

Louis Chaix<sup>1</sup>

## **New data about rural economy in the Kerma culture: the site of Gism el-Arba (Sudan).**

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Gism el-Arba is situated on the right bank of the Nile, around 3 km east of the river, near the modern village of Kadruka (Fig. 1). The archaeological remains belongs to the Kerma culture, a large kingdom which developed in Nubia, from the first cataract in the North to the fourth cataract in the South, between 2500 BC to 1500 BC (Gratien 1978; Bonnet 2004a; 2004b). The site lies around 25 kilometers south of the kingdom's capital, Kerma (Gratien 1997, 1998; Gratien & al. 2002; Gratien & al. 2003). The main «kom» is a rural settlement dated from the Ancient Kerma, around 2500 BC to the Late Kerma, towards 1500 BC. During this period, several circular huts were built, between 4 to 6 meters in diameter. Raw brick buildings were also discovered including what must have been an administrative residence. Later, houses of the Classical Kerma were quadrangular in shape, built in mud bricks, with different rooms organised around a central courtyard. All these structures delivered numerous animal bones and animal figurines too.

In this short and preliminary (because the dig and the study are not yet finished) paper, we will present the main aspects of the economy of this village. In a second part, we intend to compare the animal exploitation of this rural settlement with the fauna from the metropolis, Kerma.

### **a. The fauna from Gism el-Arba**

Bones come from two different areas (settlements 1 and 2), but their study is not yet complete and we present here the general results about animal exploitation, passing over the chronological and spatial differences.

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<sup>1</sup> Louis ««GreetingLine»», Département d'archéozoologie, Muséum d'histoire naturelle, 1 route de Malagnou, CH 1211 – Genève 6, Email: louis.chaix@mhn.ville-ge.ch.

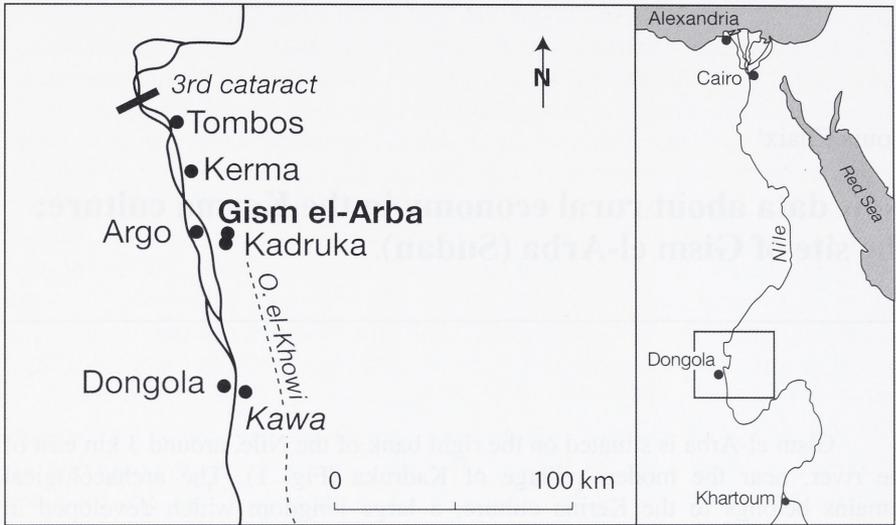


Fig. 1. Location map of Gism el-Arba and Kerma.

The majority of remains however originate from the Middle Kerma layers (2050 - 1750 BC).

Taking together all the animal categories, a total of 33.719 bones were recovered with 6848 attributed to mammals and 766 to other animal groups (birds, fishes, snails and ostrich eggs). Undetermined bones form 77.4 % of the total. (Table 1). The economy of Gism el-Arba is essentially based on domestic mammals which represent 89.2 % of the attributed remains. Amongst them, caprines (goats and sheeps) and cattle are clearly dominant. Some remains of donkeys and dogs were found, with less than 0.5 % of the domestic mammals. The wild mammalian fauna (0.7 %) is attested by rare remains of hippopotamus, gazelles (*G. dorcas* and *G. dama*), small felids and hares. Other categories of animals were also present, representing 10.1 % of the attributed remains.

Fishes are well attested in the settlement with more than 10 % of the determined remains. The study is not yet finished but we can observe the dominance of catfishes, mainly *Clarias* and *Synodontis*, with some large individuals. Fragments of ostrich eggs are abundant and a lot of beads were found in the two sites. Snails are rare. We have determined the presence of fresh-water gastropods like *Pila wernei*, *Lanistes carinatus* and *Cleopatra bulimoides*.

Amongst the bivalves, some remains of *Chambardia rubens* and *Mutela* sp. These taxa indicates shallow water but deeper ponds too.

Amongst the live-stock, caprines are dominant with 57.4% when cattle represents 42 %. The caprine herd show a clear dominance of goats (*Capra hircus*, 63.5%) when sheep (*Ovis aries*) represents 36.5 %. The two species were horned, the goats with scimitar horn-cores and the sheep with ammon-shape horns. Extraction of horn-sheats is attested for the goats. Sheep were tall animals, with long legs, very similar to those from Kerma (Chaix & Grant 1987). Goats are smaller and slender. Exploitation of caprines is characterised by a maximum of animals slaughtered before one year, but individuals more than 4 years old are present too. This figure indicate a system for meat exploitation but also for secondary products, probably milk, attested by the high percentage of goats. The preservation of skeletal elements show a relative uniformity in the distribution, indicating a local preparation of carcasses (Fig. 2a).

Cattle (*Bos taurus*) is, in terms of number of specimens, the second category. It is possible that, in terms of quantity of meat, this animal will occupy the first place. Some pieces indicate the presence of horned individuals but the bad conservation of the horn-cores do not allow a better description. Measurements of some bones show strong bovines, a little smaller than those found at Kerma (Fig. 3). The age distribution shows a clear maximum of slaughtered animals between 3 and 4 years. This scheme may indicate a meat production but also secondary uses (traction) and products (milk). The distribution of the skeletal parts is typical for a local preparation, with a higher proportion of rachis elements and extremities (Fig. 2b).

At Gism el-Arba, the importance of the live-stock is emphasized by the presence of numerous (more than 700) figurines of cattle and probably of caprines (Fig. 4). Whether they were reckoning counters, children's toys or religious objects, the purpose of these figurines has not yet been precisely identified (Chaix & Queyrat 2003). The remaining domestic mammals are the donkey (*Equus asinus*, 0.4%) and the dog (*Canis familiaris*, 0.07 %). Contrary to Kerma, we have not observed butchery marks on donkey bones.

## **b. Comparisons with Kerma**

It seems interesting to compare the economy of this rural village with the system practised in the metropolis of the kingdom, Kerma. We will briefly emphasize the main similarities and differences.

*For the similarities:*

Gism el-Arba and Kerma are characterized by a clear dominance of domestic mammals. In the two sites, wild mammalian fauna is rare, testifying of

poor hunting activities (Fig. 5). Populations of the kingdom of Kush are clearly engaged in a production system, based on cattle and caprines. These two categories play an important role in the religion and funeral ceremonies too (Chaix 2001; 2003).

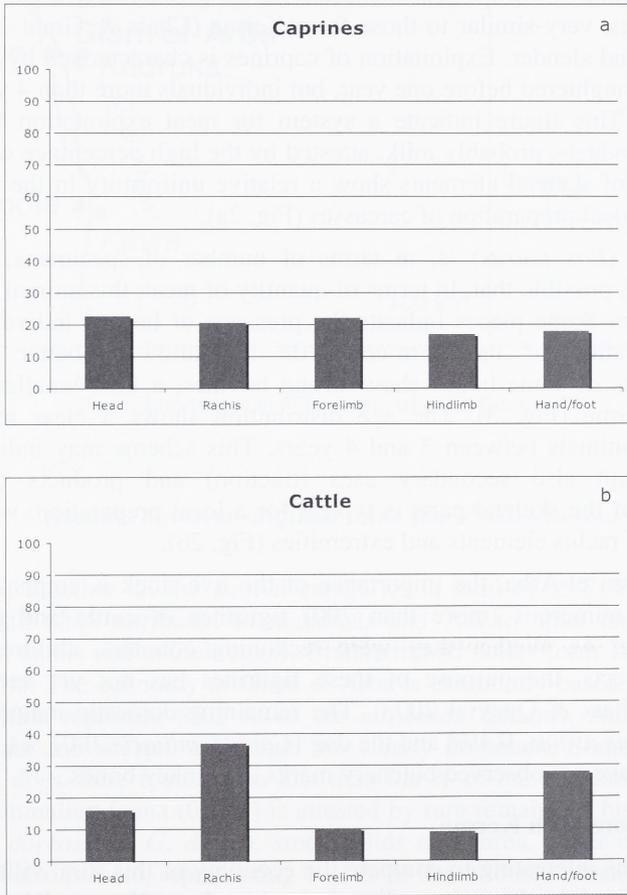


Fig. 2.: a. Caprines: distribution of skeletal elements. b. Cattle: distribution of skeletal elements.

If we consider the composition of the live-stock, the same species, namely, sheep, goat, cattle, donkey and dog are present at the two sites.

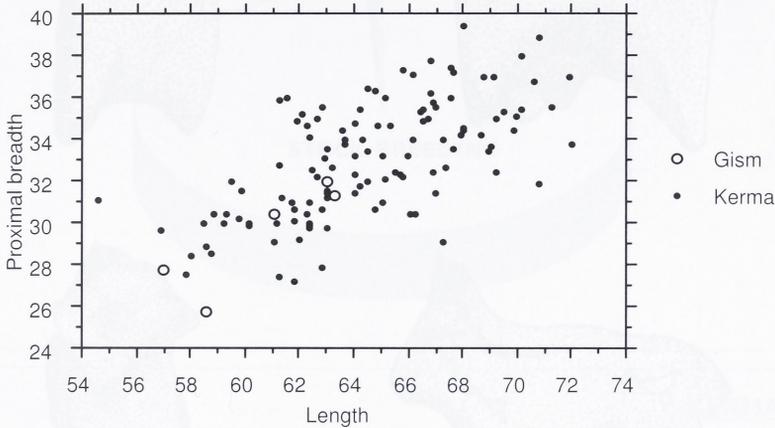


Fig. 3: Cattle - first phalanx: scattergram showing the smaller size of the pieces from Gism el-Arba.

*For the differences:*

With a more precise examination of the remains from Gism el-Arba and Kerma, we can find interesting differences.

Firstly, the preservation of the bones is better at Gism, with 77.4 % of attributed remains against 69.3 % at Kerma. It can be explained by the importance and the surface of the city of Kerma (around 20 hectares) with a lot of inhabitants affecting the preservation of bones lying on the soil. Another parameter to consider in Kerma is the variations of the ground-water level, very unfavourable to the bone conservation. Gism el-Arba represents a smaller surface of only 1.2 hectares, with a low habitation density and seems less influenced by the levels of the water too. The general composition of the two spectra shows some variations too (Tab. 2). They are illustrated by the figures 6 and 7. In terms of NISP, caprines are dominant at Gism el-Arba with 57.7 %, followed by cattle (42.3 %). At Kerma, remains of cattle are the most numerous (64.7 %), when caprines represent only 35.3 %. This situation can be linked with the great impor-

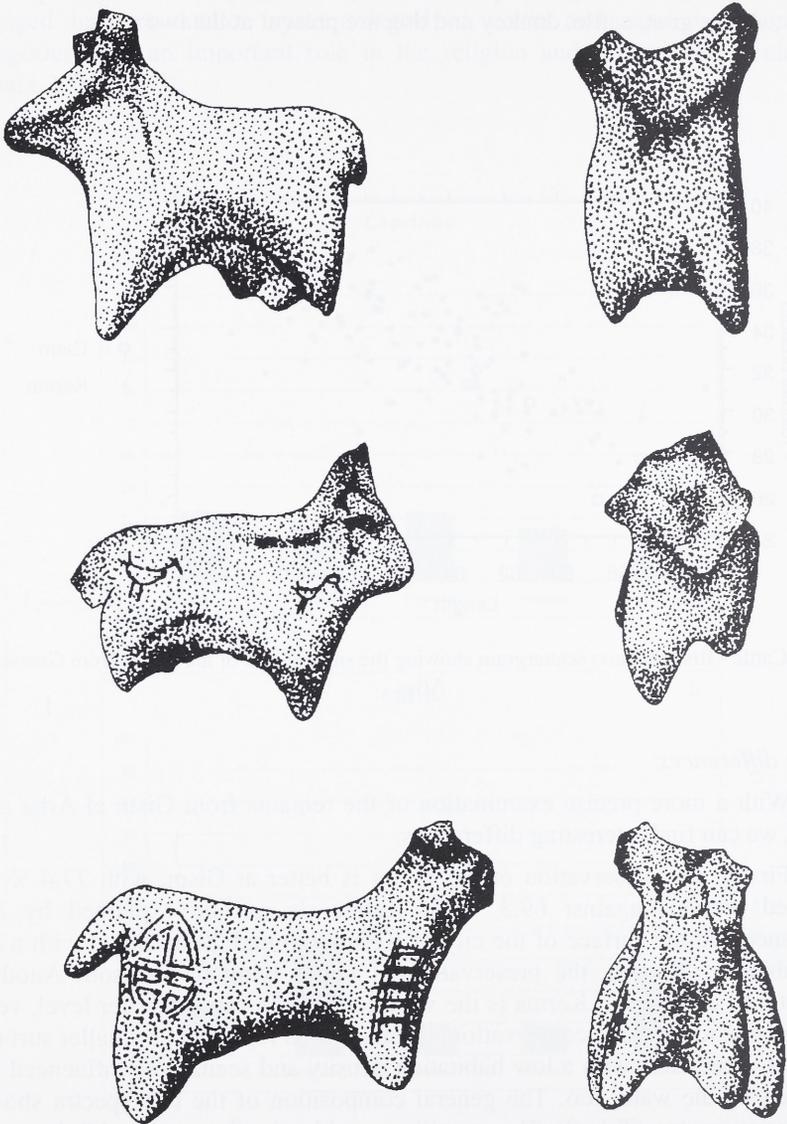


Fig. 4. Gism el-Arba: some examples of clay figurines of ruminants (drawing S. Marchi, in: Gratien & al. 2002: 88).

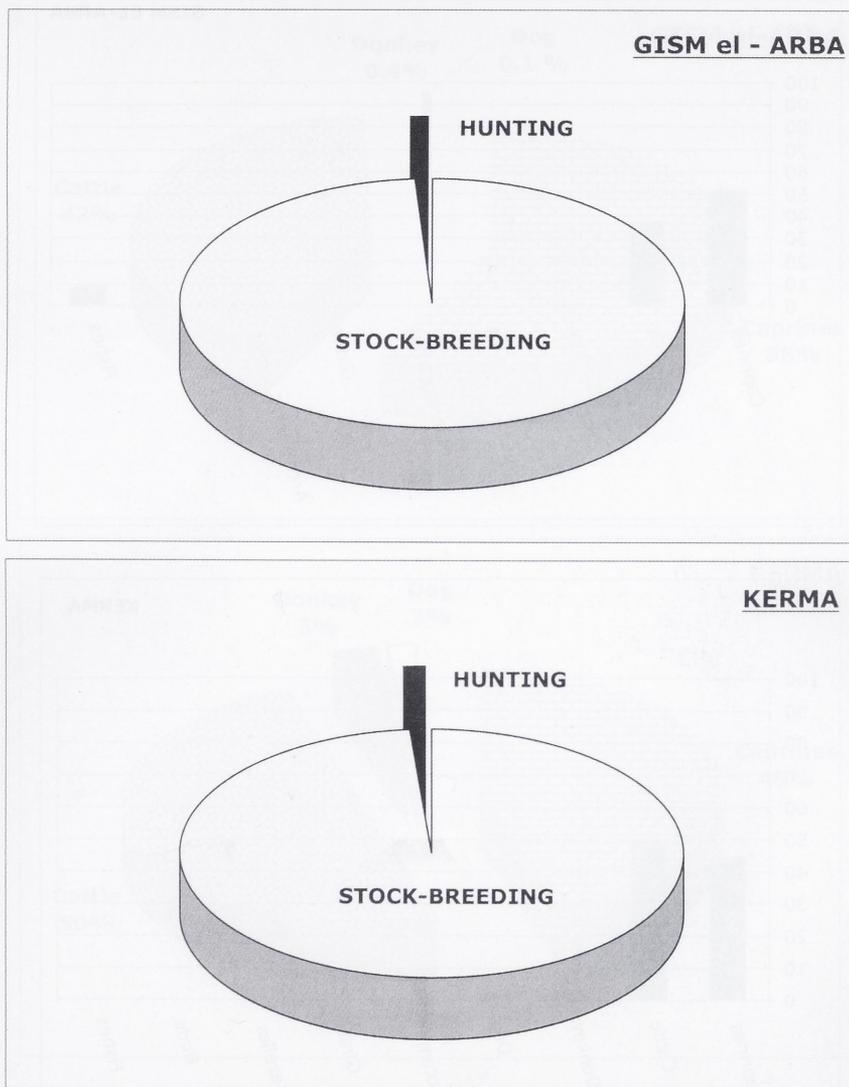


Fig. 5: Comparison between domestic and wild fauna at Gism el-Arba and Kerma.

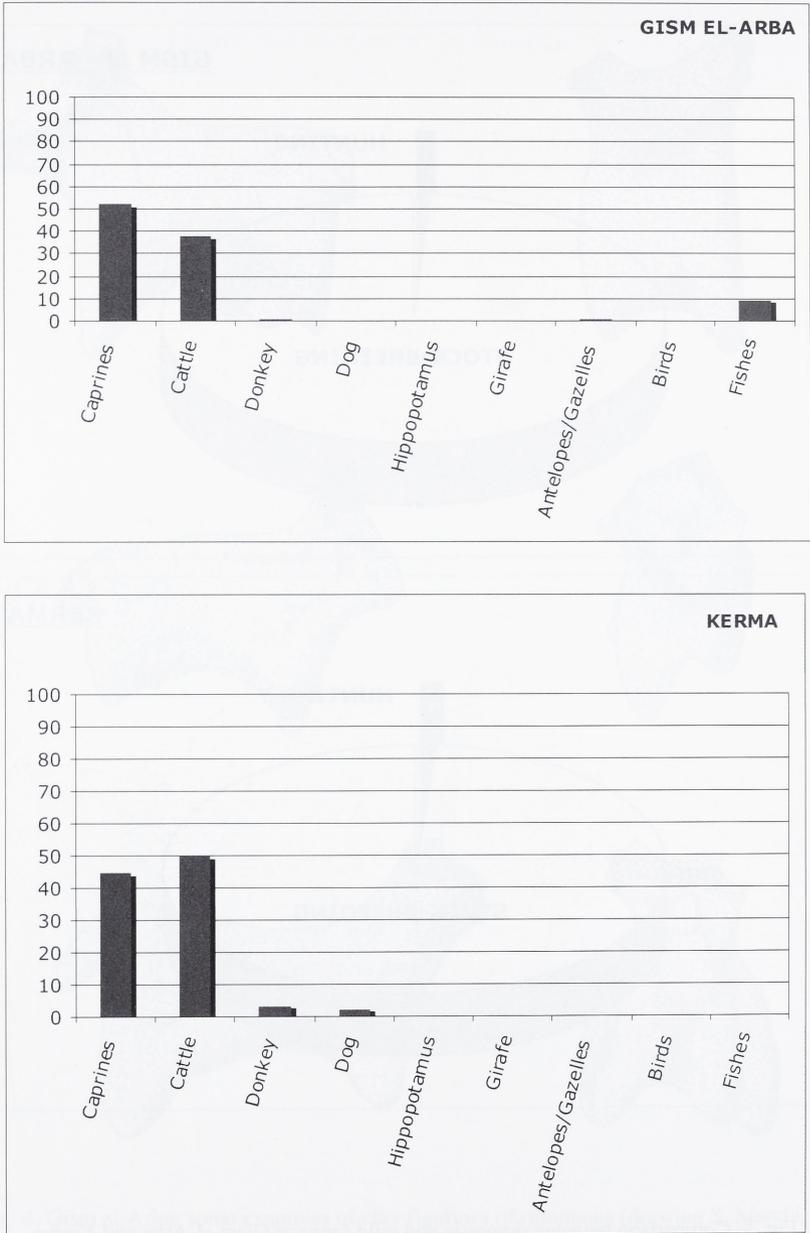


Fig. 6: Comparison between the faunal spectra of Gism el-Arba and Kerma.

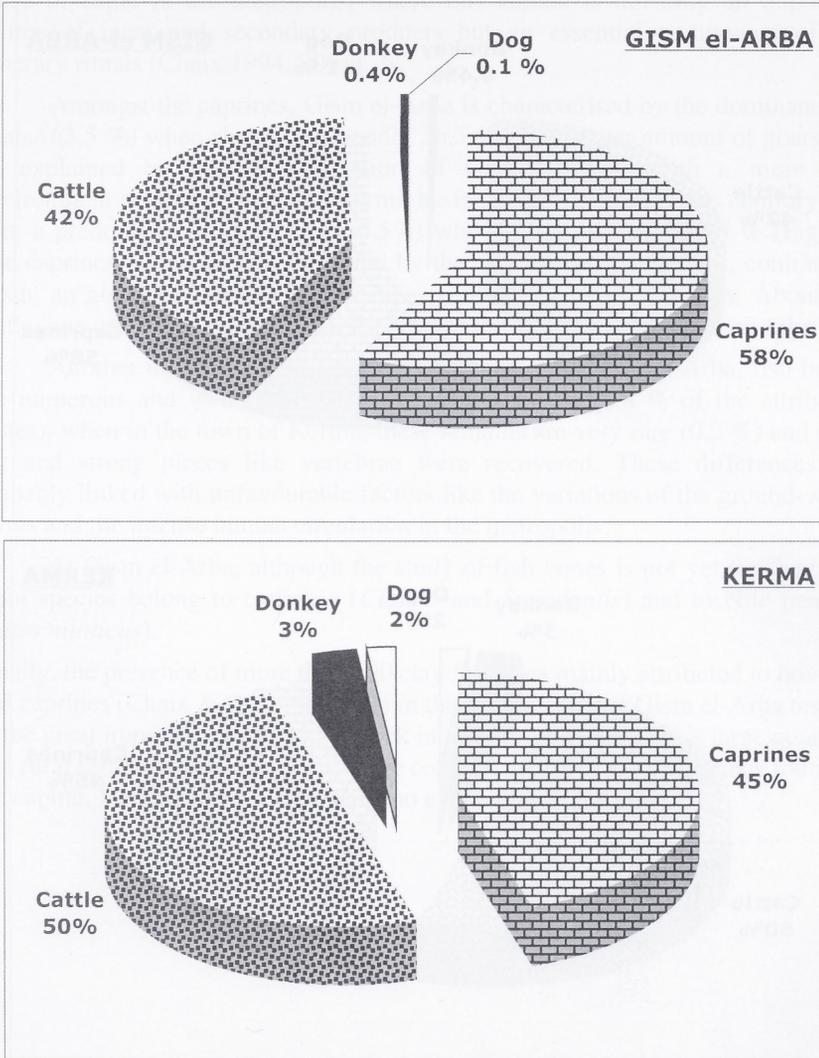


Fig. 7: Comparison between live-stock from Gism el-Arba and Kerma.

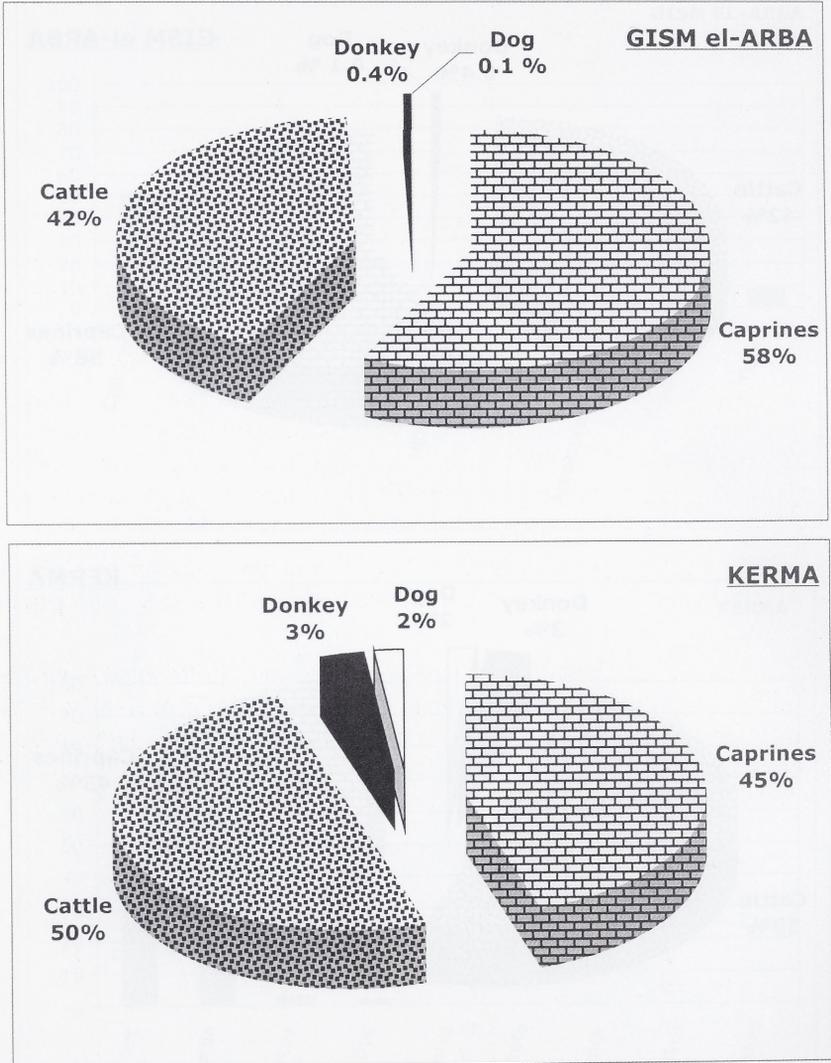


Fig. 8: Proportions of sheep and goats at Gism el-Arba and Kerma.

tance of cattle in the metropolis, where this animal is not only an important source of meat and secondary products but an essential component of the funerary rituals (Chaix 1994; 2001).

Amongst the caprines, Gism el-Arba is characterised by the dominance of goats (63.5 %) when sheeps forms only 36.5 %. The bigger amount of goats can be explained by the rural situation of Gism el-Arba, with a more arid environment compared with the Kerma basin. In the capital, on the contrary, we note a predominance of sheeps (66.5%) when goats represent 33.5 % (Fig. 8). The caprines' exploitation, illustrated by the age structure, indicates, contrary to Gism, an almost exclusive use for meat with very few old animals. About the cattle, one can note a slight smaller stature of the bovines from Gism el-Arba.

Another difference concern the ichtyofauna. At Gism el-Arba, fish bones are numerous and well preserved, with 665 elements (8.8 % of the attributed bones), when in the town of Kerma, these remains are very rare (0.2 %) and only big and strong pieces like vertebrae were recovered. These differences are probably linked with unfavourable factors like the variations of the ground-water levels and the intense human circulation in the metropolis.

At Gism el-Arba, although the study of fish bones is not yet finished, the main species belong to catfishes (*Clarias* and *Synodontis*) and to Nile perch (*Lates niloticus*).

Finally, the presence of more than 700 clay figurines mainly attributed to bovines and caprines (Chaix & Queyrat, 2003) in the settlement 2 of Gism el-Arba testify of the great importance of the live-stock in the Kerma culture. This large quantity in a rural settlement seems very strange compared with the few figurines found in the capital, Kerma. Actually, we have no explanation for this.

Tab. 1: Gism el-Arba: faunal composition.

<b>Species</b>	<b>NSP</b>	<b>%</b>
Caprines undet.	3761	
goat ( <i>Capra hircus</i> L.)	89	
sheep ( <i>Ovis aries</i> L.)	51	
cattle ( <i>Bos taurus</i> L.)	2856	
donkey ( <i>Equus asinus</i> L.)	30	
dog ( <i>Canis familiaris</i> L.)	5	
<b>Total domestic</b>	<b>6792</b>	<b>89,2</b>
hippopotamus ( <i>Hippopotamus amphibius</i> L.)	1	
dorcas gazelle ( <i>Gazella dorcas</i> (L.))	33	
dama gazelle ( <i>Gazella dama</i> (Pall.))	2	
antelope/gazelle undet.	10	
small felid	2	
hare ( <i>Lepus sp.</i> )	8	
<b>Total wild mammals</b>	<b>56</b>	<b>0,7</b>
birds	2	
fishes	665	
molluscs	24	
ostrich eggs	75	
<b>Total others</b>	<b>766</b>	<b>10,1</b>
<b>Total attributed</b>	<b>7614</b>	<b>22,6</b>
Fragments undet.	26105	77,4
<b>Grand total</b>	<b>33719</b>	<b>22</b>

Tab. 2: Comparison between the faunal spectra from Gism el-Arba and Kerma.

	Gism el-Arba		Kerma	
	NSP	%	NSP	%
Caprines	3901	51,98	15750	44,82
Cattle	2856	38,05	17500	49,80
Donkey	30	0,40	1050	2,99
Dog	5	0,07	700	1,99
Hippopotamus	1	0,01	15	0,04
Girafe	0	0,00	2	0,01
Antelopes/Gazelles	45	0,60	16	0,05
Birds	2	0,03	29	0,08
Fishes	665	8,86	80	0,23
<b>Total</b>	<b>7505</b>		<b>35142</b>	

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