

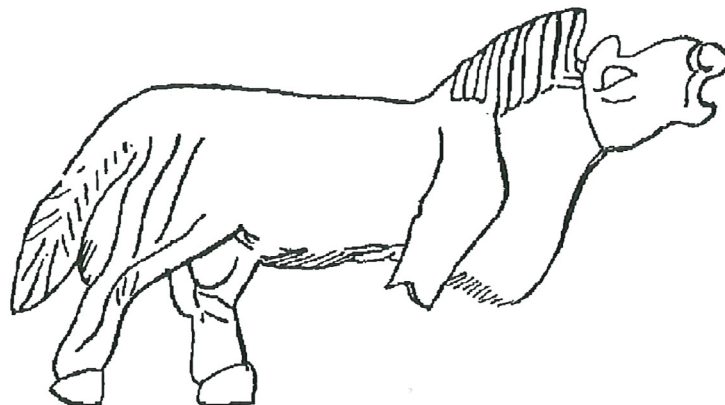


ARCHAEOZOOLOGY OF THE NEAR EAST IV A

Proceedings of the fourth international symposium on the
archaeozoology of southwestern Asia and adjacent areas

edited by

M. Mashkour, A.M. Choyke, H. Buitenhuis and F. Poplin



**ARC - Publicatie 32
Groningen, The Netherlands, 2000**

Cover illustration:

Przewalski from Susa (nacre – mother of pearl)

Dated to 2500 – 2000 BC, identified by F. Poplin

copyright:

Centre for Archeological Research and Consultancy

Groningen Institute for Archaeology

Rijksuniversiteit Groningen The Netherlands

Printing: RCG -Groningen

Parts of this publication can be used if source is clearly stated.

Information: Centre for Archeological Research and Consultancy

Poststraat 6, 9712 ER Groningen, The Netherlands

ISBN 90 – 367 – 1243 - 2

NUGI 644 - 134

Contents

VOLUME A

Preface	A
Deborah Bakken	11
Hunting strategies of Late Pleistocene Zarzian populations from Palegawra Cave, Iraq and Warwasi rock shelter, Iran	
Daniella Zampetti, Lucia Caloi, S. Chilardi and M.R. Palombo	18
Le peuplement de la Sicile pendant le Pléistocène: L'homme et les faunes	
Sarah E. Whitcher, Joel C. Janetski, and Richard H. Meadow	39
Animal bones from Wadi Mataha (Petra Basin, Jordan): The initial analysis	
Liora Kolska Horwitz and Eitan Tchernov	49
Climatic change and faunal diversity in Epipalaeolithic and Early Neolithic sites from the Lower Jordan valley	
Paul Y. Sondaar and Sandra A.E. van der Geer	67
Mesolithic environment and animal exploitation on Cyprus and Sardinia/Corsica	
Pierre Ducos	74
The introduction of animals by man in Cyprus: An alternative to the Noah's Ark model	
Jean-Denis Vigne, Isabelle Carrère, Jean-François Saliège, Alain Person, Hervé Bocherens, Jean Guilaine and François Briois	83
Predomestic cattle, sheep, goat and pig during the late 9 th and the 8 th millennium cal. BC on Cyprus: Preliminary results of Shillourokambos (Parekklisha, Limassol)	
Norbert Benecke	107
Mesolithic hunters of the Crimean Mountains: The fauna from the rock shelter of Shpan'-koba	
Hitomi Hongo and Richard H. Meadow	121
Faunal remains from Prepottery Neolithic levels at Çayönü, Southeastern Turkey: a preliminary report focusing on pigs (<i>Sus</i> sp.)	
Gulcin Ilgezdi	141
Zooarchaeology at Çayönü: a preliminary assessment of the red deer bones	
Banu Oksuz	154
Analysis of the cattle bones of the Prepottery Neolithic settlement of Çayönü	
Nerissa Russell and Louise Martin	163
Neolithic Çatalhöyük: preliminary zooarchaeological results from the renewed excavations	
Alice M. Choyke	170
Bronze Age bone and antler manufacturing at Arslantepe (Anatolia)	
Ofer Bar-Yosef	184
The context of animal domestication in Southwestern Asia	
Cornelia Becker	195
Bone and species distribution in late PPNB Basta (Jordan) - Rethinking the anthropogenic factor	
Justin Lev-Tov	207
Late prehistoric faunal remains from new excavations at Tel Ali (Northern Israel)	
Daniella E. Bar-Yosef Mayer	217
The economic importance of molluscs in the Levant	
Daniel Helmer	227
Les gazelles de la Shamiyya du nord et de la Djézireh, du Natoufien récent au PPNB: Implications environnementales	
Maria Saña Seguí	241
Animal resource management and the process of animal domestication at Tell Halula (Euphrates Valley-Sria) from 8800 bp to 7800 bp	

Contents

VOLUME B

Chiara Cavallo, Peter M.M.G. Akkermans and Hans Koen	5
Hunting with bow and arrow at Tell Sabi Abyad	
Caroline Grigson	12
The secondary products revolution? Changes in animal management from the fourth to the fifth millennium, at Arjoune, Syria	
Barbara Wilkens	29
Faunal remains from Tell Afis (Syria)	
Margarethe Uerpmann and Hans-Peter Uerpmann	40
Faunal remains of Al-Buhais 18: an Aceramic Neolithic site in the Emirate of Sharjah (SE-Arabia) - excavations 1995-1998	
Angela von den Driesch and Henriette Manhart	50
Fish bones from Al Markh, Bahrain	
Mark Beech	68
Preliminary report on the faunal remains from an 'Ubaid settlement on Dalma Island, United Arab Emirates	
Jean Desse and Nathalie Desse-Berset	79
Julfar (Ras al Khaimah, Emirats Arabes Unis), ville portuaire du golfe arabo-persique (VIII ^e -XVII ^e siècles): exploitation des mammifères et des poissons	
Chris Mosseri-Marlio	94
Sea turtle and dolphin remains from Ra's al-Hadd, Oman	
Hervé Bocherens, Daniel Billiou, Vincent Charpentier and Marjan Mashkour	104
Palaeoenvironmental and archaeological implications of bone and tooth isotopic biogeochemistry (¹³ C ¹⁵ N) in southwestern Asia	
Sándor Bökönyi † and László Bartosiewicz	116
A review of animal remains from Shahr-i Sokhta (Eastern Iran)	
Ann Forsten	153
A note on the equid from Anau, Turkestan, " <i>Equus caballus pumpellii</i> " Duerst	
Alex K. Kasparov	156
Zoomorphological statuettes from Eneolithic layers at Ilgynly-depe and Altyn depe in South Turkmeniya	
László Bartosiewicz	164
Cattle offering from the temple of Montuhotep, Sankhkara (Thebes, Egypt)	
Louis Chaix	177
A hyksos horse from Tell Heboua (Sinai, Egypt)	
Liliane Karali	187
Evolution actuelle de l'archéozoologie en Grèce dans le Néolithique et l'Age du Bronze	
Emmanuelle Vila	197
Bone remains from sacrificial places: the temples of Athena Alea at Tegea and of Asea on Agios Elias (The Peloponnese, Greece)	
Wim Van Neer, Ruud Wildekamp, Marc Waelkens, Allan Arndt and Filip Volckaert	206
Fish as indicators of trade relationships in Roman times: the example of Sagalassos, Turkey	
Ingrid Beuls, Bea De Cupere, Paul Van Mele, Marleen Vermoere, Marc Waelkens	216
Present-day traditional ovicaprine herding as a reconstructional aid for understanding herding at Roman Sagalassos	

MESOLITHIC HUNTERS OF THE CRIMEAN MOUNTAINS: THE FAUNA FROM THE ROCK SHELTER OF SHPAN'-KOB

Norbert Benecke¹

Abstract

The abri Shpan'-Koba lies in the central part of the Crimean mountains, at an elevation of about 700 m. At this site archaeological excavations took place in 1988 and 1989. They uncovered cultural layers of the Early and Late Mesolithic. The two main occupation periods were the Preboreal and the Atlantic. The fauna mainly consists of mammal remains. The most frequent species are red deer, wild boar, saiga, roe deer, brown bear and hare. Birds are represented by only a few fragments. *Cygnus olor*, *Falco* cf. *tinnunculus*, *Perdix perdix*, *Otis tarda*, *Crex crex* and *Corvus monedula* could be identified. In the early periods of occupation red deer and saiga were the most frequently hunted mammal species. Later wild boar became the most important hunted species. This change can be attributed to the Holocene re-forestation of the upper parts of the Crimean mountains at that time which is also documented in the palynological record from this site. According to various data it is supposed that the abri was occupied by groups of hunters during the spring and summer months. The fauna from Shpan'-Koba is compared with other Early and Middle Holocene faunal assemblages of the Crimean mountains. Most of them exhibit a similar pattern in the subsistence economy of the Mesolithic human groups with hunting of various mammal species being of major importance and fowling as well as fishing being random activities. It has to be pointed out that there is no evidence for winter occupation at the sites in the Crimean mountains. During the cold season the Mesolithic hunters probably lived on the coast.

Résumé

L'abri Shpan'-Koba se situe dans la partie centrale des monts de Crimée, à 700 m d'altitude environ. Les fouilles archéologiques se sont déroulées en 1988 et 1989 et ont permis de mettre au jour des niveaux du Mésolithique ancien et final. Les deux occupations principales se placent au préboréal et à l'Atlantique. La faune se compose essentiellement de restes mammaliens. Les espèces les plus fréquentes sont le cerf, le sanglier, le saïga, le chevreuil, l'ours brun et le lièvre. Les oiseaux sont représentés par quelques restes. *Cygnus olor*, *Falco* cf. *tinnunculus*, *Perdix perdix*, *Otis tarda*, *Crex crex* et *Corvus monedula* ont été identifiés. Dans les premières phases d'occupation, le cerf et le saïga sont les espèces les plus fréquemment chassées. Plus tard, ce sera le sanglier. Cette évolution peut être attribuée au retour de la forêt holocène dans les parties hautes des monts de Crimée, à cette période qui est aussi documentée par les analyses polliniques du site. Sur la base de plusieurs types de données, il s'avère que l'abri était occupé par des groupes de chasseurs durant le printemps et l'été. La faune de l'abri Shpan'-Koba est comparée avec d'autres assemblages fauniques du début et du milieu de l'Holocène des monts de Crimée. La majorité d'entre eux montre un schéma similaire quant à l'économie de subsistance des chasseurs mésolithiques, où la chasse de plusieurs espèces mammaliennes est dominante, suivie de la capture d'oiseaux et de la pêche comme activités d'appoint. Il faut souligner qu'il n'existe aucune preuve d'occupation des monts de Crimée durant l'hiver. Durant la saison froide, les chasseurs mésolithiques vivaient probablement sur les côtes.

Key Words: Crimea, Mesolithic, Subsistence Economy, Seasonality

Mots Clés: Crimée, Mésolithique, Économie de subsistance, Saisonnalité

Introduction

In contrast to the flat northern half of the peninsula largely covered by steppe-vegetation, the southern Crimea is marked by three ranges of hills, the Crimean Mountains. The caves, grottos and rock shelters of these mountains served as habitation sites for prehistoric man over long periods of time. At such places subfossil faunal remains in different quantities and from various periods have been deposited. Most of these assemblages exhibit good bone preservation. Therefore the Crimean

¹ PD Dr. N. Benecke, Deutsches Archäologisches Institut, Eurasien-Abteilung, PF 330014, D-14191 Berlin.

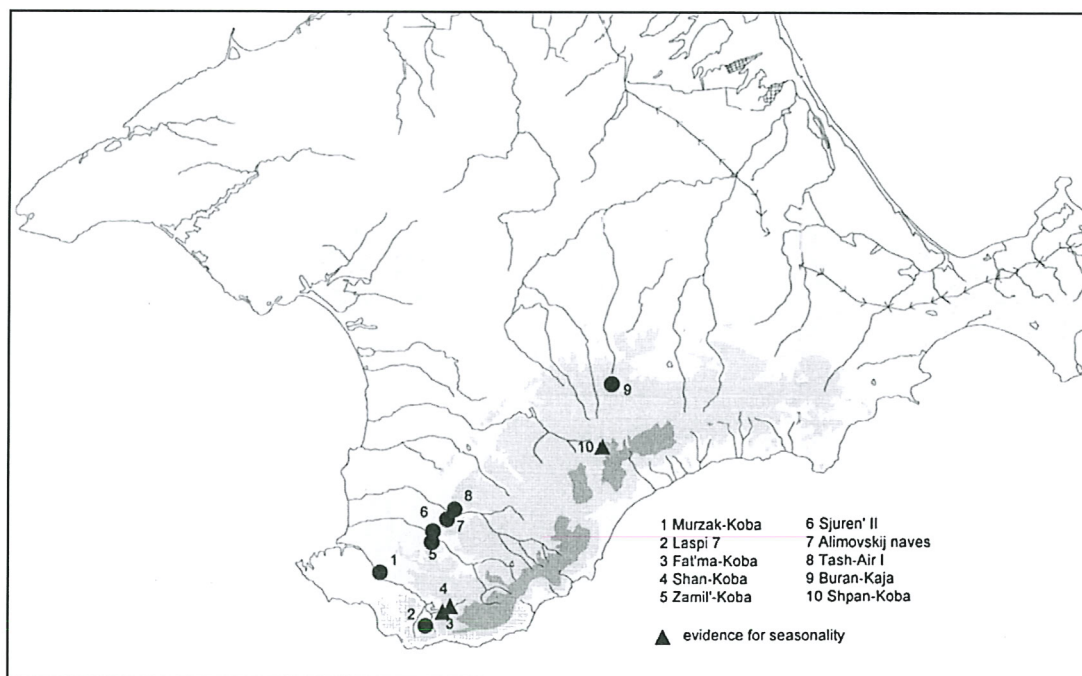


Fig. 1. Location of the mesolithic sites in the Crimean Mountains from which faunal assemblages have been studied

Mountains are an interesting area for studying prehistoric subsistence strategies (cf. Bibikov *et al.* 1994; Janevich 1995).

The region of Southern Crimea has a long tradition of archeological research on Palaeolithic and Mesolithic cultures that goes back to the late 19th century. Intense excavation activities primarily during the 1920s and 1930s and in the first decades after World War II have yielded large materials from these periods, also bringing to light faunal assemblages of various sizes in different chronological positions. Archeozoological studies became an integral part of these archeological research activities very early. As a result, a fairly large number of faunal analyses exist for the pre-Neolithic periods. Concerning the Mesolithic nearly 10 sites with faunal remains from more or less undisturbed deposits are known from the Crimean Mountains (Fig. 1).

I myself had the opportunity to study the animal remains from one of the more recent excavations in that area, that is from the rock shelter site Shpan'-Koba. The paper presents some results of this study. The exploitation pattern of animal resources in the area of the Crimean Mountains by Mesolithic human groups will then be discussed, including archaeozoological data available from other sites of this period. For a better understanding of the results presented here some information about the geography and climate of the area under investigation would seem to be helpful. They will be presented first.

Geography and climate of the Crimean Mountains

The Crimean Mountains, which are about 40-50 km wide and 150 km long, cover the southern and southeastern part of the Crimean Peninsula. They consist of three mountain ridges running parallel to one another, ascending from north to south (Fig. 2). The northerly one is only 250-300 m high, the middle one around 500 m, the most southerly, the "Jaila" (i.e. Turkish for summer pastures for sheep), has an elevation of 800-1500 m and drops away southwards almost vertically into the Black Sea. The most northerly mountain range is, like the whole northern half of the Crimean Peninsula at present, covered by a steppe. In contrast, the recent vegetation of the middle mountain range already has the character of forest-steppe, with grassland steppes on open areas between oak

forests. While the yearly precipitations in the areas of the northern and middle mountain ranges do not exceed 600 mm, in the Jaila mountain range they continue to rise in increasing levels (by up to 1000-1200 mm). This explains the appearance of beech woods. These are to be found, above all, on the northern slopes of the southern mountain range and start here at a height of 600-700 m above sea level. The upper boundary of the beechwoods lies at present at 1300 m. The treeless Jaila zone fits in above this. These open areas, today extending widely over the high plateau, are clearly anthropogenic in origin and are the result of overgrazing, the utilisation of wood, etc. (the above information from Walter 1974: 348 ff. and Walter and Breckle 1994: 229 ff.). The Mesolithic sites considered here lie, with the exception of Shpan'-Koba, in the middle mountain range zone. In the case of Shpan'-Koba we are concerned with a site situated at the foot of the Jaila Mountains, at a height of about 700 m. So far, no other Mesolithic occupation site in the Crimean Mountains have been found at such a high elevation.

For reconstructing the subsistence patterns of Mesolithic human groups it is important to note, that in the Early Holocene the sea level of the Black Sea was nearly 30 m lower than today. This means that the coastal zone south of the mountains must have been much broader than now. This explains why there is no clear evidence for Upper Palaeolithic and Mesolithic settlement. All places with human occupation from those early periods are nowadays some metres below sea level. The chronologically oldest archaeological sites on today's southern coast of Crimea belong to the Eneolithic.

A factor, which probably has had a great influence on the Mesolithic settlement in the Crimean Mountains, is climate. Within this small area there are enormous differences in climatic conditions from north to south and according to altitude. These differences are illustrated by climate diagrams for selected localities in Figure 3.

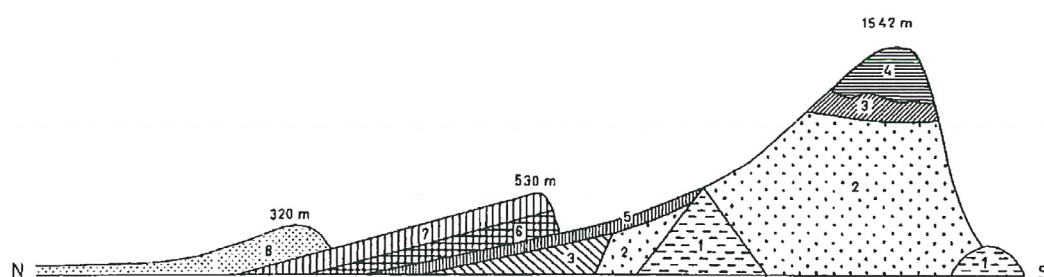


Fig. 2. North – South profile of the Crimean Peninsula (Walter 1974, Fig. 287). The numbers refer to geological structures not specified here

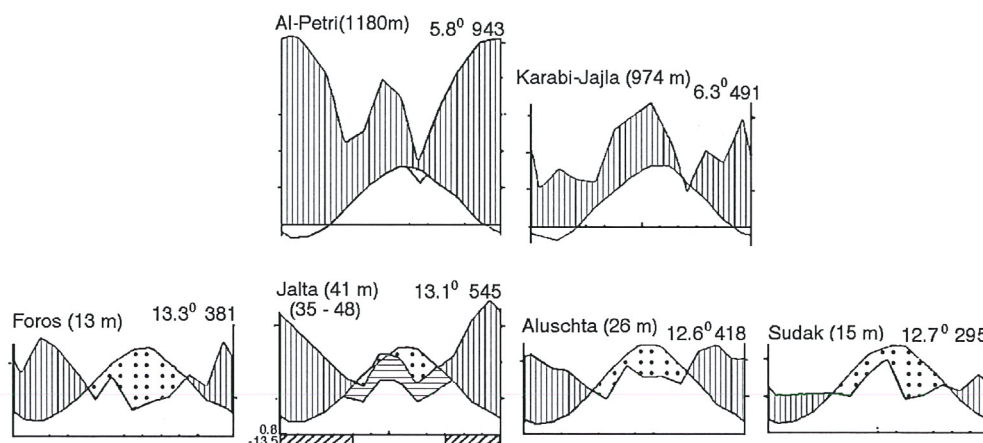


Fig. 3. Climate diagrams from the Crimean mountains. Upper row: Jaila – range; Lower row: south coast (Walter 1974, Figs. 309 and 288)

Table 1. Shpan'-Koba, 1989 excavations. Distribution of the animal remains by layer and horizon

Layer/Horizon	Number	Weight (in g)	Dated bone/tooth	C ¹⁴ (BP)
Layer 3, Hor. 6	20	112	<i>Ursus</i> , Tibia	9940 ± 50 (KIA 3683)
Layer 3, Hor. 5	86	830	<i>Equus</i> , Scapula	9840 ± 50 (KIA 3684)
Layer 3, Hor. 4	13	295	<i>Cervus</i> , Metatarsus	9930 ± 60 (KIA 3685)
Layer 3, Hor. 3	5	19		
Layer 3, Hor. 2	179	782	<i>Cervus</i> , Mandibula	9760 ± 60 (KIA 3686)
Layer 3, Hor. 1	5	28		
Layer 2, Hor. 5	80	90	<i>Sus</i> , Incisivus inf.	9730 ± 50 (KIA 3687)
Layer 2, Hor. 4	71	156	<i>Saiga</i> , Humerus	9790 ± 50 (KIA 3688)
Layer 2, Hor. 3	276	399		
Layer 2, Hor. 2	559	601		
Layer 2, Hor. 1	381	539	<i>Ovis</i> , Radius	9560 ± 50 (KIA 3689)
Layer 1, Hor. 5	228	221	<i>Capreolus</i> , Phalanx 2	6850 ± 40 (KIA 3690)
Layer 1, Hor. 4	190	250		
Layer 1, Hor. 3	199	176		
Layer 1, Hor. 2	415	436		
Layer 1, Hor. 1	635	611		
Layer 1, Hor. 1a	81	103		
Sum	3423	5648		

Summarizing those data one can state that:

1. there is much rainfall in autumn and winter in the mountains north of the Jaila-range above 400 m; for at least four months (December to March) there is much snow,
2. on the coast south of the Jaila-range a mild climate prevails throughout the year,
3. for the steppe zone north of the Crimean Mountains, there is no diagram in Figure 3, a continental climate is characteristic, however with hot and dry summers and cold winters (Walter 1974: 349).

The fauna from Shpan'-Koba

The site of Shpan'-Koba (Belogorskiy Rajon) is a rock shelter in the Dolgorukovskij-Jaila, at an altitude of about 700 m, not far from the village of Lesnoe Kipchak. In 1988 and 1989 A. A. Janevich of the Institute of Archaeology in Kiev carried out excavations at this Mesolithic site (Janevich 1993). In the first campaign (summer 1988) two test trenches were excavated, one in the inner part of the rock shelter (trench 1) and another at its entrance (trench 2). In the latter, partly mixed layers with a high proportion of finds from post-Mesolithic periods were encountered, while trench 1 revealed Mesolithic finds in predominantly undisturbed deposits from a depth of more than two metres. In the summer of 1989 trench 1 was extended to an area of about 30 m². Through the excavation results, the Mesolithic deposits could be divided into three main layers with some horizons in each. According to recent radiocarbon datings carried out at the Leibniz-laboratory (University of Kiel), lower layers 3 and 2 date to the Preboreal and layer 1 to the Atlantic (Table 1). Two datings from Shpan'-Koba carried out earlier at the laboratory of the Russian Academy of Sciences in Moscow yielded slightly different results: 9150 ± 150 (GIN 6276) for layer 2 (horizon 4-3) and 8240 ± 150 (GIN 6277) for layer 1 (horizon 5-4; Janevich 1993: 11; Janevich, pers. comm.). According to these data the middle part of layer 2 was accumulated during the Boreal and the lower part of layer 1 at the Boreal/Atlantic transition. This paper follows the periodization of the bone finds according to the new radiocarbon dates.

The faunal assemblage from Shpan'-Koba (excavation 1989) comprises about 3400 remains, above all from mammals. Only some bone fragments belong to birds, while remains of other animal groups have not been found at all. As the deposits have been completely sieved the absence of amphibians, reptiles and fish seem to reflect the actual situation at this site. In general the osteological

Table 2. Shpan' -Koba, 1989 excavations. Bone counts (NISP) for the identified species per layer and horizon

Group/Species	3-6	3-5	3-4	3-3	3-2	3-1	2-5	2-4	2-3	2-2	2-1	1-5	1-4	1-3	1-2	1-1	1-1a
I. Mammals																	
<i>Lepus europaeus</i>	-	2	1	-	1	-	-	-	1	-	1	1	-	1	-	-	-
<i>Cricetus cricetus</i>	-	3	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-
<i>Vulpes vulpes</i>	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
<i>Ursus arctos</i>	2	6	-	-	5	-	1	-	-	-	-	-	-	-	-	-	-
<i>Meles meles</i>	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	1	-
<i>Felis lynx</i>	-	-	-	-	-	-	-	-	1	-	3	-	-	-	-	-	-
<i>Equus ferus</i>	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Sus scrofa</i>	-	-	-	-	-	-	7	12	25	44	31	7	9	15	18	50	10
<i>Cervus elaphus</i>	-	2	6	-	10	1	-	6	12	19	4	2	2	2	5	1	-
<i>Capreolus capreolus</i>	-	-	-	-	-	-	-	-	-	-	2	1	2	1	3	4	1
<i>Bos taurus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-
<i>Ovis aries/Capra hircus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	-
<i>Saiga tatarica</i>	-	9	2	1	12	2	-	4	-	-	-	-	-	-	-	-	-
II. Birds																	
<i>Cygnus olor</i>	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
<i>Falco cf. tinnunculus</i>	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
<i>Perdix perdix</i>	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
<i>Otis tarda</i>	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
<i>Crex crex</i>	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
<i>Corvus monedula</i>	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
III. Unidentified																	
Group 1 (deer etc.)	4	13	-	1	8	-	5	5	14	25	55	16	12	7	25	15	9
Group 2 (pig etc.)	14	47	-	2	142	2	67	44	220	464	279	199	158	169	360	561	60
Group 3 (hare etc.)	-	-	3	-	-	-	-	-	3	1	2	2	6	3	1	-	1
not assignable	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Sum	20	86	13	5	179	5	80	71	276	559	381	228	190	199	415	635	81

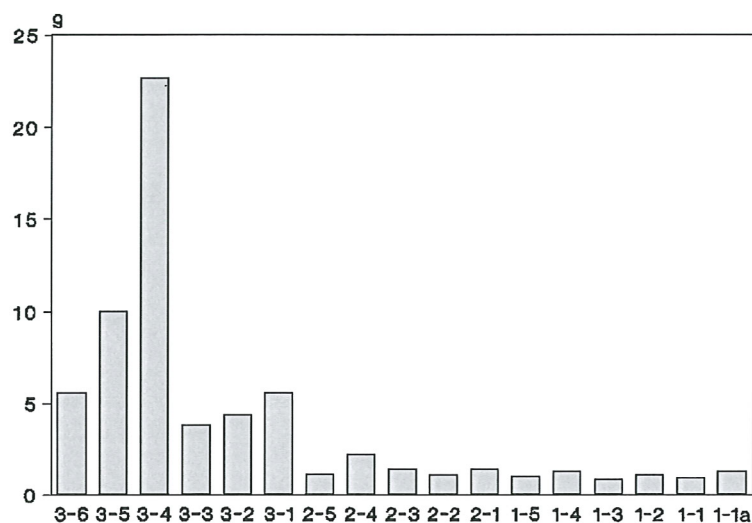


Fig. 4. Shpan'-Koba, 1989. Mean weight per specimen per layer and horizon

finds are well preserved. A bias in the composition of the faunal assemblage due to selective conditions of preservation for single animal groups can probably be ruled out. Table 1 summarizes the distribution of animal remains by layers and horizons. Most of the material consists of small bone or tooth fragments, a fact that is well illustrated in the graph in Figure 4 presenting the mean weight per specimen according to layers and horizons. Burned pieces, bones with cut marks and the type of fragmentation indicate that the faunal assemblage from Shpan'-Koba is predominantly, if not totally, of anthropogenic origin.

Because of the small size of most of the osteological remains only a part of the total material, that is about 400 specimens or 12 %, could be identified to taxon. Despite the small number of identifiable remains 20 species have been identified. These include 14 mammal and 6 bird species (Table 2). The taxonomically unidentified remains have been assigned to three size classes or groups.

The Species

A species encountered in all layers of the rock shelter, but only in low frequencies, is brown hare (*Lepus europaeus*). Its remains include fragments of different postcranial elements. They all belong to adult individuals. Some bones have cut marks on them, which indicates that hare can be regarded as an animal hunted by the Mesolithic inhabitants. According to published identifications, *Lepus europaeus* could already be found in the late glacial in this region (Vekilova 1971: Table 3; Benecke 1999: Table 4). During the early and mid-Holocene it seems to have been widely distributed here, as bone finds from several sites show.

The only rodent species identified in the faunal assemblage from Shpan'-Koba is the hamster (*Cricetus cricetus*). Two mandibles and fragments of a humerus and two femora could be assigned to this rodent. This species probably represents an element of the natural thanatocoenosis on this site. Remains of *Cricetus cricetus* have repeatedly been reported from late glacial as well as early and mid-Holocene deposits in the Crimean Mountains (Vekilova 1971: Table 4; Benecke 1999: Table 3).

Four species within the mammalian fauna studied are carnivores. These include red fox (*Vulpes vulpes*), brown bear (*Ursus arctos*), badger (*Meles meles*) and lynx (*Felis lynx*).

Bones of red fox have only been found in two horizons of layers 2 and 3. These are a fragment of a left mandible and a metatarsal, both belonging to adult animals. Remains of *Vulpes vulpes* are encountered regularly in late glacial and Holocene faunal assemblages of the region (Vekilova 1971: Table 3; Benecke 1999: Table 4), but mostly in low numbers only. This species, which is a common

wild animal on the Crimea in recent times (Heptner and Naumov 1974: 319ff.), also seems rarely to have been hunted at Shpan'-Koba.

Bone finds of brown bear are restricted to layer 3 and the deepest horizon of layer 2. These comprise ribs, a mandible and a few fragments of limb bones. Some of them have cut marks on them. This probably indicates that the meat of brown bear was consumed by the human population. At present *Ursus arctos* is absent from the Crimea and in the whole northern Black Sea region (Heptner *et al.* 1974: Figure 82). When the species became extinct is unknown.

The third carnivore, badger, is one of the rarer species in the faunal assemblage from Shpan'-Koba. It is only documented by four bones (a mandible, ulna and two metapodials) in layer 2 and 1. They belong to adult animals. A cut mark on the plantar side of a metatarsal possibly results from the skinning of the animal. The exploitation of the fur seems to have been more important in hunting this carnivore than the use of its meat. *Meles meles* is already sporadically documented in late glacial deposits of the Crimean Mountains, but the subfossil record shows that it was only in the Holocene that large populations of this species could develop here (Vekilova 1971: Table 3; Benecke 1999: Table 4). Currently the badger is widely distributed in the Crimea (Heptner and Naumov 1974: Fig. 161).

Evidence for the lynx, the last of the four carnivore species, comes only from layer 2. A loose lower canine and three bone fragments (humerus, patella, metatarsal), which could be assigned to this felid, have been found in these deposits. Similarly to the badger, the exploitation of the fur must be regarded as the main motivation for this species having been hunted. Part of the local fauna since the late glacial (Vekilova 1971: Table 3; Benecke 1999: Table 4), the lynx is no longer to be found on the Crimean Peninsula (Heptner and Sludskij 1980: 413 pp. and Figure 184). It seems that this species has long been extinct in this region.

The order of perissodactyles is represented by one species, the wild horse (*Equus ferus*), in the faunal assemblage from Shpan'-Koba. Three bones from the lower deposits of layer 3, including a rib, a fragment of a scapula and a fragment of a femur, could be assigned to this species. All bones came from adult animals. The two limb bone fragments seem to represent quite large horses with estimated withers heights of about 150 cm. Beside European wild ass (*Equus hydruntinus*), wild horse has been identified in late Pleistocene as well as Holocene deposits in the Crimean Mountains (Vekilova 1971: Table 3; Benecke 1999: Table 4). As the frequency of bone finds indicates, both equids became rarer in the transition to the Holocene. Reliable evidence for *Equus hydruntinus* remains limited to the early Holocene, while *Equus ferus* may also still occur in this area in the mid-Holocene. However, the single example from this period from Tash-Air I is not beyond question since the deposits concerned (layers 7-5) are overlain by Bronze Age to medieval layers containing numerous horse bones (probably domestic horse!; cf. Dmitrieva 1960: Table 2). Whereas wild ass occurs up until the Neolithic in the north and east of the Crimean Peninsula (e.g. Shchepinskij and Cherepanova 1969: 37; Mackevoy 1977: Table 3), wild horse survived in the north Crimea as well as on the Black Sea steppes probably into the middle of the 19th century (Heptner *et al.* 1966: 861).

As can be seen from Table 2, artiodactyl species represent the largest group within the mammalian fauna from Shpan'-Koba. The most common species in this group and of the faunal assemblage as a whole is wild pig (*Sus scrofa*). Interestingly, bones of wild pig are completely missing in the deepest layer (layer 3). In layer 2 this species occurs in very high frequencies and this remains constant in the uppermost layer 1. The remains represent all parts of the skeleton in more or less equal quantities. This seems to indicate that the hunted pigs were butchered on the site and that their meat was consumed there. The bone finds belong to different age classes: fetal or juvenile 1.1 %, juvenile 4.9 %, juvenile or subadult 59.3 %, subadult 1.9 % and, subadult or adult 32.8 %. According to these data young individuals seem to form the largest group of hunted pigs. Some mandibles as well as bones of neonatal individuals provided more precise information concerning the ages and the season in which the animals were killed (see below). Only a few pig bones could be measured. In accordance with pig bones from other sites the metrical data characterize the populations of *Sus scrofa* from the Crimean Mountains as relatively small in comparison with other early and mid-Holocene wild pig in southeastern Europe, an already established fact (cf. Benecke 1993: Table 3 and Figure 3). A partial to complete isolation of the autochthonous population in the south Crimea from wild pig living north of the Black Sea coast as well as the particular living conditions in hilly country and mountains probably contributed to this phenomenon. Part of the local fauna since late glacial times (Vekilova 1971: Table

3; Benecke 1999: Table 4), *Sus scrofa* became extinct in the middle of the 19th century in the mountainous areas of the Crimea (Heptner *et al.* 1966: 43). The wild pigs occurring here today are the result of the re-introduction of this species in 1957 (Kormilicyn and Dulickij 1972).

The second most common mammalian species in the fauna from Shpan'-Koba is red deer (*Cervus elaphus*). It is the only species whose remains are almost regularly distributed in the layers and horizons of this rock shelters. In contrast to wild pig, most remains come from subadult or adult animals. Only 8 % of the finds represent young individuals. As in wild pig, the remains of red deer represent all parts of the body. Obviously, complete animals were brought to the rock shelter and butchered at the site. The few osteometrical data point to relatively large animals. For example, the following measurements could be taken on a right mandible from layer 3: length of cheektooth row 98 mm, length of M3 40.5 mm, breadth of M3 15.0 mm. *Cervus elaphus* is one of the common, occasionally even dominant, ungulates in early and mid-Holocene faunal assemblages of the studied region (Vekilova 1971: Table 3; Benecke 1999: Table 4). It may already be found in late glacial times. Currently, the red deer may still be found in the Crimean Mountains (Heptner *et al.* 1966: 176).

A second cervid species identified in the faunal assemblage from Shpan'-Koba is roe deer (*Capreolus capreolus*). This species is less frequently encountered compared to red deer. It is completely missing in layer 3 and in most of the horizons in layer 2. The few remains of roe deer from layer 1 belong exclusively to subadult or adult animals. As a compilation by Vekilova (1971: Table 3) and Benecke (1999: Table 4) shows, *Capreolus capreolus* is one of the regularly occurring and in part, also common species found in faunal assemblages from Mesolithic sites in the Crimean Mountains, and occurred here during late glacial times. Recently its distribution in this area is mainly restricted to forested areas (Heptner *et al.* 1966: 255).

Altogether 30 specimens among the identified mammal remains could be assigned to the saiga antelope (*Saiga tatarica*), an ungulate unknown in the Crimean Peninsula today. As the data in Table 2 show, this species is restricted to layer 3 and to the lower horizons of layer 2. Most of the bones belong to adult animals. According to data compiled by Vekilova (1971: Table 3) and Benecke (1999: Table 4) *Saiga tatarica* was most abundant in late glacial times. It is also, in places like Shpan'-Koba, frequently encountered in layers from the beginning of the early Holocene. It appears however, that in the Boreal the mountainous area of the Crimea no longer was part of the *Saiga tatarica* range. In the steppes of the southern Ukraine, including the northern part of the Crimea, on the other hand it occurs in greater numbers right into the 18th century. According to data in Heptner *et al.* (1966: 577) the saiga was exterminated completely during the 19th century.

The list of mammal species in the faunal assemblage from Shpan'-Koba is completed by domestic animals, i.e. cattle and sheep/goat. A few remains of these species have been identified from the uppermost horizons of layer 1. Obviously they are intrusions from the overlying Neolithic strata, which is not considered here. It is supposed that in the Neolithic and still in younger periods, the Shpan'-Koba rock shelter was used by migrating herdsmen on their way to the summer pastures in the Jaila-zone of the Crimean Mountains or on their way back to the valleys.

The osteological material of Shpan'-Koba also contains a few bird bones. The identified species include mute swan, kestrel, partridge, great bustard, corncrake and jackdaw. It was difficult to decide whether all bird bones can be considered the remains of human meals, especially in the case of the smaller species (kestrel, corncrake and jackdaw). Cut marks have not been observed on any of these remains.

The mute swan (*Cygnus olor*) is represented by a single bone find, a fragment of a left radius from layer 2. The bone belongs to an adult animal. The find from Shpan'-Koba is the first record of this species from Holocene deposits in the Crimean Mountains (cf. Voinstvenskij 1967: 33 ff.; Vekilova 1971: Table 5; Benecke 1999: Table 2). At present *Cygnus olor* is a migratory species in the Crimean Peninsula, occupying it mainly in the spring and summer months (Kostin 1983: 28 ff.).

The fragment of a right coracoid of a falcon was found in horizon 2 of layer 3. The bone comes from a subadult animal. It probably belongs to the kestrel (*Falco tinnunculus*). This falcon species has repeatedly been identified on sites in the Crimean Mountains, i.e. in deposits of late glacial times as well as the Holocene (cf. Voinstvenskij 1967: 23 ff.; Vekilova 1971: Table 5; Baryshnikov and Potapova 1992: Table 6; Benecke 1999: Table 2). At present, the kestrel is a sedentary, nesting and migratory bird in the Crimea. Here, steppe areas and mountains up to 1400 m are its preferred habitats (Kostin 1983: 71).

The partridge (*Perdix perdix*) is documented by a right coracoid of an adult animal from horizon 1 in layer 2. The occurrence of *Perdix* in the Crimean Mountains in late glacial times and the Holocene has been evidenced from several sites (cf. Voinstvenskij 1967: 23 ff.; Vekilova 1971: Table 5; Baryshnikov and Potapova 1992: Table 6; Benecke 1999: Table 2). Currently, partridges are considered sedentary birds in the Crimea (Kostin 1983: 74).

A fragment of a right radius from horizon 1 in layer 2 could be assigned to the great bustard (*Otis tarda*). The bone belongs to an adult animal. Until now only a few osteological records of this large steppe bird are known from Holocene deposits in the Crimean Mountains (cf. Voinstvenskij 1967: 33 ff.; Vekilova 1971: Table 5; Benecke 1999: Table 2). At present *Otis tarda* still occurs in the Crimea, as a nesting and wintering bird (Kostin 1983: 84).

A partly damaged left humerus from horizon 2 in layer 2 demonstrates the presence of the corncrake (*Crex crex*) in the faunal assemblage of Shpan'-Koba. Until now this species had been described only from Late Pleistocene deposits in the Crimean Mountains (Voinstvenskij 1967: 23 ff.; Baryshnikov and Potapova 1992: Table 6; Benecke 1999: Table 2). The bone from Shpan'-Koba is the first record of this species for the Holocene. At present *Crex crex* is a rare nesting bird in the Crimea (Kostin 1983: 82). It occurs here between April and October.

A fragment of a left ulna from horizon 2 in layer 2 clearly belongs to a jackdaw (*Corvus monedula*). The bone comes from an adult animal. Remains of this species have been reported from Late Pleistocene and Holocene deposits at several sites in the Crimean Mountains (cf. Voinstvenskij 1967: 23 ff.; Vekilova 1971: Table 5; Baryshnikov and Potapova 1992: Table 6; Benecke 1999: Table 2). Currently the jackdaw is a common sedentary bird in the Crimea. Here, it inhabits nearly all kinds of biota, provided that there are adequate possibilities for nesting (Kostin 1983: 175).

Temporal changes in the fauna composition of Shpan'-Koba

On the basis of identifications listed in Table 2, it appears that the hunting of large mammals played a major role in the subsistence economy of the Mesolithic human groups who used this rock shelter as a habitation. If we summarize and compare the bone frequencies for the four most common large mammalian species - red deer, wild pig, saiga antelope and roe deer -, some changes in the economic importance of those species become apparent. Figure 5 shows the absolute frequencies for *Cervus*, *Sus*, *Saiga* and *Capreolus* by layer and horizon. In the lowest layer 3, saiga and red deer are the most important species with wild pig and roe deer absent. In layer 2, saiga becomes a rare species

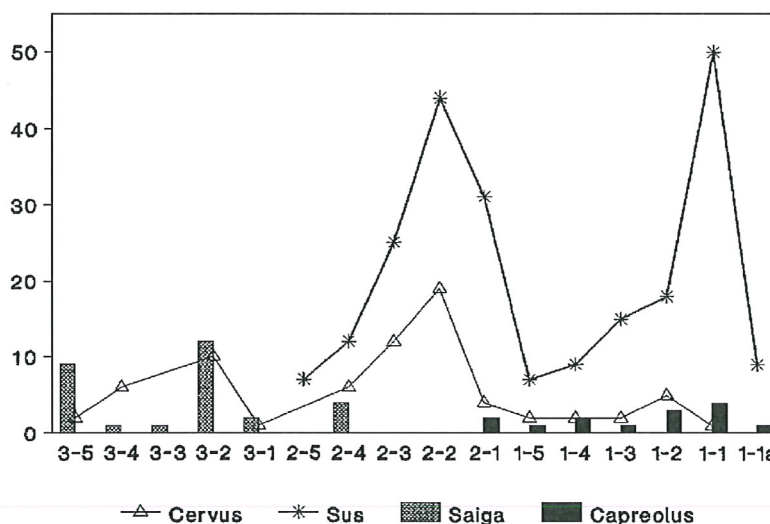


Fig. 5. Shpan'-Koba, 1989. Absolute frequencies of *Cervus*, *Sus*, *Saiga* and *Capreolus* remains according to layers and horizons

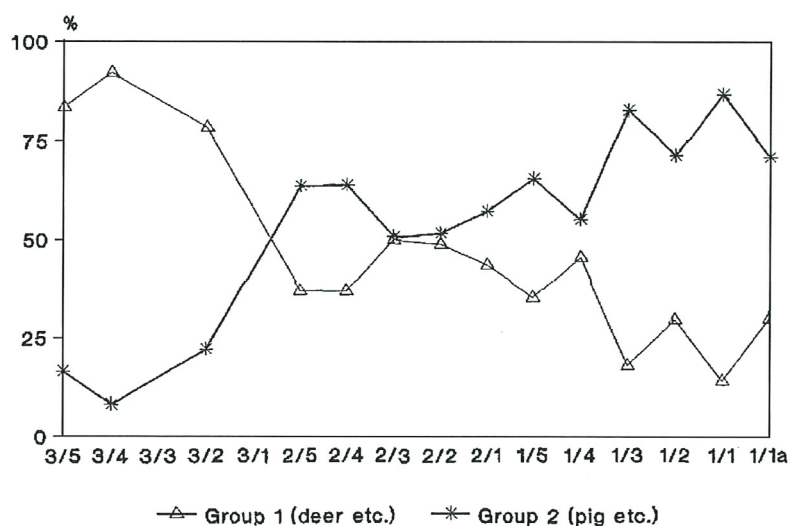


Fig. 6. Shpan'-Koba, 1989. Relative bone weights of non-identifiable animal remains which have been assigned to size groups

and finally disappears altogether. Wild pig and red deer now become the most common of the large mammal species. In layer 1, a further increase in the percentage of wild pig can be observed with red deer and roe deer having, more or less, the same low frequency. These changes can probably be attributed to the re-forestation of the Crimean Mountains at the Pleistocene-Holocene transition and during the Early Holocene. Palynological data from deposits at the site of Shpan'-Koba, indicating a clear increase of tree-pollen in the lowest horizons of layer 2 (L.G. Bezusko, pers. comm.), seem to support this assumption. The increase in the importance of pigs as a main food resource is also reflected in the relative bone weights of the finds which remained unidentified but which could be assigned at least to size groups (Fig. 6).

If we compare the data from Shpan'-Koba with faunal assemblages from other Mesolithic sites in the Crimean Mountains then it becomes obvious that the observed changes at Shpan'-Koba reflect a general trend in the evolution of the large mammalian fauna in that area. This is illustrated in Figure 7. It exhibits the species composition for *Saiga*, *Cervus*, *Sus* and *Capreolus* in ten assemblages from the Crimean Mountains, arranged chronologically covering the long period from late glacial times to the Atlantic period. As can be seen from the graph, there is a clear shift from the late glacial large mammalian fauna dominated by saiga antelope to a fauna where red deer and wild pig become the most common Holocene species.

The hunting of birds obviously played only a minor role in the subsistence economy of the human groups who occupied the Shpan'-Koba rock shelter. The concentration of the few bird remains in layer 2 seems to be more the result of the larger sample from this excavation unit than a reflection of an increase in fowling by Mesolithic hunters.

Seasonal occupation at Shpan'-Koba

An interesting question concerning Shpan'-Koba relates to the season of human occupation at this Mesolithic rock shelter. Some indication of the main season of occupation can be obtained from bones where the age of the animals can be determined relatively precisely. From the analysed faunal assemblage, 16 specimens of wild pig and red deer permitted the season these animals were killed to be determined. The elements studied include tooth rows from young individuals and neonatal bones of both species. Figure 8 summarises the results of these identifications. Some bones from Mesolithic layers uncovered during the 1988 excavations are included here. On the basis of supposed birth periods in April for wild pig and June for red deer, the lines show the probable time of death indicated by each specimen. The birth periods used here are based on those of recent populations of wild pig and red deer in the Crimean Mountains (cf. Kormilicyn 1970: 16; Kormilicyn and Dulickij 1972: 42).

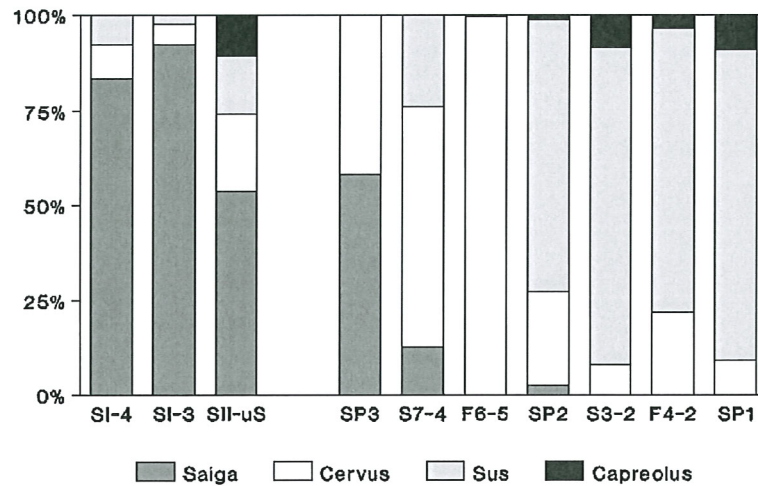


Fig. 7. Percentages of *Saiga*, *Cervus*, *Sus* and *Capreolus* in faunal assemblages from the Crimean Mountains.

Dryas I and Bølling: SI-4 – Sjurem' I (layer 3); Allerød: SI-uS – Sjurem' II (lower layer); Preboreal: SP3 – Shpan'-Koba (layer 3), S7-4 – Shan-Koba (layer 7-4), F6-5 – Fat'ma-Koba (layers 6-5), SP2 – Shpan'-Koba (layer 2); Boreal: S3-2 – Shan-Koba (layers 3-2), F4-2 – Fat'ma-Koba (layers 4-2); Atlantic: SP1 – Shpan'-Koba (layer 1)

Finds	Species	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1988/3-10	RD												
1988/2-8	WP												
1988/2-7	WP												
1988/2-5	WP												
1988/1-3	WP												
1989/3-5	RD												
1989/2-3	WP												
1989/2-3	WP												
1989/2-2	WP												
1989/2-2	WP												
1989/2-2	WP												
1989/2-2	RD												
1989/2-1	WP												
1989/1-3	WP												
1989/1-1	WP												
1989/1-1a	WP												

Fig. 8. Chart summarising the seasonal evidence from Shpan'-Koba, based on bone finds (mainly mandibles from red deer (RD) and wild pig (WP). Supposed birth periods: April (wild pig), June (red deer)

As can be seen from the chart in Figure 8, the animals must have been killed in the spring and summer months. No specimens point definitely to autumn or winter. These data are corroborated by the evidence for seasonality from the bird bones. Corncrake only occurs in the Crimea between April and September. Similarly the mute swan, a migratory bird living in the Crimean Peninsula during the spring and the summer, must have been killed in the warm part of the year. Together with the climatic data for the Jaila-zone of the Crimean Mountains presented above, the aforementioned results seem to indicate that the Shpan'-Koba rock shelter, located at an altitude of about 700 metres, must have been mainly visited and occupied by Mesolithic hunters during the spring and summer months.

Subsistence patterns of the Mesolithic hunters of the Crimean Mountains - Final remarks

As has been shown in the previous section of this paper the Shpan'-Koba rock shelter must be regarded as a seasonal camp site with the spring and summer months as the main period of occupation. In addition to the evidence from Shpan'-Koba, there is data for seasonality from two other Mesolithic sites in the Crimean Mountains, the rock shelters of Fat'ma-Koba and Shan-Koba, located close to each other in the middle section of the Kubalar-Dere Gorge (Fig. 1). In contrast to Shpan'-Koba they topographically represent Mesolithic sites from the middle range of the Crimean Mountains. Some years ago, I had the opportunity to study the pig bones from these two sites. For both materials the age-determination revealed that bones from 10 to 12 month old animals were strikingly common, with proportions of over 70 %. There were also many neonatal pig bones. For these reasons it was concluded that spring had been the main period of occupation at Fat'ma-Koba and Shan-Koba (cf. Benecke 1993: 237). As is shown in Figure 9, there are no striking differences in the frequency distribution of tooth wear stages between the pig bones from the Early Mesolithic

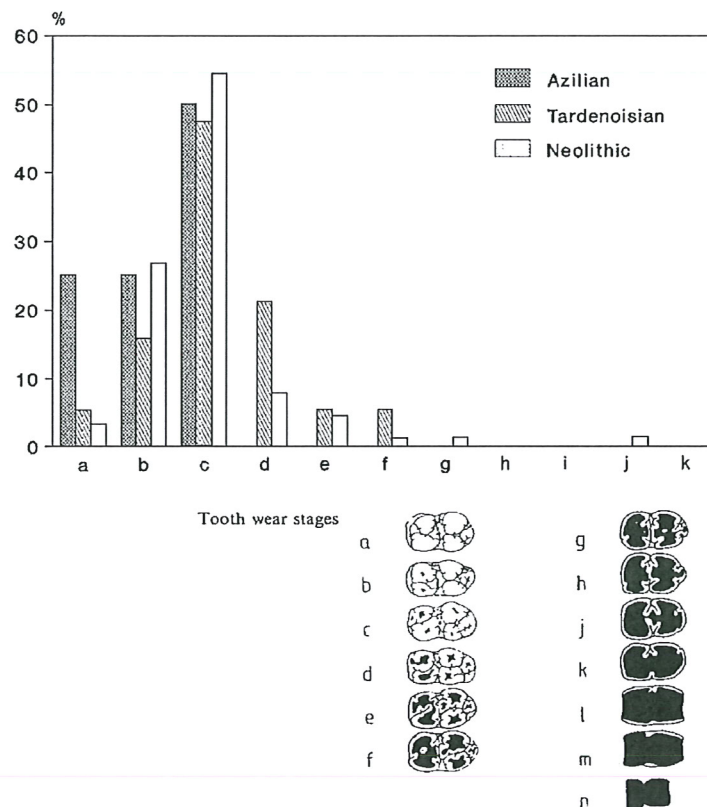


Fig. 9. Frequencies of tooth wear stages of lower first molars from wild pig in different layers of Shan-Koba

(Azilian) and the Late Mesolithic (Tardenoisian) layers based mainly on the stages of tooth wear on lower first molars from Shan-Koba. The data from Fat'ma Koba display similar results. From this it can be concluded that the main period of occupation at both sites did not change very much during the Mesolithic.

On the basis of the available evidence for seasonality it seems that the exploitation of the middle range and the lower part of the Jaila-zone of the Crimean Mountains by Mesolithic groups was probably restricted mainly to the spring and summer months. During these seasons the hunting of large mammals was of major importance in the subsistence economy. Fowling, which has been recorded at nearly all sites, was of only minor significance (cf. Voinstvenskij 1967: 23 ff.; Vekilova 1971: Table 5; Baryshnikov and Potapova 1992: Table 5-6). Activities such as fishing and collecting of land snails have been documented at some sites such as Shan-Koba, Fat'ma-Koba and Murzak-Koba. Bone remains of Black-Sea roach (*Rutilus frisii*), catfish (*Silurus glanis*), Black Sea salmon (*Salmo trutta labrax*), pike-perch (*Stizostedion lucioperca*) and shell remains of *Helix*-have been found here (cf. Vekilova 1971: Table 6; Bibikov *et al.* 1994: 19, 109 and Figure 18). As their number within the faunal assemblages is quite small, these animal groups probably contributed only to a small extent to the diet of Mesolithic populations.

Where these groups went and continued to live during the autumn and winter months is unknown. For climatic reasons the coastal strip of southern Crimea could have been a good area for an autumn and winter occupation. Unfortunately, possible occupation sites have been submerged, as pointed out above. There is only some indirect evidence for the exploitation of marine resources on the Black Sea coast by Mesolithic groups. These include the few remains of marine species in the faunal assemblages of the Crimean Mountains. For example, there are bone finds from seals and dolphins at Fat'ma-Koba (Vekilova 1971: Table 3) and Zamil-Koba (Dmitrieva 1960: Table 1). The vertebrae from very large individuals of catfish at Murzak-Koba (Gromov 1953: 461) seem to have come from fish caught in the coastal waters of the Black Sea and not in the small Chernaya-river of that mountain valley. These finds indicate that the coast of the Black Sea was part of the subsistence grounds of Mesolithic groups exploiting the animal resources of the Crimean Mountains in the spring and summer months.

Acknowledgments

I am very grateful to Dr. A. A. Janevich (Institute of Archaeology, Kiev) for making the faunal material of Shpan'-Koba available and for detailed information concerning the site. I must also thank the *Deutsche Forschungsgemeinschaft*, Bonn-Bad Godesberg, for financial support within this project.

References

- Baryshnikov, G. and O. Potapova, 1992. Paleolithic birds of the Crimean Peninsula, USSR. *Natural History Museum Los Angeles County* 36: 293-305.
- Benecke, N., 1993. The exploitation of *Sus scrofa* (Linné, 1758) on the Crimean Peninsula and in southern Scandinavia in the Early and Middle Holocene. In: *Exploitation des animaux sauvages à travers le temps. XIII^e Rencontres Internationales d'Archéologie et d'Histoire d'Antibes*. Juan-les-Pins, Éditions APDCA: 233-245.
- Benecke, N., 1999. The evolution of the vertebrate fauna in the Crimean Mountains from the Late Pleistocene to the mid-Holocene. In: N. Benecke (ed.), *The Holocene History of the European Vertebrate Fauna*. Archäologie in Eurasien 6, Rahden/Westf.: 43-57.
- Bibikov, S.N., V.N. Stanko and V.Ju. Koen, 1994. *Final'nyj paleolit i mesolit Gornogo Kryma*. Odessa, Vest'.
- Dmitrieva, E.L., 1960. Fauna krymskich stojanok Zamil'-Koba II i Tash-Air I. *Materialy i issledovaniya po archeologii SSSR* 91: 166-188.
- Gromov, I.M., 1953. Fauna pozvonocnykh tardenyazskoj stojanki Murzak-Koba v Krymu. *Materialy i issledovaniya po archeologii SSSR* 39: 459-462.

- Gromov, I.M. and G.I. Baranova, 1981. *Katalog mlekopitajushchich SSSR*. Leningrad, Nauka.
- Heptner, V.G., A.A. Nasimovich and A.G. Bannikov, 1966. *Die Säugetiere der Sowjetunion*. Band I: Paarhufer und Unpaarhufer. Jena, Gustav Fischer Verlag.
- Heptner, V.G. and N.P. Naumov, 1974. *Die Säugetiere der Sowjetunion*. Band II: Seekühe und Raubtiere. Jena, Gustav Fischer Verlag.
- Heptner, V.G. and A.A. Sludskij, 1980. *Die Säugetiere der Sowjetunion*. Band III: Raubtiere (Feloidea). Jena, Gustav Fischer Verlag.
- Janevich, A., 1995. Die Neolithisierung auf der Krim. Kulturaspekte. *Praehistorische Zeitschrift* 70: 2-31.
- Janevich, O.O., 1993. Shpans'ka mesolitichna kul'tura. *Archeologija* 1993 (1): 3-15.
- Kormilicin, A.A., 1970. K ekologii olenja blagorodnogo krymskogo. *Vestnik zoologii* 1970 (5): 15-19.
- Kormilicin, A.A. and A. I. Dulickij, 1972. K reakklimatizacii svin'i dikoj (*Sus scrofa* L.) v Krymu. *Vestnik zoologii* 1972 (1): 38-44.
- Kostin, J.V., 1983. *Pticy Kryma*. Moskva, Nauka.
- Mackevoy, L.G., 1977. *Mezolit i neolit vostochnogo Kryma*. Kiev, Naukova Dumka.
- Shepinskiy, A. . and E.N. Cherepanova, 1969. *Severnoe Prisivash'e v V-I tysjacheletijach do nashej ery*. Simferopol'.
- Vekilova, E.A., 1971. Kamennyj vek Kryma. Nekotorye itogi i problemy. *Materialy i issledovanija po archeologii SSSR* 173: 117-161.
- Voinstvenskij, M.A., 1967. Iskopaemaja ornitofauna Ukrainy. *Prirodnaja obstanovka i fauny proshlogo* 3: 4-77.
- Walter, H., 1974. *Die Vegetation Osteuropas, Nord- und Zentralasiens*. Stuttgart, Gustav Fischer Verlag.
- Walter, H. and S.-W. Breckle, 1994. *Spezielle Ökologie der Gemäßigten und Arktischen Zonen Euro-Nordasiens*. (Ökologie der Erde 3). 2. Auflage. Stuttgart, Jena, Gustav Fischer Verlag.