ASIKLI HÖYÜK: A "PROTODOMESTICATION" SITE

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Summary

In this paper the faunal data known from the earliest Neolithic settlements in eastern Anatolia are compared with new data from the excavations at Asikli Höyük. In particular the domestic or non-domestic status of the caprines are studied. Faunal composition, representative bone counts, age and sex patterns of the slaughtered animals are used to establish the phase of Neolithic development in Asikli.

Résumé

Asikli Höyük : un site de "protodomestication".

Dans cette étude, la faune d'Asikli Höyük est comparée avec les faunes d'autres sites néolithiques anciens de l'Anatolie de l'Est. Le spectre faunique, la représentation des différentes parties du squelette et la distribution de l'âge et du sexe sont analysés. En particulier, le statut des caprinés est discuté. Le stade de développement néolithique à Asikli est défini.

Zusammenfassung

Asikli Höyük: Eine Fundstelle der "Protodomestikation".

In diesem Beitrag werden Daten zur Fauna aus den ältesten neolithischen Siedlungen Ostanatoliens mit neuen Daten aus der Siedlung Asikli Höyük verglichen. Insbesondere wird der Stand der Domestizierung von Ovicapriden untersucht. Daten über die Zusammensetzung der Faunenliste, das repräsentative Vorkommen einzelner Skelettpartien und die Alters-/Geschlechtsverteilung werden genutzt, um die Neolithisierung in Asikli nachzuvollziehen.

Key Words

Anatolia, Early Neolithic, Asikli Höyük, Animal domestication, Ovis *spec.*

Mots clés

Anatolie, Néolithique ancien, Asikli Höyük, Domestication animale, Caprinés.

Schlüsselworte

Anatolien, Neolithisierung, Asikli Höyük, Fauna, Ovicapriden.

Anatolia has long been recognized as a major centre of Neolithic development, including animal domestication. Considering the impact this must have had on the human society and subsequent development and spread of the Neolithic cultures, it is surprising to realize how little we actually know about the Neolithic archaeozoological developments in Anatolia. The number of archaeozoological reports about this period of at least 3000 years is very small and consists, in chronological order, of often partial studies of the sites of Hacilar (Westley, 1970), Çatal Höyük (Perkins, 1969), Cayönü (Lawrence, 1982), Suberde, Gritille (Stein, 1990), Hayaz Höyük (Buitenhuis, 1985, 1988), Can Hasan III (Payne, 1991), Çafer (Helmer, 1985) and Girikihacyan (Watson, 1983). Research on Höyücek (DeCupere, in prep.), Hallam Çemi (Redding, pers. comm.) and Yumuktepe (Mersin; Buitenhuis, unpublished) is in progress.

To this material can now be added a large sample of faunal remains from Asikli Höyük.

Asikli lies at the western edge of Cappadocia, near the escarpment of the Central Plateau, along the Melendiz river c. 25 km east of Aksaray. The surroundings consist of flat tuff plateaus formed by eruptions from several large volcanoes and cut by valleys. These valleys can be rather open but also narrow and deep, and provided good shelter against harsh climatic conditions. The plateaus are and were rather bare, while the valleys along the rivers were quite wooded.

The site is being excavated since 1989 by the University of Istanbul, under the supervision of Prof. Dr. Ufuk Esin (Esin *et al.*, 1991). The biological remains are studied by members of the Biological Archaeological Institute in Groningen, the Netherlands.

The site is dated to 8920 - 8515 bp or 8040 - 7490 cal. BC. The occupation was extensive and consisted of a large number of houses forming a partly closed complex in which hundreds of people lived at the same time. Remains

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Table 1: Asikli Höyük. Numbers of fragments for each fusion stage of the different bones of *Ovis ammon orientalis* (O) and *Capra aegagrus* (C). (d = distal, p = proximal).

		Open			Closed		
		C	O	C/O	C	O	C/O
Age: foetal				n = 749			
cranium				4			
mandibula				8			
scapula				54			
humerus				79			
radius				75			
ulna				74			
metacarpus				21			
pelvis				74			
femur				101			
tibia				89			
metatarsus				33			
metapodium				50			
astragalus				12			
calcaneus				10			
phalanx I				40			
phalanx II				9			
vertebrae				16			
Age: < 1 year				n = 117			n = 2405
scapula	d			25	81	258	92
humerus	d		15	23	68	400	87
radius	p		2	10	24	220	376
phalanx I	p	1		28	24	113	385
phalanx II	p		2	11	35	138	104
Age: 1-3 years				n = 597			n = 1001
tibia	d	33	42	105	32	218	203
metapodium	d	1	11	183	9	62	191
calcaneus	p	18	88	116	20	217	49
Age: 3-4 years				n = 1854			n = 1010
humerus	p		15	175	2		63
radius	d	20	118	291	13	75	56
ulna	p/d	21	84	3	27	107	60
femur	p/d	27	88	550	37	113	274
tibia	p	1	95	366	10	65	108

Table 2: Percentage of the NISP of the major species groups in the different phases of Asikli Höyük.

Phase	**2G**	**2F**	**2E**	**2D**	**2B**	**2A**	**2?**	**P/R**	**TOT**
species:									
Equus	2.4	3.8	1.1	0.2	0.3	0.1	1.6	1.1	1.1
Sus	5.5	4.4	2.1	3.5	0.3	0.4	2.1	0.4	1.7
Cervids	0.8	0.6	0.7	0.7	0.4	0.6	0.8	0.9	0.7
Bos	4.8	6.2	3.8	6.1	9.1	6.7	10.2	20.0	8.9
Caprini	84.8	84.2	88.0	86.5	88.1	90.6	82.4	77.0	85.0
Lepus	1.6	0.8	4.4	2.9	1.8	1.5	2.8	0.5	2.5
ratio *Ovis/Capra*	9.2	3.7	5.9	5.9	4.7	3.3	5.2	3.2	5.7

Table 3: Preliminary faunal spectrum from Asikli Höyük (excavations 1989-1993). Numbers are numbers of identified specimens (NISP).

Phase	2G	2F	2E	2D	2B	2A	2?	P/R	TOT
species:									
Erinaceus europaeus	3								3
Canis lupus	1							1	2
Canis lupus/familiaris		1		1					2
Vulpes vulpes	4	1	6	13	7	1	22		50
Equus sp.	24	24	30	4	11	1	133	13	216
Sus scrofa	55	28	56	61	10	5	175	5	340
Cervidae, spec. unknown	4	2	13	9	3	1	23	8	59
Dama sp.	2	1	5	2	8	5	22	1	44
Cervus elaphus	1				1	2	17	1	21
Capreolus capreolus	1	1		1	2		5		9
Bos primigenius/Bison sp.	48	39	103	105	326	84	854	227	1738
Capra aegagrus	29	39	90	63	134	63	334	63	665
Ovis ammon orientalis	267	143	549	380	632	177	1727	200	3808
small ruminants (prob. O/C)	548	351	1757	1055	2386	887	5074	613	12123
Rodentia, unidentified	1						1		1
Microtus sp.						1			1
cf. *Glis glis*							2		2
Lepus capensis	16	5	120	51	64	19	231	6	496
Aves, unidentified	2		4		1	2	8		15
Anatidae, unidentified			2	1	1		3		7
Aegypidae, unidentified			1		1		3		5
Falconidae, unidentified					1				1
Circus aeruginosus			1				1		2
cf. *Accipiter gentilis*					1				1
Falco tinnunculis			2				1		3
Otis tarda							2		2
Bubo bubo				1			2		3
Corvus corone				4	1		2		8
Corvus frugilegus				1			2		3
Testudinae	1		2	1	3	8		1	15
Pisces		1			1				2
Gastropoda, unidentified								1	1
Total	1003	636	2745	1752	3595	1255	8645	1140	19648

of a large wall surrounding the settlement, at least in the later periods, suggest a further need of protection.

A very rich assemblage was found among the architectural debris, at least in quantity. No pottery existed, and obsidian and bones formed the vast majority of remains. The stone tool assemblage consists almost 100% of obsidian.

In 1985, Payne published a first report on remains gathered at the foot of the *höyük*. In the present article, only the material from the excavations is analysed.

About 25% of the faunal remains has been studied to date. All material was found within the settlement and consists almost exclusively of kitchen refuse. This is attested by the relative absence of elements of crania and lower extremities, such as metapodials and phalanges (tab. 1).

A total of ca. 20,000 fragments has been identified to species (tab. 2 and 3). It is surprising how little variety is found in the species list. This quite probably reflects the kitchen origin of the material more than the real absence of other animals at this site.

At least seven building phases were recognized by the archaeologists. The so-called "phase P/R" consists of the material from the complex of buildings outside the wall. The stratigraphic relationship to the other areas is not clear. Table 2 and figure 1 show the percentages of the major

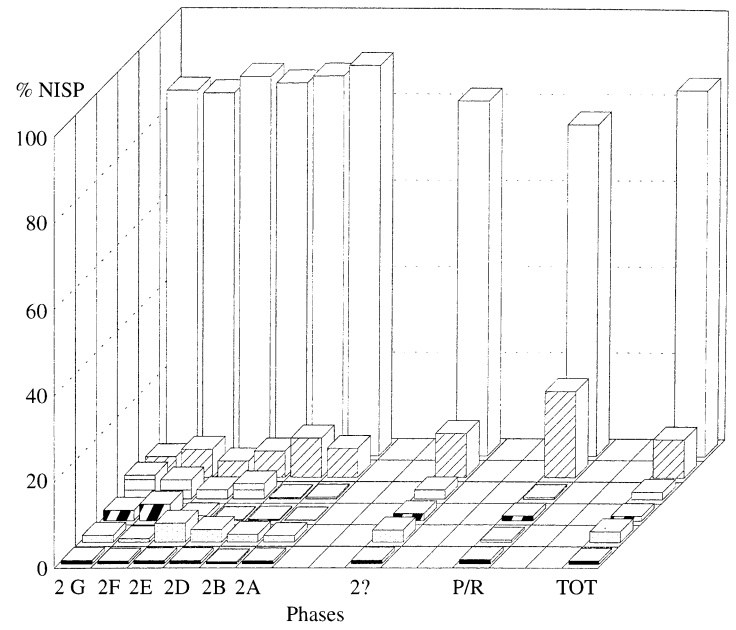

Fig. 1: Graphic representation of the relative importance of the major species groups in the different phases of Asikli Höyük.

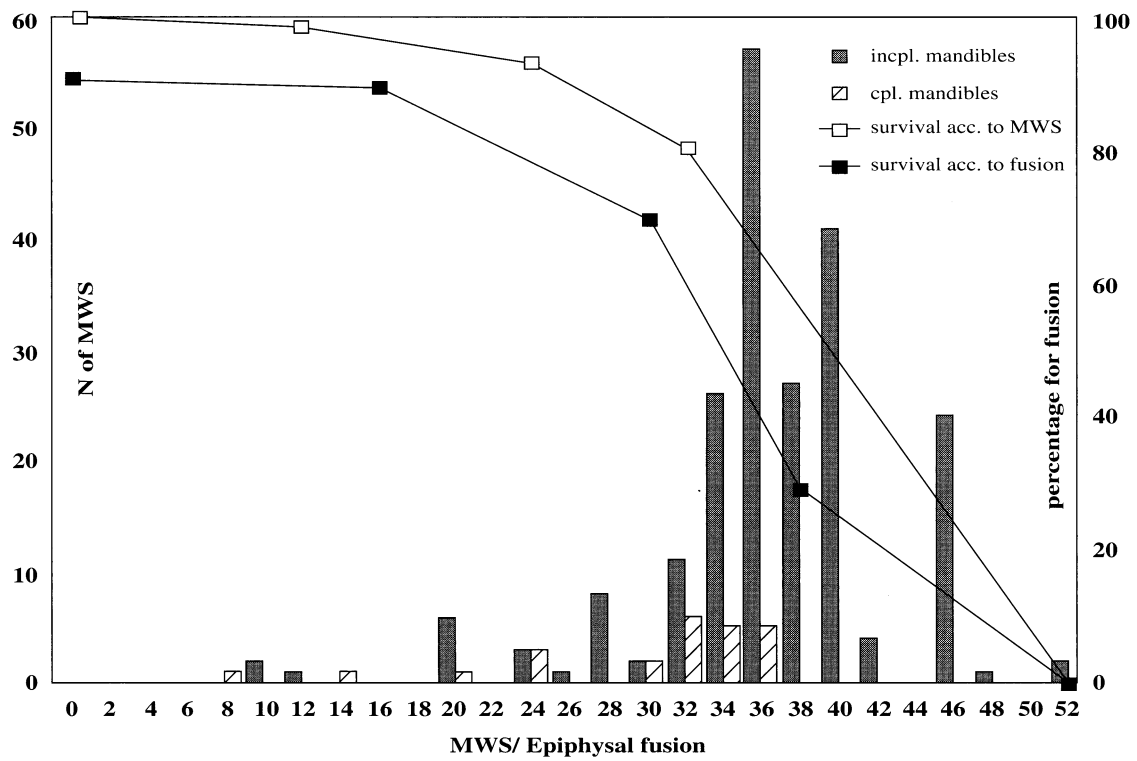

Fig. 2: Age patterns for the caprines of Asikli Höyük. The lines represent survivalship curves based either on MWS (mandible wear stage, Grant, 1982) or on epiphysal fusion. The bar diagrams specify the scatter according to the MWS.

species groups for each phase. In the older phases there are somewhat more pigs and equids, but the changes are slight. The vast majority of remains are from caprines, mainly from *Ovis*. Apart from these, equids, pigs, cattle, cervids, hares and foxes were of some importance. The exact species of *Equus* needs to be further determined, but the few dental remains show almost connecting buccal and lingual sulci suggesting them to belong to *Equus hydruntinus*[1]. On the basis of measurements the presence of wild horse, *Equus ferus*, has also been established.

The question of the wild or domestic status of caprines, and possibly cattle and pig, is raised. In the following analysis only caprines are discussed.

Based on a large number of identified remains, ages, sexes, sizes and size patterns may indicate this status. The large numbers of identified remains assure us of the probable reality of the patterns.

Age

The age pattern could be established both on the mandibular tooth wear, according to Grant (1982), and on the epiphysal fusion pattern. In table 1 the numbers of identified remains for each epiphysal fusion stage are given.

Figure 2 shows the representative curve in which each fused stage is divided according to the next groups percentages until the last group. Particular attention should be given to the large number of peri-natal elements. These were all found among the kitchen debris as individual elements and not as complete or semi-complete skeletons. This indicates that these very young individuals were consumed. Both patterns, the tooth wear and fusion, correspond extremely well. By far most animals were killed between 2.5 and 4 years old. The number of young animals is extremely small, especially in view of the large number of remains from peri-natal animals. The pattern is therefore not clear, although it suggests at least a 'killing' of many animals early in the year, from January to April, which is the last period of gestation and of birth. Summer killing of sheep seems to have been slight, while also no large numbers of animals older than 4 years occurred. This suggests a control over the kill-off which is not consistent with free hunting practices. The high number of peri-natal elements can be seen as the result of hunting in spring, which however is not consistent with known hunting practices, in which pregnant animals are normally not killed; or as the result of the actions by man in controlling (herding?) the animals in a situation which led to a high infant mortality. Unfamiliarity in keeping animals may have been a factor.

Sex

The sex ratios for the different bones are given in table 4. For *Capra* more males than females were identified. However, the number of sexed remains which could not be attributed to a particular species is large enough to influence this pattern. It is obvious that there is no clear sex division among the killed animals. This again suggests a winter pattern for the major kill-off as in that period the *Ovis* herds tend to gather and males and females mingle more than during the summer, when the young and females are separated from the males.

Size

The ultimate proof of domestication are the changes that occurred in the anatomy. One of the earliest observable ones is size change. A problem that does exist is the lack of reliable comparison material. The number of specimens from wild *Ovis orientalis* from this area is very

Table 4: Asikli Höyük.
Numbers of sexed bones of *Capra* and *Ovis*.

	Capra	Ovis	O/C	TOT.
female:				
cranium		7		
scapula	9	4	1	
radius	3			
pelvis	10	53	167	
astragalus	8	52		
calcaneus		1		
atlas	8	7		
epistropheus	1	6	4	
total	**36**	**133**	**172**	**341**
male:				
cranium		1	1	
scapula	10	4		
pelvis	16	66	142	
femur			1	
tibia			2	
astragalus	24	49		
calcaneus		2		
atlas	4	6		
epistropheus	2	7	2	
total	**56**	**135**	**148**	**339**

[1] My thanks to H.-P. Uerpmann for his suggestions about this question.

small, and animals from other areas tend to have different sizes. Therefore I have chosen to compare the Asikli material with material from other sites. Measurements from Çafer, Hayaz and Gritille are used together with measurements from modern individuals. I am well aware of the almost circular reasoning which occurs when archaeological evidence is used to describe other archaeological material. In the future objective comparison norms need to be established, which then need to be used by all scientists. In the meantime the evidence of Asikli is many times larger in quantity than that of other sites. Figure 3 presents two measurements of astragalus, GLl and Bd. The data from the other sites are compared with a random selection of one hundred astragali from Asikli. Statistical evidence proves that the variability of the Asikli material is clearly within the limits of a normal population. So,

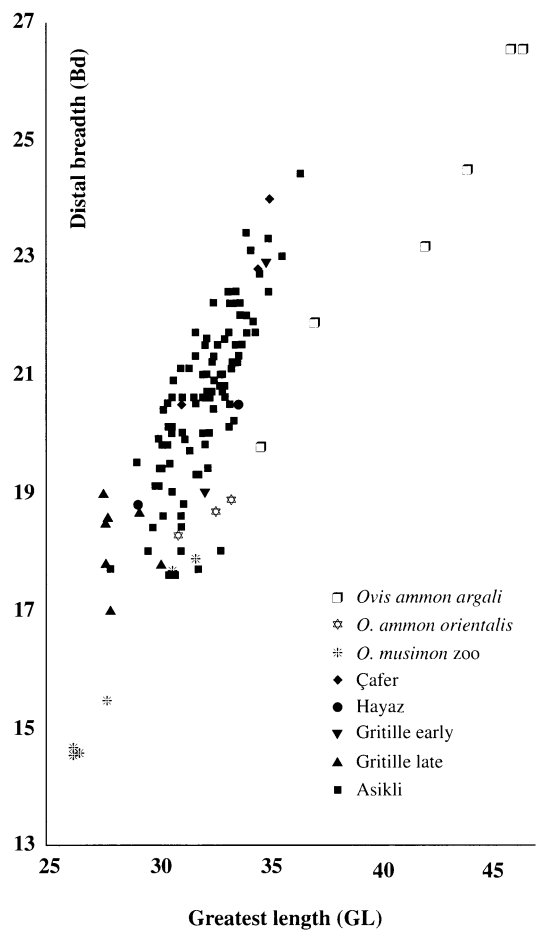

Fig. 3: Scatter diagram for the measurements of astragali from different sites and recent material.

Table 5: Abundance of the major species in Cayönü and Çafer.

Cayönü	**"earlier"**	**"uppermost"**
	%	%
Bos	14.8	2.2
Cervids	17.0	1.3
Caprini	23.4	81.3
Sus	44.7	15.2
Çafer		
	N	%
Bos	99	14.9
Cervus	12	1.8
Dama	3	0.4
Ovis/Capra	336	50.6
Capra	119	
Ovis	20	
Capreolus	7	1.0
Sus	202	30.4
Carnivora	5	0.7

instead of using other sites as a comparison with the Asikli material, I propose to use the Asikli material to create a norm for other sites. As such the data supports the conclusion of the researchers for Çafer, Gritille and Hayaz about the status of domestication in the *Ovis* material from their sites.

Another method is the Size-Index (SI) comparison as proposed by Uerpmann (1979). Calculating the SI for *Ovis* on the BT (breadth of the *trochlea distalis*) of the humerus as an example, the following values were obtained: mean = 61.07; std = 9.63; min. = 17.9; max. = 90.0; n = 373, with the standard measurement as 29.5 mm. For *Capra* the values are as follows: mean = 54.19; std = 13.65; min. = 31.7; max. = 78.0; n = 59, with the standard measurement as 34.2. From these data it is clear that the *Ovis* are generally even larger than the standard wild individual and that the *Capra* are as large as the comparison.

We may safely assume that the Asikli material does not show any significant anatomical size changes.

Faunal diversity

A less direct indication of domestication is the diversity of the fauna list. As far as can be established by the scarcity of data, the hunted fauna in the earliest periods of neolithization is much less dominated by one species than in the later periods. In table 5 the abundance of the species in Cayönü are given, in which the 'earlier' phase shows a much less dominance of caprines than the 'uppermost' phase, in which the fauna diversity became

more or less the same as in Asikli. It is in this so-called 'uppermost' phase of Cayönü, that Igor Lawrence found the first anatomical evidence for domesticated caprines. This change is different from the changes in the more southern Levant area, where the evidence is much more that of a rapid change by introduction of domestic animals than a gradual change of exploitation of local resources.

Conclusion

Asikli Höyük is a large well-organised settlement with a large population. The food-procurement needed to be organised on a regular basis. As such the study of botanical remains by Van Zeist (pers. comm.) has shown that domesticated grains were available, and therefore agriculture was going on. However, gathering was still of great importance, as for instance illustrated by whole layers of seeds of *Celtis australis*, a berry-producing tree.

The hypothesis about the development of agriculture and animal husbandry as proposed, for instance by Stein (1990) and by Redding (1988), will effectively show the position of the Asikli community in this cultural change.

As the hypothesis contains in its first step the development of a sedentary life-style while continuing a free hunting and gathering strategy, Asikli is clearly beyond this stage. More clear examples are 'earliest' Cayönü and even older, Hallam Çemi. The next stage of the hypothetical development is the development of agriculture. The reasons for this development are not specifically accounted for, but increased security of the sedentary life-style and therefore all year-round local work by groups of people that would otherwise be vulnerable, such as women with smaller children and the elderly, may have provided the opportunity for plant-cropping.

The next stage is a well-developed agriculture, which became so important that the whole community needed to be involved, at least part of the year. If agriculture has become a major food source in this area, the crops needed to be tended and protected from at least the late spring till autumn. At this moment seasonality of particular activities of the community became evident.

The last stage is then acquiring a complete control over all food production by introducing or developing animal husbandry.

It is apparently at the penultimate stage of this development that we must place the community of Asikli. From the age and sex selection it is clear that some control over the major animal species was exercised. The age and sex patterns suggest a seasonality, which for a large population and a long period needed to depend on some form of control. However, the size pattern suggests no anatomical changes.

Asikli may therefore be seen as a site in which agriculture was developing and a certain amount of control was established over animals, but in which domestication still had not taken place yet. It is of course a question of definition to say that domestication has taken place only if all aspects of cultural and anatomical changes can be observed.

It is a pity that the site was abandoned at this stage, but this seems also to be a pattern of neolithisation, in that the establishment of fully-agricultural societies tends to be in new sites, and not be a direct continuation of previous settlements. One very positive aspect is the availability of a large amount of data of, at least anatomically, wild *Ovis orientalis* and other major species. These data are available on request from the author.

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