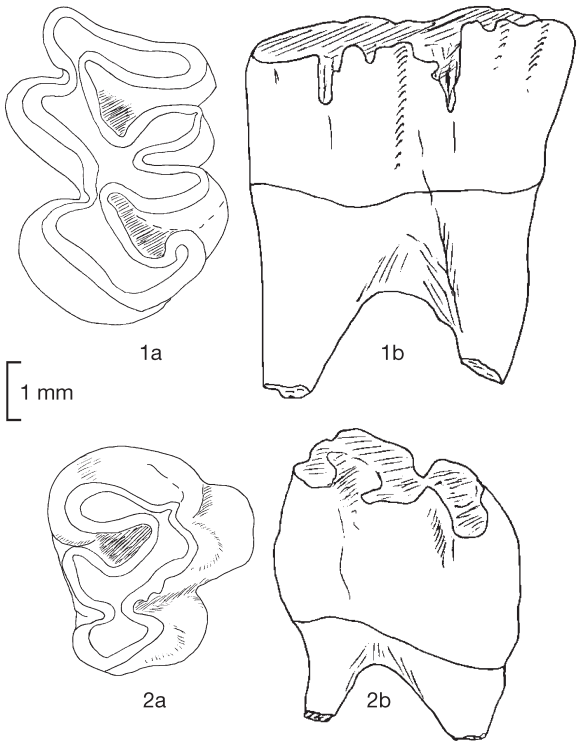


Fig. 4-21 Kabazi V, sub-unit III/7: 1a, 1b – m2 of *Allactaga major*; 2a, 2b – m3 of *Allactaga major*.

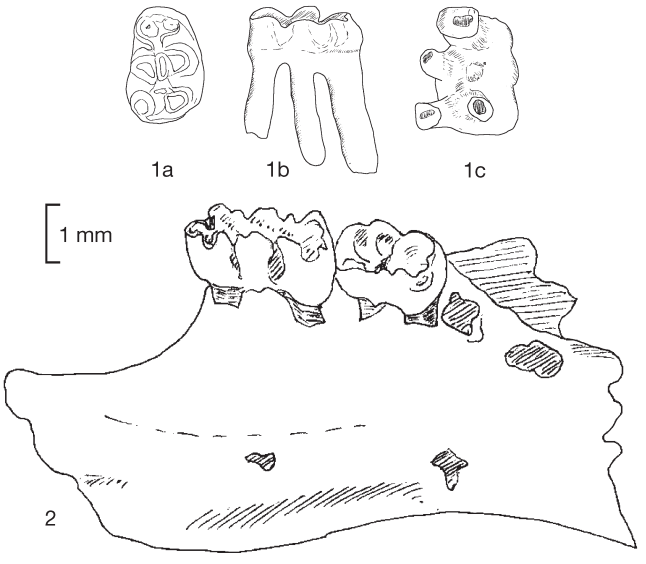


Fig. 4-22 Kabazi V, sub-unit III/2: 1a, 1b, 1c – m1 of *Cricetulus migratorius*; 2 – lower mandible with m1 and m2 of *Apodemus flavicollis*.

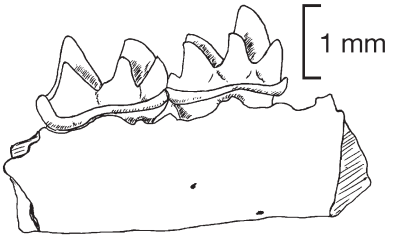


Fig. 4-23 Kabazi V, level IV/1. Fragment of lower mandible of *Myotis* sp.

Small Mammal Remains from Unit IV

In Unit IV a total of 118 remains of small mammals were identified at species level. The five distinguished species belong to the orders Chiroptera and Rodentia (Table 4-4).

The remains of mouse-eared bat (Myotis genera) found in Level IV/1 (Fig. 4-23) show very extensive ranges in Eurasia, with five different species of *Myotis* genera in the Crimea alone. Their favourite food is insects; their common habitats are caves, rock shelters and hollows in tree-trunks. Most species belonging to *Myotis* genera prefer rather mild climatic conditions, including forest steppe, forests of different types, and various mountain habitats.

Little suslik is a typical habitant of the steppe and semi-desert; cerials are its preferred food.

Northern mole – vole, which inhabits forest-steppe, steppe and semi-desert, prefers biotopes with various grass cover and soft soils.

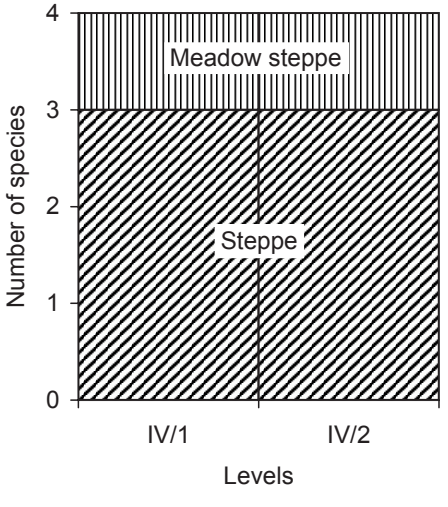


Fig. 4-24 Kabazi V, unit IV. Ecological groups of small mammals.

Ellobius talpinus can also live in "takyrs" in semi-deserts and deserts. This animal appears only very rarely on soil surfaces; mostly it lives in subterranean long bore-cores and feeds on the roots and bulbs of grass plants.

The modern range of the grey hamster is very wide and includes the southern part of Eastern Europe and West Siberia, as well as Kazakhstan and Central Asia. It inhabits forest-steppe, steppe, semi-desert and desert, both in the plains as well as in the mountains. Among its favourite foods are seeds and sometimes insects (Gromov *et al.*, 1963).

Altaian vole *Microtus obscurus* prefers meadows and steppe-like environments.

Forest and cold-adapted animals were not found in Unit IV. Open steppe-like landscapes were the principal environments during the accumulation of the deposits of the Unit IV (Fig. 4-24). The absence of forest species in the Unit IV small mammal assemblage could be explained by the restricted number of remains found in Unit IV. In all other levels of Kabazi V the number of remains of forest species is rather low.

Palaeoenvironments During the Accumulation of Kabazi V Deposits

The high quantities of small mammal bones recovered from Kabazi V make it possible to reconstruct the principal environments in the proximity of Kabazi V at times of human occupation. Accordingly, mammal assemblages strongly suggest that Kabazi V, a collapsed rock-shelter close to the Kabazi plateau, was situated in an area in which steppe-like landscapes prevailed. The majority of small mammals found in deposits from the site would have inhabited open environments, such as steppes, forest-steppes, and semi-desert. Nine of the 16 small-mammal species could be attributed to this group and include little suslik, bobac marmot, great jerboa, lesser five-toed jerboa, northern mole-vole, grey hamster, yellow steppe lemming, steppe lemming, and narrow-skulled vole. Some of these, such as the little suslik, were found in all levels, others only in some of the levels (Table 4-5, Fig. 4-25). The dominant species in all levels is the Altaian vole *Microtus obscurus* (Table 4-5, Fig. 4-25). This animal has also been noted at many other Middle Palaeolithic Crimean sites, e.g. at Kabazi II, Buran Kaya III, Siuren 1, Starosele, Karabi Tamchin, and Chokurcha (Markova 1999, 2004 a, 2004b, 2004c, 2005). In earlier papers this vole was described as *Microtus arvalis* or *Microtus socialis* (Gromov 1961). Only new cariotypic studies of this animal have led to the differentiation of a separate species (Malygin 1983, Zagaradniuk 1991). The morphological characteristics of the molars of this species also indicate its distinction from the other species of the *Microtus arvalis* group (Markova 1999).

Fig. 4-25 shows the distribution of the quantity of small mammal remains in the archaeological sub-units of Kabazi V. *Microtus obscurus* remains dominate in all levels (Table 4-5). This animal would have preferred open environments, such as steppes and meadows. Altain vole was also shown to be main constituent in the assemblages from Kabazi II.

The second most dominant small mammal recovered from most levels is the little suslik (Fig. 4-25). This animal is found quite typically in steppes, semi-deserts and deserts, where it feeds on cerials, tulips, onions and others plants. Its bore-cores ("krotovinas") can extend up to 2 m below the surface.

The northern mole-vole was also a common element of the small mammal assemblages during Kabazi V human occupation periods. The remains of this animal were found in Unit II, III and IV (Table 4-5). Its modern range covers forest-steppes, steppes, semi-deserts and deserts of Eastern Europe (including the Crimea), Kazakhstan, Central Asia, and Siberia. This animal is adapted to an underground existence, and prefers soft soils with rich grass cover. Its food includes the roots and bulbs of different grasses.

Yellow steppe lemming bones found in Unit III also indicate open landscapes near the site. This species is now absent in the Crimea, but was found in other Crimean Palaeolithic sites, and was very common during the Pleistocene on the Russian Plain. Yellow steppe lemming remains were recovered both in interglacial and glacial Pleistocene deposits. It was a very common feature of the "Mammoth assemblage" during the last glaciation (Baryshnikov, Markova 2002; Markova 2004d).

Steppe lemming remains were recovered in Unit II and Unit III (sub-units III/1, III/2, III/3). This mammal inhabits the south of Eastern Europe, including the Crimea, Kazakhstan and the south of Siberia up to the Enisei River. Steppe lemming is a typical habitant of steppe and semi-deserts. Its range widened extensively during all the glacial periods of the Pleistocene, including the time of the Valdai Glaciation (Markova, 2004d), periglacial open environments proving very favourable.

Great jerboa remains were found at the site in low quality, but in many of the levels. Currently, it

Taxa	Level II/3	Level II/3-4	Level II/4	Level II/4a	Level II/7	Sub-Unit III/1	Sub-Unit III/2	Sub-Unit III/3	Sub-Unit III/4	Sub-Unit III/5	Sub-Unit III/6	Sub-Unit III/7	Level IV/1	Level IV/2
Chiroptera														
Myopis sp. - mouse-eared bat	·	·	·	·	·	·	·	·	·	·	·	·	1	·
Insectivora														
Talpa sp. – Eurasian mole	1	·	·	·	·	·	·	·	·	·	·	·	·	·
Sorex araneus Linnaeus – Eurasian common shrew	1	·	·	·	·	·	·	·	·	1	·	·	·	·
Lagomorpha														
Lepus europaeus Pallas – Eiropean broun hare	·	·	·	·	·	·	·	2	·	·	·	·	·	·
Rodentia														
Spermophilus pygmaeus Pallas – little suslik	2	1		13	·	30	23	13	1	21	2	·	6	3
Marmota bobac – bobac marmot	·	·	·	·	·	·	·	1	·	1	·	·	·	·
Allactaga major Kerr – great jerboa	1	·	·	·	·	·	1	·	5	2	1	·	·	·
Pygeretmus (Alactagulus) pumilio Kerr – lesser five-toed jerboa	·	·	·	·	·	·	2	·	·	·	·	·	·	·
Dryomys nitedula Pallas – forest dormouse	·	·	·	·	·	1	·	4	·	·	·	·	·	·
Apodemus (Sylvaemus) flavicollis Melchior – yellow-necked mouse	·	2	1	·	6	2	·	1	1	·	·	·	·	·
Ellobius (Ellobius) talpinus Pallas – northern mole-vole	·	·	·	1	·	·	·	1	4	62	5	1	6	1
Cricetulus migratorius Pallas – grey hamster	2	2	·	·	·	·	1	·	·	3	·	·	1	1
Arvicola terrestris Linnaeus – water vole	1	·	·	·	·	1	5	3	1	20	·	1	·	·
Eolagurus luteus Eversmann – yellow steppe lemming	·	·	·	·	·	5	8	27	·	2	3	·	·	·
Lagurus lagurus Pallas – steppe lemming	1	1	·	2	·	20	1	12	·	·	·	·	·	·
Microtus (Microtus) obscurus Eversmann – Altaian vole	65	56	2	25	·	70	47	33	10	239	27	22	78	32
Microtus (Pallasiinus) oeconomus Pallas – root vole	·	3	·	·	·	·	·	·	·	·	·	·	·	·
Microtus (Stenocranius) gregalis Pallas – narrow-skull vole	·	·	·	·	·	2	·	·	·	·	·	·	·	·
Total number of species:	8	6	2	4	1	8	8	10	6	9	5	3	5	4

Table 4-5 Kabazi V. Small mammal species composition, combined collection from all field campaigns.

inhabits southern parts of Eastern Europe, and is common in the Crimea. The modern range of great jerboa also includes Kazakhstan and southern Siberia. *Allactaga major* prefers forest-steppes, steppes and semi-deserts. Its food includes seeds, bulbs and the roots of different grasses. Great jerboa was widely distributed during the last glaciation. It spread further west at this time.

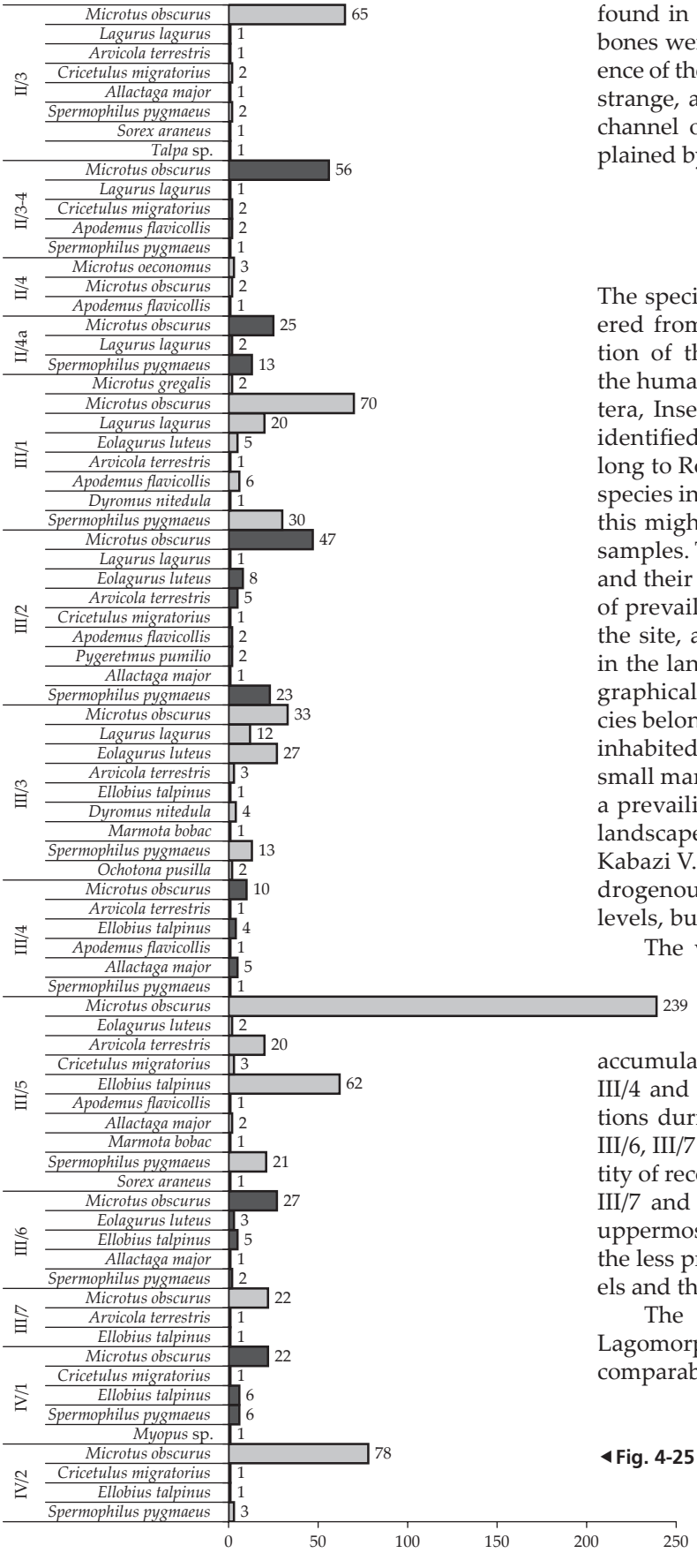
Remains of the lesser five-toed jerboa were only found in level III/2. This mammal is no longer found in the Crimea. Its modern range includes the lower Volga basin, Kazakhstan and Central Asia. Its favourable biotopes are semi-deserts and deserts. However, *Pygertmus pumilio* is also known to penetrate into regions with steppe. Its food includes bulbs, seeds, and green parts of plants. Lesser five-toed jerboa prefers to build their bore-holes in solid deposits. The remains of this animal were also identified in layer 6 at Buran-Kaya III (Markova 2004b). The presence of bones of *Pygeretmus pumilio* indicates an area with solid soils near the site during the Kabazi V, III/2 accumulation.

A small number of remains from two further steppe mammals (bobac marmot and narrow-skulled vole) support the impression of widely distributed open landscapes during the Middle Palaeolithic at Kabazi V.

Three forest species are also known from Kabazi V. These are Eurasian mole, yellow-necked mouse, and forest dormouse. The last two species are found typically in broadleaved forests. Eurasian mole is distributed in forests and forest-steppes (Fig. 4-26).

Common shrew is now found in many regions covering most of the natural zones of Eurasia. It is absent only in semi-deserts and desert. This insectivore feeds on insects, Amphibia, small mammals, and the seeds of coniferous trees (Flint et al., 1970).

Two hydrogenous voles were identified at the site. Water vole *Arvicola terrestris* remains were



found in most levels. Root vole *Microtus oeconomus* bones were recovered only in level II/3-4. The presence of these species in deposits at Kabazi V is rather strange, as nowadays the site lies 150 m above the channel of the Alma River. The finds may be explained by the hunting activity of birds (Fig. 4-26).

Conclusions

The species composition of small mammals recovered from Kabazi V makes possible a reconstruction of the principal palaeoenvironments during the human occupation. Eighteen species of Chiroptera, Insectivora, Lagomorpha and Rodentia were identified at the site, most of which (14 species) belong to Rodentia. Although the occurrence of these species in the sub-units and levels of the site varies, this might be explained by the varying volume of samples. The composition of small mammal species and their ecological fittings can be taken as markers of prevailing ecological situations in the vicinity of the site, and also provide information on changes in the landscape which occurred during the stratigraphical sequence (Fig. 4-26). The majority of species belong to groups of animals which would have inhabited arid open landscapes. Thus, most of the small mammals found at Kabazi V are indicative of a prevailing arid steppe with nearby forest-steppe landscapes. This group dominates in all layers of Kabazi V. Forest and meadow-steppe as well as hydrogenous species are also present in most of the levels, but only in very low numbers.

The varying ratios of the principal ecological groups of small mammals lead to the following conclusions: a higher occurrence of forest and shrub areas during the accumulation of Unit II and Unit III (sub-units III/1, III/4 and III/5), but with more arid climatic conditions during earlier depositional phases (sub-units III/6, III/7 and levels IV/1, IV/2). However, the quantity of recovered mammal remains in sub-units III/6, III/7 and levels IV/1, IV/2 were lower than in the uppermost occupations. Thus, this might explain the less pronounced richness in species in these levels and the absence of forest species remains.

The diversity of small mammals (Rodentia, Lagomorpha and Insectivora) from Kabazi V is quite comparable with the modern one, though species

◄**Fig. 4-25** Kabazi V. Species composition and quantity of remains of small mammals

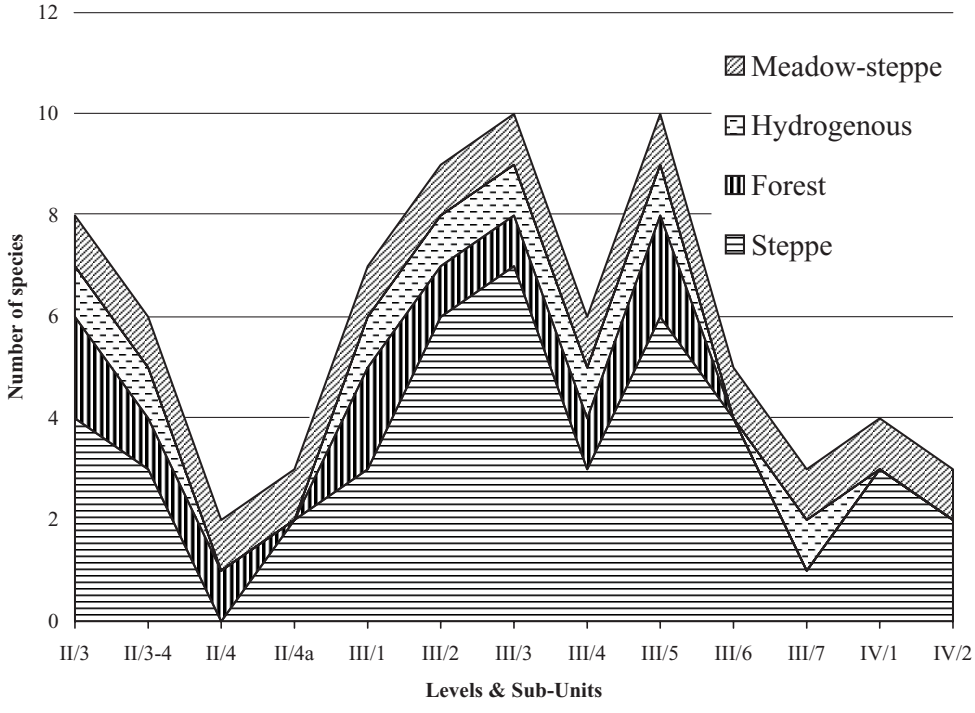


Fig. 4-26 Kabazi V. Ecological groups of small mammals from different levels and sub-units.

composition has changed significantly (Table 4-6). A total of 18 species were found at Kabazi V, with 20 small mammals (rodents, insectivores and lagomorphs) currently noted for the Crimea.

Some of the mammals found in Kabazi V deposits are no longer present in the Crimea: The range of the yellow steppe lemming *Eolagurus luteus* has decreased significantly. Nowadays, it is known only in some regions of Mongolia and China, and in the Zaisan Depression. Narrow-skulled vole *Microtus gregalis*, which was very common during the Pleistocene on the Russian Plain and in the Crimea, has now disappeared from Eastern Europe and is only found in the steppes of Kazakhstan and in the tundra zone, probably due to the appearance of a continuous forest zone following the end of the Valdai glaciation. Bobac marmot *Marmota bobac* also disappeared from Crimea and is now distributed in easternmost steppe territories. The aforementioned animals were common in Crimea and on the Russian Plain during the Valdai Glaciation, attracted as they were by decreasing temperatures during glaciation. The different types of open landscapes, with grass cover, were the prerequisites for their existence. The lesser five-toed jerboa *Pygeretmus* (*Alactagulus*) *pumilio* restricted its range in the Holocene under the influence of increasing humidity. Forest dormouse *Dryomys nitedula* is also not found in the modern Crimean fauna (Table 4-6).

Several aliens appeared in the Crimea in the Holocene, including rats and red squirrel, primarily as a result of anthropogenic influence and even deliberate introduction (red squirrel was introduced in the 20th century).

The accumulation of bones at Crimean sites is primarily connected with the hunting activities of owls, which would have nested in the rocks and rock-shelters (Gromov 1955; 1961). Consequently, these birds, which would have hunted on small mammals living in open areas, have greatly influenced the composition of the small mammal fauna spectrum at Kabazi V. Thus, due to the hunting ranges of owls, which can cover some several kilometres, the fauna distinguished at Kabazi V actually reflects natural conditions encountered in a rather wide area around the site. Obviously the influence of open landscapes distributed on the Kabazi plateau on the species composition of Kabazi V small mammals must have been significant.

The Kabazi V fauna list differs significantly from the modern one, which could be explained first of all by the different climatic conditions in the Late Pleistocene and at the present time, but also by anthropogenic pressure on nature in the Crimea during the Holocene. In sum, the new rich materials recovered during the excavations in 2002-2003 have made possible more reliable reconstructions.

Taxa	Kabazi V	The recent Crimean small mammals
Insectivora		
Erinaceus europeaus L. – European hedgehog	·	+
Talpa sp. - Eurasian mole	+	·
Crocidura leucodon Herm. – white-toothed shrew	·	+
Crocidura suaveolens Pall – lesser white-toothed shrew	·	+
Sorex minutus L. – pigmy shrew	·	+
Sorex araneus Linnaeus – Eurasian common shrew	+	+
Lagomorpha		
Lepus europaeus Pallas – European hare	+	+
Rodentia		
Sciurus vulgaris L. – red squirrel	·	+
Spermophilus pygmaeus Pallas – little suslik	+	·
Marmota bobac Pallas – bobac marmot	+	·
Allactaga major Kerr – great jerboa	+	·
Pygeretmus (Alactagulus) pumilio Kerr – lesser five-toed jerboa	+	·
Dryomys nitedula Pallas – forest dormouse	+	·
Sicista subtilis Pallas – Southern Birch Mouse	·	+
Apodemus (Sylvaemus) flavicollis Melchior – yellow-necked mouse	+	+
Rattus norvegicus Berc. – common rat	·	+
Rattus rattus L. – roof rat	·	+
Mus musculus L. – house mouse	·	+
Ellobius (Ellobius) talpinus Pallas – northern mole-vole	+	+
Cricetus cricetus L. – common hamster	·	+
Cricetulus migratorius Pallas – grey hamster	+	+
Arvicola terrestris Linnaeus – water vole	+	+
Eolagurus luteus Eversmann – yellow steppe lemming	+	·
Lagurus lagurus Pallas – steppe lemming	+	+
Microtus (Microtus) obscurus Eversmann – Altaian vole	+	+
Microtus (Pallasiinus) oeconomus Pallas – root vole	+	·
Microtus (Sumerionys) socialis Pallas – social vole	·	+
Microtus (Stenocranius) gregalis Pallas – narrow-skull vole	+	·
Total number of species:	17	20

Table 4-6 Small mammal species composition of modern and fossil Rodentia, Lagomorpha and Insectivora in Crimea.

The fauna from the earliest occupations at Kabazi V (Unit IV, sub-units III/7, III/6) is indicative of open steppe-like and meadow-steppe landscapes near the site. Later, during Unit III (sub-units III/1, III/4, III/5), few forest species appear in the small mammal assemblages. This shows a change to open environs with some forested and scrubbed areas located near the site. Some of the intermediate sub-units of Unit III (sub-units III/2 and III/3) might have experienced some increased aridity (stadial conditions?). At the close of human occupation at Kabazi V (Unit II) small mammal species included steppe, forest and meadow-steppe mammals, which are indicative of similar environmental conditions to those which prevailed during sub-unit III/1. The large mammal data from Kabazi V supports the impression of wide tracts of open landscape near the site, where typical steppe and semi-desert animals, such as saiga-antelope *(Saiga tatarica)* and Pleistocene ass *(Equus hydruntinus)* were the dominant species (Burke 1999).

On the whole, the Kabazi V sequence is correlated with MIS 3 (Chabai *et al.*, 2004), which was the most moderate stage of the last glaciation (Arnold *et al.*, 2002). The absence of cold-adapted animals in all levels indicates that climatic conditions during times of human occupation would have been moderate and comfortable. During the Late Pleistocene, and even during the coldest phase of the Valdai Glaciation, the low Crimean Mountains with their various local biotopes and different types of vegetation were the refuge not only for mammals, but also for Middle Palaeolithic human groups.

Abstract

МЕЛКИЕ МЛЕКОПИТАЮЩИЕ СРЕДНЕПАЛЕОЛИТИЧЕСКОЙ СТОЯНКИ КАБАЗИ V. ПАЛЕОЭКОЛОГИЧЕСКАЯ РЕКОНСТРУКЦИЯ

МАРКОВА А.К.

Видовой состав мелких млекопитающих, обнаруженных в многослойной палеолитической стоянке Кабази V, позволяет реконструировать основные изменения окружающей среды на протяжении обитания древнего человека. Из культурных отложений стоянки удалось определить восемнадцать видов мелких млекопитающих (Chiroptera, Insectivora, Lagomorpha, Rodentia). Содержание остатков мелких млекопитающих в различных слоях отличается, что зависело, в значительной мере, от объема исследованного материала. Видовой состав и экологические особенности мелких млекопитающих указывают на основные характеристики ландшафтов, окружающих стоянку и также на определенные экологические изменения окружающей среды на протяжении существования памятника (Fig. 4-26). Большинство определенных видов мелких млекопитающих относятся к обитателям открытых аридных ландшафтов и указывает на распространение аридных степных и лесостепных местообитаний. Эта группа животных доминирует во всех слоях Кабази V. Лесные, луговые и околоводные млекопитающие также присутствуют в большинстве слоев стоянки, но в очень малом количестве.

Отношение между основными экологическими группами млекопитающих позволяет говорить о более значительном распространении залесенных участков вблизи стоянки во время накопления культурных слоев II и III (пачки горизонтов III/1, III/4, III/5). Более аридные климатические условия существовали в более раннюю фазу накопления отложений (пачки горизонтов III/6, III/7, и горизонты IV/1, IV/2). Нужно отметить, однако, что количество костных остатков мелких млекопитающих, обнаруженных в этих слоях ниже, чем в более поздних отложениях. Этот факт, вероятно, объясняет и более низкое видовое богатство мелких млекопитающих в более ранних отложениях, и, возможно, отсутствие в них остатков лесных видов.

Разнообразие мелких млекопитающих (Rodentia, Lagomorpha, Insectivora) из Кабази V сопоставимо с современным, однако видовой состав заметно отличается (Table 4-6). Восемнадцать видов, были определены в Кабази V; в настоящее время в Крыму обитают 20 видов грызунов, насекомоядных и зайцеобразных.

Некоторые из найденных в Кабази V млекопитающих в настоящее время не обитают в Крыму: ареал желтой пеструшки Eolagurus luteus в настоящее время резко сократился (сейчас она обитает лишь в Монголии, Китае и Зайсанской котловине). Узкочерепная полевка Microtus gregalis, вид, широко распространенный на Русской равнине и в Крыму на протяжении всего плейстоцена, во второй половине голоцена исчез из Восточной Европы, и теперь населяет казахстанские степи, а также тундры. Разделение ареала этого вида произошло в конце валдайского оледенения в результате формирования сплошной лесной зоны. Также из Крыма исчез сурок байбак Marmota bobac, который сохранился в более восточных степях. Упомянутые выше животные находили благоприятные условия обитания в Крыму и на Русской равнине во время последнего оледенения, т.к. температурные параметры не являлись для них ограничивающим фактором. Основным условием их обитания является распространение открытых ландшафтов разных типов. Тарбаганчик Pygeretmus (Alactagulus) pumilio , определенный в Кабази V, также сократил свой ареал в голоцене под влиянием возросшей увлажненности. Лесная соня Dryomys nitedula не обнаружена в современной фауне Крыма (Таблицы 4-6). В голоцене произошло появление в фауне Крыма двух видов крыс и белки (последняя была акклиматизирована в XX веке).

Накопление костных остатков мелких млекопитающих в крымских стоянках, прежде всего, связано с охотничьей деятельностью сов, гнездящихся в скалах и расщелинах (Gromov 1955, 1961). Нужно отметить, что совы предпочитают охотиться на мелких млекопитающих, распространенных, прежде всего на открытых участках. Этот момент, вероятно, отражается на видовом составе мелких млекопитающих Кабази V. Также важно иметь ввиду, что охотничий ареал хищных птиц составляет несколько километров, таким образом, фауна мелких млекопитающих, обнаруженная в Кабази V, дает представление о ландшафтах, распространенных широкой полосой вокруг стоянки. Несомненно, что влияние на видовой состав млекопитающих данного памятника открытых ландшафтов расположенного вблизи плато Кабази должно было быть значительным.

Состав фауны стоянки Кабази V сильно отличается от видового состава современной фауны горного Крыма. Прежде всего, это объясняется изменившимися климатическими условиями. На современную фауну также оказало влияние антропогенное воздействие. Полученные в 2002-2003 гг. новые богатые материалы костных остатков мелких млекопитающих из стоянки Кабази V позволяют провести более достоверные реконструкции.

Фауна из наиболее ранних отложений (культурный слой IV, пачки горизонтов III/7, III/6) указывает на преобладание открытых степных и луговых ландшафтов вблизи стоянки. Позднее, во время формирования отложений пачек горизонтов III/1, III/4, III/5, в фауне появляется несколько лесных видов, что свидетельствует о чередовании вблизи стоянки как открытых, так и лесных биоценозов. Вероятно, пачка горизонтов III/1 отложились в брянский межстадиал (=Денекамп), а пачка горизонтов III/5 – в межстадиал Гражданский проспект (=Хенгело). Фауна некоторых пачек горизонтов (III/2, III/3) возможно отражает некоторую аридизацию (стадиальные условия?). В наиболее поздних отложениях стоянки (культурный слой II) фауна мелких млекопитающих включает степные, лесные и луговые виды. Эта фауна отражает сходные климатические условия с таковыми пачки горизонтов III/1, и, возможно, отвечает концу брянского межстадиала. Результаты исследований

крупных млекопитающих также дают представление о широком распространении открытых ландшафтов около стоянки. Видами – доминантами являлись сайга *Saiga tatarica* и плейстоценовый осёл *Equus hydruntinus* (Burke 1999; Глава 6 в этом томе).

Отложения всех слоев Кабази V коррелируются с изотопно-кислородной стадией 3 (MIS 3), с наиболее теплой фазой последнего оледенения (Arnold et al., 2002). Отсутствие во всех слоях стоянки животных, адаптированных к суровым климатическим условиям, указывает на умеренный климат, благоприятный для обитания древнего человека. Низкие горы Крыма с многообразием локальных биотопов и разнообразной растительностью являлись на протяжении валдайского оледенения рефугиумом как для млекопитающих, так и для древнего человека.