LATE PREHISTORY OF THE NILE BASIN
AND THE SAHARA
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Fishing along the prehistoric Nile

This brief overview is limited to archaeological sites, which the author has under study (*cf.* Van Neer 1984) and to some ichthyofaunas described in the literature. Of the latter category only those with quantitative data are considered. Geographically this synthesis is limited to Egypt and the Sudan; the sites are of Late Palaeolithic, Epipalaeolithic and Predynastic times. Two faunal assemblages from Dynastic times are also included as they are important for the interpretation of the place of capture of the fish. Bibliographical references are limited to the faunal reports. An extensive bibliography on the biology of the fish and on the ethnographic data mentioned in this paper can be found elsewhere (Van Neer 1984; Gautier and Van Neer 1989; von Brandt 1984).

Of the some 50 fish genera recorded from the Nile in Egypt and the Sudan today, only a small part is found in archaeological context. This is mainly due to differential preservation. Only those genera that are often encountered on archaeological sites will be considered here. These are here divided arbitrarily into a group with a prolonged stay on the alluvial plain and into a group that does not, or only briefly, enter the floodplain. The habitat preferences of the fish and the migrations in function of the water level determine where and when they are most likely captured.

Floodplain *versus* main river dwelling fish

The proposed division is based on biological data of the fish, but also on the comparison of the ichthyofaunas from a number of sites (Table 1 and 2). From these fossil assemblages it becomes clear that certain fish are often associated.

Clarias (catfish), *Protopterus* (lungfish), *Tilapia* and *Barbus* are grouped here as fish with a prolonged stay on the alluvial plain. *Clarias* and *Protopterus* are able to resist deoxygenation as they dispose of accessory breathing organs enabling them to take up oxygen from the air. *Protopterus* burrows into the mud when the floodplain dries out and can survive complete habitat desiccation by forming cocoons.

Table 1

Percentage frequencies of the most common fish found in archaeological context in Egypt and Sudanese Nubia

Sites	Sample size	Floodplain dwellers			Open water forms			
		Cyprinidae (mostly Barbus)	Clariidae (mostly Clarias)	Tilapia	Hydrocyon	Bagridae (mostly Bagrus)	Synodontis	Lates
Late Palaeolithic								
Wadi Kubbaniya (1)								
E 78-2, E 78-3, E 78-4, E 81-1 totals	74804	0.34	99.27	0.38	-	0.01	-	-
E 81-3, E 81-4, E 82-3 totals	13966	0.16	48.21	51.62	-	-	0.01	-
Makhadma 2 (2)	1303	-	98.7	1.3	-	-	-	-
Makhadma 4 (2)	7294	0.40	29.85	68.40	-	-	1.34	0.01
Idfu and Isna (3)	±2500	0.7	99.0	0.2	-	0.1	-	-
Kom Ombo (4)	448	0.2	99.1	-	-	-	-	0.7
Nubia (5)								
1017	71	-	100	-	-	-	-	-
8859	161	0.6	98.2	0.6	-	-	-	0.6
ANW-3	64	1.6	93.7	-	-	-	3.1	-
2004	36	94.5	5.5	-	-	-	-	-
443	15	6.7	93.3	-	-	-	-	-
1018	3	-	100	-	-	-	-	-
1020	2	-	100	-	-	-	-	-
1028	54	16.7	83.3	-	-	-	-	-
8905	291	-	100	-	-	-	-	-
8956	12	-	100	-	-	-	-	-
34	19	-	100	-	-	-	-	-
ANE-1	48	12.5	87.5	-	-	-	-	-
448	240	0.8	98.0	-	-	0.4	0.8	-
8899-C	1	-	100	-	-	-	-	-
440	362	0.3	76.0	0.8	-	0.8	11.0	11.1
Epipalaeolithic								
Nubia (5)								
DIW-1	35	-	14.3	-	-	68.6	17.1	-
DIW-51	4	-	-	-	-	-	-	100
Elkab (6)	32	-	18.8	-	-	3.1	25.0	53:1
Predynastic								
El Khattara (Nagada) (7)	132	2.3	66.7	4.6	-	0.7	8.3	17.4
Maghara (8)	42	2.4	23.8	4.8	-	50.0	7.1	11.9
Dynastic								
Elephantine (9)								
Cemetery	724	4.4	0.5	-	3.4	20.0	44.7	27.0
Temple of Sattet	1770	1.8	0.6	-	-	64.6	12.4	20.6

The original data are borrowed from: (1) Gautier, Van Neer 1989; (2) Vermeersch, Paulissen, Van Neer, this volume; (3) Greenwood, Todd 1976; (4) Churcher 1972; (5) Greenwood 1968; (6) Greenwood 1978; (7) Van Neer, in press a; (8) Van Neer, in preparation; (9) Boessneck, von den Driesch 1982.

Clarias, however, needs a minimum supply of water and oxygen to survive in burrows. *Tilapia* and *Barbus* depend on gill breathing exclusively, but of all Nile fishes, their hemoglobine has the highest affinity for oxygen, even in the presence of high carbon dioxide tensions. Because of their respiratory adaptations the above mentioned

Table 2

Frequencies of the most common fish found on archaeological sites in Central Sudan

Sites	Sample size	Floodplain dwellers				Open water forms			
		Protopterus	Barbus	Claridae (mainly Clarias)	Tilapia	Hydrocyon	Bagrus	Synodontis	Lates
Early Khartoum									
Khartoum Hospital (1)	?	P(a)	–	P	P	P	P	P	P
Shabona (b)	?	?	?	?	P	?	?	P	P
Saggai (2)	>1000	R	–	F	R	R	R	F	F
Khartoum Neolithic									
Shaheinab (3)	315	0.3%	–	61.9%	9.9%	–	–	18.1%	9.8%
Zakiab (3)	961	72.6%	–	9.0%	10.1%	–	–	6.0%	2.3%
Um Direiwa 1 (3)	20	75.0%	–	15.0%	–	–	–	10.0%	–(c)
Nofalab (3)	59	–	–	55.9%	11.9%	–	–	28.8%	3.4%
Kadero (4)	36	19.4%	–	33.3%	2.8%	–	2.8%	22.2%	19.4%
Geili (2)	>100	–	–	F	–	–	–	F	F
Late Neolithic									
Kadada (5)	±1000	–	R	R	?	?	R	F	F

P – present; R – rare; F – frequent

(a) This genus was not mentioned in the original report, but we found it in the mammalian collection restudied by J. Peters (Laboratorium voor Paleontologie, Rijksuniversiteit te Gent);

(b) Until now we only saw very few fish remains from this site. A detailed study is planned;

(c) Some *Lates* bones derived from very small individuals are not included here as they are believed to have been captured on the alluvial plain.

The original data are borrowed from: (1) Arkell 1949; (2) Van Neer 1983; (3) Tigani el Mahi 1982; (4) Van Neer, in press b; (5) Van Neer 1986.

genera are able to remain on the alluvial plain for a long period. They can even stay there all year round but for *Tilapia* and *Barbus* remnant pools with slightly oxygenated water are necessary. In case of complete desiccation of the floodplain, only *Protopterus* is able to survive; the other species will die if they did not migrate into the main channel. For the interpretation of fish remains from archaeological sites, it is important to stress that within each species, large individuals return to the main channel before smaller ones.

Opposed to the floodplain dwellers a group of open water forms is accepted here, consisting of *Lates* (Nile perch), *Hydrocynus* (tiger fish) and two catfish genera: *Synodontis* and *Bagrus*. If these fish come on the alluvial plain at all, their stay is of short duration. Some of them are even said to never leave the main channel. Fishes of this group remain shortly on the alluvial plain to spawn or lay their eggs in the main channel. In the latter case, the fry migrate into the floodplain where there is an abundance of food and shelter. After a period of rapid growth the juveniles migrate towards the main channel. Very small individuals of these species may hence also be considered as taken from the alluvial plain.

Floodplain *versus* main river exploitation in prehistoric times

With reference to the two groups of fish defined in the foregoing paragraphs, three types of sites can be distinguished: those with floodplain fishing, those with main river exploitation and a third category with fishing in both environments.

At most Palaeolithic sites ichthyofaunas seem to be exclusively derived from floodplain fishing. At the Late Palaeolithic sites from Egypt and Sudanese Nubia (with the exception of site 440), *Clarias*, *Tilapia* and *Barbus* are the predominating genera (Tables 1 - 2). It is unlikely that these fish were taken from the main river for in case fishing from the shore was practised, other fish genera should be present as well. Possibly site 440 from Sudanese Nubia represents a settlement where shore fishing was practised. From post-Palaeolithic times only Um Direiwa 1 has given evidence so far for fishing restricted to the floodplain. The Nile perch remains found on that site are of very small individuals that may represent juveniles in their first growing period, captured on the alluvial plain before the migration towards the main channel.

Settlements with open water fishing only are rare; apparently alluvial plain exploitation was not practised on those sites where the floodplain is absent or very narrow. This must have been the case at the Dynastic sites from Elephantine and at El-Kadada, where floodplain dwellers are rare. These fish may have been taken from the narrow floodplain or may have been included in the catch of the main channel. In Epipalaeolithic times and onwards, fishing seems to have been practised in both floodplain and main river; the importance of the exploitation of each part of the river system probably was related to the extent of the alluvial plain and its topography (presence of residual pools, oxbow lakes etc.).

Season of capture and fishing techniques

The season of capture can be derived from the biology of the fish in relation to the behaviour of the river. Some of the hypotheses formulated here might eventually be confirmed by growth ring analysis on fin spines, vertebrae or otoliths.

At the very beginning of the inundation *Clarias* undertakes its spawning runs and is very vulnerable to predation by man. During one or a few consecutive nights catfish are found spawning in shallow marginal areas (less than 10 cm to 40 cm deep) and can be easily caught by hand, or with striking or wounding gear, or cover pots as is still done today. *Tilapia* also spawn in shallow marginal areas, but their breeding season can cover several months. In their circular nests breeding *Tilapia* are easy to trace and capture.

When the breeding is over, adult fish migrate into the deeper waters of the alluvial plain and become very dispersed. Fishing will hence not be very productive until the Nile waters recede. To keep back migrating fish, dams and fences are often erected today. Archaeological evidence for such structures is available for some late south African sites (Deacon 1984).

Another peak of productive fishing occurs when residual pools are formed. Simple fishing techniques are again very successful and are likely to have been practised in group. In addition to hand grasping, use of striking and wounding gear, cover pots, stupefaction of fish by stirring up the mud or with ichthyotoxic plants may have been adequate techniques. Fish gorges made of bone were found at Makhadma 4 and Wadi Kubbaniya. Attached to bottom lines such gorges are suitable for the capture of catfish. In case they were used for the capture of *Tilapia* rod and line or drift lines were necessary.

Table 3

Complete ichthyofauna of the Wadi Kubbaniya sites that yielded large samples
(relative frequencies, per cent)

	Anguilla	Barbus	Clarias	Tilapia	Hydrocyon	Bagrus	Synodontis	Lates
Wadi Kubbaniya								
E 78-2	0.51	0.13	99.30	0.06	–	–	–	–
E 78-3	0.43	0.05	99.28	0.23	–	–	–	–
E 78-4	4.25	0.47	94.24	1.03	–	0.01	–	–
E 81-1	10.61	2.38	86.58	0.43	–	–	–	–
E 81-3	–	–	85.83	14.17	–	–	–	–
E 81-4	0.01	0.17	27.82	72.00	–	–	–	–
E 82-3	0.02	0.16	76.89	22.91	–	–	0.02	–

At the Wadi Kubbaniya sites it was possible to distinguish between sites on which fish was captured mainly at the beginning of the inundation and sites with fish taken mainly from residual ponds (Table 3). Sites E 78-2, E 78-3, E 78-4 and E 81-1 yielded more large catfish and *Tilapia* (Table 4), apparently captured when breeding. This is indicated by the presence of eel, a species that follows spawning fish and feeds on their eggs and fry. Eel is virtually absent from the second category of sites on which the catfish and *Tilapia* remains are on the average of small individuals.

Table 4

Relative frequencies (per cent) of *Clarias* and *Tilapia* in the different size classes at Wadi Kubbaniya

	Very large		Large		Medium		Small	
Site	Clarias (>75 cm SL)	Tilapia (>45 cm SL)	Clarias (50-75 cm SL)	Tilapia (30-45 cm SL)	Clarias (25-50 cm SL)	Tilapia (15-30 cm SL)	Clarias (<25 cm SL)	Tilapia (<15 cm SL)
E 78-2	2.9	-	24.6	-	72.5	-	-	-
E 78-3	0.4	-	11.8	7.0	84.0	87.0	3.8	6.0
E 78-4	-	-	18.3	6.0	76.9	90.0	4.8	4.0
E 81-1	3.4	-	42.4	-	52.5	96.5	1.7	3.5
E 81-4	-	-	-	0.7	55.7	88.4	44.3	10.9
E 82-3	-	-	2.7	2.0	78.5	84.8	18.8	13.2

Small samples not included.

This also is in agreement with the biology of the fish: adults migrate first into the main channel. At least two of these sites, E 81-3 and E 81-4 are situated near a shallow basin that may have contained water for a considerable period of the year. Because of the comparable composition of the ichthyofauna (high percentage of *Tilapia*, *cf.* Table 1), the fish found at Makhadma 4 is also considered as taken from residual pools rather late within the post-flood season. Moreover, the fish from this site are mostly of small size. All the material from Late Palaeolithic sites of Egypt and Sudanese Nubia should be re-analysed (size estimations) to allow for similar statements about the periods of floodplain fishing. The low percentage of *Tilapia*, however, seems to indicate that long lasting residual pools such as found at Wadi Kubbaniya and Makhadma 4 were absent.

Protopterus lungfish were not found at the above mentioned sites, but even today they are rare north of Khartoum. The easiest ways to capture lungfish is the use of striking and wounding gear when floodplain waters are shallow, or to dig the aestivating animals out of their burrows later in the year when their habitat has dried out.

As still is the case today, fishing on the main channel will have been practised when the water was low, for reasons of access, but also because the main Nile waters are less turbulent then. Fishing equipment suitable for the capture of large Nile perch, *Synodontis* and *Bagrus* are hooks, harpoons and nets. With the possible exception of hook and line, the successful use of this gear seems difficult without the help of rafts or boats. Harpoon fishing from the shore is possible, but some fish, especially large Nile perch, occur only exceptionally inshore. All Early Khartoum sites (Shabona, Khartoum Hospital, Saggai) have yielded bone harpoons; at Khartoum Hospital small (line?) sinkers of fired clay were found. Not a single hook made of Nile bivalves was found in these sites; the earliest evidence for such fish hooks comes from Khartoum Neolithic sites. This does not exclude, however, that fishing with hooks was practised during the Early Khartoum as perishable materials such as acacia thorns may have been used. It is possible that during the Early Khartoum times fishing on the main Nile was practised from rafts; during the Khartoum Neolithic dug-outs may have appeared as indicated by the presence of tools for hollowing wood since that period. Direct archaeological evidence for rafts or boats is not available, however.

With the exception of Catfish Cave (Wendt 1966), no bone harpoons have been found at the Epipalaeolithic sites in Egypt and Sudanese Nubia, but this may be a result of the small number of settlements excavated until now and of the poor preservation of the bone recovered so far. The main technological innovation of the Epipalaeolithic is the manufacture of microliths, some of which may have been hafted into wooden sticks to obtain wounding gear suitable for fishing (arrow, harpoon).

All the open water forms are here considered as taken from the main channel. In reality some of them may also have been captured on the floodplain during maximum high water. If this was the case, it might be better to speak of deep water fishing versus shallow water exploitation. Technologically, however, this makes no difference as in both environments the same fishing gear as well as boats or rafts were necessary. In case deep water fishing in the floodplain was practised, main river fishing may have been less considerable than indicated by the percentages of open water forms. The biological data, however, indicate that not all these fish can come from the floodplain, as certain species and especially their large adults do not enter the alluvial plain.

Preparation and preservation of the fish

Archaeozoological evidence for preparation or conservation of fish from archaeological sites along the Nile is scarce so far. The intraskeletal distributions of the fish remains already studied shows a constant scarcity of catfish vertebrae. With the abundant material from Wadi Kubbaniya it was possible to demonstrate that this underrepresentation must be considered as a result of lesser preservation chances of vertebrae in comparison with catfish head bones and with vertebrae of other species. These findings are confirmed by a comparable underrepresentation of the catfish vertebrae from pre-Quaternary sites. Decapitation, drying and subsequent removal of fish bodies from the sites seems hence not to be involved. Even on archaeological sites with permanent habitation (protohistoric sites of Koyom in Chad and Sou in Cameroun) catfish vertebrae are extremely rare. Ethnographic evidence for decapitation of catfish in Africa is also difficult to collect. Moreover, removing a catfish head may be rather difficult if only stone tools are available.

It is very likely that fish were dried after capture as is still done today. Either sun or smoke drying may have been practised. For the latter way of preparation evidence may be present at Makhadma (*cf.* Vermeersch, Paulissen and Van Neer, this volume). Loss of fish meat occurs in the first stages of drying because of the infestation by blowfly larvae. Once the fish meat is dry, dermestid beetles are attracted and within a few months leave nothing but skins and skeletons. On the basis of these observations made today, it is unlikely that dried fish will have been an all year round food supply on sites where only floodplain fishing was practised. If sufficient fish is caught at the beginning of the inundation, enough meat may be available until residual pools can be exploited. However, the fish dried at that moment will in our opinion, not preserve until the next inundation.

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