Archaeofauna 3 (1994): 109 - 113

THE IMPORTANCE OF FISHING IN THE ECONOMY OF THE FUCINO BASIN (ITALY) FROM UPPER PALAEOLITHIC TO NEOLITHIC TIMES

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ABSTRACT: The paper reviews fish remains retrieved in paleolithic, mesolithic and neolithic sites from the Fucino basin. A general scarcity of fishes in many samples as well as an almost total dominance of trouts seems to have been caused by both natural (hydrological history of the area since the Pliocene) and anthropic (fishing techniques) agents. Fishing also exhibited seasonal peaks which one can relate to the nature of the occupations detected in the area.

KEYWORDS: FISHES, PALEOLITHIC, MESOLITHIC, NEOLITHIC, ITALY, SEASONALITY, ECOLOGY

RESUMEN: El trabajo lleva a cabo un repaso a los restos de peces recuperados en yacimientos de la cuenca del Fucino desde tiempos paleolíticos hasta el Neolítico. La escasez general de peces en casi todas las muestras y la casi absoluta dominancia en las mismas de truchas parece tener causas tanto naturales (hidrografía de la zona desde el Plioceno) como culturales (tipo de artes pesqueras utilizadas). La actividad pesquera, además, presentaba una marcada estacionalidad que podemos atribuir a los tipos de ocupaciones detectadas.

PALABRAS CLAVE: PECES, PALEOLITICO, MESOLITICO, NEOLITICO, ITALIA, ESTACIONALIDAD, ECOLOGIA

The Fucino lake was situated in Abruzzo and reached its maximum dimensions during the Pliocene period. Throughout this period it still discharged into the Salto river through the Cesolino hills (717 m above sea level). Later on, at an undefined moment, when the waters diminished probably after seismic events, it became a closed basin fed by several streams. The waters disappeared through evaporation and through underground sink holes.

During the last century the lake measured 155 km^2, but the remains of prehistoric villages in the plains exposed after drying-out periods indicate that at certain moments the lake covered a smaller area. Because of the lack of an emissary, the lake was subjected to dangerous changes in level and during historic times it even increased so much that it reached over the top of the Cesolino hills and flowed into the Salto river.

During Ancient Roman times there were several projects for reclamation and, under Claudius's reign, an artificial emissary was dug to pass under Mount Salviano and flow into the Liri river. The emissary was completed in the year 52 A.D. Other work was performed under Hadrian's government, but thereafter maintenance was neglected and the tunnel became filled with debris making it useless. The lake was then dried out by Prince Alessandro Torlonia in 1875.

About 18,000 years ago the level of the waters was already considerably reduced and the caves which appeared in the rocky slopes surrounding the lake became inhabited, like the Tronci cave and the Maurizio shelter which gravel closed about 14,000 years ago, around which time a layer of volcanic ashes formed in the other caves but is not to be seen in these older ones (Radmilli, 1977).

The remains of fish belonging to this first phase are rare to find. In fact, there are none to be seen in the Tronci cave deposits and only one fragment has been found in the Maurizio shelter. Another fragment has been discovered in the Ciccio Felice cave.

The economy of these caves was based on hunting large mammals, in particular deer and equine species, though the variety of game hunted appears to have been fairly vast and included cold climate animals like marmots and ibexes.

In the Upper Palaeolithic levels of the La Punta cave the fish remains are numerous but it is in the Ortucchio cave (Cremonesi, 1968) that there is evidence of fishing being important in the economy of these populations. There is evidence, in fact, that 13,000 years ago large mammals remains began diminishing while those of small game and fish increased. This is indicative of some critical event occurring to large fauna species, probably due to climatic factors.

Fishing, known before this period though very little practised, became very important and even, in some cases, fundamental.

In the Upper Palaeolithic levels of the Maritza cave fish remains are very abundant and, along with small mammal and fowl hunting, fishing becomes the main resource of the economy during the third Bertonian phase (Grifoni & Radmilli, 1964). Immediately after this period fishing in the Maritza cave becomes once again of secondary importance whereas remains of small mammals continue to be numerous; in the Mesolithic level of the Continenza cave, however, fish remains are again to be seen in quantity. These levels may be dated at around 10,000 years ago and studies on faunal remains clearly evidence a further reduction in certain species like ibexes, marmots and aurochs (Wilkens, 1987).

Fishing finally loses its importance during the Neolithic period when it becomes a marginal activity.

In the Neolithic impressed-ware level of the Continenza cave, 785 fish remains were recognizable compared with the 9,368 found in only four squares of the Mesolithic level in the same cave. This situation is even more evident in the St. Stefano village (Neolithic impressed-ware period) near Ortucchio (Wilkens, in press) where only five fragments have been revealed. From this period on, fish remains become increasingly rare since the economy was then oriented towards other resources. At Paterno, a few fragments have been found in Neolithic pitholes with Ripoli-type pottery.

The fish remains discovered are as follows:

SITE	**FRAGMENTS**
Maurizio shelter (Upper Pal.)	1
Ciccio Felice cave (Upper Pal.)	1
La Punta cave (Upper Pal.)	36
Ortucchio cave (Upper Pal.)	1118
Maritza cave (Upper Pal.)	25046
Continenza cave (Mes.)	9368
Continenza cave (Neol.)	785
S.Stefano (Neol.)	5
Paterno (Neol.)	2
La Punta cave (Neol.)	3

These remains have been analysed both by direct comparison with present-day samples and, in the case of vertebrae, by radiographic comparison. The only species identified is *Salmo trutta* L., the trout.

Considering the enormous amount of remains examined, it appears that the trout was the only ichthic species in the lake at that time large enough to be considered of economical importance. At a more recent moment, not long before the reclamation which took place during last century, the situation had changed and tench *Tinca tinca*, barbel *Barbus barbus*, eel *Anguilla anguilla* and *Scardinius erythrophthalmus* inhabited the lake (Del Re, 1835; Agostinoni, 1908) and may have been either brought there by man or else they could have penetrated through the emissary which was opened up during Roman times or perhaps in those rare moments when the level of the lake overtook the Cesolino hill. The presence of eels suggests the existence of a continuous though insignificant connection with other flows of water. According to Phoebonius (Phoebonius 1678), trout brought into the lake through imissaries were rarely found (López, 1976).

The exclusive presence of trout in the period in question might be explained by the hypothesis that there had been an interruption in the discharge of water into the emissary during a still quite cold period, to the extent that access to the lake and to the streams it flowed into was barred to species which could survive in a temperate environment. Later on, the lake became unsuitable for trout because of the low levels of oxygen in its waters, caused by the rise in temperature during the summer months. Hence, the trout only survived in the imissaries.

The growth rings of vertebrae have been studied, to reveal a possible seasonal increase in fishing. In spite of the high number of damaged or unreadable vertebrae, the following percentages have been recorded:

	SPRING	SUMMER	AUTUMN	WINTER
Ortucchio cave	61.3%	10.8%	18.0%	9.9%
Maritza cave	63.8%	3.4%	6.2%	26.7%
Continenza Mes.	49.3%	0.9%	6.9%	42.9%
Continenza Neol.	61.5%	28.2%	2.6%	7.7%

This seasonal behaviour in fishing is not due to shifting of the fish populations but rather to economical causes. It is very likely that during the seasons when very little fishing was done, people performed other activities. In particular, the very low percentage of summer and autumn remains may be explained by some of the people moving to higher grounds to hunt mammals such as ibexes, chamois amd marmots.

As one may see, fishing was mainly a Springtime activity. At Ortucchio it was carried out at other seasons as well, especially in Autumn, whereas in the Maritza cave and in the Mesolithic level of the Continenza cave it was rare during Summer and in Autumn, though a fair amount was done in winter. The high percentage of Winter remains in these two caves may be due to the fact that the inhabitants during this season were blocked in the warmer regions around the lake. In the Neolithic level of the Continenza cave, on the other hand, there is a fairly high percentage of Summer remains, whereas the remains of fish who died during Autumn and Winter are scarce. It must be remembered that the cave was not occupied during this period.

It is quite likely that this essentially springtime fishing (together with hunting of water fowl) was also reflected on larger game hunting, thus allowing large wild mammals a certain time for relaxation during the reproductive periods, which generally take place towards late spring. Hence, a certain balance came about and allowed the survival of certain mammals throughout a critical climatic period.

Fishing becomes less important during the Neolithic period when the economies changed to production, with the introduction of domestic animals and agriculture. A similar type of situation, where trout fishing was extensively performed, is to be seen in the Upper Palaeolithic and Mesolithic levels of the Madonna a Praia a Mare cave (Durante, 1978). Besides trout, remains of eel (*Anguilla anguilla*) and gilthead (*Sparus aurata*) have also been found. Considering that this is a coastal cave, these trout may have been sea-trout which went upstream along the Noce river during their spawning period. The Praia a Mare trout were very large and are to be compared with the sea-trout found in Northern Europe and with those in the lake Garda (*Salmo trutta carpio*), whereas those in the Fucino basin were on the average smaller, as can be seen in the size of those found in the Mesolithic levels of the Continenza cave. A quadrate bone (Os quadratum) of considerable proportions was found only in Ortucchio. The smallness of the trouts in the Fucino may have been due to a lack or low quality of food (if other fish existed there they must have belonged to small-size species so that they escaped being fished by the procedures used for trout). It was not possible, however, to date their age at death because of their bad state of preservation and for the fact that they were encrusted, especially in the middle parts.

Continenza cave, Mesolithic period:

	MEAN	**RANGE**
Os linguale, width	6.22	4.2 - 11
Os articulare, width upper art.	3.82	2.8 - 5.9
Os quadratum, width upper art.	3.88	2.1 - 5.3
Os dentale, anterior length	4.60	2.1 - 8.1

At present a few subspecies of trout live in fresh water environments in Italy. The Mediterranean Sea is not suitable for this species because of its high salt content, but sometimes river trout venture far down to the sea and stay near the estuaries. Since trout reproduce during Winter, from November to December with temperatures around 5-10° C (Spillman, 1961), in the Fucino case, if we had been dealing with the anadromous form, most of the fish would have been captured in Autumn and in Winter, but in our case the majority of deaths never took place in Winter and a high percentage is only to be seen in the Mesolithic period of the Continenza cave. One is therefore led to believe that the lake was already isolated.

On the other hand, if the Tronci cave and the Maurizio shelter, which were located only slightly above the present day plain, were already inhabited 18,000 years ago, the existence of a connection with some other emissaries is rather unlikely. We are therefore dealing with a population of trout who had adapted to a lacustrine habitat following the isolation of this basin.

A less specialised type of fishing, with the presence of numerous fresh water species during this period, has been revealed in Italy through certain remains found in the Mesolithic levels of the Azzurra and Lonza caves near Trieste. Among others, remains of pike (*Esox lucius*), *Scardinius erythrophthalmus*, *Chondrostoma nasus* and tench (*Tinca tinca*) have been retrieved (Meluzzi & Wilkens, 1984a, 1984b).

While numerous objects, interpreted as weights for fish-nets, have been attributed to later periods, no such devices have been found in connection with the period in question indicating the existence of fishing activities. It is quite likely that Winter fishing was performed when the fish gathered in places which were more suitable for their reproduction. On the other hand, there are several techniques which have been used even until quite recent times in this area which leave no traces in archaeological deposits, such as fishing with bow-nets or with faggots (López, 1976). The latter technique was typical in this area and consisted in placing, during autumn, a certain number of shelter-traps made of wood poles embedded in the lake bed in circles. The space inside these circles of poles was filled to the top with faggots. Nets attached to poles were then used to capture fish who used these shelters. Cloths were sometimes stitched together and wound round the poles so that they made a sort of recipient which went from the lake bed to the surface. The faggots were then removed from the top and the fish were trapped inside, ready to be captured by various methods.

A caudal spine of *Myliobatis* sp. found in the village of St. Stefano at Ortucchio (Neolithic impressed-ware period) had no connection with fishing but rather with trading along the coastline; traces of wearing along the proximal part indicates that it might have been used as a tool.

BIBLIOGRAPHY

Agostinoni, E. (1908). *Il Fucino.* Bergamo.

Cremonesi, G. (1968). Contributo alla conoscenza della preistoria nel Fucino: la grotta di Ortucchio e la grotta La Punta. *Rivista di Scienze Preistoriche*: 145-204.

Del Re, G. (1835). *Descrizione topografica fisica economica politica dè reali domini al di qua del Faro nel Regno delle Due Sicilie.* Napoli.

Durante, S. (1978). Note on *Salmo trutta* L. in the Pleistocene of Praia a Mare (Southern Italy). *Quaternaria*: 117-121.

Grifoni, R. & A. Radmilli (1964). La grotta Maritza e il Fucino prima dell'etó romana. *Rivista di Scienze Preistoriche*: 53-127.

López, L. (1976). *Lago di Fucino e dintorni.* Japadre ed. L'Aquila.

Meluzzi, C. & B. Wilkens (1984a). La fauna. In: Cremonesi, Meluzzi, Pitti & Wilkens: Grotta Azzurra: scavi 1982 (nota preliminare). *Il Mesolitico sul Carso triestino*: 28-36. Italo Svevo ed. Trieste.

Meluzzi C. & B. Wilkens (1984b). La fauna. In: Meluzzi, Pitti, Radmilli & Wilkens: Il Mesolitico nella grotta Lonza. *Il Mesolitico sul Carso triestino*: 121-123. Italo Svevo ed. Trieste.

Phoebonius M. (1678). *Historiae Marsorum libri tres, una cum eorundem Episcoporum catalogo.* Napoli.

Radmilli, A.M. (1977). *Storia dell'Abruzzo dalle origini all'età del Bronzo.* Giardini ed. Pisa.

Spillman, C. (1961). Poissons d'eau douce. *Faune de France.* Paul Lechevalier ed. Paris.

Wilkens, B. (1987). *Il passaggio dal Mesolitico al Neolitico attraverso lo studio delle faune di alcuni siti dell'Italia centro-meridionale.* Doctorate Thesis, Pisa.