Marcel Otte, Sonia Shidrang & Damien Flas (eds.) - *L'Aurignacien de la grotte Yafteh et son contexte (fouilles 2005-2008) /The Aurignacian of Yafteh cave and its context (2005-2008 excavations).* Liège, ERAUL 132, 2012, p. 117-126.

V - THE UPPER PALEOLITHIC FAUNAL REMAINS FROM YAFTEH CAVE (CENTRAL ZAGROS), 2005 CAMPAIGN. A PRELIMINARY STUDY

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1. Introduction

Yafteh Cave in Khorramabad Valley (Lorestan province) is among the many sites discovered by Hole and Flannery in the 1960s during their prehistoric investigations in southwest Iran. In 1965, Hole's excavation at Yafteh yielded a large artifact assemblage which was described briefly in a general report on the prehistoric sequences of southwest Iran (Hole & Flannery 1967).

Recent re-excavation at Yafteh Cave by a joint Iranian-Belgian team in 2005, directed by M. Otte and F. Biglari, led to the discovery of rich assemblages of lithic artifacts, faunal remains and other finds from a small 2 x 2 m test pit (Otte *et al.* 2007, Shidrang 2007).Two squares (F15 and G15) were excavated, each divided into four sub- squares and excavated by arbitrary 10-15 cm thick spits. The excavation yielded a significant amount of faunal remains for which initial results were published in the 2007 report (Otte *et al.* 2007). The present paper is the result of faunal analysis of the 2005 excavation at Yafteh Cave. In this preliminary presentation we focus our discussion on taxonomic identifications and taphonomic issues, discussing the definition of each taxonomic group.

2. The faunal assemblage[1]

Initial study of the assemblage was undertaken in Iran at the Palaeolithic Center of the National Museum in Iran, followed by some expertise at the Archaeozoology Laboratory of the Natural History Museum of Paris. The collection is now housed at the Centre for Palaeolithic Research at the National Museum of Iran in Tehran. Approximately 16000 faunal remains have been examined.

2.1. Mammalian Remains

Taphonomic issues

Bone preservation is rather poor and a heavy concretion covers most of the bones. Animal bones also suffered high fragmentation as shown by the ratio of unidentified remains (12570 remains) (Tab.1).

Yafteh 2005 assemblage	N	Weight	% N	% Weight (g)	W/N
NISP	1183	2281.3	7.4	20.5	1.9
LM/SM/SR	2149	4737.3	13.5	42.5	2.2
UI	12570	4121.7	79.0	37.0	0.3
Total	15902	11140.3	100.0	100.0	0.7

Table 1 – Distribution of animal bones in Yafteh cave (assemblage 2005). NISP = Number of Identified Specimen; LM/SM/SR= Large Mammal, Small, Ruminant; UI= Unidentified fragments.

A specific acid treatment was necessary to clean the bones and make them ready for study. The Yafteh animal bone assemblage is highly fragmented (cf. trampling). Other factors also contributed to its deterioration: direct firing or heat exposure (Plate 1b) and human or carnivore gnawing, breakage (Plate 1c). The high fragmentation of the assemblage restricted the recording of many measurements. The most frequent anatomical parts and measurable ones of the assemblage were the phalanges and metapodials of medium size mammals (PR^2 =39%) (Fig. 1).

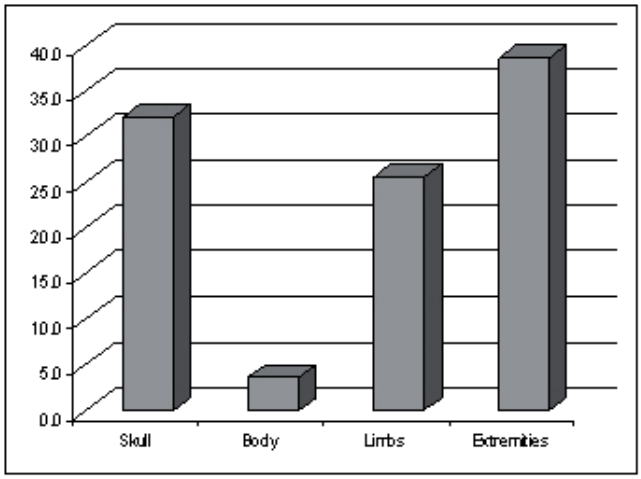

Figure 1 – Relative distribution of the skeletal part in Yafteh 2005.

The significant number of first, second and third phalanges in the assemblage attracted our attention to a taphonomic question addressed for faunal assemblages in caves and the origin of their accumulation. Experimental studies on Egyptian vulture (Gypaetus barbatus) nests show that this bone eater raptor could have been the putative bone accumulator in archaeological sites (Robert & Vigne 2005). Besides the high representation of the extremities in the assemblage, other factors should also be examined, among which digestion marks are the most important diagnostic indication for the contribution of the Egyptian vulture to the bone accumulation. In Yafteh, digestion marks are very rare and the hypothesis of the accumulation by this raptor can be rejected. Anatomical discrepancies are thus related to other taphonomic and anthropogenic factors. The macromammalian remains of Yafteh were accumulated by humans as evidenced by the faunal composition and cut marks left on the bones (plate 1a); the species composition (mainly herbivores), the presence of hearths and the high percentage of burnt bones, the presence of cut marks and the relative absence of carnivore activity are solid arguments supporting this assumption. However, the Yafteh assemblage also contains microvertebrate remains (rodents, fish and other microvertebrates). The taphonomic characteristics of these remains are discussed below.

Herbivores

The bulk of the assemblage is composed of small herbivores expressed by 54 % of the NISP (fig. 2a and b, table 2a and 2b). The principal taxa in this category are represented by ovi-caprids (96 %) and 4 % gazelles. The ratio of sheep to goat is 1:4.

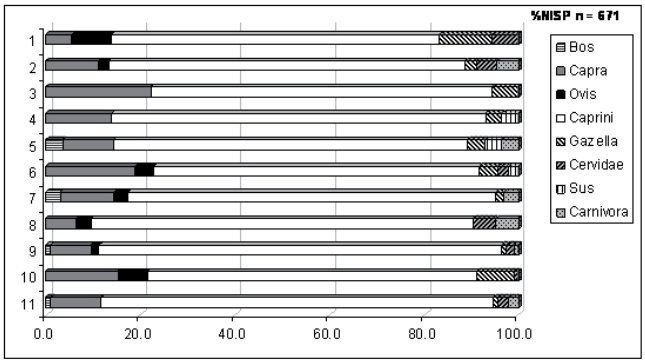

Figure 2a – Yafteh 2005. Distribution of the principal Mammalian species by means of NISP. gnawing marks.

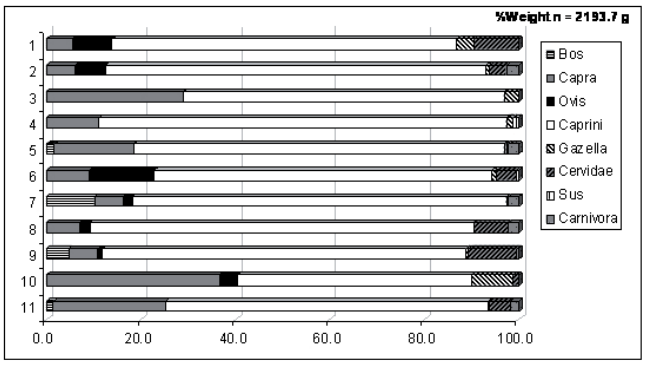

Figure 2b – Yafteh 2005. Distribution of the principal Mammalian species by means of weight.

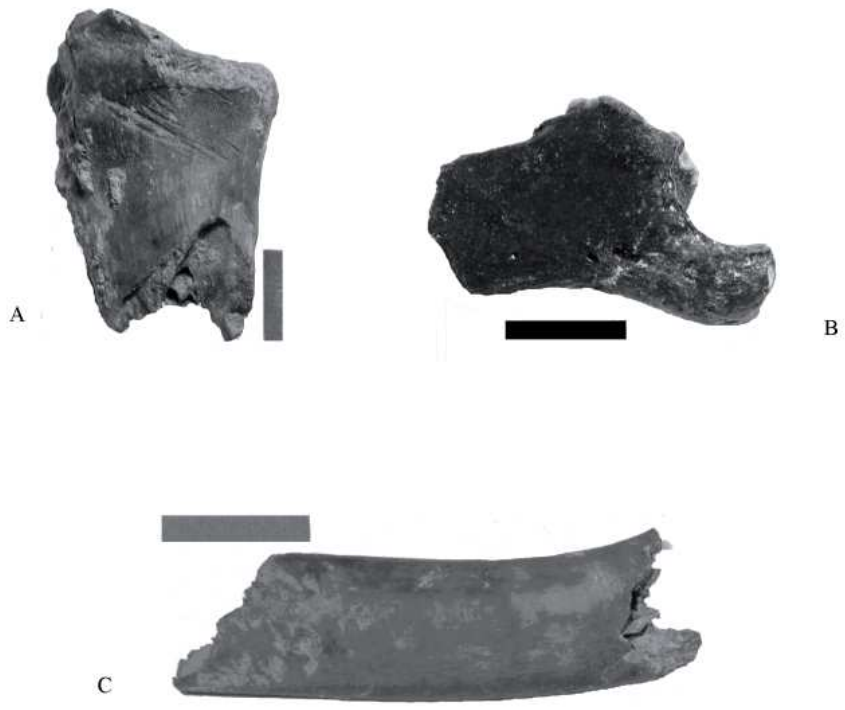

Plate 1 – Anthropogenic traces in Yafteh (2005). A) 15A-6, D 164 - 172 cm, *Caprini*- Radius Proximal with disarticulation cut marks. B) F15C-10, D. 203 - 216 cm, Capra , third phalanx, burned. C) F15A -2, D. 113 - 134 cm; Medium Mammal, rib, Carnivore gnawing marks.

NISP % / Spits	Bos	Capra	Ovis	Caprini	Gazella	Cervidae	Sus	Carnivora	Lepus	Microvertebrate	Bird	Turtle	Fish	Mollusc	Total NISP
1	0.0	4.3	6.5	54.3	8.7	4.3	0.0	0.0	0.0	17.4	0.0	2.2	2.2	0.0	**46**
2	0.0	1.8	0.4	12.3	0.4	0.7	0.0	0.7	1.1	2.5	0.4	0.4	79.4	0.0	**277**
3	0.0	7.8	0.0	25.5	2.0	0.0	0.0	0.0	7.8	15.7	0.0	0.0	41.2	0.0	**51**
4	0.0	4.7	0.0	27.1	1.2	0.0	1.2	0.0	1.2	3.5	1.2	1.2	58.8	0.0	**85**
5	1.8	5.5	0.0	38.2	1.8	0.0	1.8	1.8	7.3	36.4	0.0	5.5	0.0	0.0	**55**
6	0.0	12.3	2.7	45.2	2.7	1.4	1.4	0.0	17.8	11.0	1.4	4.1	0.0	0.0	**73**
7	2.1	7.3	2.1	51.0	1.0	0.0	0.0	2.1	16.7	17.7	0.0	0.0	0.0	0.0	**96**
8	0.0	4.6	2.3	58.6	0.0	3.4	0.0	3.4	9.2	14.9	0.0	1.1	1.1	1.1	**87**
9	0.7	7.1	1.4	69.5	0.7	1.4	0.0	0.7	7.8	9.2	0.0	1.4	0.0	0.0	**141**
10	0.0	13.9	5.8	63.5	7.3	0.7	0.0	0.0	2.9	5.1	0.7	0.0	0.0	0.0	**137**
11	0.9	8.7	0.0	67.8	0.9	1.7	0.0	1.7	10.4	5.2	0.0	2.6	0.0	0.0	**115**
12	0.0	0.0	0.0	27.8	0.0	5.6	0.0	5.6	55.6	0.0	0.0	0.0	5.6	0.0	**18**
Total NISP	5	77	20	517	23	14	3	12	86	110	4	15	294	1	**1181**

Table 2a – Yafteh 2005. Distribution of the faunal remains (NISP).

Weight% / Spits	Bos	Capra	Ovis	Caprini	Gazella	Cervidae	Sus	Carnivora	Lepus	Microvertebrate	Bird	Fish	Total Weight (g)
1	0.0	5.3	8.0	69.9	3.6	9.0	0.0	0.0	0.0	3.4	0.0	0.9	**118.0**
2	0.0	6.0	6.2	78.1	0.9	3.4	0.0	2.4	1.1	0.8	0.2	0.7	**194.5**
3	0.0	27.0	0.0	62.8	2.9	0.0	0.0	0.0	3.5	3.7	0.0	0.0	**51.4**
4	0.0	10.5	0.0	81.8	1.4	0.0	1.1	0.0	0.4	3.2	0.4	1.2	**56.1**
5	1.5	15.0	0.0	70.1	0.4	0.0	0.6	1.8	1.2	3.2	0.0	6.2	**72.5**
6	0.0	8.2	12.3	64.3	0.9	3.8	0.4	0.0	3.4	0.1	0.4	6.3	**151.4**
7	9.7	6.0	1.8	76.1	0.4	0.0	0.0	2.1	2.1	1.7	0.0	0.0	**205.4**
8	0.0	6.8	1.9	76.6	0.0	7.0	0.0	2.0	2.5	1.9	0.0	1.5	**198.0**
9	4.5	6.1	0.8	75.1	0.6	9.9	0.0	0.4	1.2	0.3	0.0	1.2	**312.4**
10	0.0	36.4	3.7	49.3	8.7	1.3	0.0	0.0	0.6	0.0	0.0	0.0	**525.5**
11	1.5	22.9	0.0	65.9	0.3	4.4	0.0	1.6	1.8	0.3	0.0	1.3	**340.9**
12	0.0	0.0	0.0	40.8	0.0	44.2	0.0	7.1	8.0	0.0	0.0	0.0	**55.2**
Total Weight	40.2	375.2	69.7	1509.5	59.3	113.6	1.6	24.6	37.2	20.8	1.2	28.4	**2281.3**

Table 2b – Yafteh 2005. Distribution of the faunal remains (Weight -g-).

The few measurements for the second phalanges of Capra with a minimum of 26 and a maximum of 31.7 are comparable to those reported by M. A. Zeder (2003:129, fig. 4) for the Palaeolithic sites of Iran.

Other species identified in the fauna are cervids and boars, represented by post-cranial and cranial bones. It was not possible to identify whether these remains belonged to Dama or Cervus. Boar is barely represented in the assemblage with only 3 remains.

Carnivores

Carnivores are represented by 3 families, Canidae (Vulpes vulpes), Felidae (Panthera pardus and Felis sp.), Mustelidae (Mustela foina and Meles meles) (see plate 2). Two different types of coprolites of large carnivores, most probably hyenas and bears, indicate other possible inhabitants in the site. An interesting find in Yafteh Cave was the presence of leopard (Panthera pardus) first and second phalanges, in different spits of the lower levels of the site.

F	15	C	7	169 - 182 cm	Metapodial (plate 2b)
G	15	D	8	179 - 185 cm	Phalanx 2 (plate 2a)
F	15	A	12	225 - 239 cm	Phalanx 1

The presence of these extremities could be related to the use of the skin; they are generally not removed during the preparation of the skin.

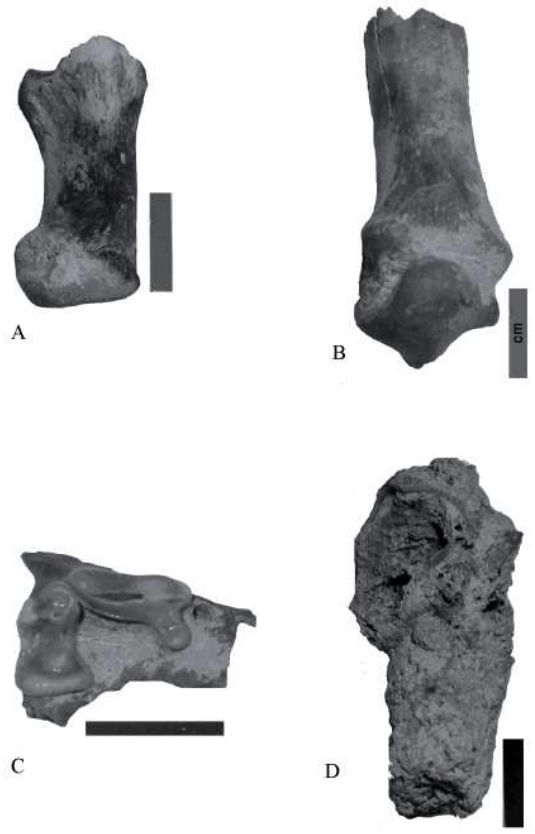

Plate 2 – Carnivore remains in Yafteh (2005). A) G15D-8, D. 179 - 185 cm. *Panthera pardus*- Second phalanx. B) F15C-7, D. 169 – 182 cm; *Panthera pardus*, Distal metapodial. C) G15B-2 D.126 - 137 cm; *Martes foina*. D) F15B-11, D. 212 - 227 cm; *Hyena coprolite*.

2.2. Microvertebrates

These remains are principally composed of fish and rodent remains (fig. 3). The bones were collected after systematic dry sieving of the sediments, a volume of approximately 500 litres which was sieved with three sizes of mesh with apertures of 1 mm³, 2.2 mm and 4.4 mm.

Rodent remains

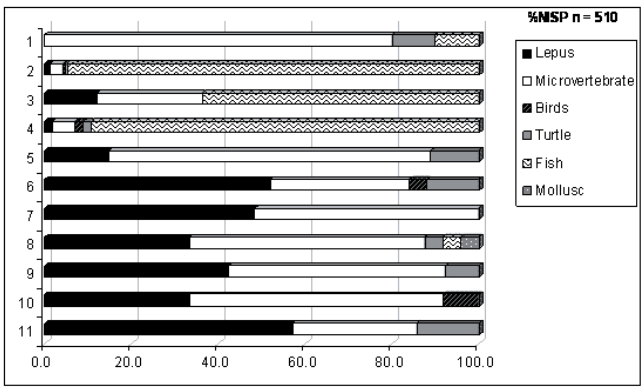

Figure 3 – Yafteh 2005. Distribution of the small vertebrates and non vertebrates by means of NISP.

The collected material was studied by using comparative osteological collections of Iranian rodents at the Department of Rodent Studies of Ferdowsi University in Mashhad. The mandibles and teeth (NISP=30) were washed with HCL (5 %) and separately classified and studied in detail for taxonomic identification. For the rodents, two families and eight species have been identified based on the upper or lower molars recover by dry sieving. The remains are distributed between a depth of 130 cm and 160 cm (fig. 4).

The most abundant species are from the Muridae family. The

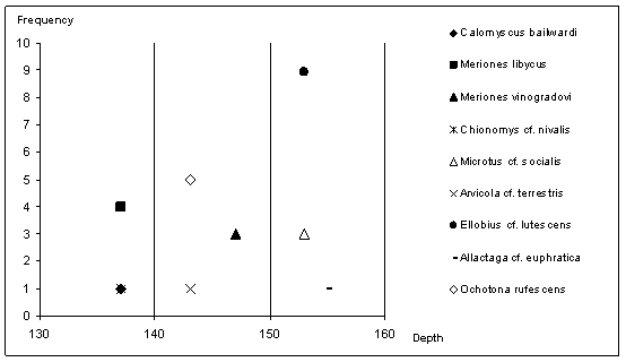

Figure 4 – Taxinomic distribution of the Rodents and Lagomorpha molar and premolars (excepted Lepus) in Yafteh 2005.

Muridae are represented by the Cricetinae (hamster), Gerbillinae (jirds) and the large sub family of Microtinae (voles) for which four species could be identified: the Kurdistan mole-vole (Ellobius cf lutescens), the snow vole (Chionomys nivalis), the water vole (Arvicola terrestris) and the social vole (Microtus cf. socialis). The last rodent group in Yafteh is the Dipodidae, represented by the jerboa (Allactaga cf. Williamsi).

The other microvertebrate group is represented by the Lagomorpha for which two species were identified: the pika (Ochotona rufescens) and the hare (Lepus europaeus) (plate 3).
These last species are also easily distinguishable by their post-cranial bones and were identified in both F and G squares and in various loci. They are present throughout practically all the excavated Upper Palaeolithic sequence.

Rodents and Lagomorpha (except hare) recovered in Yafteh in 2005 result from the pellet accumulation from birds of prey.

Fish remains

Taphonomy of the fish remains

The dry sieving was also important for the recovery of fish remains. Out of 329 remains, 294 were identified (166 in F15 and 163 in G15) (table 3).

They are mostly concentrated in loci 2 and 4, and only one bone in Locus 8. From a taphonomic point of view, burn and heat marks are present in low number on 30 bones (9.12 %). Post-depositional factors may be the cause of these marks; however, human activity aiming at the preparation of the fish for food cannot be

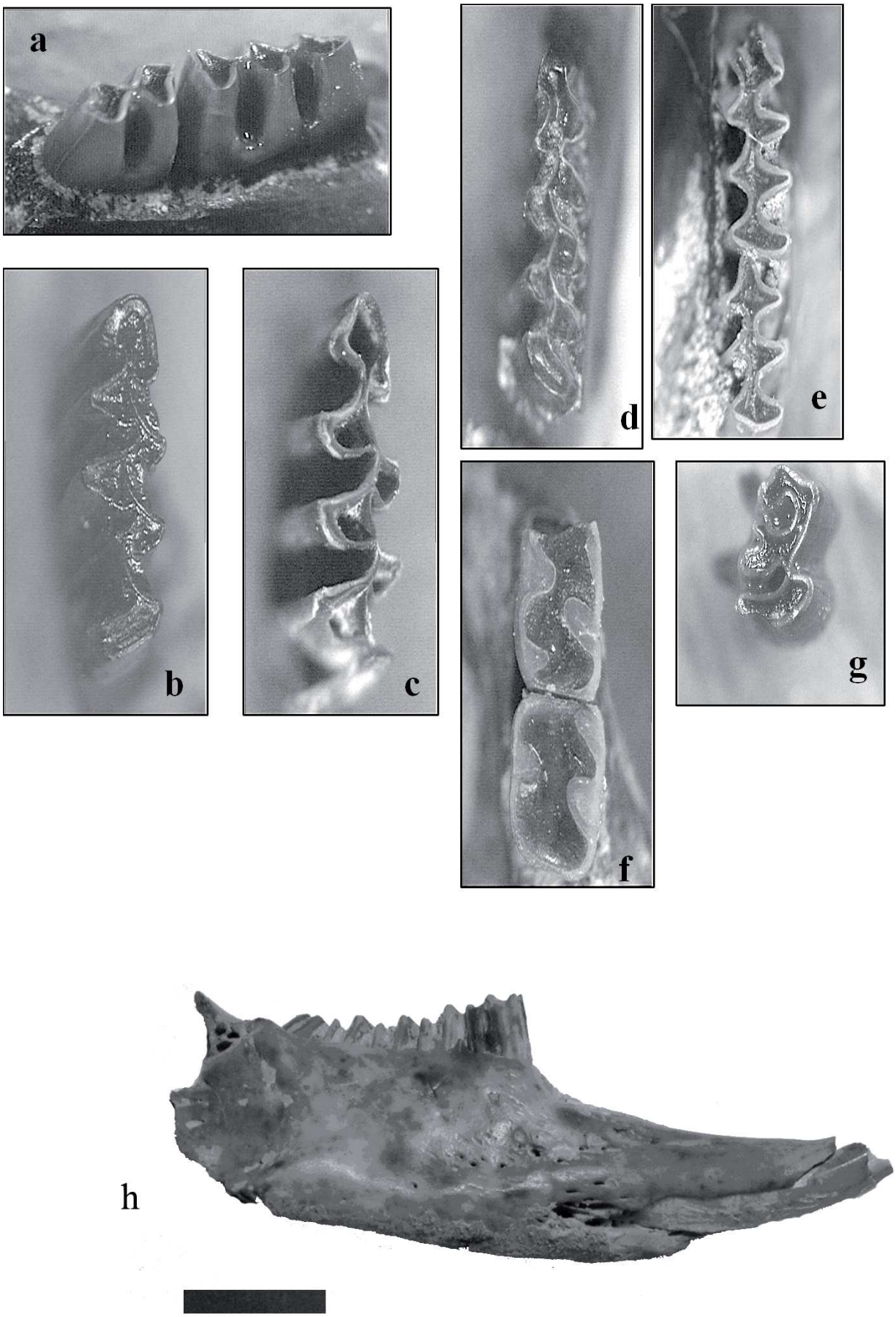

Plate 3 – Rodentia and Lagomorpha in Yafteh (2005). a) Lower molar teeth of *Meriones libycus* (25 x). b)- Lower right molar (M1) of *Chionomys cf. nivalis* (40 x). c)- Lower right molar (M1) of *Arvicola cf. terresteris* (40X). d)- Lower right molar (M1) of *Microtus cf. socialis* (40 x). e)- Lower left molar teeth of *Ellobius cf. lutescens* (40x). f)- Lower right molar containing M1 and M2 of *Calomyscus bailwardi* (25 x). g)- Isolated teeth of *Allactaga cf. Euphratica* (25x). i)- Mandible of *Lepus europaeus*. Pictures b, c, d, e, f and g are here distorted.

	Square F15			
Locus (depth in cm)	Cyprinidae	Leuciscus (?)	IND	**Total**
1 (113-125)	1	2	1	**2**
2 (134-141)	105		11	**118**
3 (137-146)	7	2		**7**
4 (143-153)	30	4	7	**39**
Total F15	**143**		**19**	**166**
	Square G15			
2 (125-140)	111	2	9	**122**
3 (137-147)	14		7	**21**
4 (143-153)	18		1	**19**
8 (179-185)	1			**1**
Total G15	**145**	**2**	**17**	**163**

Table 3 – List of fish taxa by square.

excluded. Only one remain presents modifications due to digestive processes (Nicholson 1993; Wheeler & Jones 1989:61-78; Butler & Schroeder 1998): distortions (figure 1f, plate 4). Other bone modifications were not observed.

Taxonomic considerations

The cranial bones and vertebrae were identified to the taxonomic level of family, represented by one taxon; the Cyprinids (carp fish) all found in loci 2 and 4. Only in one case a pharyngeal bone allowed identification to the level of genera and revealed the presence of a chub (Leuciscus) (plate 4). Leuciscus are represented at least by four species on the basis of morphological differences. It is, however, difficult to identify these species, since no local collections exist.

The reconstruction of dimensions for Cyprinid vertebrae was realized separately for precaudal and caudal vertebrae following the Global Rachidan Profiles (GRP) method (Desse et al. 1989) and data from modern carp (Radu, unpublished data) (table 4). In Figure 5 we report vertical (M1) and horizontal (M2) diameters of all vertebrae, plus the reference data for modern carps (TL=132 mm; TL=28 mm; Tl=265 mm). It can be observed that the maximum values obtained in Yafteh are not higher than 265 mm TL.

The size of the precaudals range between 124 and 231 mm (weight 20-145 g) and the caudals between 133 and 188 mm (25-75 g). Finally, it can be observed that the medium sizes are very small: 150 mm Tl (40 g) , the minimum and maximum varying between 124 mm (10-20 g) and 231 mm Tl (145 g). The Leuciscus individuals are also quite small. The two individuals, whose dimensions were approximate, are 74 and 147 mm Tl (17 and 34 g). Small sized Cyprinids predominate in the assemblage.

Environmental indications

As for the environmental information, Cyprinids live in medium temperature (around 0-15 °C). They need a stable environment, excluding harsh and long winters. The absence of Salmonids and Esocids in a Palaeolithic site and the exclusive presence of Cyprinids is surprising. Trout is today distributed on the upper levels of the Tigris basin[4]; it seems that during the Palaeolithic the species was absent. This might be its most southern limits. The exclusive presence of Cyprinids indicates a mild climate with a relatively short winter. This is in contradiction with Van Zeist and Bottema's studies (1982:278) suggesting a climate "colder than at present […] also much drier".

Taphonomic remarks

It is still difficult to determine whether the fish remains resulted from human (fish consumption) or animal activity (faecal remains, regurgitation pellets from ichthyophagous birds, etc.). Noteworthy is the concentration of the fish remains in loci/spits 2 and 4 suggesting the same groups of consumers. If the assemblage was originated from human activity, then the distribution of the reconstructed fish lengths is similar to the distribution for the captures realized by humans using different fishing gear (gill net, seine

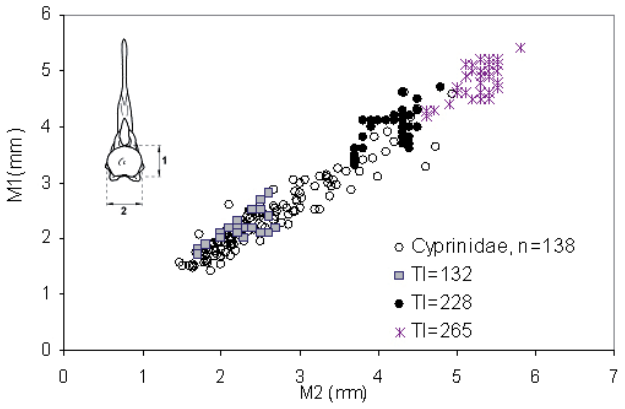

Figure 5 – Vertebras diameters (M1 & M2) of Yafteh in comparison with 3 modern carps *(Cyprinus carpio)*. Plain circles = Yafteh material. Stars, squares and bold circles = comparative matrial.

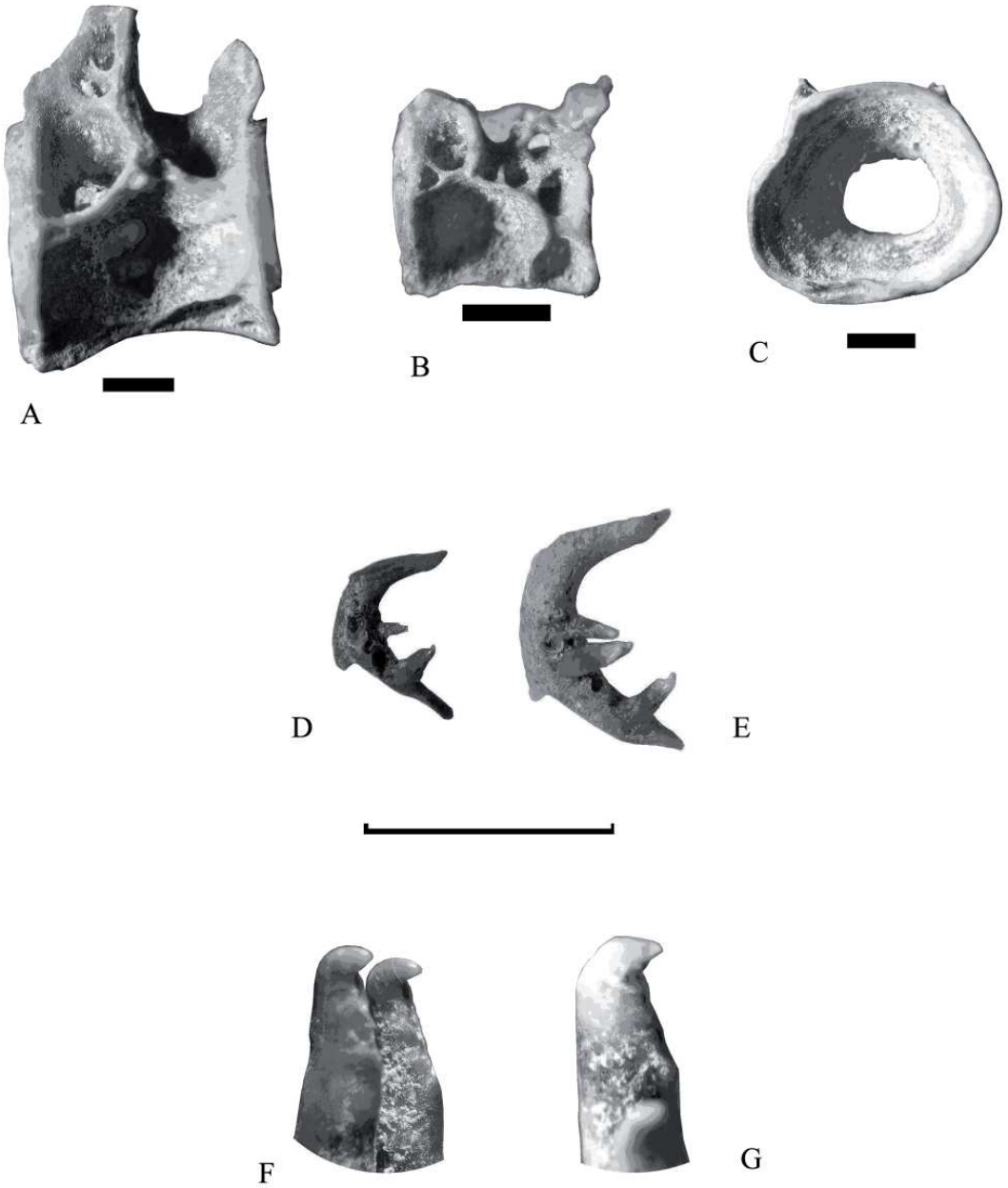

Plate 4 – Fish remains in Yafteh (2005). A, B: Cyprinids, precaudal vertebra. C: Cyprinid, vertebra affected by digestive processes (scale 1 mm). D: *Leuciscus* sp.: *os pharyngeum inferius* from Yafteh. E: *Leuciscus* sp.: *os pharyngeum inferius* from Danube site (scale 1 cm). F, G: teeth details from Yafteh and from Danube site.

Taxa	Bone	Equations	Coefficient of determination
Cyprinus carpio	precaudal vertebra 8	TL = 55.702M1 + 70.287	$R^2 = 0.9733$
	precaudal vertebra 17	TL = 55.37M1 + 43.155	$R^2 = 0.9852$
	caudal vertebra 22	TL = 51.786M1 + 55.408	$R^2 = 0.9929$
	caudal vertebra 33	TL = 64.412M1 + 56.86	$R^2 = 0.9857$
	Weight	Weight = $1.9697*10^{-5}$ $TL^{(2.9574)}$	$R^2 = 0.995$
Leuciscus idus	*os pharyngeum inferius*	TL = 46.195M4+13.592	$R^2 = 0.99$
	Weight	Weight =$4.3739*10^{-6}$ $TL^{(3.1819)}$	$R^2 = 0.997$

Table 4 – Equations for estimate the size (TL in mm and Weight in g).

net, baited hook (Greenspan 1998:974 fig. 1) Also it should be borne in mind that selection can also be due to carnivores. Among those represented in the site the fox, (Vulpes vulpes), the leopard (Panthera pardus), the stone marten (Mustela foina), the badger (Meles meles), and probably the hyenas or bears (indirect evidence or the coprolits) consume food in the hunting place (Van Neer 1997:208). However, the remains can be deposited with the faeces if the animals have come to the cave.

So the question can be posed regarding the origin of the accumulation of these remains, whether they result from carnivore, human or raptor activities, since we also have other microvertebrate remains belonging to pellet deposits.

3. General Discussion

The human subsistence activity in Yafteh is based on the hunting of small size herbivores (Ovis-Capra-Gazella); Capra outnumber Ovis remains and Gazella is represented by an average of 2.5 %. Medium and large herbivores (Cervids and Bos) were also hunted by the inhabitants of Yafteh. Finally, hare seems to be a relatively important component of subsistence range since it is present in all spits.

The presence of cut marks and breaks evidence intensive anthropogenic action on animals bones. The presence of these marks has been observed in near equal amounts in all spits.

As for the microvertebrates, the presence of these remains simultaneously with the anthropogenic material makes it difficult to allocate these remains to either human or carnivore/raptor activities. For the rodent remains, however, the remains belong to pellets. The question could not yet be resolved for the fish remains.

Environmental reconstruction is also an important issue for the general understanding of this Palaeolithic settlement. The rodent remains are statistically too small to allow a reliable environmental image (Fig. 4), although it is diversified. On the basis of the present-day distribution of the represented species, Yafteh Cave may have been surrounded by several ecological niches: steppe lowlands (gazelles, gerbils, jerboa, social vole), piedmont and cooler uplands (wild sheep, wild goat and mouse-like hamster) and forested/bushy zones (red deer, wild boar).

The information yielded by the rodents gives only partial insight into the environmental setting of Yafteh:

1. Because of the concentration of data between a depth of 130 and 160 cm (spits 1 to 4)

2. Because of the limited taxonomic associations in each context, not exceeding two. For a reliable environmental understanding we need more data form all spits and also complementary information from botanical material (carpology and palynology).

On the basis of the available data, it can be concluded that hunting activity in Yafteh was concentrated on small herbivores, and principally wild goats. The understanding of the Yafteh fauna should be also viewed through comparison with other sites in the Zagros (fig. 6).

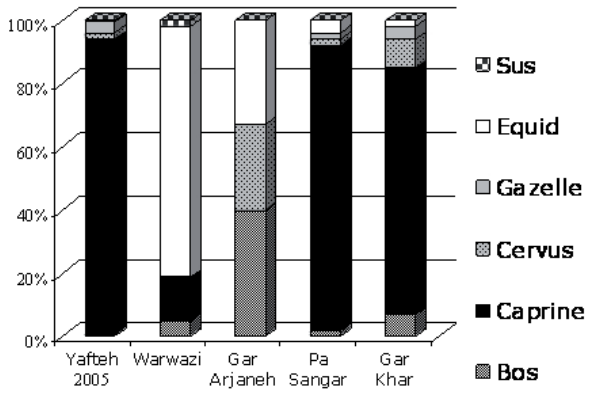

Figure 6 – Faunal spectra of the Zagros Upper Palaeolithic sites.

Brian Hesse in his Gar e Khar paper (1989:41) noted that the Yafteh material compares in many ways to the Upper Palaeolithic samples from Ghar e Khar, Shanidar, Pa Sangar and especially to Karim Shahir, exceptional for their restricted faunal spectra and divergences with some of the other contemporaneous sites in the Zagros. However, the major difference of Yafteh (2005) with these sites is the number of identified remains, more important that the others and which may introduce a bias for comparisons and interpretations. In the meantime, even with error introduced by sample size, narrow specialised faunal spectra tend suggest seasonal occupations[5]. The occupation season of the Yafteh cave is still under investigation with the use of herbivore tooth remains – extremely fragmented – and bone fusion data. Initial analyses show that young or very young animals are present in this assemblage,

but a bone survival study should be performed properly on the entire assemblage. If after these analyses the frequency of young animals is still important, we could suggest a spring /summer occupation of the site.

4. Conclusion

On the basis of a significant bone sample, the following observations can be made:

1. All the mammalian species are still living on the Iranian Plateau.
2. Hunting activity in Yafteh was concentrated on small herbivores, and principally wild goats.
3. No major changes are observed in the faunal composition and distribution along the sequence represented by 12 Spits/loci, especially striking when examining the weight diagram (fig. 2b).

On the basis of the present-day distribution of the represented species, Yafteh Cave might have been surrounded by several ecological niches. Steppe lowlands (gazelles, meriones, allactaga, social vole), the piedmont and the cooler uplands (wild sheep, wild goat and mouse-like hamster) and the presence of forested spots suggested by the presence of red deer, wild boar and hare. Important issues to be examined in detail are the understanding of the environmental setting and the dissociation of the anthropogenic and natural contribution in the present faunal spectrum since the site seems to have been occupied simultaneously by humans and carnivores within a seasonal alternation. Other issues that are currently being studied on the Yafteh material are the mortality profiles, with the help of biochemistry. The latter will help in documenting the seasonality of the food resources. Future investigations in Yafteh Cave should be more intensively concentrated on the recovery techniques of microvertebrates and the recovery of other bioenvironmental markers (insects and parasites), complemented with botanical studies.

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Notes

[1] A short report of the faunal remains of Yafteh Cave was published in Otte *et al.* 2007.

[2] The Percentage of Representation of skeletal parts was calculated here by correcting the NISP of each bone to the actual representation of the bone in the skeleton (e.g., herbivore phalanges: the total number of phalanges was divided to 8).

[3] The 1 mm aperture was unfortunately not used, not easily compatible with dry sieving and the hard sediment.

[4] Recently the European brown trout Salmo trutta was artificially introduced in the upper part of the Tigris River basin (where populations still existed in the 1970s (Banarescu 1977:47). From the Zagros Mountains near Kerman, two records exist (Walczak 1972 cited by Code B.) that have not been confirmed by specimens.

[5] The practical absence of aurochs and the total absence of Equids are noted in Yafteh Cave.

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