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CONSUMPTION OF ANIMAL RESOURCES AT THE SITES OF AKARÇAY TEPE AND TELL HALULA (MIDDLE EUPHRATES VALLEY, 8th-6th MILLENNIA CAL. BC)

Maria Saña,[1] Carlos Tornero[2]

Abstract

The archaeological sites of Akarçay Tepe (Urfa, Turkey) (7580-6080 cal. BC) and Tell Halula (Aleppo, Syria) (8800-6500 cal. BC) are located in the middle Euphrates valley and cover the Neolithic period, including the 8th and 7th millennia cal. BC. The archaeozoological analysis of the faunal remains retrieved during the archaeological excavations at Akarçay Tepe and Tell Halula allows us to formulate some preliminary hypotheses regarding the management strategies of the animal resources used by the communities that occupied the settlements. This analysis reveals the main changes which occurred at these sites throughout the archaeological sequence. The thorough study of the different assemblages on the basis of their condition (quantity and quality of the recovered material) and composition (species, age classes, physical aspect of the animal) indicates a significant space-time variability which demonstrates a differential dynamic in the hunting and husbandry strategies practiced during this period. At the same time, the wide diversification identified necessitates working with minimal units of observation in order to establish possible correlations between the different assemblages and sites and formulate appropriate explanations. We present in this work the general results obtained for these two sites, first evaluating the economic strategy implemented in each of them and the main changes that occurred, and then analyzing all this information in an integrated form.

Keywords: Tell Halula, Akarçay Tepe, animal domestication, animal resource consumption, animal resource appropriation.

Résumé

Les sites archéologiques d'Akarçay Tepe (Urfa, Turquie) (7580-6080 av. J.-C. cal.) et Tell Halula (Aleppo, Syrie) (8800-6500 av. J.-C. cal.) sont situés dans la moyenne vallée de l'Euphrate et couvrent la période du VIII^e^ au VII^e^ millénaire av. J.-C. L'analyse archéozoologique des restes d'animaux trouvés pendant les fouilles archéologiques nous permet de formuler des hypothèses préliminaires concernant les stratégies de gestion des ressources animales mises en pratique par les communautés qui ont occupé ces sites, et d'identifier les principaux changements survenus tout au long de la séquence archéologique.

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L'étude approfondie des différents assemblages sur la base de leur condition (quantité et qualité du matériel récupéré) et leur composition (espèces, classes d'âge, aspect physique de l'animal) indique une variabilité spatio-temporelle significative qui démontre une dynamique différentielle en ce qui concerne les stratégies de chasse et d'élevage pratiquées pendant cette période. En même temps, l'importante diversification observée souligne la nécessité de travailler avec des unités minimales d'observation afin d'établir des corrélations éventuelles entre les différents assemblages et sites et de formuler des explications adéquates. Nous présentons dans ce travail les résultats généraux obtenus pour ces sites, en évaluant en premier lieu la stratégie économique conduite à Tell Halula et à Akarçay Tepe et les principaux points d'inflexion, et en analysant ensuite de façon intégrée toute cette information.

Mots-clés *: Tell Halula, Akarçay Tepe, domestication animale, consommation des ressources animales, appropriation des ressources animales.*

INTRODUCTION

The data presented in this paper are the results of the archaeozoological analyses of the faunal assemblages recovered at Tell Halula and Arkarçay Tepe sites during the field work conducted from 1993 to 2004 (Molist 1996, 1998a, b, 2001, 2002; Saña 1999; Arimura *et al.* 2001; Balkan-Atlı *et al.* 2002, 2004; Molist *et al.* 2004). These sites are still under excavation and research,[3] and therefore some of the conclusions presented are preliminary hypotheses.

The archaeological analyses conducted to date have focused on establishing the dynamic of management and exploitation of animal resources during each one of the phases of occupation of both settlements and then evaluating the main diachronic changes registered. The latter point was emphasized by studying the different aspects which could have conditioned these changes and analyzing their impact on the social and political background of these Neolithic societies (Helmer, Saña 1996; Peters *et al.* 1999; Saña 1999, 2000, 2005; Saña, Helmer 1999). Obviously, to fulfil this objective, all archaeological aspects are integrated into the analysis, as otherwise it would be impossible to characterize the economic strategies of a certain social formation. By this, it is understood that animal management is considered from the point of acquisition of the animals or specific animal productions to their distribution and consumption, whether the latter is exclusively for survival or for ideological or political purposes. Based on this general framework, the questions asked of the archaeological record were not dependent upon which animal species were supplying food. Instead, the scope of the questions widened in search of information about the mechanisms that permitted or limited access to the ownership and/or consumption of these animals and animal products.

Taking into account the spatial (Halula and Akarçay Tepe sites) and temporal framework (7800-6000 cal. BC) of the analysis, we consider that many parameters and variables could define accessibility to the animal resources in terms of the archaeological record. Furthermore, the possibilities and opportunities for accessibility may vary in regard to acquisition/appropriation, possession, distribution and consumption of the animals or their products, or productions resulting from their exploitation. For acquisition, it is important to know, for example, whether the different social units which made up the communities under study had access to the animal resources and commodities in the same way. Thus, the animal species exploited (specific variability) and the degree of appropriation of these species (reproductive, dietary, production control, etc.) may enable us to preliminarily characterize and quantify the differences and changes in the forms of access and possession. An understanding of the patterns that *direct* distribution and consumption requires systematic and precise information on the recovery context of the faunal remains, including their spatial context. This last aspect, which is the key to determining the underlying social

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relationships, is difficult to objectively integrate into the archaeological studies, mainly due to the criteria currently prevailing in the recovery and recording of faunal remains at most excavated sites. This situation often forces one to work on the basis of excessively large units of analysis which makes it impossible to determine both the forms of consumption practiced (collective, individual, social, biological, etc.) and the distribution mechanisms implemented. However, this does not prevent establishing and working with smaller units than those traditionally used (middle PPNB, late PPNB, delimited phases of occupation based on extrinsic economic criteria, etc.), which are representative on a large scale of the use made of the occupied space and the abandonment behaviour. Obviously, working with these *intermediate* units of analysis requires conducting a priori a systematic and exhaustive taphonomic analysis of, at least, the assemblages of faunal remains.

For Tell Halula and Akarçay Tepe, all the faunal remains recovered have been recorded using the individual minimum units established during the excavation (floor, features, concentrations of material). These units served as the basis for the subsequent archaezoological analysis. For interpretative and explanatory purposes, these minimum units, which are representative of a certain action or set of actions in a specific time and space, were later grouped together in larger units according to the spatial and temporal dimensions:

—Temporal dimension: the minimum units were grouped by phases of occupation. A phase of occupation is a set of archaeological remains representative of a specific installation which, even if its temporal duration is variable, is physically delimited to the same archaeological materiality.

—Spatial dimension: based on the spatial articulation of the archaeological remains, two sub-units of analysis have been established. In the first, the use made of each space in particular is taken into account. The more general second one differentiates between collective and individual/particular spaces of use, according to the architectonic characteristics and the rest of the categories of archaeological remains.

Considering that the results contemplate the comparative analysis of the data, another aspect evaluated was the degree of equivalence between the different units used for comparison, making sure that the same criteria are used to establish them and that they are socially significant units, as this second aspect is necessary to interpret the faunal remains at a socioeconomic level. Various factors, which are however extrinsic to the definition of these units of analysis and comparison, may directly influence the content of the assemblages of faunal remains. In this sense, the taphonomic analyses have made possible identification of the remains which, whether spatially or temporally, cannot be directly associated with the activities undertaken by the inhabitants of these settlements and thus were not included in this study. For this reason, the evaluation of the following aspects was integrated into the taphonomic analysis:

—the relationship between the organization and the use of space and the character and condition of the assemblages of faunal remains;

—the homogeneous or non-homogeneous condition of the assemblages in the different spaces and time periods analyzed.

The evaluation of the latter aspect was conducted by examining quantitatively whether the recovery of the material was conducted in a different way or not, through the relationship between the number of recovered remains and the excavated volume and through the relationship between the number of remains and the degree and intensity of fragmentation of the material. On a qualitative level, the possibility of a differential preservation of the material and the nature of the action of the various post-depositional agents and processes were evaluated. The final objective was to identify and isolate those factors which may have (qualitatively and quantitatively) altered or modified the content of the faunal assemblages, in order to evaluate and correct the potential distortions in light of the final interpretation. This examination was conducted on three levels, beginning with an analysis of the internal dynamic of the minimum recorded unit (space), followed by an analysis of the general dynamic of each occupation phase (space + time) and finally with the correlations between the different phases of occupation (time).

ANIMAL RESOURCES EXPLOITED AT TELL HALULA

The archaeological sequence documented for Tell Halula represents a long continuous period of time from 7800 to 5700 cal. BC. This sequence was divided into a total of 37 phases of occupation (PO), each one defined by a group of several levels and features which represent an episode of the human settlement (Molist 1996, 1998a, 1998b, 2001, 2002; Saña 1999; Molist *et al.* 2004). The oldest occupations are dated to around 7800-7600 cal. BC. The excavation of this sector revealed a habitation area along with its associated exterior areas in a synchronic alignment of 7 houses. Following a chronological order, the work performed made it possible to differentiate a series of architectonic levels of Neolithic pottery which represent PO20 to PO32 of the settlement dated to around 6900-6800 cal. BC. From the current data, there seems to be no discontinuity between the beginning of this phase and the end of the PPNB. The immediately subsequent occupations were found in excavation sector 43, dating to around 6100 cal. BC (PO35). Finally, the most recent tell occupations (corresponding to the Halaf period, PO35-PO37) are dated between 6000 and 5500 cal. BC.

At the present time, almost all the faunal assemblages recovered at this site have been analyzed (NR = 16,964). The integration of the information provided by the analysis of the spatial articulation of the faunal remains, the patterns of skeletal representation, the slaughter patterns and biometric analysis have determined the principal changes which occurred in the management of the animal resources during the time period represented at the site (Saña 1999). In order to evaluate these changes in terms of accessibility to the animal resources, two aspects are examined in this study. Firstly, the variability of the resources consumed in each one of the phases of occupation was taken into account. Not necessarily all of the resources consumed will be representative of the accessible resources. Consumption is determined by a series of diverse aspects which must reflect forms of appropriation and distribution of the resources as well as dietary needs and preferences. Moreover, it is difficult to determine the consumption practices of the communities only from animal resources without integrating the other available resources and productions. Nevertheless, we consider it appropriate, as a preliminary estimation, to analyze the dynamic and inflection points documented on animal products consumption as an aspect which is linked to the current forms of access to animal resources. The second aspect evaluated was the change in the modalities of appropriation of the animals, keeping in mind that animal domestication (which is represented in this settlement) entails substantial changes in the forms of social appropriation of the resources, up to the moment of collective access.

This is based on the fact that the composition by species of a certain faunal association is directly conditioned by the economic strategy practiced by the community in relation to the acquisition of the required resources in light of their maintenance and survival. While environmental availability can act as a conditioning factor at times, the mode in which the production, distribution and consumption processes are carried out in relation to the social relationships established is what will ultimately define the strategy practiced. In this way, and in relation to the animal domestication process, the role of husbandry and hunting activities cannot be evaluated as a direct representation of community-environment relations, but rather, as it directly depends on the form of appropriation of the resources, it will be this form that will condition and influence the content of the different associations (Saña 1999). The presence/absence of certain species and the representation percentages of the different species examined from this point of view become an essential element in the attempt to characterize the meat consumption patterns. These data were analyzed in an integrated way by using the principal component analysis (PCA).

The integrated evaluation of all of the sequence based on the specific variability documented in each occupation phase through a principal component analysis shows significant changes which probably derive from changes in the management strategies towards the animal resources. In this way and as it can be observed in the graphical representation (*fig. 1*), three differential dynamics are registered:

—diversified exploitation and consumption of the wild resources during the oldest occupation phases (PO1 to PO12);

—a strategy mainly focused on the consumption of domestic sheep and goats during the intermediate occupation phases (PO13 to PO19);

—increase in specific diversification, also with the consumption of domestic pigs and cattle (PO25-PO35). During the most recent phases a greater importance of sheep and goat consumption is again apparent (PO36-PO37).

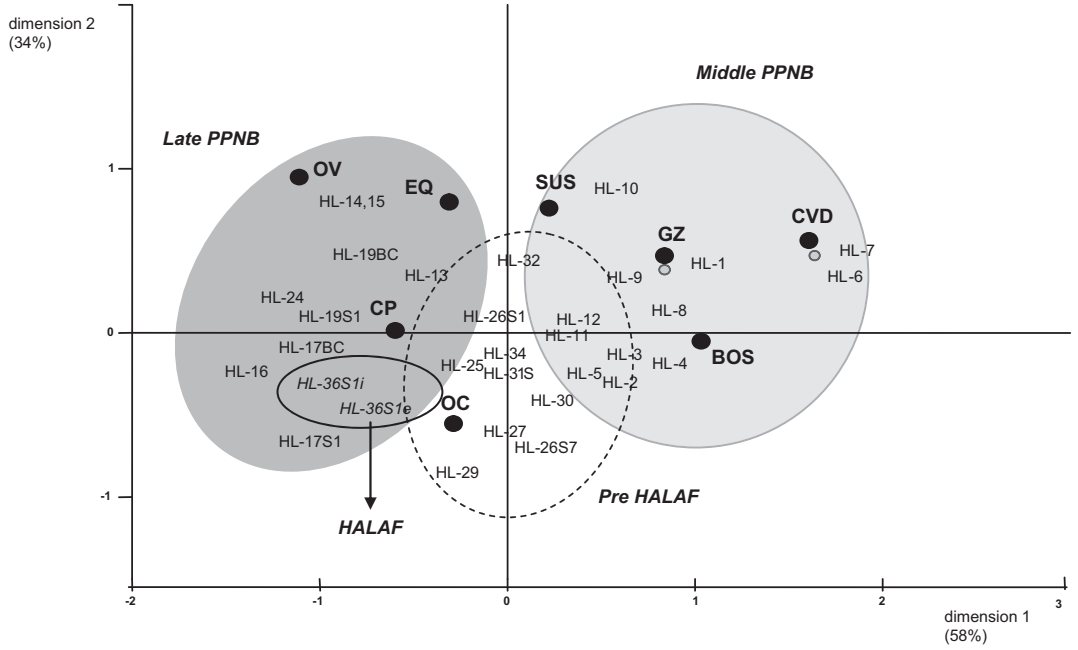

Fig. 1—Dynamics of specific distribution between the different phases of occupation analyzed in an integral manner using principal component analysis (PCA, factors 1 and 2). CP: Capra*; CVD:* Cervidae*; EQ:* Equus*; GZ:* Gazella*; OC:* Ovis/Capra*; OV:* Ovis.

During the period covering approximately 7800 to 7300 cal. BC, the communities settled in Tell Halula exploited a wide range of animal resources, the majority being used for meat consumption. It is important to highlight that in this settlement, *Capra* husbandry is in evidence beginning with the oldest occupations. The beginning of sheep husbandry is apparent for the first time in occupation phase 8 (7590-7520 BC). During and after the pre-Halaf occupations the presence of bovid and suid remains, which are most likely domestic, is in evidence (Saña 1999). If we look at the correlations shown on the PCA graph, a positive correlation between the exploitation of wild species (*Bos primigenius*, gazelle, *Sus scrofa*, cervids) can be observed during the initial occupation phases, with a less diversified consumption of meat products, now mostly focused on the culling of domestic species (basically sheep and goats) in the intermediate occupation phases (PO13-24). The next inflection point is dated around the occupation phases 25-29 (6900-6800 BC), when there is another significant increase in the number of animal species used for consumption, with the more systematic inclusion of domestic pigs and cattle and with a relative increase in the hunting of equids and gazelles.

This general trend is also represented in the curve obtained from the calculation of the relative diversity index (*fig. 2*). For this calculation, the specific variability represented in each phase of occupation was taken into consideration. The consumption of meat products varies significantly throughout the temporal sequence represented at Tell Halula. The dynamic of change, which seems to be linear and progressive, is not at all so. This aspect is evident from the positive and negative correlations between the different phases of occupation represented in the PCA. In this respect, the inflection points and general trends were arranged hierarchically in chronological order by the axes of the PCA graph.

Given that the exploitation of these species had not necessarily been oriented towards the exclusive purpose of consumption and that the quantity of consumable products supplied by each of them is significantly different, this analysis was correlated to the quantity of meat products potentially supplied by

each of the animal species in each phase of occupation (*fig. 3*). In this case, the correlations obtained show a significant degree of homogeneity between the first nine phases of occupation, with a relatively diversified consumption, especially of wild species, among which cervids and gazelle play a relatively important role. However, it should be taken into consideration that this greater initial diversity could be the result of the addition or integration of different seasonal patterns. Moving along in time, during the phase of occupation 11 there is a significant change with an evermore important consumption of domestic animals. Mainly from occupation phase 16, the animals killed for this purpose are primarily sheep, goats and cattle. A differential trend between the most recent, intermediate and oldest occupations at Tell Halula can be clearly observed.

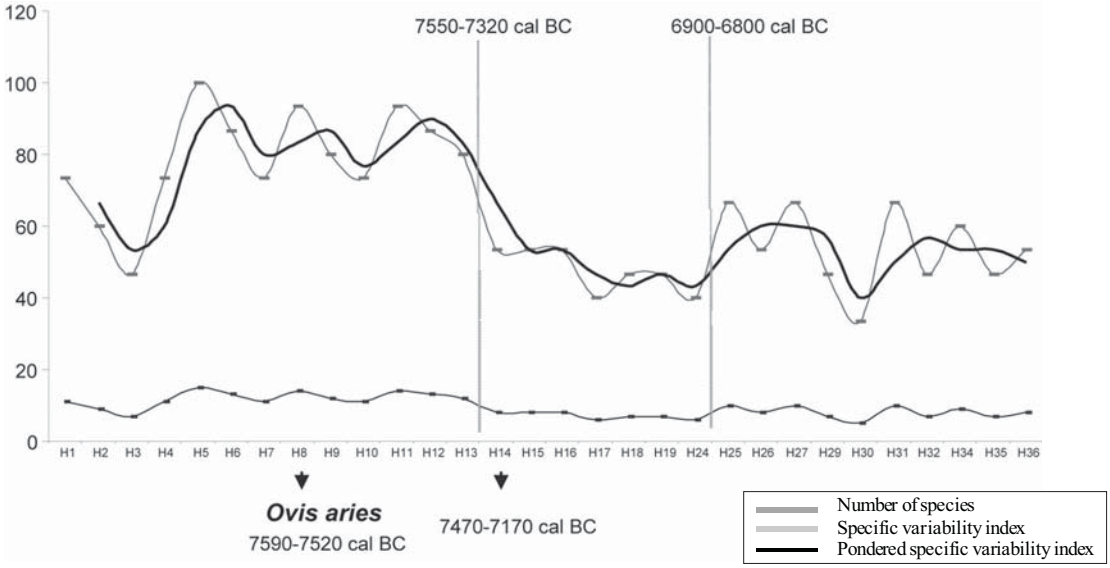

Fig. 2—Variations in the specific variability index throughout the temporal sequence documented at Tell Halula from PO1 to PO36. H: Phase of occupation.

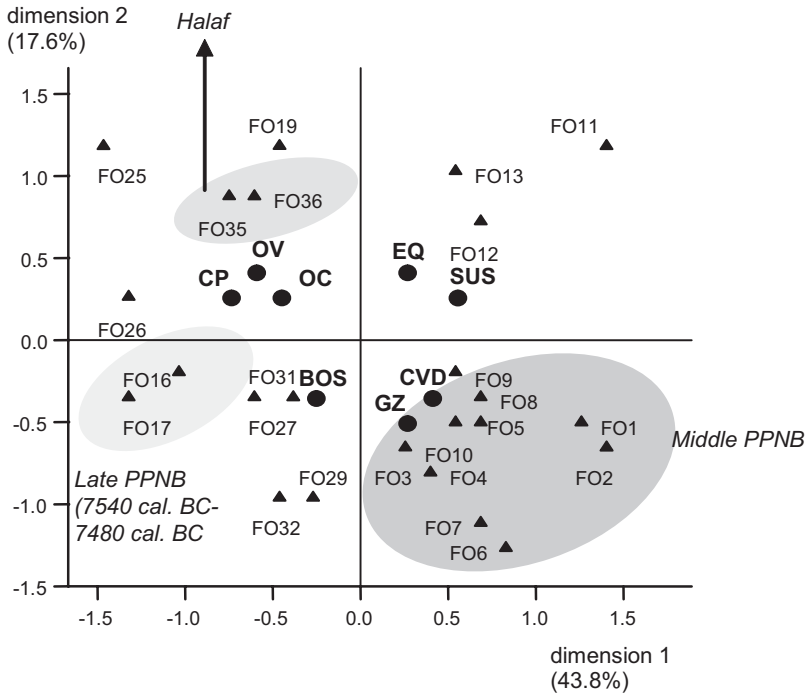

Fig. 3—Graph with the correlations obtained between the quantity of biomass potentially supplied by each animal species and the different phases of occupation (FO) of Tell Halula. CP: Capra*; CVD: Cervidae; EQ:* Equus*; GZ:* Gazella*; OC:* Ovis/Capra*; OV:* Ovis.

It is important to emphasize that the quantity of products potentially supplied by cattle (*Bos primigenius/taurus*) is around 40-60% of the total throughout the entire sequence (*fig. 4*), with a negative correlation recorded among this group and the remaining species. Another interesting fact is that the adoption of *Ovis aries* during occupation phase 8 does not mean, on a meat supply level, a significant point of inflection with respect to the previous occupation phases. In this sense, the adoption of the sheep in PO8 could be an attempt to stabilize the long-term subsistence base in anticipation of future imbalances or simply in order to satisfy the demand during unproductive seasons. Even though in the following phase of occupation (PO9) the predominance of *Capra* husbandry continues, a significant increase in the breeding and culling of sheep is apparent. The quantity of biomass potentially supplied by sheep and goats does not surpass, however, 15% of the food production obtained from the exploitation of animal resources in general.

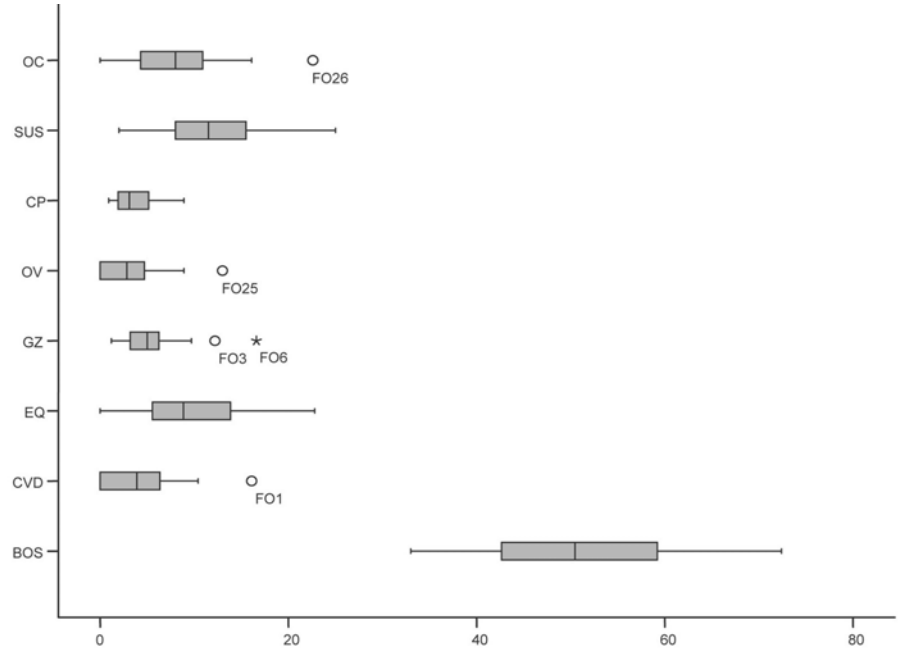

Fig. 4—Comparison of the quantity of meat products potentially supplied by each animal species throughout the archaeological sequence of Tell Halula. CP: Capra*; CVD: Cervidae; EQ:* Equus*; FO: Phase of occupation; GZ:* Gazella*; OC:* Ovis/Capra*; OV:* Ovis.

ANIMAL RESOURCES CONSUMED AT ARKARÇAY TEPE (EUPHRATES VALLEY, TURKEY)

Akarçay Tepe is located in the alluvial plain of the Euphrates River. The site is an artificial mound about 7 m in height. The archaeological excavations and studies conducted to date revealed a sequence dating from 7600 to 6100 BC (Arimura *et al.* 2000, 2001; Balkan-Atlı *et al.* 2002, 2004). For interpretative purposes, the different levels have been grouped into layers (= phases of occupation at Tell Halula) (*fig. 5*). The field work was centred in three excavation sectors (East sector, West sector, Trench 20 sector). In the East Sector (NISP = 9570), where the oldest occupations of Arkarçay Tepe were found, the excavation of a total of 12 layers was carried out, which cover the second half of the 8th millennium BC with evidence for the first pottery productions in layers 2 and 3. In the Trench 20 sector (NISP = 4766) a continuous series of pre-pottery layers (layers 20T-10 to 20T-23) and pottery layers (20T-1 to 20T-9) has been differentiated and dates from 7430 to 6200 BC. Some of the layers are contemporary to the East Sector. Finally, in the West Sector (NISP = 302) where the most recent occupations were found, a total of 7 layers have been established, all with pottery and dating from 6480 to 6080 BC (Arimura *et al.* 2000, 2001; Balkan-Atlı *et al.* 2002, 2004).

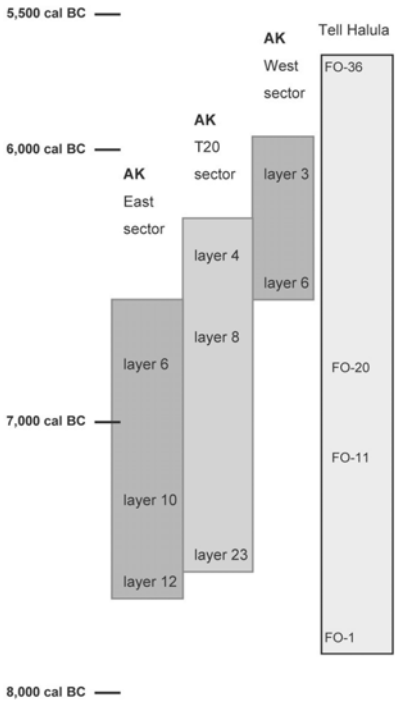

Fig. 5—Outline of the chronological correspondence between Tell Halula and Arkarçay Tepe (AK). FO: Phase of occupation.

Following the example of Tell Halula, and with the purpose of evaluating the changes in the animal consumption patterns and then integrating the data obtained from both settlements, the analysis was based on the correlations between the chronology and the management and exploitation strategies of the main animal species (*fig. 6a, b, table 1*).

Layer	BOS	CPAE	CP	CVD	EQ	GZ	OC	OV	SUS
Layer 5	14,81	1,23	12,35	3,70	1,23	6,17	29,63	20,99	9,88
Layer 4	14,06	-	6,25	-	-	4,69	34,38	25,56	14,06
Layer 2	13,79	-	17,24	3,45	-	3,45	24,14	31,03	6,90

Table 1—Percentages of relative representation of the different animal species in the West sector of Arkaçay Tepe. CP: Capra hircus*; CPAE:* Capra aegagrus*; CVD: Cervidae; EQ:* Equus*; GZ:* Gazella*; OC:* Ovis/Capra*; OV:* Ovis*.*

The PCA results relative to the East Sector (*fig. 6a*) indicate three different dynamics of animal exploitation, taking into account the negative correlations observed between the presence of sheep/goats and the presence of cattle and, in relation to the wild species, the presence of cervid remains as opposed to the presence of gazelle and equid remains, showing a strong positive correlation between these last two species. The suids do not show significant variations throughout the archaeological sequence analyzed from this sector. The principal points of inflection are therefore located between layers 10 and 9, and a second point of inflection between layers 7 and 4-5, with a particular dynamic registered during the occupations corresponding to layer 6.

In the Trench 20 sector (*fig. 6b*), the dynamic is characterized by the general dominance of sheep/goat remains, with significantly high frequencies of representation during the earliest and latest occupations (layer 1-6 and 10-23). Hunting activity is almost exclusively focused on the equids. Throughout the intermediate period of occupation (layers 7 to 9), cattle and pig husbandry and cervids and gazelle hunting acquire comparatively significant importance.

By way of illustration, looking at the lower number of faunal remains analyzed to date from the West Sector (*table 1*), it is worth mentioning that different dynamics are observed in this sector between the oldest and most recent levels. The strategy followed during the occupations corresponding to layers 5, 6 and 7 is highly diversified, when cattle, pig and sheep/goat husbandry as well as hunting, mainly of gazelles, were practiced. In layer 4, the importance of breeding activities increases relatively with substantial consumption of suids.

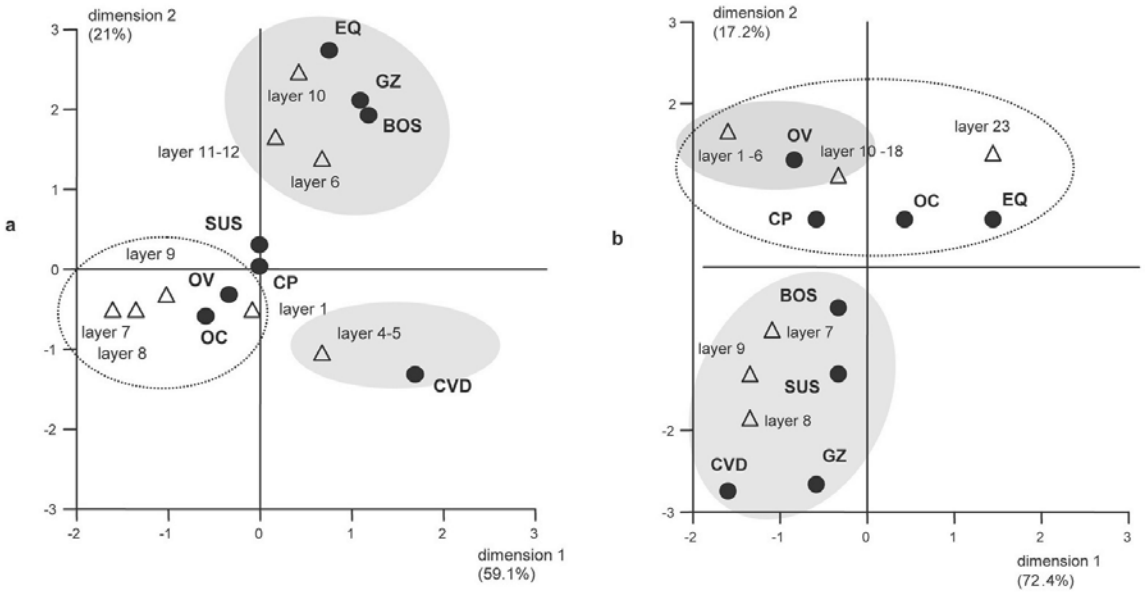

Fig. 6—a) Graphical representation of the PCA results obtained for the East sector at Arkaçay Tepe; b) Graphical representation of the PCA results obtained for the Trench 20 sector at Arkaçay Tepe. CP: Capra*; CVD: Cervidae; EQ:* Equus*; GZ:* Gazella*; OC:* Ovis/Capra*; OV:* Ovis.

The evaluation of the correlations expressed in the PCA graph (*fig. 7*) shows, as was the case for Tell Halula, a chronological ordering of the sequence. During the oldest phases of occupation of the settlement (T20-23 and ES-10/11/12) the economic strategy implemented is mainly based on the breeding of sheep and goats, accompanied by hunting activity principally oriented towards the equids (*Equus hemionus*). Moving further along in time (ES-1 to 9), there is generally a diversification of husbandry activity, where cattle begin to acquire more importance than the sheep/goats. Maximum diversification, however, is reflected during the latest occupations (T20-1 to 18 and WS 2-5), during which the suids are exploited more and more for consumption and the hunting of gazelles and equids increases relatively.

As at Tell Halula, throughout the entire sequence a significant contrast is found between the consumption of sheep and goats and the consumption of cattle, a trend to consume meat products from a less diversified group of animal species when the consumption of sheep/goats is established and an increase in the specific variability, once the consumption of domestic pigs and cattle is well determined.

In order to estimate the statistical significance of the general trends obtained from the individual analyses of Tell Halula and Akarçay Tepe, an integrated analysis of this information was conducted (*fig. 8*). The correlations between individuals and variables expressed in figure 8 demonstrate similar patterns between the oldest occupations at Halula (PO1-PO12) and the earliest (ES-10/11/12) and latest (ES-4/5/6) from the East sector of Akarçay, as opposed to the pattern registered for the most recent occupations of Tell Halula and the intermediate ones of the East sector (ES-7/8/9). Even if the occupation phases of Tell Halula maintain their temporal order, the integrated analyses of both settlements show a differential dynamic (with respect to Halula) for the oldest layers of the Trench 20 sector (T20-7 to 23) and those established for the West sector. This differential dynamic could be due to a relatively

higher importance of the consumption of products supplied by the suids at Akarçay Tepe (from T20-23 to WS-2) and a greater relative importance of gazelle hunting during the most recent occupations of the East Sector (ES-4/5/6). The internal difference reflected between the different excavation sectors at Akarçay Tepe indicates the need to take into consideration not only the temporal but also the spatial dimension.

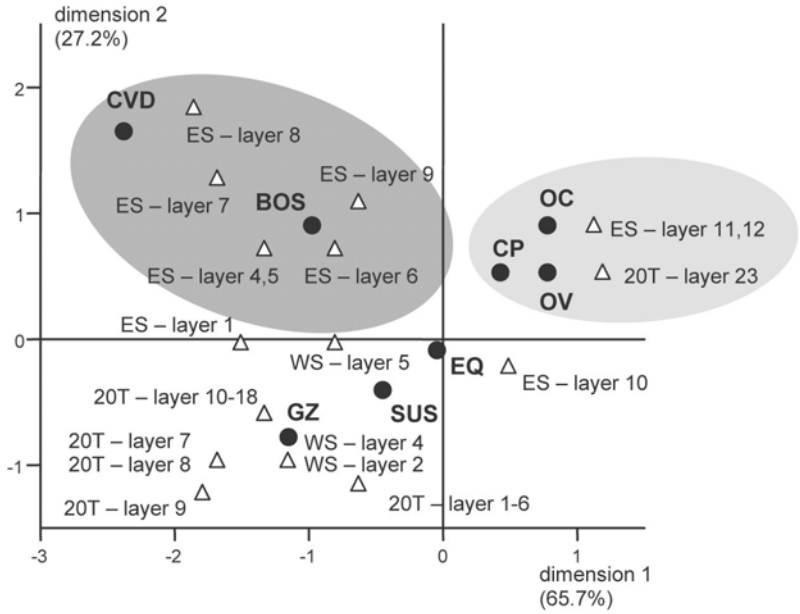

Fig. 7—Graphical representation of the PCA results obtained by integrating the different excavation sectors of Akarçay Tepe. CP: Capra*; CVD: Cervidae; EQ:* Equus*; GZ:* Gazella*; OC:* Ovis/Capra*; OV:* Ovis.

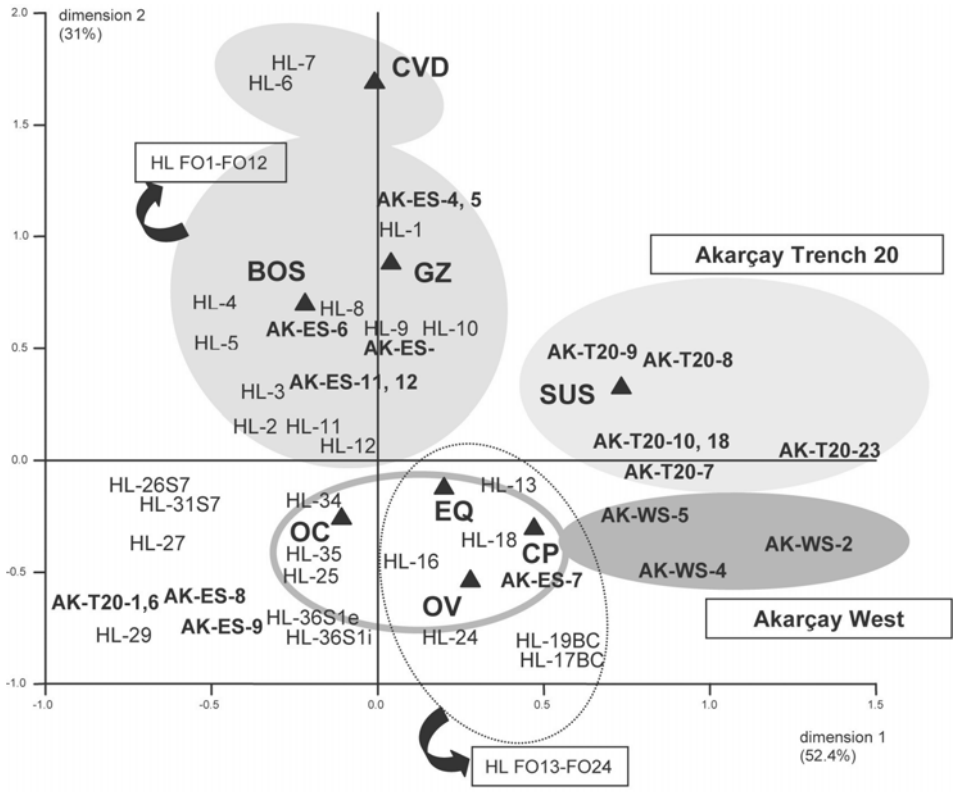

Fig. 8—Graphical representation of the PCA results obtained by integrating the data by sectors of Akarçay Tepe and Tell Halula. CP: Capra*; CVD: Cervidae; EQ:* Equus*; GZ:* Gazella*; OC:* Ovis/Capra*; OV:* Ovis.

VARIABILITY IN THE CONSUMPTION PATTERNS AND FORMS OF APPROPRIATION OF THE ANIMAL RESOURCES

With respect to the preceding results, it is important to consider the variables which may be relevant to the changes observed in the consumption patterns. Without a doubt, as is seen in the correlations represented in figure 8, these variables go beyond the natural availability in animal resources. The domestication of the species (or the adoption of the already domesticated form), the means of maintaining and breeding these domestic animals and the acquisition of new products of animal origin (whether directly or indirectly) as well as their relative level of control by a part of the community or its different social components, are some of the principal parameters that must be kept in mind when attempting to explain such changes. With domestication, the animals are no longer just a natural resource. The social form that regulates their maintenance, control and use is transformed in accordance with the new status they acquire as permanent resources. Therefore, domestication constitutes a social condition of production which is different to that which existed up to that point, being based on the ownership of the means of production and the existence of permanent relations between the means of production and the producers who depend on them (Vicent 1988, 1990). Even though we know that animal domestication entails changes in the forms of appropriation, distribution and consumption of animal resources, demonstrating this from the archaeological record, for the initial stages of domestication, is not an easy task.

In the specific case of the settlements discussed here, this problem was tackled by using criteria other than the strictly biological ones relative to the animal itself (cf. Helmer *et al.* 2005), by characterizing the management of each animal species on a diachronic level based on the integrated analysis of the skeletal variability and the spatial articulation of the faunal remains (species/anatomical units represented in each observation and analysis unit). To this effect, it was taken into consideration that the degree of anatomic variability obtained for each animal species in each phase of occupation would probably have been conditioned by the interval of time in which accumulation formed and by the maintenance patterns of the occupied space practiced.

Even though the recorded variability of these two aspects for the Akarçay Tepe settlement is significantly high, without clear patterns or trends that make it possible to trace changes or identify significant points of inflection, it was possible for Tell Halula to establish a series of differential dynamics that may be of interest in the attempt to characterize the forms of appropriation and distribution of the animal resources during these period. The main documented differences consist of a differential representation of the skeletal elements between the animal species exploited, with the domestic animals generally providing relatively more complete skeletons than the wild animals, and in a spatial distribution of the faunal remains which is also different between the interior and exterior areas of the village settlement.

Based on these results, and looking at the frequencies of representation of the different animal species, we can see that the forms of animal resource management practiced during the oldest occupations of Tell Halula are probably characterized by the practice of collective strategies such as acquisition, processing and consumption of the animals and animal products. This would include at least the different social units which used the same exterior space. But, as the importance of animal breeding increases in the economic strategies practiced by these communities as well as the number of culled domestic animals, the degree of skeletal variability registered by the different animal species also increases. The presence of all the skeletal elements, and therefore the presence of complete animals in the exterior areas associated with each house, may be evidence that it was the whole animal, whether alive or dead, that played a role in food distribution. It is at the end of the middle PPNB (occupation phases 7 and 8), when the more systematic presence of faunal remains on the occupation floors and domestic features inside the houses is also documented. The more diverse representation of the different anatomical units in the case of the domestic species may be the result of an integrated management of each species by the basic social unit that played a role in the breeding and production process (Saña 1999; Saña, Molist 2004).

Even if there is no direct evidence at Tell Halula of the means of distribution of the animal products between the different social units (houses), the presence of complete animals and sacrificed individuals representing a wide age range, together with equipment for the storage of agricultural products within

the houses, are characteristics indicate that these social units possessed relative autonomy in the series of activities that composed the production process. The ever wider diversity of domestic animal species associated with these constructions is also demonstrated by the extension of their management capacity, thus highlighting their relative autonomy in the productive cycles. This *autonomy* may in fact be at the origin of the decrease in the consumption of wild species once the breeding of sheep and goats was well-established. During the initial period of breeding, however, the need for cooperation would probably have been more necessary, mainly due to the fact that faced with certain production demands, the development level of the breeding techniques would not enable an increase in productivity once intensified. From this, the importance of hunting can be derived. However, hunting and breeding need not have been strictly simultaneous, but may have been managed based on the seasonal cycle. In periods of low breeding productivity, hunting would have been practised in such way that the composition of the domestic flocks would not have been altered and a reproductive cycle would have been ensured (Saña *et al.* 2001).

The progressive increase in the quantity of domestic resources exploited associated with individual social units is evidence of the gradual isolation of this unit as a basic unit of production and thus, probably, of appropriation. At this time, the observed acquisition strategy tends to follow more homogenous patterns, with reduction in the diversity of wild species exploited. The gradual substitution of short-term productive cycles for long-term productive cycles leads to a situation in which animal breeding not only fulfils the purpose of satisfying immediate consumption needs but also ensures the next reproductive cycle. And here lies the importance of hunting activity as a short-term, but not a long-term solution. And here also lies the need to enlarge the base of resources that make it possible to stabilize the long-term productive cycles by incorporating new domestic species. The careful management of species with different reproductive rhythms under artificial conditions would make it possible to survive the seasonal fluctuations in the number of births and sacrifices, and therefore constitutes an alternative to hunting. The variability observed in the representation frequencies of the domestic species does not alter the general management strategy. This was most probably a response to local fluctuations which did not substantially affect the strategy practiced.

Hunting activity, which had relatively lower economic importance during the later occupation phases of Halula and Akarçay Tepe, was now primarily focused on the acquisition of animal species favourable to a steppe biotope, mainly equids and gazelles. This is complemented by the occasional exploitation of cervids, aurochs and wild boar. Thus, the gradual substitution of the wild resources by domestic ones demonstrates the success of this strategy, although it must be remembered that once the process began, the loss of flexibility in the practice of alternative strategies may have also contributed to this greater degree of concentration on domestic resources. The fluctuations in the specific variability found in the PO26 in Tell Halula and in the intermediate layers of the East Sector and the Trench 20 Sector at Akarçay Tepe may also be linked to a change in the modalities of appropriation of these resources on a community level, with a greater independence in terms of production of the different social units that made up the community. In this situation, although the herds may have been managed by various social units, there is the possibility of their appropriation by individual social units, thus increasing the differential distribution possibilities of the production means and along with this, the possibilities of differential access to the consumable animal resources. From this it can be seen that the beginnings of animal husbandry practices not only indicate an inflection point in the acquisition strategies, but also, with the concept of ownership, they suggest a transformation of the social relations of production (Lumbreras 1981).

Although throughout this study there is a tendency to stress the importance of meat consumption, related to the biological reproduction of the community or social unit involved, the fact cannot be overlooked that in these first farming communities certain species and animal products played crucial roles in their social development. The animals or certain animal products were instruments of social interaction, being used in transactions and exchange and thus contributing to the establishment and reaffirmation of certain roles and social links. Their inclusion in ceremonies and ritual activities (offerings, sacrifices, magic, cults, etc.) is evidence of their importance in ways other than simply as food. In this way, the consumption of the animals transcends their role as food. To study them requires the integration of all the material manifestations of which they were a part. In the specific case of Tell Halula and Akarçay Tepe, there is little evidence related to this aspect. At Akarçay Tepe, there is an exceptional find in the U27 excavation sector (feature 25) of an assemblage of faunal remains (NISP = 1337), probably resulting from a collective consumption

activity in which a total of 19 mainly domestic animals were involved, indicating a significantly high meat supply. The predominant role of cattle (whether in their wild or domestic form) in the supply of meat at Tell Halula should also be taken into consideration. Even though we cannot yet determine the preservation techniques of the meat products which were implemented in the short and long term, the sacrifice of such an animal implies, without a doubt, the immediate acquisition of a substantial amount of products. The detailed evaluation of the symbolic manifestations (animal remains deposited as offerings at burials, animal representations and intentional animal deposits) discovered at this settlement (Saña, Molist 2004) certainly shows that this is the only animal species that is recurrently represented in intentional depositions (bucrania, horns, clay figures). As for the other domestic food production species (sheep, goats, pigs), it is absent from the all the funerary contexts excavated in this settlement. The degree of independence demonstrated in the acquisition of the domestic resources destined for food consumption is in significant contrast to the temporal and spatial homogeneity seen in the symbolic manifestations in which these animal species occur. Although domestic animals constitute a *suitable* resource for individual appropriation and differential accumulation, they do not yet play a role (during the middle and recent PPNB) in the representation of social differentiation.

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