ARCHEOZOOLOGICAL STUDIES ON THE TRANSITION FROM THE MESOLITHIC TO THE NEOLITHIC IN THE NORTH PONTIC REGION

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Summary

The development of subsistence economy and the emergence of animal husbandry in the North Pontic region is examined on the basis of the faunal assemblages from 35 Mesolithic and Early Neolithic sites. During the Mesolithic period, very distinct forms of resource exploitation were implemented according to the natural conditions of the area (forest-steppe, steppe zone, Crimean mountain region). The finds from south Crimea reveal that the abris were used seasonally for hunting, particularly on wild boar. Elements of the Neolithic economy emerge in the investigated region, both in the western section (Bug-Dnestr culture) and in the steppes around the Azov Sea (Matveev-Kurgan sites), beginning around 6000 BC. The morphological findings do not support the theory of the autochthonic domestication of pigs on the Crimean Peninsula, nor of cattle in the north Pontic steppe regions.

Résumé

Études archéozoologiques sur la transition du Mésolithique au Néolithique dans la région du nord de la Mer Noire.

Le développement de l'économie de subsistance et l'émergence de l'élevage dans la région du nord de la mer Noire sont discutés sur la base de restes de faune de 35 sites du Mésolithique et du Néolithique ancien. Au Mésolithique, on observe des formes très différentes d'utilisation des ressources selon les conditions naturelles environnantes (zone de forêt-steppe, zone de steppe, région montagneuse de la Crimée). Pour le sud de la Crimée, les découvertes témoignent d'une utilisation saisonnière des abris pour la chasse, en particulier au sanglier. Des informations relatives à l'économie du Néolithique commencent à apparaître dans la région couverte par cette recherche, à partir de 6000 av. J.-C. environ, et cela non seulement dans la zone occidentale (culture de Bug-Dnestr) mais aussi dans les steppes autour de la mer d'Azov (stations de Matveev-Kurgan). Les résultats morphologiques ne confirment pas la domestication autochtone du porc en Crimée ni celle du bœuf dans les régions nord-pontiques de steppes.

Zusammenfassung

Archäozoologische Studien zum Übergang vom Mesolithikum zum Neolithikum im nördlichen Schwarzmeergebiet.

Auf der Grundlage von Faunenresten aus 35 Fundplätzen des Mesolithikums und frühen Neolithikums wird die Entwicklung der Nahrungswirtschaft sowie die Herausbildung der Tierhaltung im nördlichen Schwarzmeergebiet untersucht. Entsprechend den naturräumlichen Gegebenheiten (Waldsteppen- und Steppenzone, Gebirgsregion der Krim) zeigen sich hier ganz unterschiedliche Formen der Ressourcennutzung während des Mesolithikums. Für die Südkrim belegen die Funde eine saisonale Nutzung der Abris zur Jagd insbesondere auf Wildschweine. Elemente der neolithischen Wirtschaftsweise treten im Untersuchungsgebiet etwa ab 6000 v. Chr. auf, und zwar sowohl in dessen westlichem Teil (Bug-Dnestr-Kultur) als auch in den Steppen am Asowschen Meer (Matveev Kurgan-Stationen). Die morphologischen Befunde sprechen gegen die autochthone Domestikation von Schweinen auf der Krim und von Rindern in den nordpontischen Steppengebieten

Key Words

North Pontic, Mesolithic - Neolithic, Subsistence economy, Animal domestication.

Mots clés

Région du nord de la mer Noire, Mésolithique-Néolithique, Économie de subsistance, Domestication des animaux.

Schlüsselworte

Nördliches Schwarzmeergebiet, Mesolithikum - Neolithikum, Nahrungswirtschaft, Tierdomestikation.

Introduction

The regions of the southern Ukraine and Moldavia show a long tradition of archeological research on Mesolithic and Neolithic cultures that goes back to the late 19th century (reviews in Danilenko, 1969; Markevič, 1974; Telegin, 1985). The intense excavation activities primarily during the 1920s and 1930s and in the first decades after World War II have provided a large material on these periods. Archeozoological studies had become an integral part of these archeological research activities much earlier than

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in many other regions of Europe. As a result, a large number of fauna analyses exist for the Mesolithic and Neolithic periods in the region of the northern Black Sea. The majority of these studies were carried out by V. I. Gromova, I. M. Gromov, E. L. Dmitrieva, V. D. Lebedev, V. I. Calkin, A. I. David, V. I. Bibikova and N. G. Belan. Unfortunately, the investigation of animal remains was primarily carried out from a faunistic point of view and, aside from a few exceptional works, respective publications were generally brief and often consisted of nothing more than a list of species and corresponding zoological evaluations. While they contain valuable information on matters concerning fauna history and paleoecology, the published material does not provide sufficient data for investigations on the economic structures of Mesolithic and Neolithic cultures. Consequently, earlier studies on economic changes during the transitional period between the Mesolithic and the Neolithic in the North Pontic region that were based solely on existing literature remained largely superficial and were only able to vaguely establish general trends (e. g. Tringham, 1969; Dolukhanov, 1979; Korobkova, 1987).

While working on an interdisciplinary research project on the environment, settlement and economy of Mesolithic to early Metal Age civilizations in the northern region of the Black Sea, a project which involved the Deutsche Archäologische Institut, the Seminar für Ur- und Frühgeschichte (Freie Universität, Berlin) and the Archeological Institute in Kiev, I had the opportunity to study several of the most significant archaeofaunal assemblages from the southern Ukraine with regard to the economic changes during the transitional period between the Mesolithic and Early Neolithic. Special emphasis was given to bone finds of the economically most important animal species such as aurochs, wild horse, red deer, wild boar, domestic cattle and domestic pig. Specific analysis of population structure (age composition, sex ratio) and changes in size and shape were to provide conclusions concerning the exploitation pattern affecting these animal species and the changes that took place in a particular region at a certain time. Particular attention was paid to the problem of the autochthonic domestication of wild animals (aurochs, wild boar) during the transition to the Early Neolithic period. Bone collections from the following sites were studied (location numbers in brackets refer to those in tab. 1 and fig. 1): Girževo (9), Beloles'e (10), Mirnoe (11), Igren' 8 (13), Kamennaja Mogila (18), Semenovka (19), Matveev-Kurgan (20), Višennoe 1 (24), Buran-Kaja III (25), Špan-Koba (27), Alimovskij naves (29), Murzak-Koba (32), Fat'ma-Koba (33), Šan-Koba (34) und Laspi 7 (35). The paper presented here is designed to provide an overview of the results of these studies.[1]

Research area and finds

The investigated area covers the regions on the northern shore of the Black Sea, bordered on the southwest by the Donau and Prut rivers and on the east by the Don river (fig. 1). It constitutes part of the southwest end of the Russian Plain, a lowland area criss-crossed by the wide valleys of large rivers such as the Dnestr, Bug, Dnepr, Donez and Don in a northwest to southeast direction.

The vegetation on the continental section of the investigated region can be divided into two distinct zones: the northern forest-steppe and the southern steppe. The development of these vegetation zones during the postglacial period has already been explored rather well in studies on pollen analysis (Artjušenko, 1970, 1980), while little is known about vegetation development on the Crimean Peninsula. Existing vegetation reveals that the region is divided into three zones: the steppe in the northern region of the peninsula, the forest-steppe in the hilly areas of South Crimea (starting at an altitude of about 250 m a.s.l.) and finally the forest zone of the Crimean mountains. Mountain steppe or karst meadows known as "Jaila", apparently a primarily natural phenomenon, begin to emerge at an altitude of 800 m (Rubner and Reinhold, 1953, fig. 74).

Archeozoological collections from 35 different sites dating to the Mesolithic and Early Neolithic have been incorporated in this study. Figure 1 illustrates their location in the investigated region, and table 1 indicates the chronological position and size of the respective faunal assemblages.

Subsistence economy in the Mesolithic period

Collections from a total of 23 dwelling sites were evaluated for the Mesolithic period during this investigation. The following represents a brief characterization of subsistence economy in the various regions of the North Pontic region on the basis of faunal remains.

The forest-steppe zone

Four Mesolithic fauna complexes were taken from the forest-steppe zone in the northern area of the investigated

(1) A complete draft of the results is currently being compiled for the Berichte der Römisch-Germanischen Kommission.

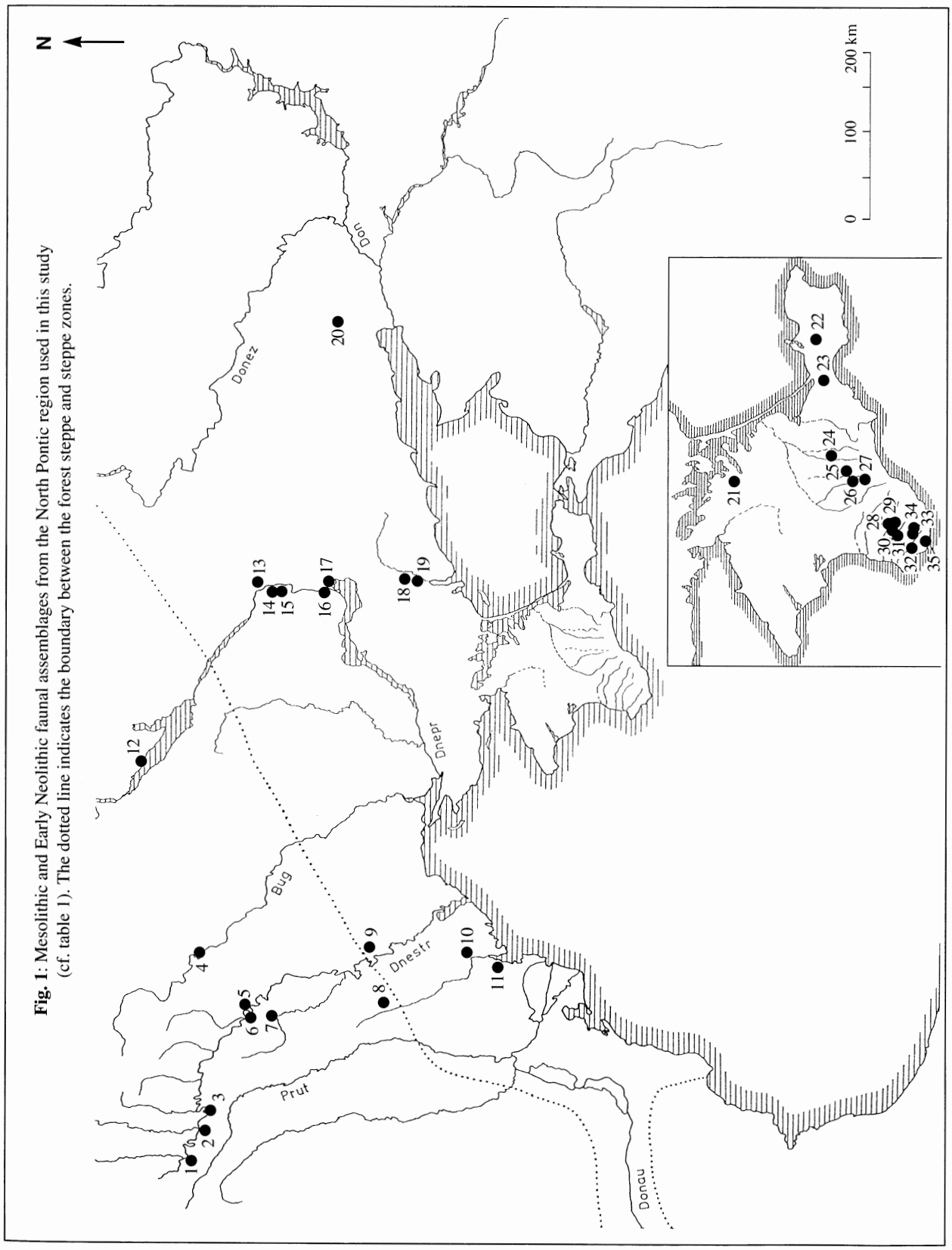

Fig. 1: Mesolithic and Early Neolithic faunal assemblages from the North Pontic region used in this study (cf. table 1). The dotted line indicates the boundary between the forest steppe and steppe zones.

No.	Site	Period/Culture	Number of bones
1	Oselivka I, obl. Černovcy	Early Mesolithic	some few bones
2	Molodova V obl. Černovcy	Early Mesolithic	c. 2,100
3	Korman' IV, obl. Černovcy	Early Mesolithic	73
4	Baz'kov ostrov, obl. Vinnica	Early Neolithic, Bug-Dnestr culture	810
5	Cikinovka I, obl. Vinnica	Early Neolithic, Bug-Dnestr culture	70
6	Soroki, r. Soroki		
	Soroki I/II	Late Mesolithic	c. 1,400
	Soroki I-V Bug-Dnestr-Kultur	Early Neolithic,	c. 3,000
7	Florešty 1, r. Florešty	Early Neolithic, Linear Pottery culture	678
8	Novye Rušesty 1, r. Kotovsk	Early Neolithic, Linear Pottery culture	c. 3,100
9	Girževo, obl. Odessa	Late Mesolithic	267
10	Beloles'e, obl. Odessa	Early Mesolithic	89
11	Mirnoe, obl. Odessa	Late Mesolithic	c. 10,000
12	Buz'ki, obl. Čerkassy	Early Neolithic, Dnepr-Donez culture	184
13	Igren' 8, obl. Dnepropetrovsk	Late Mesolithic and Early Neolithic	some 1000 bones
14	Šulaev ostrov, obl. Dnepropetrovsk	Early Neolithic, Sursk culture	267
15	Surskoj 1-4, obl. Dnepropetrovsk	Early Neolithic, Sursk culture	c. 1,200
16	Sobački, obl. Zaporož'e	Early Neolithic, Dnepr-Donez culture	223
17	Srednij Stog I, obl. Zaporož'e	Early Neolithic, Dnepr-Donez culture	98
18	Kamennaja Mogila, obl. Zaporož'e	Mesolithic - Neolithic	some 1000 bones
19	Semenovka, obl. Zaporož'e	Early Neolithic	some 100 bones
20	Matveev Kurgan, obl. Rostov	Early Neolithic	1131
21	Martynovka, obl. Krym	Early Neolithic	110
22	Leninskoe 1, obl. Krym	Early Mesolithic	some few bones
23	Frontovoe 1, obl. Krym	Early and Late Mesolithic	114
24	Višennoe 1, obl. Krym	Late Mesolithic	some few bones
25	Buran-Kaja III, obl. Krym	Early Mesolithic - Neolithic	some 100 bones
26	Kukrek, obl. Krym	Late Mesolithic	some few bones
27	Špan'-Koba, obl. Krym	Early Mesolithic - Eneolithic	some 100 bones
28	Taš-Air I, obl. Krym	Early Mesolithic - Neolithic	2,060
29	Alimovskij naves, obl. Krym	Early and Late Mesolithic	c. 2,550
30	Sjuren' 2, obl. Krym	Early Mesolithic	340
31	Zamil'-Koba II, obl. Krym	Early Mesolithic - Neolithic	1619
32	Murzak-Koba, obl. Krym	Late Mesolithic	423
33	Fat'ma-Koba, obl. Krym	Early Mesolithic - Eneolithic	some 1000 bones
34	Šan-Koba, obl. Krym	Early Mesolithic - Late Neolithic	some 1000 bones
35	Laspi 7, obl. Krym	Late Mesolithic	some few bones

region. These consists of Oselivka 1 (1), Molodova V (2), Korman' 4 (3) and Soroki I and II (6) in the central Dnestr region (fig. 1). It should be mentioned that the fauna of the first three collections is still characterized by the Late Pleistocene and Early Holocene periods. Reindeer and elk are the most important game species in these sites. In contrast, faunal materials from the lower layers of Soroki 1 and 2 belong to the Late Mesolithic period. According to two radiocarbon dates for Soroki 2, both Mesolithic layers (3, 2) of this settlement date back to the middle and second half of the 7th millennium BC respectively. The bone finds of mammals are dominated by red deer, roe deer and wild boar. Numerous fish remains, in particular those of cyprinids and catfish (*Silurus glanis*), imply intense fishing activities. Food collecting obviously played a significant role in the economy, as evidenced by the large number of shell remnants from snails (*Helix vulgaris*, *Helix pomatia*) and mussels (*Unio crassus*). Overall, the faunal remains verify the diverse exploitation of the terrestrial and aquatic resources at this site during the Late Mesolithic period.

The steppe zone

The bordering steppe zone to the south provided Mesolithic faunal remains from sites on the lower reaches of the Dnestr and the Dnepr. These include the collections of the Early Mesolithic site Beloles'e (10) and the Late Mesolithic sites Girževo (9) and Mirnoe (11) from the lower Dnestr region. The bone finds from Beloles'e are primarily those of wild horse and include those of aurochs and saiga. Even in the temporally much younger Girževo, the hunt for wild horses appears to have been the basis of subsistence economy, as 62% of the determinable bones were those of wild horses. This small fauna collection also revealed the presence of aurochs and European wild ass. Beloles'e and Girževo represent dwelling sites on the platform of high river terraces, while the Late Mesolithic station Mirnoe belongs to another type of settlement, namely sites found on flood-plains and low terraces (Dolukhanov, 1979: 87). This explains the deviation in the frequency of the economically most important animal species when compared to Beloles'e and Girževo. The material found in Mirnoe indicates that the most common wild animal is by far the aurochs. Almost 83% of the bone finds belong to this species, while only 14% were those of wild horses and 1,1% of European wild ass. The hunt for aurochs obviously took place in the branched river valley system of the Drakuli. As revealed by the results of pollen analysis from Mirnoe, the river valley and the cliffs in the vicinity of the site were wooded in the Late Mesolithic period, while the bordering terraces had a steppe vegetation similar to that of today (Paškevič, 1982). The aurochs probably gathered in large numbers in the river valleys, particularly during the extremely dry periods in the summer and autumn months. The findings concerning age structure and sex ratio indicate that aurochs hunting was not particularly selective. The nearby steppe provided favorable conditions for the second most important sector of subsistence economy, horse hunting. The ascertained age data seem to indicate that wild horses were stalked or hunted in family groups (fig. 2; Levine, 1990, figs. 3 ff.). According to the existing faunal remnants, the exploitation of other animal resources such as birds, fish and molluscs was of little importance.

Two faunal collections of the Late Mesolithic Kukrek culture, Igren' 8 (13) and Kammenaja Mogila (18), are available from the lower Dnepr region. The bone material found in Igren' 8 is dominated by aurochs, red deer and wild boar. Numerous fish and mollusc remnants, which I am currently studying, reveal the intense exploitation of the aquatic resources of the Dnepr. In contrast, food production in the steppe station of Kammenaja Mogila was based largely on wild horses.

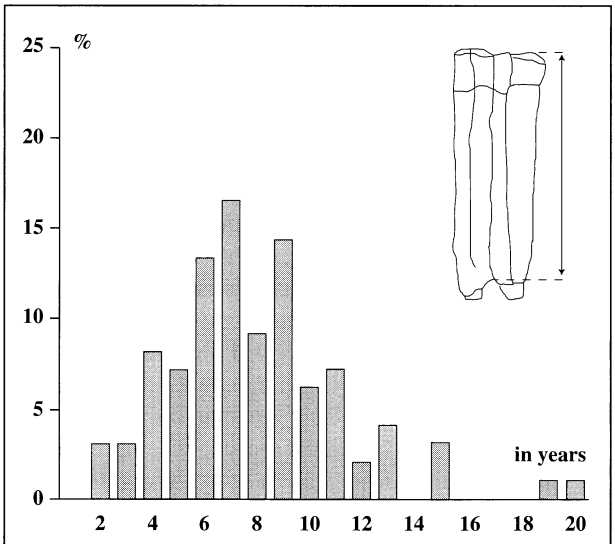

Fig. 2: Age structure of wild horses from the Late Mesolithic site of Mirnoe according to crown height measurements on the cheek teeth.

Table 1: Mesolithic and Early Neolithic faunal assemblages from the North Pontic region used in this study (Chronological data according to Danilenko, 1969, Markevič, 1974 and Telegin, 1985). Abbreviations: obl. - Oblast, r. - Rayon.

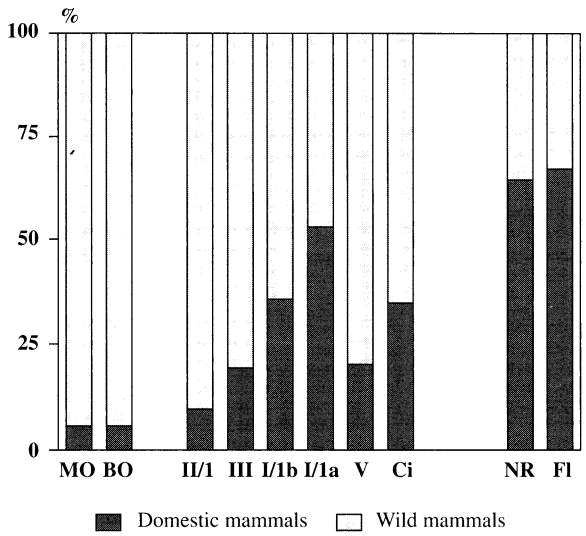

Fig. 3: Relation between domestic and wild mammals within faunal assemblages from sites of the Bug-Dnestr and Linear Pottery cultures. From left to right: Mit'kov ostrov (MO), Baz'kov ostrov (BO), Soroki - different sites and layers (II/1, III, I/1b, I/1a, V), Cikinovka I (Ci), Novye Rusešty 1 (NR), Florešty 1 (Fl).

Crimean Peninsula

On the Crimean Peninsula several vegetation zones have developed at a relatively short distance due to the rise in altitude from north to south. As expected, this is expressed in the composition of the fauna from Mesolithic sites of this region (Janevič, 1990).

The steppe zone in the northern and eastern regions of the Crimean Peninsula contains the sites Leninskoe 1 (22) and Frontovoe 1 (23). The fauna from the Early Mesolithic horizons of both sites indicates that wild horse and wild ass were hunted intensely. While species such as aurochs, saiga and red deer were also found, they appear to belong to the more seldom prey animals. The hunt for wild equids appears to have been the principle basis of subsistence economy in this region also during the Late Mesolithic period, as it is illustrated by the fauna found in layer 3 of Frontovoe.

The Mesolithic sites in the forest-steppe zone and forest zone of the southern area of the Crimean Peninsula occupied by the Crimean mountains and its foothills primarily represent abris along small rivers at an altitude of between 200 and 450 m. Many of these sites show signs of continuous settlement from the Late Pleistocene to the mid Holocene periods. The faunal remains from the early Mesolithic layers, e. g. those of Alimovskij naves (29), Sjuren' 2 (30), Zamil'-Koba II (31), Fat'ma-Koba (33) und Šan-Koba (34), are predominantly those of red deer, saiga, roe deer and wild boar. In the Late Mesolithic period the faunal material changed in such a way that wild boar became the economically most important game in almost all of the investigated sites of southern Crimea. Fowling and fishing also played an important part in the subsistence economy of this region. As indicated by the analysis of the age structure in wild boar, the shelters were used only seasonally by hunting groups. The age-related findings revealed that 10-12 months old animals were strikingly frequent, with proportions of over 70%. It thus seems reasonable to conclude that the winter months and the early spring were the principle periods of occupation (Benecke, 1993, 1994).

Subsistence economy during the Early Neolithic period

The osteological materials from the Early Neolithic period currently available for studies on Neolithic subsistence economy are unfortunately not very extensive. Only 12 faunal assemblages from settlements that existed exclusively during the Early Neolithic period, as well as a few faunal collections from multi-phase sites can be taken into consideration. This material will be used in the following as the basis of discussion concerning the formation of Neolithic economic structures in the Bug-Dnestr region, the lower Dnepr and Donez region and on the Crimean Peninsula.

Bug-Dnestr region

The region between the Seret and the Prut, more specifically the northern area that is part of the forest-steppe zone, contains the oldest Neolithic settlement in the North Pontic region. During the first half of the 6th millennium BC, the Criš culture became distributed here, presumably through immigrants from the lower Danube valley. They were responsible for the introduction of domestic animals and cultivated plants to the areas west of the Prut river (Tringham, 1971; Markievič, 1974). The old Neolithic territory in the Prut and Seret drainages was expanded further to the east, i. e. to the Dnestr river, when it was occupied by Linear Pottery farmers about 5400 BC. Animal remains from sites like Florešty 1 (7) and Novye Rusesty 1 (8) give us a picture about the pattern of the subsistence economy during this period and in that area. The bone finds from these settlements cover the complete stock of Early Neolithic domestic animals, including cattle, pig, sheep, goat and dog. The most frequent of the domestic animals was cattle, followed by pig and sheep/goat. While

hunting was of only marginal significance in Linear Pottery settlements in many regions of Central Europe (Döhle, 1993; Benecke, 1994, fig. 39), it appears to have played an important part in the food economy of the Dnestr region. The share of game for Novye Rusešty 1 and Florešty 1 is 34% and 32% respectively (fig. 3). According to the bone finds, red deer, wild boar and roe deer were among the most frequently hunted species. In another settlement of the Linear Pottery culture, Troyan, the share of game is approximately 35% (Dolukhanov, 1979: 102).

Influenced mainly by the Criš culture, the Late Mesolithic population that occupied the forest-steppe uplands between Dnestr and Bug soon adopted ceramic technology and selected aspects of the Neolithic subsistence economy, giving rise to the first indigenous Neolithic culture of the North Pontic region: the Bug-Dnestr culture (Danilenko, 1969; Markevič, 1974; Tringham, 1971). Faunal assemblages of this culture come from i. e. Baz'kov Ostrov (4), Cikinovka I (5) and from various sites in Soroki (6). The faunal remains from Soroki are of particular interest, as they more or less span the entire development of subsistence economy over a long period of time, from the Late Mesolithic period to the end of the Bug-Dnestr civilization (c. 5600-4700 BC). They show, for example, that animal husbandry was of little significance in the early stages of this culture, as evidenced by the 10% share of domestic animals in layer 1 of Soroki II which date back to the middle of the 6th millennium BC. While bone finds reveal that the keeping of domestic animals increased in the following centuries, it was never to play a dominating role in subsistence economy (fig. 3). Wild forest animals (red deer, wild boar, roe deer), fish and molluscs constitute the essential basis of food until the end of the Bug-Dnestr culture in the early 5th millennium BC. This is verified by the archeozoological data from Baz'kov Ostrov (4), Cikinovka I (5) and other investigated sites of this culture (Danilenko, 1969, tab. 1).

It has yet to be mentioned that the faunal assemblages from the Late Mesolithic layers of Soroki I (layer 2) and Soroki II (layers 3 and 2) also contain the remains of domestic animals, namely those of cattle and pig. These finds date back to the second half of the 7th millennium BC. It is the period in which the Early Neolithic began to emerge in neighboring regions on the lower Danube (Breunig, 1987). If these cattle and pig bones are chronologically identical to the Late Mesolithic layers of Soroki, then the exchange of goods such as food products with the Mesolithic population obviously took place at a very early stage in the eastern contact zone. As a result, domestic animals were sporadically introduced to the settlements of the hunters and fishers on the Dnestr.

Lower Dnepr-Donez region

During the first centuries of the 5th millennium BC, a new culture known as the Cucuteni-Tripolye emerged in the region between the Seret and the Dnestr. Within a short time, it spread towards the northeast and reached the Dnepr, completely absorbing the older Neolithic culture in the region between the Dnestr and the Bug (Dnestr-Bug culture) in the process. Influenced by the Early Tripolye culture (Phase A), the Mesolithic population in and to the east of the Dnepr region took on domestic animals and cultivated plants, thus adopting the fundamental basis of an agricultural economy. This subsequently led to the formation of an independent Neolithic culture, the Dnepr-Donez culture in the eastern section of the North Pontic region around the middle of the 5th millennium BC (Telegin, 1968). A close relation to this culture was the Sursk society, a culture that had also spread in this region. Faunal data from sites of these two cultures are rather thin. Only very few settlements along the Dnepr have provided faunal assemblages that can be evaluated. They reflect various developmental stages and strategies of subsistence economy (fig. 4).

The animal remains from layer D1 of Igren' 8 (13), as well as those from Šulaev Ostrov (14) and Surskoj 1 (15) represent a very early stage of the Neolithic period in the Dnepr region. The share of domestic animals at all of these stations does not exceed 10%. Of particular interest here is the site Igren' 8, as it also provided animal remains from Mesolithic layers (cf. above). A comparison of the faunal assemblages of layer D1 and the older deposits reveals that the spectrum of exploited animal species is by and large identical. Traditional Mesolithic methods of food acquisition such as hunting, fishing and gathering small animals obviously continued in this area.

A more advanced stage of Neolithic subsistence economy first became evident in younger faunal assemblages that are to be synchronized with level II of the Dnepr-Donez culture, i. e. in Buz'ki (12), Surskoj 2-4 (15), Sobački (16) and Srednij Stog I (17). The percentage of domestic animals in the bone finds of these sites runs between 30 and 75%. The composition of fauna from domestic and wild animals shows significant differences between the various sites. In Buz'ki (12), cattle keeping was the basis of food production with domestic animals. This also applies to the younger settlements of Surskoj (Surskoj 2-4). As in Buz'ki, pigs, sheep and goats were of marginal significance. In contrast, the most important domestic animals in the settlements of Sobački (16) and Srednij Stog I (17) included not only cattle but also small ruminants. Game in both sites included a relatively large

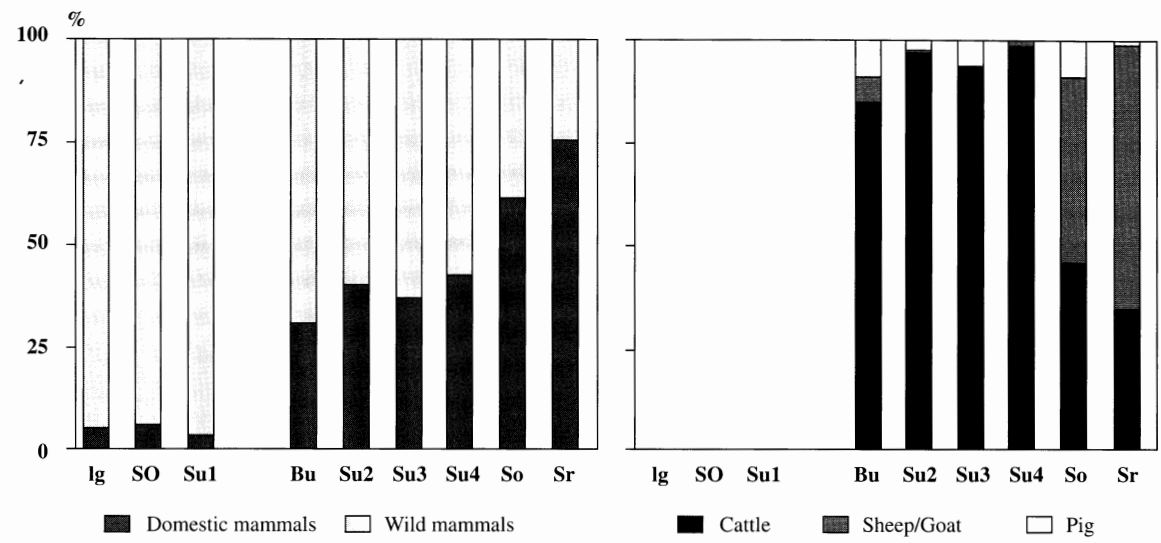

Fig. 4: Relation between domestic and wild mammals (left) and percentages of cattle, sheep/goat and pig (right) within faunal assemblages from sites of the Dnepr-Donez and Sursk cultures. From left to right: Igren' 8 (Ig), Šulaev Ostrov (SO), Surskoj 1 (Su1), Buz'ki (Bu), Surskoj 2 (Su2), Surskoj 3 (Su3), Surskoj 4 (Su4), Sobački (So), Srednij Stog I (Sr). In the first three assemblages the number of bones from domestic mammals is too low for calculating their percentages.

number of wild horses, while red deer, roe deer and wild boar represent the most common games in the settlements of Buz'ki and Surskoj.

Little is known about the Early Neolithic development in the steppe regions of the Sea of Azov. Studies on the early stages of agriculture in this region are still largely based on the extensive finds from Kamennaja Mogila (18). Unfortunately, the stratigraphic situation concerning the bone finds from the old excavations remains so unclear (Tringham, 1969), that this faunal complex cannot be incorporated in this study. Remarkable findings on the transition between the Mesolithic and Neolithic periods in the steppes on the northeastern shores of the Black Sea have subsequently brought more recent excavations in the so-called Matveev Kurgan stations on the central reaches of the Mius river. The fauna of settlements I and II are comprised mainly of wild animals, consisting primarily of various species of equids (wild horse, kulan, wild ass), red deer and wild boar. In addition, fishing appears to have been of some importance, as evidenced by numerous pike, catfish and carp remains. These osteological finds are supplemented by cattle, sheep/goat and pig bones. The share of domestic animals at both sites is almost 20%. The archeological material, including pottery and polished tools, dates back to a very early stage of the Neolithic period (Križevskaja, 1992). This is confirmed by two radiocarbon dates from Matveev Kurgan I that place this complex at around 6000 BC. Following this, the Early Neolithic period in the region of the Sea of Asov is almost of the same age to that of the western area of the North Pontic region (Criš culture in Moldavia).

Crimean Peninsula

The only Early Neolithic faunal assemblage to be taken from the steppe regions of northern Crimea is that of Martynovka (21). The relatively small sample comprises primarily the remains of wild animals such as aurochs, wild horse, wild ass and red deer, with a few bones belonging to cattle and sheep/goat. The share of the latter is less than 10%, which indicates that subsistence economy in this area was still largely supported by hunting. The assemblage dates back to the 5th millennium BC. It remains unclear as to whether older Neolithic stages, similar to those in the region around the Sea of Azov, also occurred in this region, as the material currently available does not provide any concrete evidence in this regard.

The faunal remains for the sites in the valleys of the Crimean mountains incorporated in this study (25, 27, 28,

31, 33 and 34 in fig. 1) verify a large degree of continuity with respect to the animal species exploited during the transition to the Neolithic period. Although the bone finds include those of domestic animals (cattle, sheep, goat and pig), their numbers continue to remain low into the Eneolithic period (Benecke, 1993, fig. 1). The hunt for wild boar, deer and roe deer as well as fowling and fishing formed the basis of food acquisition during the Neolithic period. As evidenced by the findings on age structure, in particular for wild boar, the sites were apparently only occupied seasonally during the winter months and in early spring, as was the case during the Late Mesolithic period (cf. above). Where these human groups lived and the resources they exploited during the rest of the year remain unknown, as does the time at which Neolithic influences emerged in the valleys of the Crimean mountains. This is due to the lack of radiocarbon dates for the respective layers in the abris.

To the problem of autochthonic animal domestication

Impressed by the discovery of the Early Neolithic Džejtun culture in Turkmenia and furthered by the inadequate knowledge on the beginnings of the Neolithic in Southeastern Europe during the 1950s and 60s, a number of Soviet archeologists supported the theory of an independent emergence of the Neolithic in the North Caspian and North Pontic regions (e. g. Krajnov, 1957; Stoljar, 1959; Danilenko, 1969). According to this theory, the autochthonic domestication of cattle and pig occurred at a very early stage in the region of the Bug-Dnestr culture, on the Crimean Peninsula and in the North Pontic steppe regions, which subsequently led to the emergence of a so-called "aceramic Neolithic period". Even today arguments for this theory are widely distributed in the literature. The question will therefore be briefly examined as to whether the bone remains of cattle and pigs from the given regions and cultures show any morphological signs of autochthonic animal domestication.

Unfortunately, the respective evaluation was not possible for the Early Neolithic Bug-Dnestr culture, as the bone material could not be examined. Examination of the published material revealed that elements of Neolithic economic structures found their way into this region successively and gradually over a longer period of time. The bones of cattle and pigs were occassionally found in the early layers of Soroki (II/3-2 and I/2), while cereal remains were first found in subsequent horizons (starting with II/1;

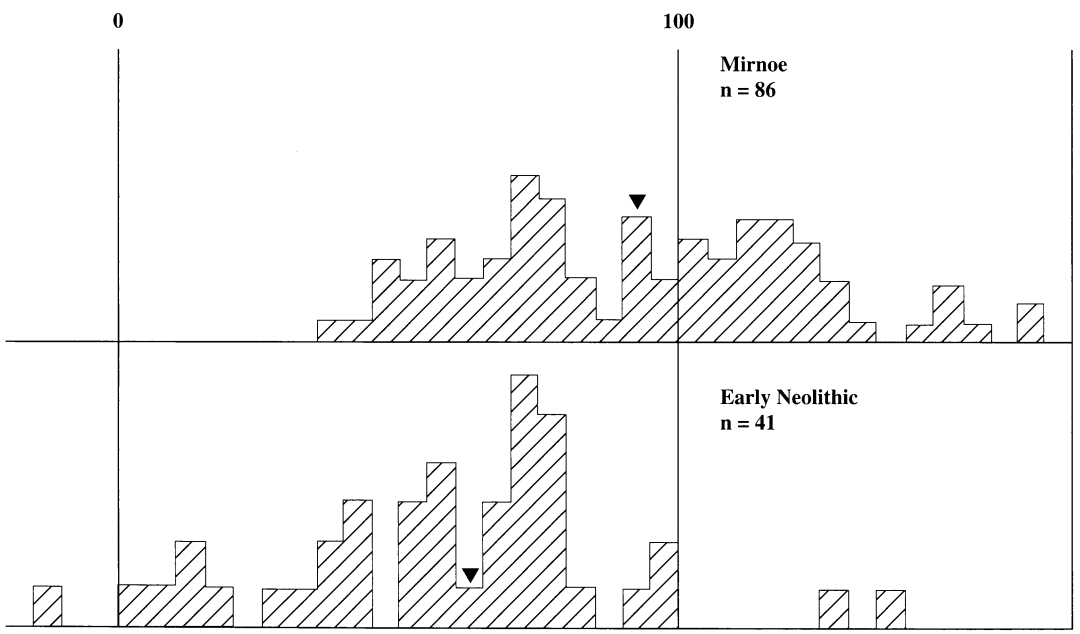

Fig. 5: Size comparison by means of the frequency distribution of size indices between Late Mesolithic aurochs (Mirnoe) and Early Neolithic *Bos* populations from the North Pontic region. The triangle indicates the position of the mean.

Markevič, 1974, table 8). According to the archeozoological finds, the economy of the Bug-Dnestr culture continued to be based mainly on the exploitation of natural resources into the later stages of its existence (cf. above). The finds from the river valley settlements obviously represent the transition from the availability phase to the substitution phase within the neolithisation process (Zvelebil and Rowley-Conwy, 1984). Corresponding settlement maps show the close distance between developed farming communities and predominantly Mesolithic communities (Dolukhanov, 1979, fig. 29). Comparative cases of the coexistence of different economic systems during the transitional period between the Mesolithic and the Neolithic were also found in other regions of Europe, e.g. in the region of the Iron Gate and in Northern Central Europe (Denmark, Schleswig-Holstein and Mecklenburg). It can therefore be assumed that the region of the Bug-Dnestr settlements was hardly an environment in which the domestication of animals could have taken place. Pigs and cattle were primarily introduced by the Early Neolithic cultures to the west and southwest of this region.

The theory of an autochthonic pig domestication in Crimea during the Late Mesolithic period I have been critically dealt with in previous studies (Benecke, 1993, 1994). Summing up the results of these investigations, one can conclude that the morphological findings do not favor the assumption regarding the domestication of wild boar in the mountain valleys of southern Crimea. Pigs and other economically important domestic animals do not appear until the Early Neolithic period and were introduced to this region as parts of the neolithisation process.

It was the finds from Kamennaja Mogila in particular that led to the assumption of an independent evolution of cattle keeping in the North Pontic steppe regions. Bone finds from three sites in this region, Igren' 8 (13), Kamennaja Mogila (18) and Semenovka (19) were used to perfom a morphological comparison with an autochthonic aurochs population, namely that of Mirnoe (11). As illustrated in figure 5, the cattle from the Early Neolithic layers are on the average significantly smaller than the aurochs, the lower limits of the variation in particular being shifted considerably to the left towards small animals. Some of the finds with size indices of over 100 are definitely those of aurochs, while the pieces with values of under 90 should primarily belong to cattle. The distribution of size indices, as shown in figure 5 for the North Pontic region, can also be found in a similar form for the Early Neolithic cattle populations of Central Europe (Benecke, 1994, figs. 18 ff.). It is characteristic of an already advanced stage of domestication. If the North Pontic region had been a local domestication area, the distribution of size indices for the Early Neolithic finds related to the local aurochs population would have displayed a different pattern (e. g. Uerpmann, 1979; Meadow, 1984). In this case, the morphological findings also tend to support the import of domestic animals during the neolithisation process in the North Pontic region, rather than the autochthonic domestication of animals.

Acknowledgements

The Deutsche Forschungsgemeinschaft (*DFG*) supported these studies by granting travel allowances for study trips of several weeks to Kiev and St. Petersburg. I am deeply grateful to all colleagues who helped me during my visits at the different museums and institutes. Many thanks are due to Dr A. A. Janevič (Kiev), Dr. T. V. Krakhmalnaya (Kiev) and Dr G. F. Baryshnikov (St. Petersburg).

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