



# ARCHAEOZOOLOGY OF THE NEAR EAST

## VIII

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### TOME I

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## ILIPINAR: THE FAUNAL REMAINS FROM THE LATE NEOLITHIC AND EARLY CHALCOLITHIC LEVELS

Hijlke BUITENHUIS<sup>1</sup>

### ABSTRACT

Ilipinar, situated on the western shore of Lake Iznik in northwest Anatolia, provides an insight into the development of a region between the Anatolian and Balkan areas, and therefore into the dispersion of Neolithic achievements. The material dates from the latter part of the 7th millennium BC to the middle of the 6th millennium BC. Both the cultural and faunal remains show an interesting pattern of pioneer occupation, bringing the achievements of the Neolithic (domestic animals, plants, pottery etc.) from the more central Anatolian area and a development of local potentialities. This development is clearly shown in the changes in the composition of the faunal complex through the layers, from a complex more related to an Anatolian origin into an exploitation of the local wooded area into a grass-rich open situation. The relationship of the occupants in a wider regional context is unclear. Cultural developments, for instance in the pottery, show a clear connection developing with the Thracian and Bulgarian areas, but the faunal remains from sites around the Sea of Marmara seem to show quite locally defined exploitation pattern and choices.

*Keywords:* Anatolia, domestic animals, neolithisation, exploitation patterns.

### RÉSUMÉ

*Le site d'Ilipinar sur le bord ouest du lac d'Iznik dans le Nord-Ouest de l'Anatolie offre un aperçu de l'évolution d'une région située entre l'Anatolie et les Balkans et ainsi de la diffusion de la néolithisation. Le matériel date de la fin du VII<sup>e</sup> millénaire au milieu du VI<sup>e</sup> millénaire av. J.-C. Aussi bien les vestiges culturels que les restes fauniques illustrent le modèle intéressant d'une occupation pionnière apportant les innovations néolithiques (les animaux domestiques, les plantes, la céramique) typiques de la zone du centre de l'Anatolie centrale et du développement des potentialités locales. Ce développement est clairement visible dans les variations de la composition de l'ensemble faunique à travers les couches. La composition faunique montre d'abord un ensemble en relation avec une origine anatolienne, puis une exploitation des zones forestières locales, enfin une situation de pâturages ouverts. Les rapports des occupants du site dans un contexte plus étendu, au niveau régional, ne sont pas connus. Le développement culturel, en ce qui concerne la céramique en particulier, montre une relation nette avec la région de la Thrace et de la Bulgarie mais les vestiges de faune des sites autour de la mer de Marmara semblent indiquer un modèle et des choix d'exploitation relativement locaux.*

*Mots-clés :* Anatolie, animaux domestiques, néolithisation, modèle d'exploitation.

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## INTRODUCTION

Western Asia and SE Europe meet physically in the Marmara region. The region was therefore thought to be critical for uncovering links for the cultural exchange between the continents. In the light of the theories, no longer seriously opposed, that incipient agriculture or the formation of Neolithic cultures in SE Europe were influenced or even directly descended from the developing Neolithic cultures in Western Asia, it was assumed that investigations of an early settlement in this contact zone would provide contextual data for this process and shed light on the first sedentary life in this region.

The site of Ilıpınar was chosen after several surveys as the most promising to provide different occupation levels for this period.

## SITE DESCRIPTION AND LOCATION

Ilıpınar is situated in the Lake Iznik basin about 2 kms west of the lake shore at an altitude of about 100 m above sea-level (*fig. 1*). The nearest town is Orhangazi in the province of Bursa. The mound covers about 2.5 ha and was built up during spans of intermittent occupation stretching from the Anatolian Late Neolithic to the Byzantine period.

A perennial spring at the foot of the mound probably attracted people to settle here. Nearby clay deposits, used up to the present for pottery production, may also have been of importance in the selection of the site.



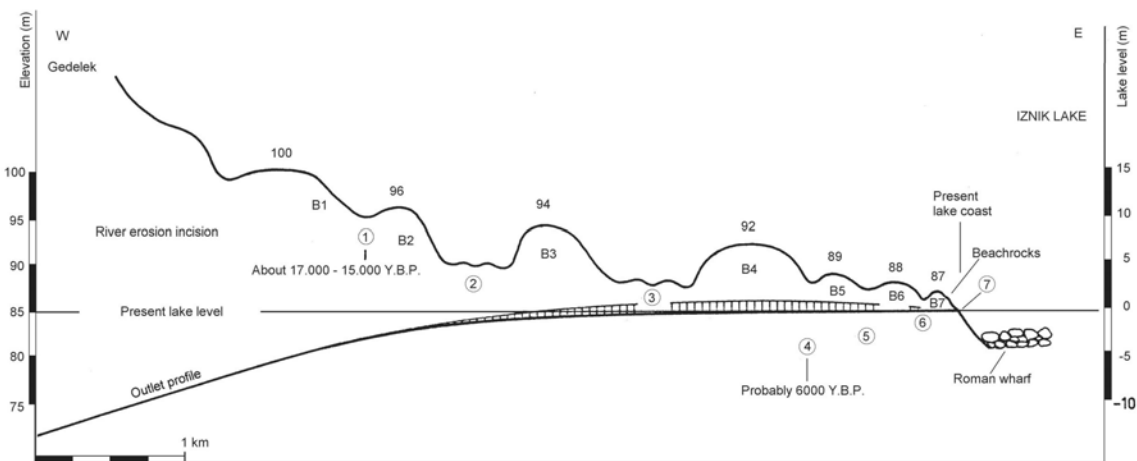
*Fig. 1—Map of the region and the location of Ilıpınar and sites mentioned.*

The höyük is under intense cultivation as is every square meter of the Iznik Lake valley. Parts of the höyük are planted with orchards and olive groves, while other parts are used for alternating field crops. Agricultural activities have changed the outline of the mound and plowing has seriously damaged the top of the archeological layers.

The Iznik Lake is part of a series of east-west oriented tectonic geological features in the region, which form part of trough-shaped depressions along several fault lines. Lakes have formed in these depressions.

In the Late Glacial and early Holocene period the lake levels were much higher. In time the lake drained westward into what is now the Sea of Marmara through the Karsak gorge. The drop in the lake levels is indicated in the landscape by the presence of beach banks. Studies by İlhan Kayan (1995) have shown that when the site of Ilıpınar was occupied for the first time the lake shore was already located as far as 2 km west of the site location (*fig. 2*).

The site is located at the foot of a piedmont, an alluvial fan from the mountains to the north. The spring occurs on the edge of the alluvial fan and the valley floor.



*Fig. 2—Schematic topographical profile from the mountains to the lake shore with the beach ridges (from Kayan 1995).*

## CLIMATE AND VEGETATION

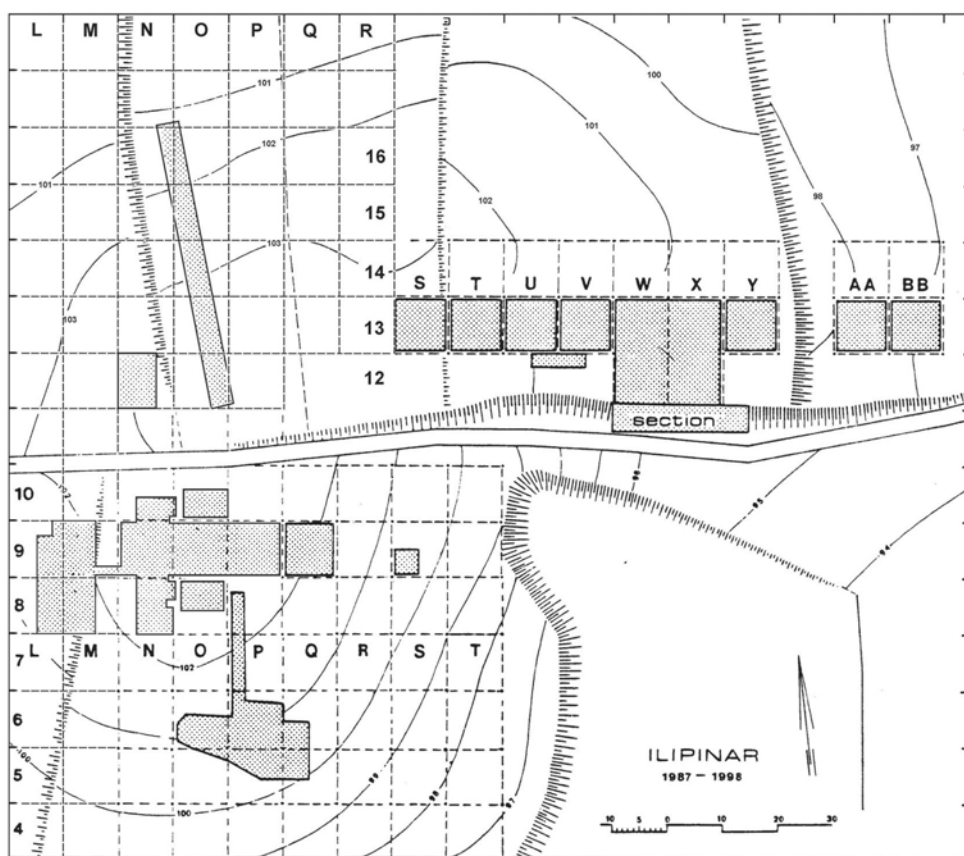
The area described here is ruled by a climate that differs from the highland because of its low elevation. The average summer temperature is 24°C and the winter temperature *ca* 4°C. The annual precipitation is *ca* 800 mm with a minimum of 70 mm in the summer. The climate is thus Euro-Mediterranean.

The vegetation in the area differs significantly from the high plateaus. At present very little of the natural vegetation cover is left. Studies by Bottema and Woldring (1995) and Stuijts and Casparie (1995) indicate that, at the beginning of the occupation of the site, tree pollen represents 70-80% of the pollen rain and herb pollen is at a minimum. Beech, birch, oak, ash, hazelnut and pistachio were common. The first species probably occupied the lower valley floor which presumably was quite wet due to the natural drainage from the lake to the west. The other species were probably found more on the slopes of the surrounding mountains. The botanical studies indicate that at the beginning of the occupation, the probable exploitation area, the valley floor and the alluvial fans west of the lake and between the mountain ridges, was densely forested with few open areas.

## STRATIGRAPHY AND ARCHEOLOGY OF THE SITE

The site was excavated from 1988 to 1998 (*fig. 3*) (Roodenberg 1995; Roodenberg, Thissen 2001) and revealed occupation levels from the Late Neolithic to the Byzantine period. Ten major phases were recognized:

- Phase I: A Byzantine cemetery from the late sixth century AD, with *ca* 200 tombs uncovered.
  - Phase II: Early Roman structural remains on the east slope (square AA and BB) and surrounding the spring.
  - Phase III: Pits and silos dating to the Late Early Bronze Age, possibly related to the occupational layers of nearby Hacilar-tepe.
  - Phase IV: Burial yard of the Late Chalcolithic, with *ca* forty burials in “hocker” position.
- These first four layers have yielded little usable animal remains and are not included in this analysis.



*Fig. 3—Plan of the excavation areas.*

The analysis focuses on the earlier, prehistoric occupation levels. The following phases were distinguished according to several criteria:

- changes in construction practices;
- possible disruption in the occupation marked by destruction layers;
- typological changes in the finds, especially the pottery.

These led to the following stratigraphical divisions:

- Phase V (*fig. 4*): First recognized in refuse pits, later found as major occupation levels on the west slopes of the höyük and divided into two further phases: VB and VA. Houses are made of mud-brick and mud slabs and constructed as connecting cells with open courts in front with work areas and ovens (Gérard 2001). Some of the pottery is reminiscent of Karanovo III or early Vinca-type pottery.

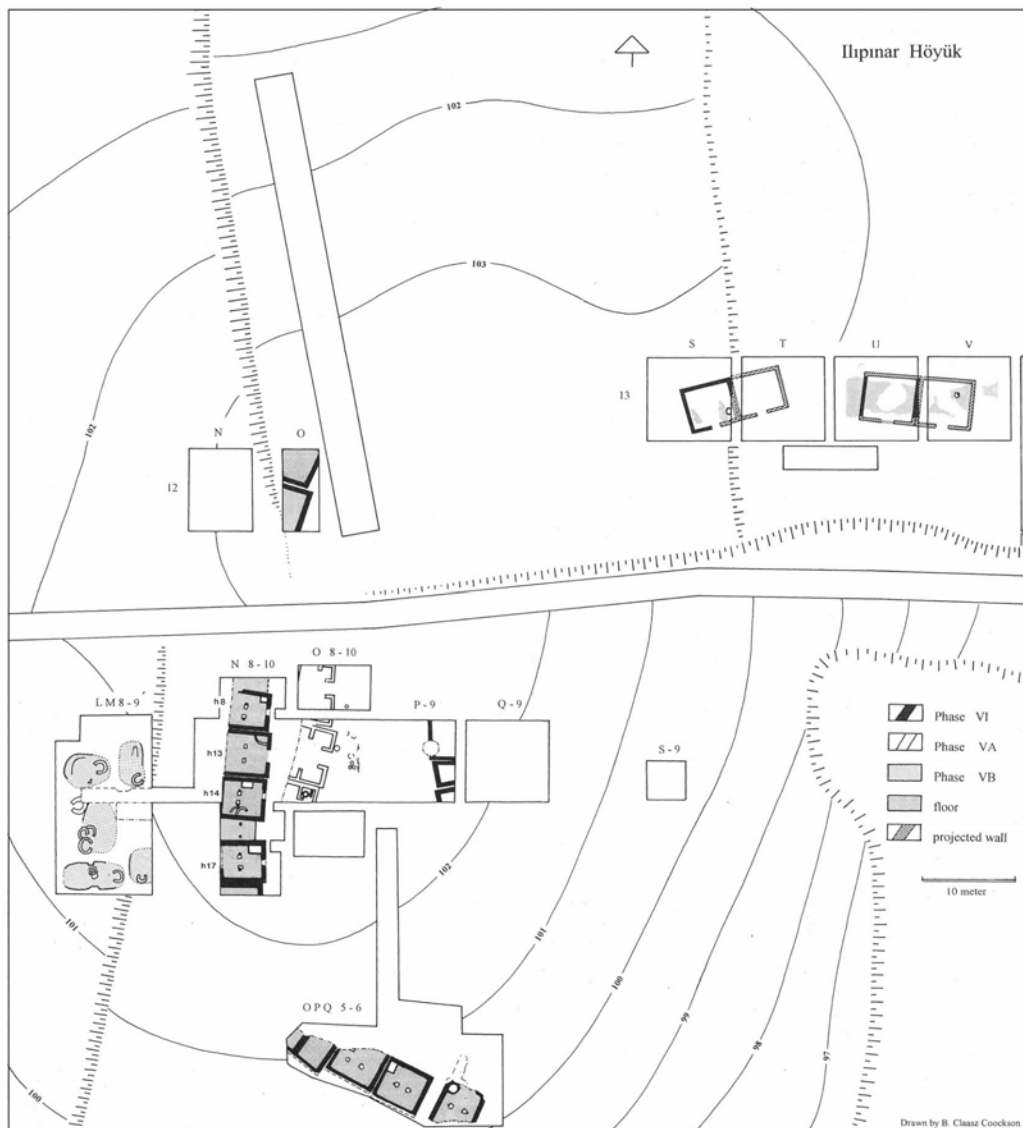


Fig. 4—Plan of the architectural remains in phases V and VI.

—Phase VI: Mainly found west of the ‘big square’ and consists of a single mud brick building, some with cellars transitioning to the cell-row buildings in phase V.

—Phase VII: Only found in the central squares consisting of the last of the wood and mud buildings from earlier phase VIII and is probably the transition to the mud brick building phase.

—Phase VIII (fig. 5): Thick layer of up to 1.50 m thick, found only in the central square. The buildings are made of wooden poles standing in foundation ditches or on wooden slabs, with wattle and daub walls. Sometimes floors were covered by wooden planks. Reconstructing these structures suggests they had central supporting posts and gabled roofs (fig. 6).

—Phase IX: House construction of walls with mud slabs and wooden posts, and transition to phase VIII houses.

—Phase X: Not only found in the central square but also on the western slope under a thick layer of debris in square S9. The houses are of the same type as in phase IX, but separated by a destruction layer.



Fig. 5—Plan of the architectural remains (postholes, wooden floors and foundations) in phase VIII.

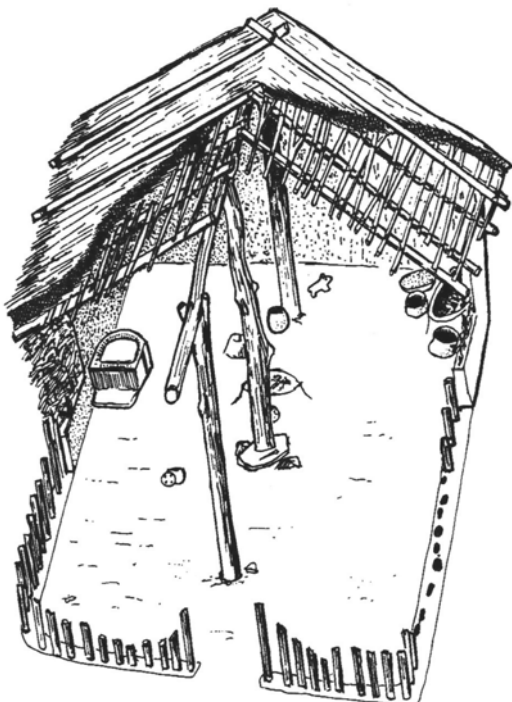
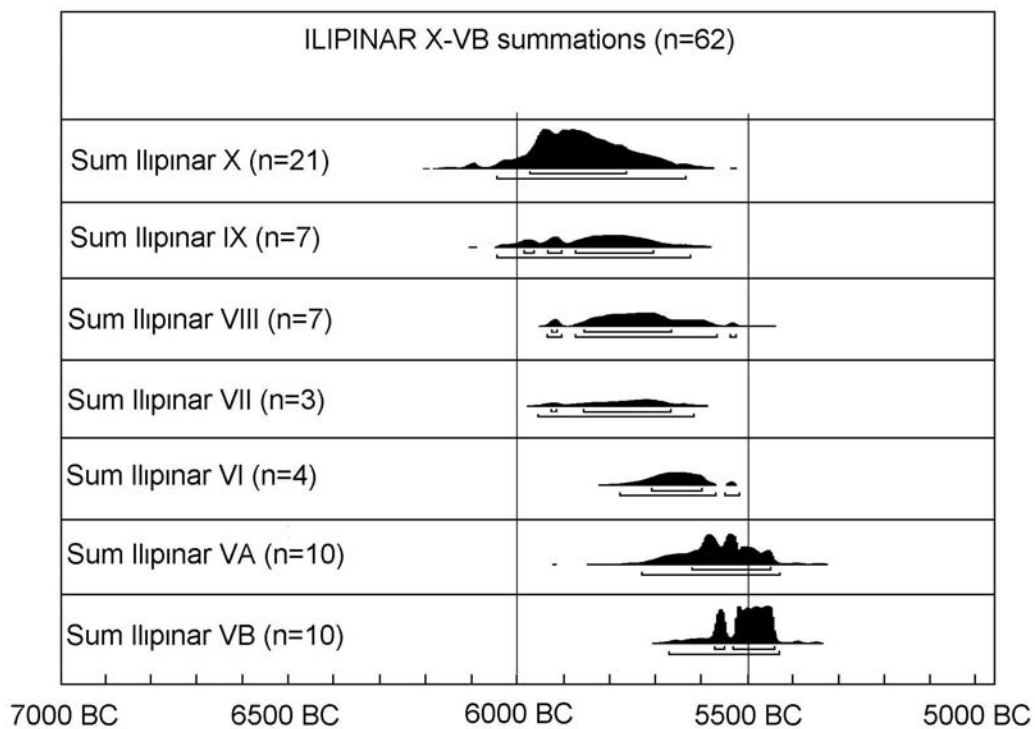


Fig. 6—Reconstructed house from phase VIII.

Apart from the stratigraphical and architectural considerations for the separation of these layers, typological changes in the finds are also relevant to the phase separation. The pottery analysis in particular (Thissen 2001) has revealed striking developments. In phase X, for example, chaff-tempered wares were found which are almost absent in the later phases. Thissen showed that this pottery is reminiscent of types found at, for example, Hacilar in the lake district of central Anatolia. Also, some rough figurines are reminiscent of material found at this site. Technologically however, almost all of the pottery from Ilipinar is local (van As *et al.* 1995). In later phases the pottery shows more and more similarities with pottery from other Marmara sites and eastern Bulgarian sites and no longer any similarities with Anatolian sites. Comparison with early Neolithic sites from Greece shows no similarities at all (van As *et al.* 1995). It is only in phase V that similarities of finds between sites in the Marmara region and the eastern Balkans become quite strong, resulting in pottery of a Vinca type, which has no direct relationship with pottery from earlier periods in Ilipinar and is suspected to have been introduced from the Balkans.

The phases described above are dated by a series of  $^{14}\text{C}$  dates, which show that they form a continuous occupation period between 6000 and 5400 cal. BC (*fig. 7*).



*Fig. 7—Summary of the  $^{14}\text{C}$  dates.*

## MATERIAL AND METHOD

In this report the questions and results of the analysis are discussed. Individual data are not presented.<sup>2</sup>

The animal remains are representative of kitchen and butchering debris. Only a few larger parts of crania, horn cores or long bones were recovered. Though fragmentary, the bones had not been smashed to

2. These can be obtained from the author by contacting him through e-mail: at h.buithuis@arcbv.nl.

small pieces consistently. The bones were very well-preserved, due to the groundwater percolating through the soil and its clayish consistency. The groundwater is rich in minerals. On the one hand this preserved the bones and strengthened them by depositing minerals in the bone interstices, on the other hand it also deposited a layer of minerals on the outer surfaces of bones. Especially on porous surfaces such as horn cores and antlers, a thick, hard layer of minerals was often present. Removing this layer often damaged the surface of these fragments. As a consequence traces of human activities on bone surfaces were not visible, or they were damaged. As a result only clear-cut or chopping marks were identified, and only on a small percentage of the fragments. Another modification on the bone remains, burn marks, were very often found. However, there are several destruction layers on the site, where fire burned down the houses with such intensity that pottery and soil melted. Most of these remains show a high degree of burning which suggests that it was caused by the destructive fires. It is therefore not possible to use burn marks to analyze human activities.

The most common other use of bones is as material for the production of tools. In Ilipinar bone tools are a substantial part of the recovered objects. Among almost 58,000 studied remains at least 1000 are worked bones. These consist of awls, needles, chisels, perforated and unperforated pointed spatulas, spoons, axe and adze handles made from antler, as well as some ornaments (Marinelli 1995). The spoons seem to be typical for this region. Antler has almost always been used to make handles or sleeves for small axes or adzes. The process of fabricating these from raw antlers to the finished product is completely represented among the remains.

All remains were hand collected. Due to the parameters set by the authorities in Turkey, excavations were carried out without mechanical tools. In general, the process in Ilipinar was to remove a layer of soil by loosening it with small pickaxes, sifting through the soil for finds, and then shoveling it away. It depends very much on the workers as to whether small finds are recovered in this way. However, experience in Ilipinar showed that recovery by hand of even small finds was quite good and consistent. An example is the recovery of a few thousand small beads just a few millimeters in width. However, a cut from the main section 1 meter wide and 50 cm deep consisting of debris from phases VI to X was systematically wet-sieved over a mesh of 2-3 mm in diameter. The residue was examined for fragments indicating find groups that were not recovered by the hand collecting. In all the residues only two tiny fish vertebrae and two fragments of bird bones were found, apart from small fragments of the usual long bones or shells. It seems therefore that the recovery of the remains is only slightly biased.

## FAUNA

A total of 57,950 fragments with a total weight (excluding shell remains) of over 820 kg were analyzed. At least 36 species were identified (*table 1*). These are the five domestic species: dog, pig, sheep, goat and cattle; the wild mammals: wolf, fox, bear, wild cat, panther, equine species, wild boar, fallow deer, red deer and roe deer, aurochs, beaver and hare; the bird species: cormorant, spoonbill (cf.), wild duck and goose, small crow, falcon type and a plover; two species of tortoise, a land crab, and the molluscs: common edible garden snail, blue mussel, oyster, cockle and freshwater mussels.

For the analysis the material was attributed to the different phases. Some of the phases were taken together.

The quantitative analysis reveals some interesting patterns. In the analysis the focus is on the mammals and molluscs. The remains of the other species are so few that their occurrence is almost incidental. Only the tortoise remains occur quite frequently, but it is uncertain as to whether they all belong to the prehistoric material. At the present time a very large number of tortoises live in the pond formed by the spring at the foot of the mound, and they do tend to dig into the archeological layers. Many of the remains are found quite near the section of the höyük close to the pond. However, some of the tortoise remains are heavily burned and came from contexts near the destruction layers. These must have been present during the fires and illustrate at least their presence in earlier times. Whether and how they were exploited is difficult to determine.

Taxa	Phases	X	IX	IX/VIII	VIII/VII	VI/VA	VB	MIX
Unidentified								
size rabbit to dog		11	21	75	37	14	8	71
size dog to sheep		716	5606	1495	4914	1600	1573	2764
size wild boar to cattle		57	442	154	349	129	179	258
size red deer to cattle		75	1372	357	1439	602	723	535
size >> cattle			4	4	1			
Domestic mammals								
<i>Canis familiaris</i>	dog	2	23	8	35	28	45	10
<i>Sus domesticus</i>	pig	19	1514	323	1902	406	148	440
<i>Ovis aries</i>	sheep	55	355	120	446	100	72	187
<i>Capra hircus</i>	goat	25	453	143	707	73	33	140
<i>Ovis aries</i> or <i>Capra hircus</i>	sheep/goat	17	14	66	7	4	40	74
small ruminant		204	2229	616	2472	965	654	990
<i>Bos taurus</i>	cattle	50	888	233	890	566	1024	363
Domestic or wild mammals								
<i>Canis familiaris/lupus</i>	dog/wolf			1			1	2
<i>Canis/Vulpes</i>	dog/fox			1			2	4
<i>Sus scrofa</i> (wild/dom.)	pig/boar	14	102	21	105	15	14	47
small cervid/ovicaprid		1	22	41	51	1	8	28
large cervid/ovicaprid		2	73	23	45	11	23	33
small ruminant (wild/dom.)			2	35	294			3
<i>Bos taurus/primigenius</i>	cattle/aurochs	2	21	18	44	26	22	26
Wild mammals								
<i>Canis lupus</i>	gray wolf		1					
<i>Vulpes vulpes</i>	red fox		5		5	2	2	2
<i>Ursus arctos</i>	brown bear		1		2			3
<i>Felis sylvestris</i>	wild cat		7		2			
<i>Panthera pardus</i>	leopard		1					
Equidae, species unknown		1				1	2	5
<i>Sus scrofa</i>	wild boar	32	85	4	62	7	14	39
Cervidae, species unknown		24	153	14	85	42	68	97
<i>Dama dama</i>	european fallow deer	19	623	38	200	215	176	97
<i>Cervus elaphus</i>	red deer	7	44	2	11	11	8	13
<i>Capreolus capreolus</i>	roe deer	5	113	12	55	28	16	31
<i>Bos primigenius</i>	aurochs		1	1	10	4		1
<i>Cervus</i> or <i>Dama</i> spec.				10	30			1
<i>Capra/Ovis/Dama</i> spec.						1		
small ruminant wild						4		
<i>Dama/Capreolus</i>	fallow/roe deer		2			1		
<i>Castor fiber</i>	beaver		1	1				
small rodentia, species unknown			4				1	
<i>Lepus capensis (europaeus)</i>	hare	3	8	2	9	3	7	11
Others								
Aves, species unknown (wild)	Birds	1	3	1	1			11
<i>Phalacrocorax carbo</i>								1
cf. <i>Platalea leucorodia</i>					1	1		
Anatidae, species unknown			3				1	1
<i>Anser</i> ssp.		1	4		3			1
Falconidae, species unknown								1
Charadriidae, species unknown					1			
<i>Corvus frugilegus</i>			1					
Aves, size = duck			4					1
Aves, size = goose			2		2	1	2	2
Testudines, species unknown	Reptils	5	51		35	5	2	45
<i>Clemmys caspica</i>								2
Testudinidae, species unknown			2		16			1
<i>Testudo hermannii</i>			6					
<i>Testudo graeca</i>			1					12
Pisces, unidentified	Fishes	1					3	
Cyprinidae, unidentified								1
<i>Potamon potamius</i>	Crustacean	1						1
Mollusca, unidentified	Molluscs		1		5	1		
Gastropoda, unidentified			1		1			
Buccinidae/Turridae, species unknown					7			
Turridae like, ribbed			1					
<i>Helix aspersa</i>		515	24	3	16	1	7	262
<i>Mytilus galloprovincialis</i>		504	1310	153	1464	212	441	1226
<i>Ostrea edulis</i>		11	40	1	27	32	28	126
<i>Cerastoderma (Cardium) edule</i>		1	183	78	7	20	3	25
<i>Unio</i> sp.		2	265	40	651	121	225	113
Total		2383	16093	4094	16446	5254	5575	8107

Table 1—Number of remains of identified species and groups in the different phases of Ilipinar.

In figures 8 and 9 the relative quantitative remains for the mammals is given. By far the majority of the remains are from domestic animals. There is a decrease of domestic animals in the phases X and IX from 85% to roughly 78% in numbers, and in weight of bones from 85% to roughly 58%. It is easy to imagine that wild species were more abundant in the early phases of the occupation and that with ongoing exploitation of the area they became scarcer.

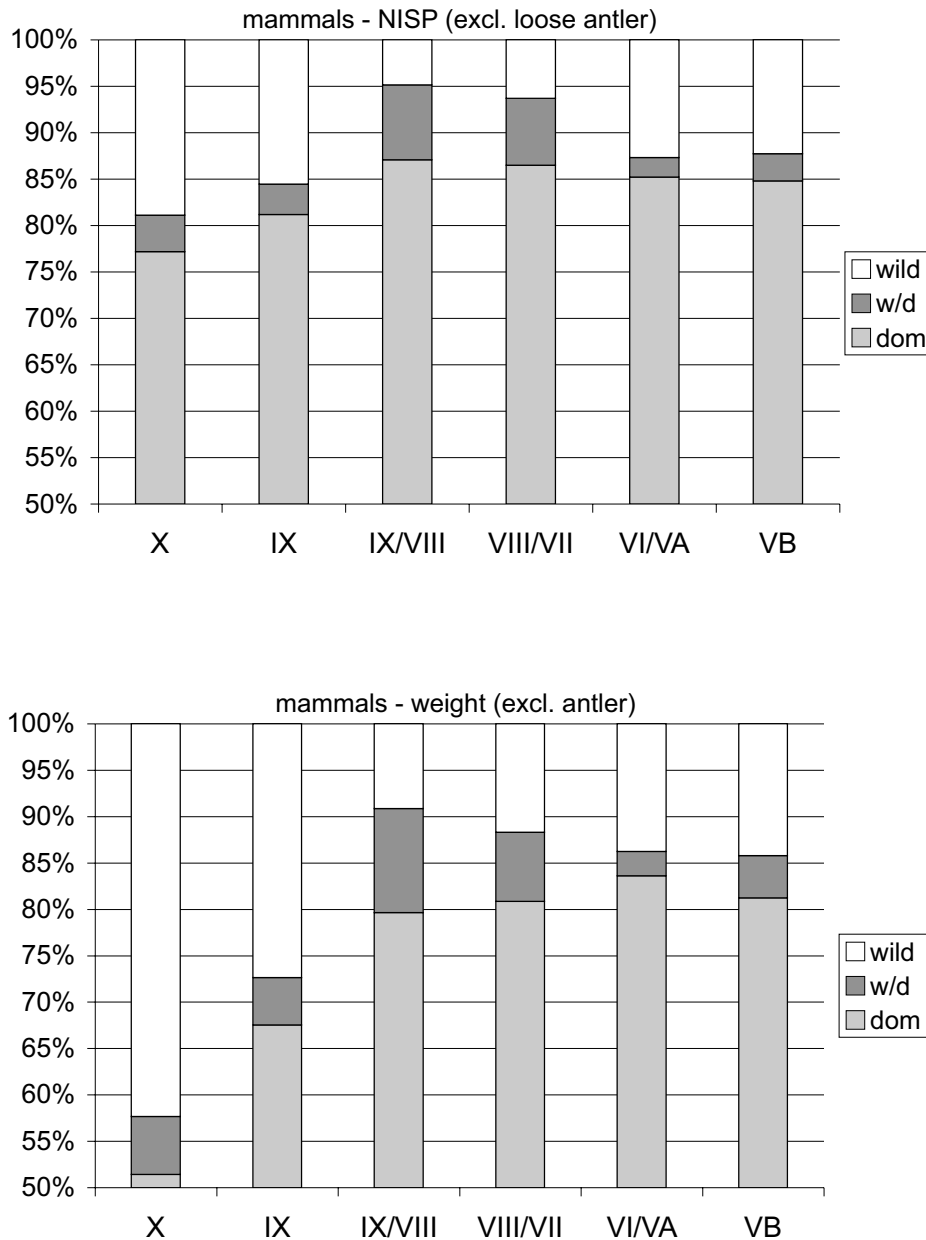


Fig. 8—Percentages of remains of wild and domestic species in the different phases.

If we look at the distribution of the domestic mammals in the different phases (fig. 9) again there are clear differences. By far the most important in the earliest phase X are sheep/goats. However, in the following phases, IX to VII, pigs become an important second. In the last two phases VI and V pigs lose

their importance again but on the other hand there is a clear increase in cattle. At the same time (fig. 10) we can see that in the earliest phase sheep are more frequent than goats, which changes in levels IX to VII where goats occur more frequently than sheep, until the phases VI and V where sheep again become more prevalent.

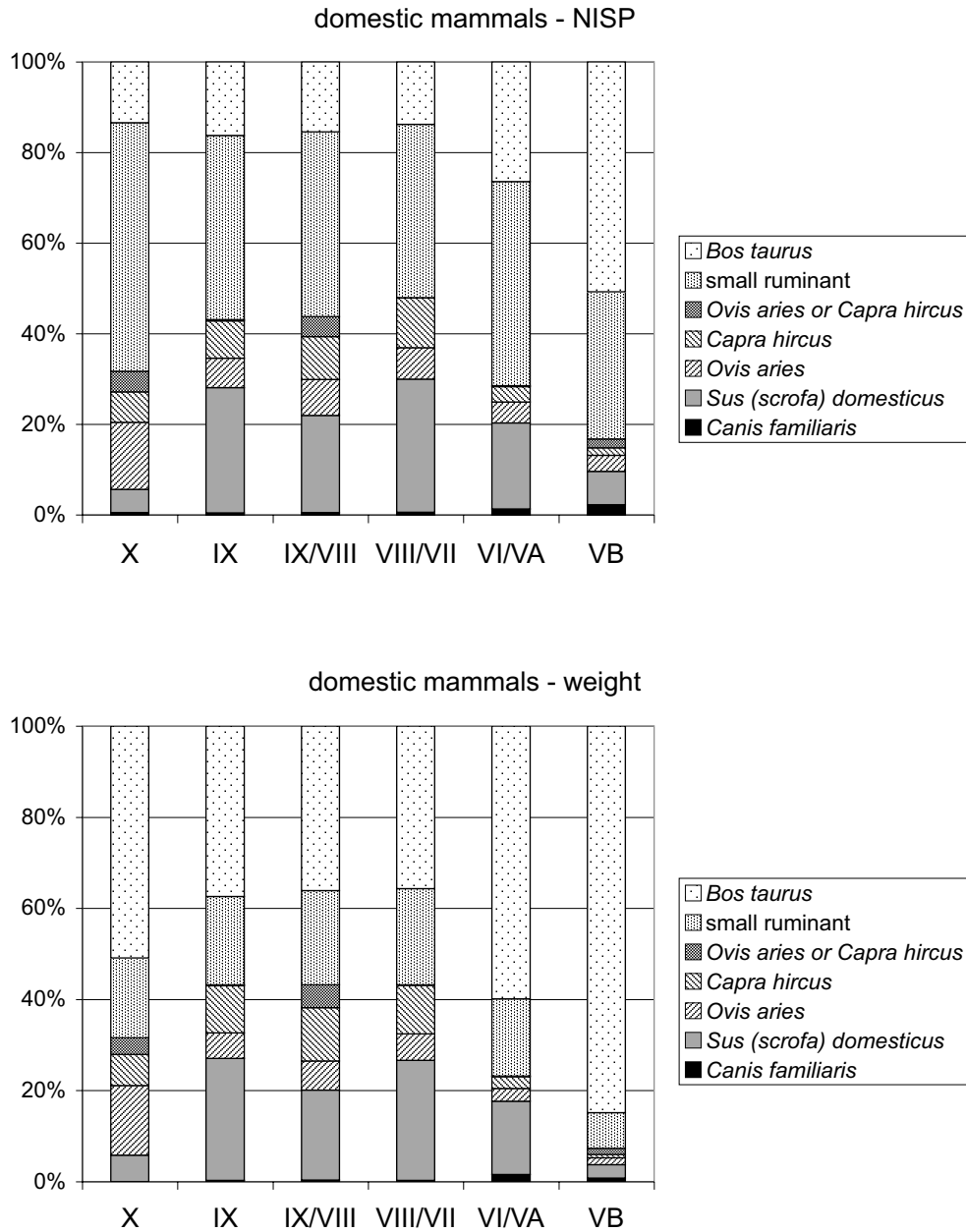
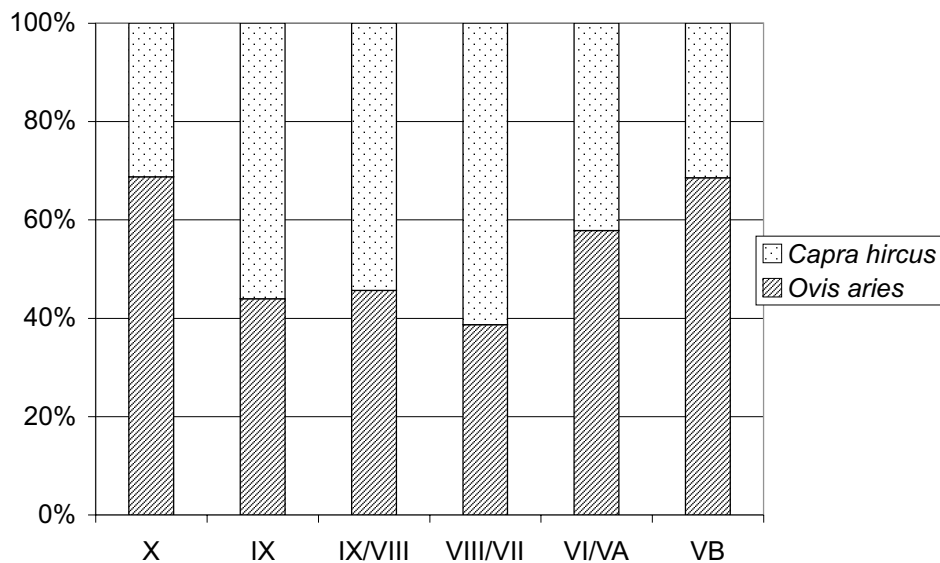


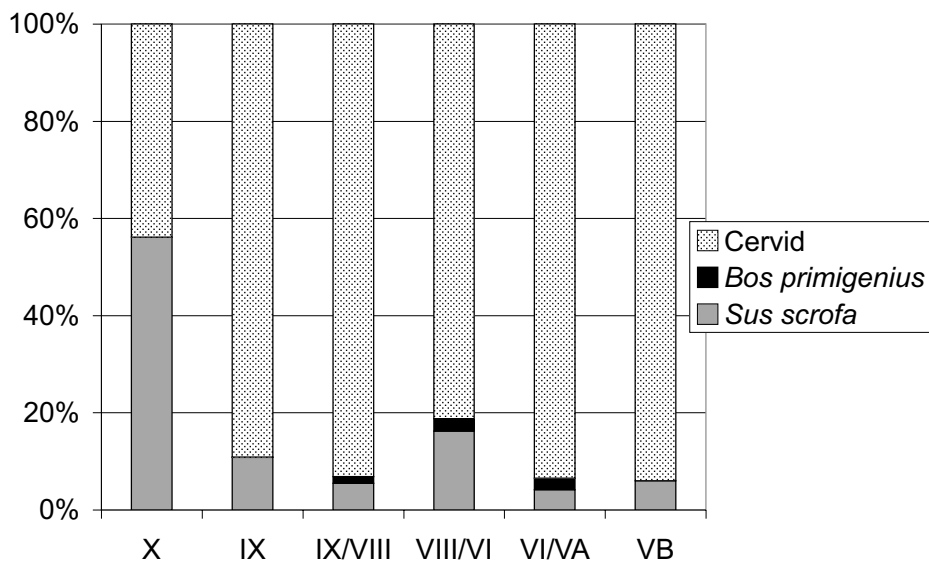
Fig. 9—Percentages of the domestic mammals.

The wild mammals can be separated into two groups of different economic importance: deer, wild boar and aurochs versus the economically less important other species. The first three species occur in large numbers (apart from the aurochs) while the others are much less common. However, the species richness is highest in phase IX (to VII).

When we look at the commonly found wild species (*fig. 11*)—wild boar, deer and aurochs—, we can see that in the early phase X wild boar especially is hunted, while mainly deer were recovered in the later phases.



*Fig. 10—Relative proportions of sheep and goats in the different phases.*



*Fig. 11—Relative proportions of the main wild species in the different phases.*

#### THE ECONOMIC USE OF THE DOMESTIC ANIMALS

The analysis of the economic use of the domestic animals was carried out by comparing for the different phases:

- the distribution of the skeletal parts;
- size ranges;

- the ageing patterns;
- the sex distribution.

Looking at the distribution of the skeletal parts for *Ovis/Capra* (fig. 12) it is noticed that apart from a lack of cranial and dental remains in phase X for goats, the patterns are the same in all phases, especially if we take sheep and goats together. It is also clear that all skeletal parts are represented more or less as expected if animals are slaughtered and processed completely on the site. The same holds true for *Bos* and *Sus* (fig 13).

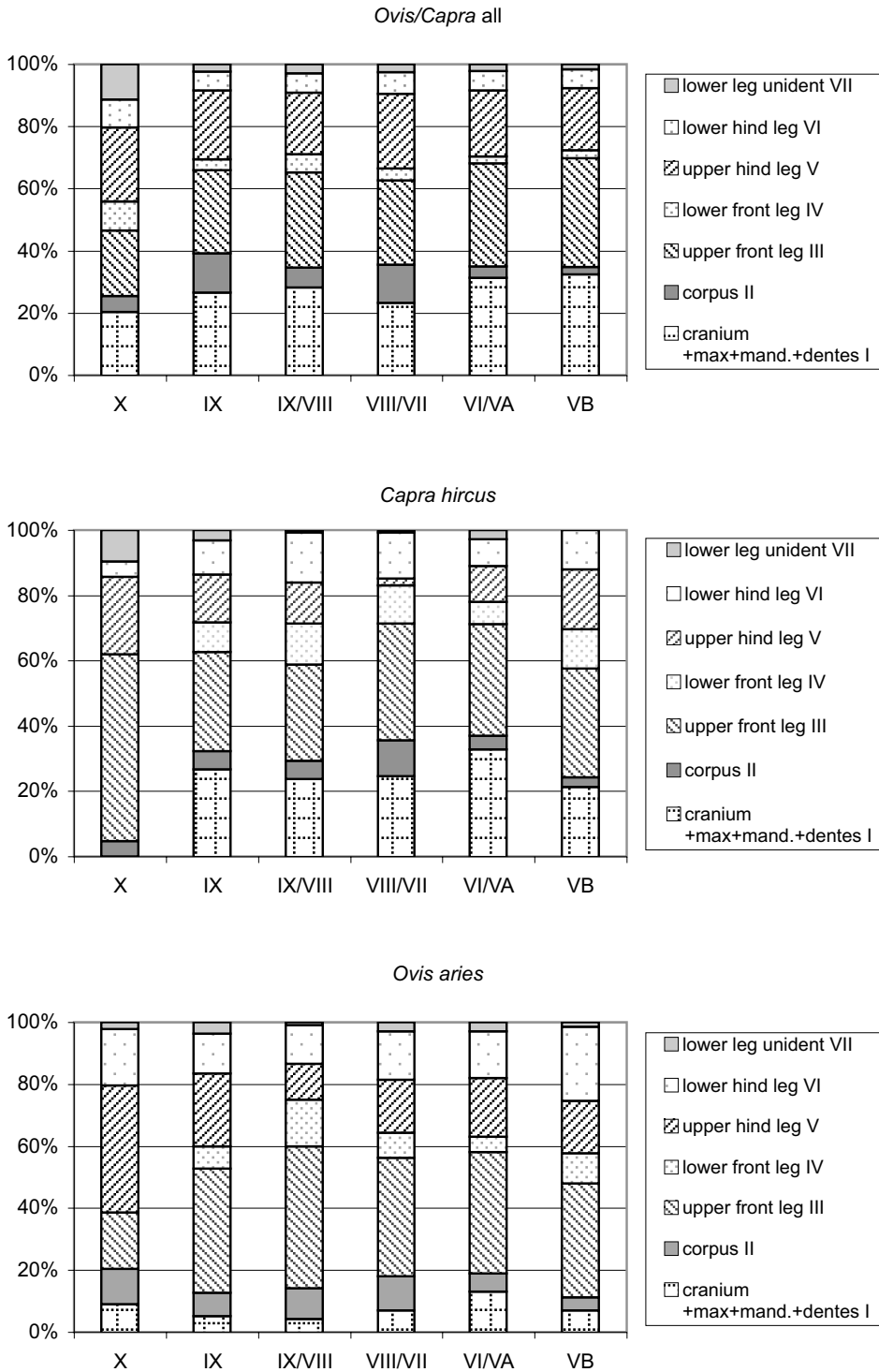


Fig. 12—Relative proportions of skeleton remains (grouped) of sheep and goats in the different phases.

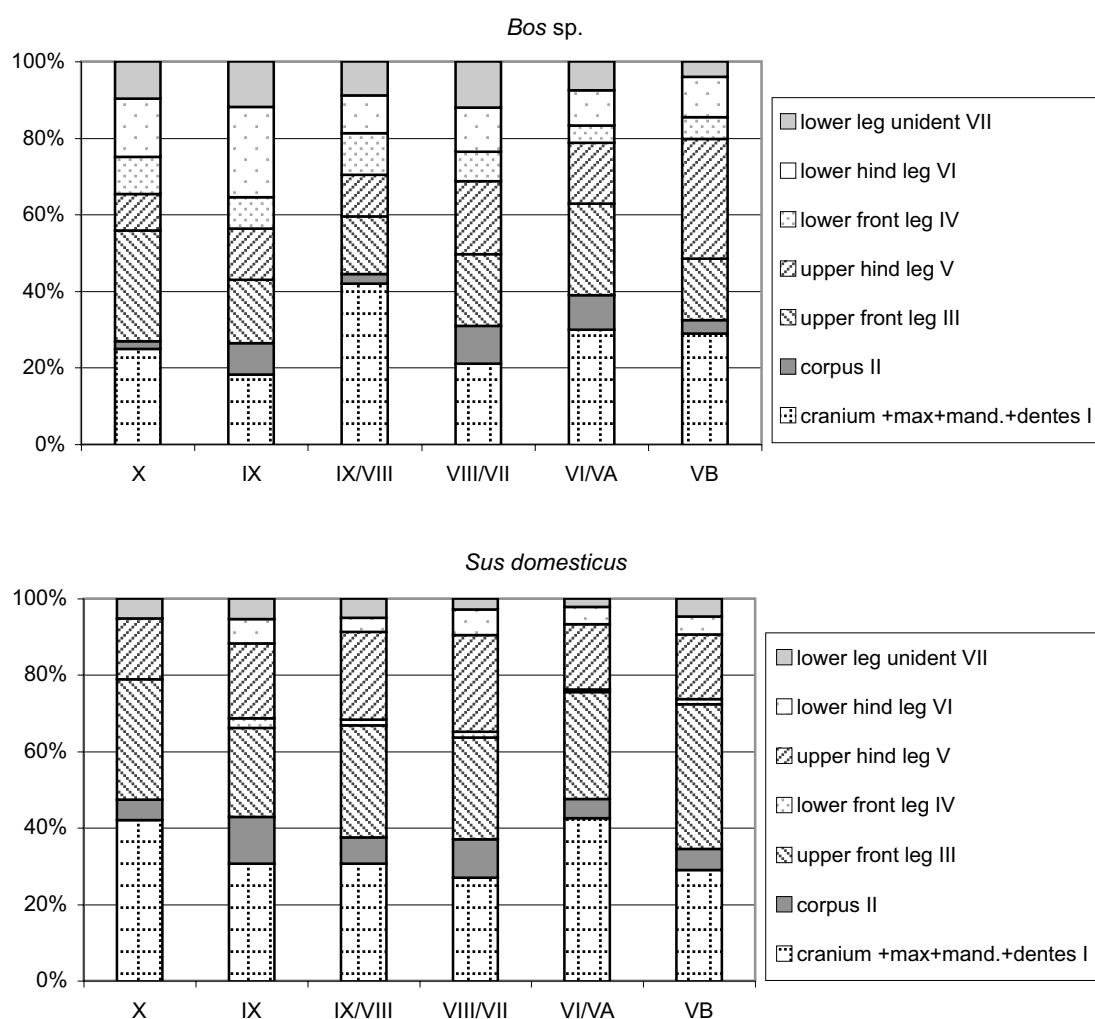


Fig. 13—Relative proportions of skeleton remains (grouped) of cattle and pigs in the different phases.

The sizes of the animals were calculated using the Log Size Index method (Meadow 1983). Only width measurements are used in these diagrams. The purpose of the size comparison is twofold. One is to establish whether among the remains of the four species there are elements of the wild forms. Aurochs and wild boar were known to be part of the normal wild fauna in this region, but this region was thought to be outside the natural distribution area of sheep and goats.

In figure 14 the size indices for *Sus* are given in the different phases. In the earlier phases some wild boar can be identified, the standard individual being a female wild boar from Turkey. There is also, perhaps related to the decrease in numbers of wild boar, a clear size decrease overall, from +0.75 in phase X to -0.50 in the later phases (the number of remains in phase VB is too small to be significant).

In figure 15 the size indices for *Bos* are given. It is clear that most of the animals are much smaller than the standard individual, the well-known female aurochs from Ullerslev, Denmark (Degerbøl, Fredskild 1970). It seems safe to assume that most remains are from domestic cattle, especially if we consider that evidence from Anatolia suggests that the wild aurochs were generally somewhat larger than in Europe. There seems to be no significant size change for cattle in the different phases.

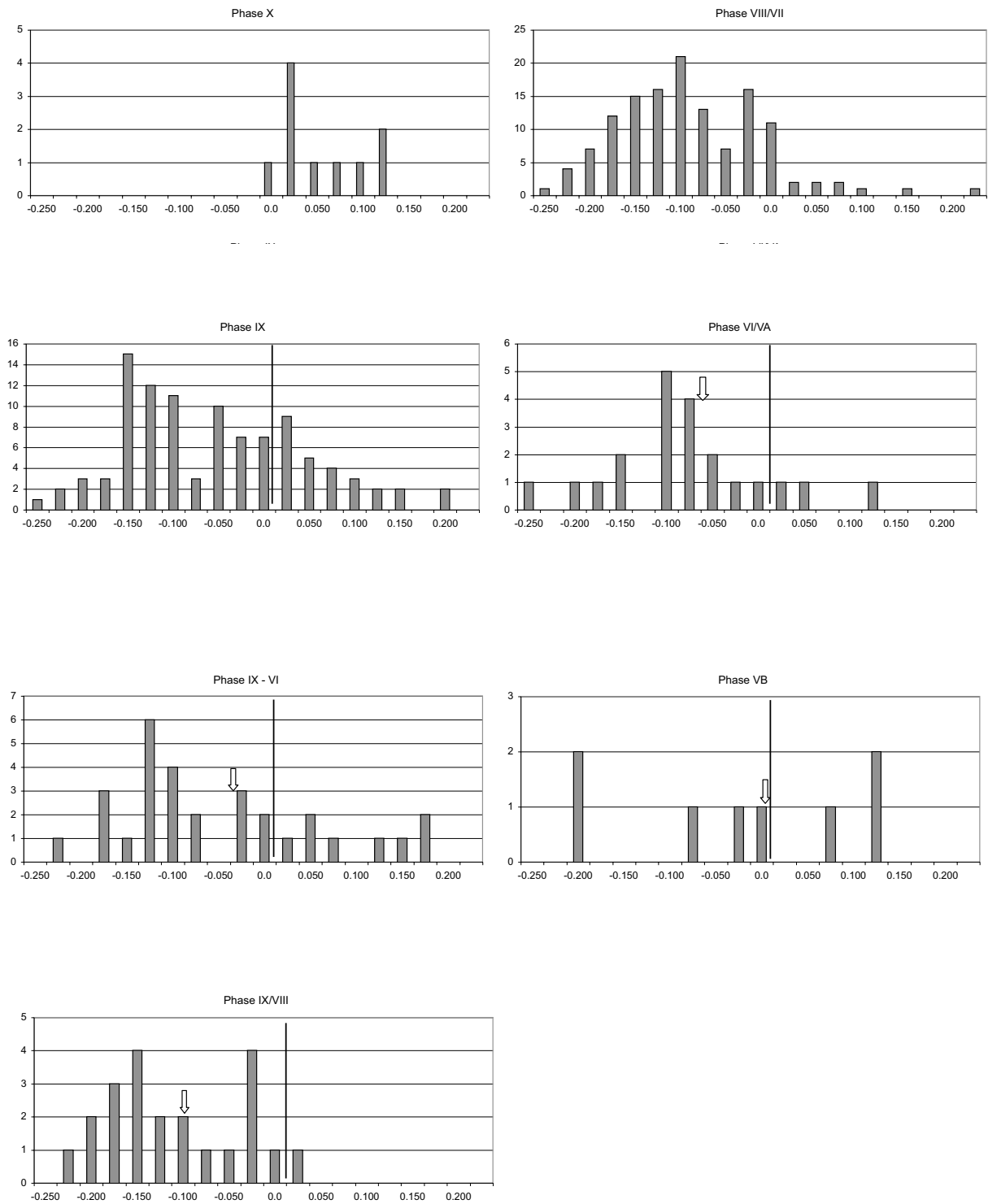


Fig. 14—Log Size Indices (SI) for *Sus sp.* in the different phases.

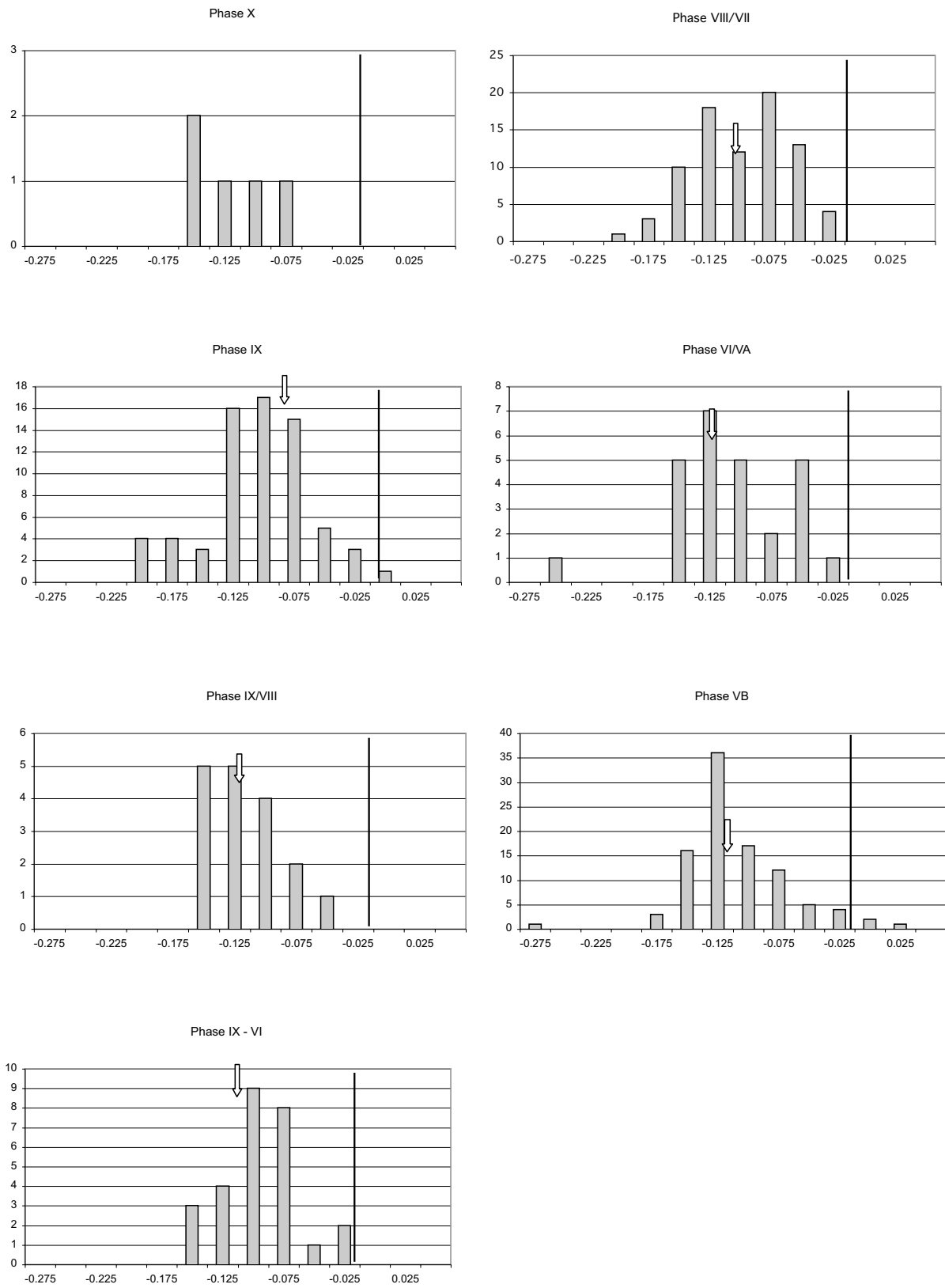


Fig. 15—Log Size Indices (SI) for *Bos sp.* in the different phases.

In figure 16 the size indices for *Ovis* are given. In comparison with the standard individual, a female wild sheep from the Taurus mountains, it is clear that there are only domestic sheep found at Ilipinar, and that their size does not change through time.

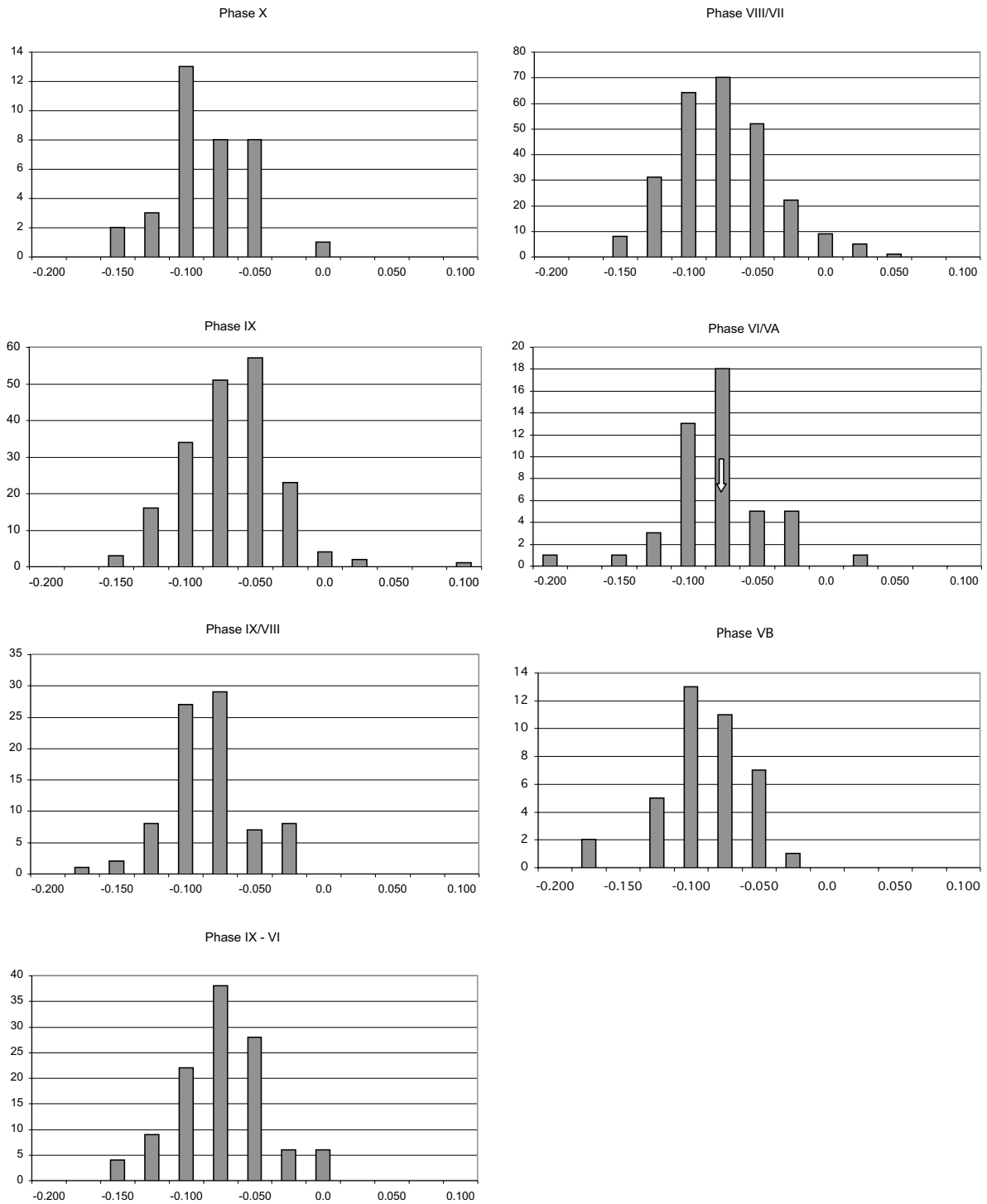


Fig. 16—Log Size Indices (SI) for *Ovis* sp. in the different phases.

In figure 17 the indices for *Capra* are given. Here there are indications of two groups, a typical one smaller than the standard individual and one the size of the standard. The standard individual is a female *Capra aegagrus* from the Taurus mountains. It may be that the large individuals are wild specimens or even belong to *Capra ibex*. However, the latter were not recognized among the remains. In general they also tend to be larger than the *aegagrus*. If we take into account the sex distribution (table 2), it seems that these large individuals could very well be large domestic males. Unlike the sheep there does seem to be a clear size decrease among the goats.

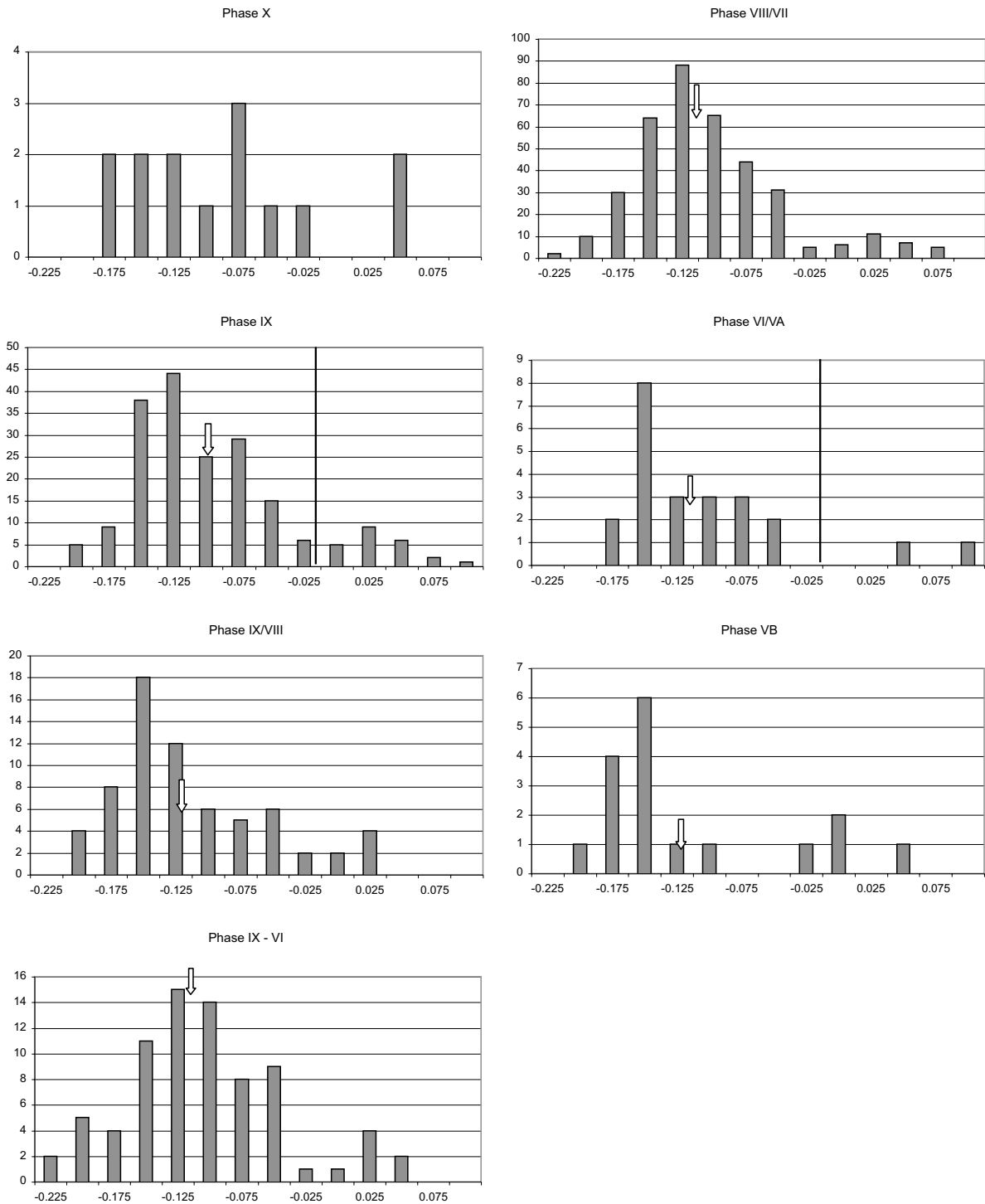


Fig. 17—Log Size Indices (SI) for *Capra* sp. in the different phases.

Animal groups		Phases						
		X	IX	IX/VIII	VIII/VII	VI/VA	VB	IX-VI
<i>Sus</i>	female		9	19	10	7	1	7
	male		7		8	2		1
<i>Ovis</i>	female	1	15	2	8	2	1	6
	male	2	2	1	4	3	1	3
<i>Capra</i>	female	1	3	1	11	1		3
	male	1	6	3	19	1		1
<i>Ovis/Capra</i> all	female	4	51	1	33	8	10	45
	male	5	22	16	41	8	6	64
<i>Bos</i>	female				3	2	14	1
	male					3	33	

Table 2—Number of identified female and male remains for the domestic mammals in the different phases of Ilipinar.

Looking at the age patterns based on the dental eruption and wear patterns of the mandible remains (fig. 18) there does not seem to be any difference in the separate phases. 80 % of the pigs were killed before they reached the age of 2 years, about 60% of the cattle were killed before 3 years of age and more than 90% of the sheep and goats were killed before they reached an age of 3-4 years.

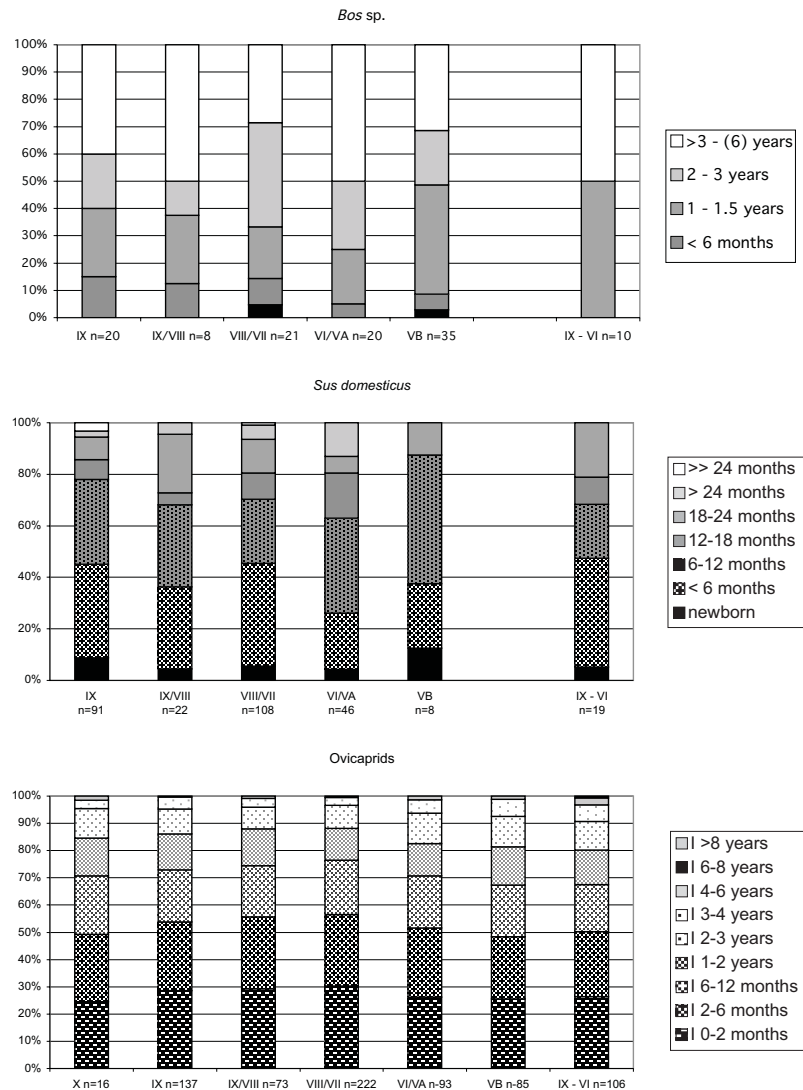


Fig. 18—Relative proportions of the different age groups in the phases for *Bos sp.*, *Sus sp.* and *Ovis/Capra* based on dental eruption and wear.

For the epiphyseal fusions (*fig. 19*) the pattern seems less clear, but pigs were still killed mainly up to 2 years of age, and the pattern for sheep/goats also suggest that 4 years is the age limit for the slaughter pattern, especially if we take into account that by far most of the vertebra have unfused corpi.

For cattle the pattern seems about the same for the dental remains and epiphyseal fusion pattern, except that in the youngest two phases the kill-off in stage 4 (age 36-42 months) seems much lower than in the other phases.

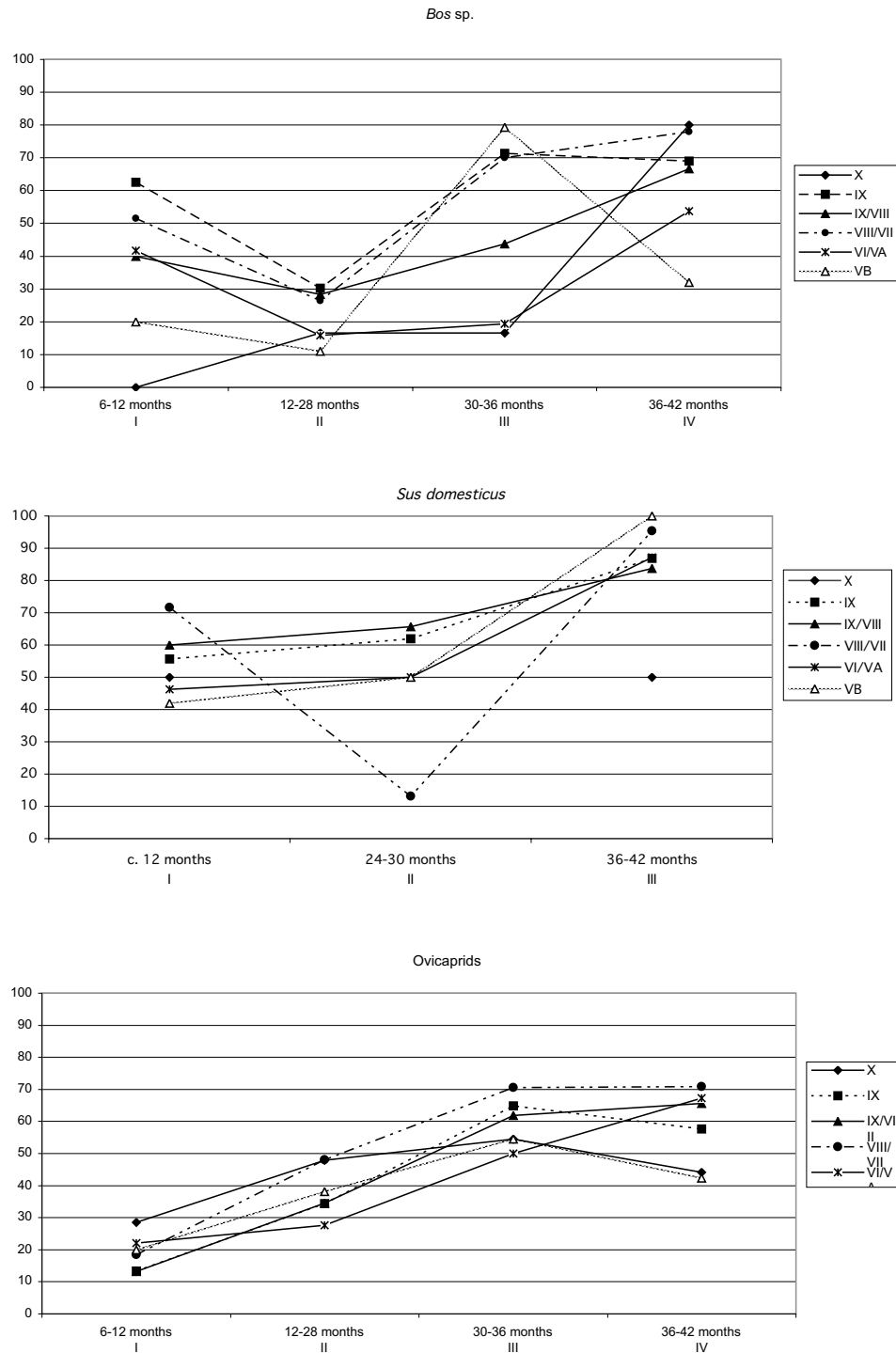


Fig. 19—Relative proportions of the different age groups in the phases for *Bos sp.*, *Sus sp.* and *Ovis/Capra* based on epiphyseal fusion patterns.

## CONCLUSIONS ON THE MAMMAL REMAINS

The mammal remains from Ilipinar strongly indicate an economy based on domestic animals. Wild species seem to have been hunted regularly, but mainly those directly in competition for the areas used by the settlers. It seems clear that the pioneers arrived with a full set of domestic animals and set out to exploit their environment using these as their major source. As stated in the introduction, the exploitation area was probably quite densely forested. It is therefore not surprising that in the pioneering stages hunting was at its peak. What seems to be reflected in the material is that the people of Ilipinar exploited a largely forested area for a long time. This is reflected in the increase of pigs and goats in the phase IX-VII. It is only in the later stages that the grazers, sheep and cattle, become more dominant, thus indicating that open fields of grass were more available. This stage coincides with a clear increase in herbaceous and grass pollen in the pollen studies (Bottema, Woldring 1995).

## MOLLUSCS AND FISHES

There is one other major food source important to the people at Ilipinar, the molluscs (*fig. 20, 21*). In phase X, 50% of the mollusc remains are from the edible snail *Helix aspersa*. The other remains are from the blue mussel, *Mytilus galloprovincialis*. After this first phase, remains of the edible snail are scarce. There is a steady increase of the species *Unio* (freshwater mussel), *Cerastoderma edule* (cockle), and *Ostrea edulis* (oyster). This change in the relative importance of the different molluscs is such that during the excavation their recovery was sometimes used as a guide to the probable phase to which the excavated levels belonged. This becomes even clearer as it was also observed that in the phases later than phase V, the blue mussel decreased even further in relative numbers and oyster and cockle became by far the most important. These two species always occurred together.



*Fig. 20—The mollusc remains.*

These changes must be related to environmental changes. Of course the *Unio* species are freshwater molluscs and must have been collected around the lake and in the drainage channels. However the relative change from mussels to more cockles and oysters suggests that the marine environment where they were collected had changed. The latter species indicate a more saline environment. This could very well be related to fluctuating sea levels of the Sea of Marmara. Geological studies have shown that at the end of the 7th millennium BC the Sea of Marmara was sometimes not connected to either the Black Sea or the Mediterranean. It is postulated that around 6000 BC the Black Sea was again connected through the Bosphorus with the Sea of Marmara, and therefore received an influx of relatively fresh water. The modern-day connections through the Dardanelles seem to have developed afterwards leading to a gradual salinization.

A relatively large amount of molluscs were recovered, so it is surprising that only five small fish remains were found. Lake Iznik contains quite large fish, especially catfish and cyprinids. The Sea of Marmara could also have provided fish, as they have been recovered on other sites, but apparently the inhabitants of Ilipinar, although they collected shellfish, were not interested in fish as an exploitable resource.

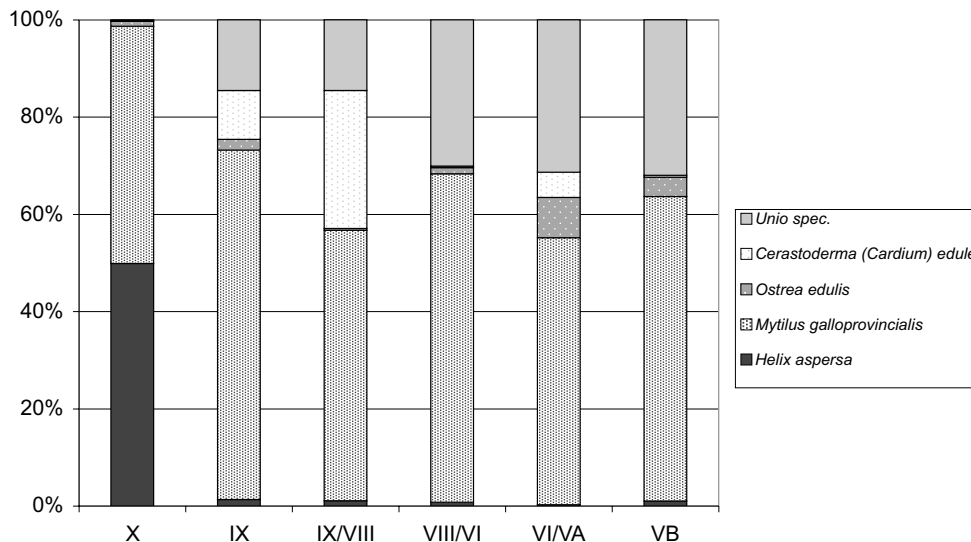


Fig. 21—Relative proportions of the mollusc species in the different phases.

## THE POSITION OF ILIPINAR WITHIN A LARGER CULTURAL CONTEXT

As stated in the introduction, one of the aims of the project was the study of the relationship between SE Europe and Anatolia. Thus it is important to understand whether Ilipinar is typical for the period in this region and what other evidence exists. For a long time NW Anatolia was a blank in our archeological data. Only two sites were excavated in the 1950's, Fikirtepe, and later Pendik (see fig. 1). The Fikirtepe faunal remains have been studied intensively (Boessneck, von den Driesch 1979). At the time of that study however, comparative data from possibly related sites were missing. It is therefore not surprising that a link with Bandceramic was investigated. However, since the 1990's other sites have been excavated and their remains are under study. Menteşe, in the Yenisehir plain, dates to the earliest phase of Ilipinar and

maybe even earlier. On this site at least the pottery provides a comparative relation with the Anatolian Late Neolithic of Hacilar, in which chaff-tempered wares were found like those in Ilipınar phase X (Roodenberg, personal communication). Unfortunately the animal remains have not yet been published (Gourichon, Helmer, in preparation). Actually, apart from Fikirtepe, no other remains from comparable sites have been published to date.

The material from Fikirtepe (Boessneck, von den Driesch 1979) dates to the second half of the Ilipınar sequence discussed above. Fikirtepe is a coastal site, which is reflected in the faunal remains. A large number of fish remains were found. The mammal remains show that cattle and, to a lesser extent, sheep and goats, were the major species. Pigs are almost completely missing. Among the other finds such as bone tools and ceramics there are some similarities with the material from Ilipınar, but not with the earliest phases. The architecture in Fikirtepe seems to have been dug-out pits with light mud brick or mud slab walls.

Other sites from around the same period located on the European side of the Sea of Marmara are: Yarımburgaz, Toptepe and Hoca Çeşme. Yarımburgaz is a cave-site with extensive Palaeolithic occupation and a small Chalcolithic level (Buitenhuis, in preparation). The material is quite mixed but seems to be mainly sheep and goats and some cattle. Other remains are scarce. The pottery does show some similarities with that from Later Ilipınar and Fikirtepe. The second site on the European coast is Toptepe (Buitenhuis, in preparation). This is a site lying directly on a cliff near the sea. Again some of the finds are comparable but the houses are single mud brick structures. The remains from the mammals are not numerous and mainly sheep/goats. However, there is a huge (over 3 m high) midden of mainly blue mussel shell remains. The third site is Hoca Çeşme, on the Greek/Turkish border. Here the architecture consists of dug-out pits with stone walls. The location of the site, on the edge of an estuary, is reflected in the faunal remains. Large amounts of shells were found, mainly cockles and some oysters. These were collected in big pits and apparently stored by sealing these pits with clay. The mammal remains are again mainly sheep and goat. One site which is somewhat comparable but slightly later than Ilipınar is Asağı Pınar in Turkish Thrace (Benecke 1998). It is also an inland site with mainly sheep/goats and cattle in about equal amounts. The finds and architecture from this site are in general typical for the period, as in eastern Bulgaria, and part of an early Vinca culture which was at that time spreading back to Anatolia.

In conclusion one cannot say how representative Ilipınar is for the Marmara region. Although it is at the moment the only site of the first part of the sixth millennium with a continuous occupation, the differences with the other sites are too numerous to speak of one culture from the point of view of the faunal remains. There are exploitation patterns in Ilipınar which are not reflected on the other sites and *vice versa*. On the other hand, it seems quite possible that Ilipınar is part of the pioneering development by Neolithic people with an Anatolian background who were adapting themselves to the environment and to different exploitation possibilities. The most important element in Ilipınar that suggests that the inhabitants did not come directly from the Anatolian hinterland is the completely different architecture. The slow acculturation seen in the slow introduction of similar types of finds on the different sites seems to have its origin partly in the Balkans and not in Anatolia. The complete absence of any comparable material with Neolithic Greece suggests that this "Neolithisation" of the Marmara region occurred independently of other dispersals, and only in the later phases does a process of introduction of new elements in the region suggest an amalgamation towards a larger cultural unity.

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## BIBLIOGRAPHY

- AS A. VAN, WIJNEN M.-H. 1995, "The Neolithic and Chalcolithic pottery from Ilipınar's Phases X-V. A technological study", in J.J. Roodenberg (ed.), *The Ilipınar Excavations I. Five Seasons of Fieldwork in NW Anatolia, 1987-1991*, Nederlands Historisch-Archeologisch Instituut te Istanbul, Leiden, p. 77-108.
- BENECKE N. 1998, "Animal remains from the Neolithic and Bronze Age settlements at Kirklareli (Turkish Thracia)", in H. Buitenhuis, L. Bartosiewicz, A.M. Choyke (eds), *Archaeozoology of the Near East III*, ARC-Publication 18, Groningen, p. 172-179.
- BOESSNECK J., DRIESCH A. VON DEN 1979, *Die Tierknochenfunde aus der neolithischen Siedlung auf dem Fikirtepe bei Kadiköy am Marmarameer*, Institut für Palaeoanatomie, Domestikationforschung und Geschichte der Tiermedizin, München.
- BOTTEMA S., WOLDRING H. 1995, "The Prehistoric environment of the Lake Iznik area: a palynological study", in J.J. Roodenberg (ed.), *The Ilipınar Excavations I. Five Seasons of Fieldwork in NW Anatolia, 1987-1991*, Nederlands Historisch-Archeologisch Instituut te Istanbul, Leiden, p. 8-16.
- BUITENHUIS H. in preparation, *The Faunal Remains from Three Prehistoric Sites in Turkish Thracia*.
- DEGERBØL M., FREDSKILD B. 1970, "The urus (*Bos primigenius* Bojanus) and Neolithic domesticated cattle (*Bos taurus domesticus* Linné) in Denmark", Det Kongelige Dansk Videnskabernes Selskab, *Biologiske Skrifter* 17 (1), p. 1-234.
- GÉRARD F. 2001, "Stratigraphy and architecture on the southwest flank of Ilipınar", in J.J. Roodenberg, L.C. Thissen (eds), *The Ilipınar Excavations II*, Nederlands Historisch-Archeologisch Instituut te Istanbul, Leiden, p. 177-222.
- KAYAN I. 1995, "The geomorphological environment of the Ilipınar mound", in J.J. Roodenberg (ed.), *The Ilipınar Excavations I. Five Seasons of Fieldwork in NW Anatolia, 1987-1991*, Nederlands Historisch-Archeologisch Instituut te Istanbul, Leiden, p. 17-34.
- MARINELLI M. 1995, "The bone artifacts of Ilipınar", in J.J. Roodenberg (ed.), *The Ilipınar Excavations I. Five Seasons of Fieldwork in NW Anatolia, 1987-1991*, Nederlands Historisch-Archeologisch Instituut te Istanbul, Leiden, p. 121-142.
- MEADOW R.H. 1983, "Appendix G: the vertebrate faunal remains from Hasanlu period X at Hajji Firuz", in M.M. Voigt (ed.), *Hasanlu Excavations Reports Vol. I: Hajji Firuz Tepe, Iran: the Neolithic Settlement*, Philadelphia, p. 369-422.
- ROODENBERG J.J. (ed.) 1995, *The Ilipınar Excavations I. Five Seasons of Fieldwork in NW Anatolia, 1987-1991*, Nederlands Historisch-Archeologisch Instituut te Istanbul, Leiden.
- ROODENBERG J.J., THISSEN L.C. (eds) 2001, *The Ilipınar Excavations II*, Nederlands Historisch-Archeologisch Instituut te Istanbul, Leiden.
- STULTJS I.-L.M., CASPARIE W. 1995, "Wood remains", in J.J. Roodenberg (ed.), *The Ilipınar Excavations I. Five Seasons of Fieldwork in NW Anatolia, 1987-91*, Nederlands Historisch-Archeologisch Instituut te Istanbul, Leiden, p. 157-158.
- THISSEN L.C. 2001, "The pottery of Ilipınar, phases X to VA", in J.J. Roodenberg, L.C. Thissen (eds), *The Ilipınar Excavations II*, Nederlands Historisch-Archeologisch Instituut te Istanbul, Leiden, p. 3-154.