Y-II2

COLONIZATION OF ISLANDS BY EARLY MAN AND ITS EFFECT ON THE ENVIRONMENT

P.Y. SONDAAR° and M.D. DERMITZAKIS°°

° Institute of Earth Sciences, Budapestlaan 4, Utrecht (Netherlands)
°° Subfaculty of Earth Sciences, Panepistimiopolis, Athens (Greece)

From the Pleistocene a host of endemic faunas are known, having in common a low diversity in taxa in which the large mammals are mainly represented by elephant, deer and hippo.

The clearest examples of such faunas are found on islands in the Mediterranean, the Japanese archipelago, Philippines and the Indonesian archipelago (Dermitzakis & Sondaar, 1978, 1985).

Commonly paleoecological conditions on islands have led to the development of faunas with dwarfed species, showing a low gear locomotion due to the lack of large carnivores (Sondaar, 1977).

It is clear that such faunas with slow moving dwarfs are ver vulnerable if large predators enter the island environment and mostly a sharp break in faunal composition can be observed after mans arrival on the island, marked by extinction of many islands endemics. This is extremely clear when neolithic man colonized the islands and brought its live-stock.

The settlement of the Mediterranean islands by Man is generally considered a relative recent event in human history and it was neolithic Man who left its traces on the larger islands about 8000 years ago and this farmer is mostly seen as the first colonizer of the islands (Cherry, 1981).

However, recent discoveries proove an earlier presence on the island Sardinia (Arca et al., 1982; Sondaar et al., 1986) and a model is presented why only Sardinia of the Mediterranean islands could support a paleolithical hunter-gatherer population (Sondaar et al., in press; Sondaar in press).

Pleistocene Man on islands with an endemic impoverished (Middle Pleistocene) island faunas is also known from different islands in S.E. Asia. The question arises if the arrival of this Pleistocene hunter-gatherer on the islands caused also extinctions between the island endemics and why some islands were colonized and others not.

The fauna and flora of Pleistocene islands in S.E. Asia and the Mediterranean were restricted and in case of colonization by a Man a constant food supply is the first requirement. On an island the hunter-gatherer was probably more dependent on animal protein in his diet, which means that an equilibrium between the local fauna and Man is needed. Obviously the island must not be too small. The find of Paleolithic artefacts (Arca et al., 1982) and a Paleolithic settlement on the island of Sardinia together with an endemic unbalanced island fauna with mainly deer and the "hare" Prolagus (Sondaar et al., 1984) has made it possible to study a Pleistocene island environment in which an equilibrium existed between the local fauna and Man.

The size of Pleistocene Sardinia must have been large enough to maintain a large population of Prolagus and overkill did not occur. On other islands in the Mediterranean like Crete and Cyprus endemic Pleistocene mammals like dwarf elephants, hippos and deer are found together with murids (Sondaar, 1977). The latter were too small to be a potential food source for man. If Paleolithic Man had arrived on these islands, the dwarf mammals would have been an easy prey and would have been quickly reduced in number and the source of food would have become too small to support a hunter-gatherer population. The logical consequence would be that Paleokithic Man would have had to leave the island, the re-establisment of the deer, elephant and hippo populations must have taken at least several years, since the reproduction rate in these groups is low.

Only those islands are suitable for permanent colonization by Pleistocene Man if exploitation of the natural resources on the island can support viable human population over a larger period without exhausting the resources. On islands with an endemic unbalanced fauna with a low diversity, the presence of a mammal, large enough in size, with a high reproduction rate is essential for a possible permanent settlement of a hunter-gatherer population. The ochotonid Prolagus of Pleistocene Sardinia/Corsica fulfilled this requirement. Together with its size and not situated that far from the mainland. Sardinia/Corsica was the only island suitable for colonization by paleolithic Man in the Mediterranean.

References

Arca, M., F. Martini, G. Pitzalis, C. Tuveri & A. Ulzega (1982) - Paleolitica dell' Anglona (Sardegna Settentrionale). Richerche 1979-1980. Quadarni, 12, pp. 58, fig. 27.

Cherry, J.F. (1984) - The initial colonization of the West Mediterranean islands in the light of island biography and Paleogeography. In: B.A.R. International series 229. The Deya Conference of Prehistory. p. 7-29, Oxford.

Dermitzakis, M.D. & P.Y. Sondaar (1978) - The importance of fossil Mammals in reconstructing Paleogeography with special reference to the Pleistocene Aegean Archipelago. Ann. Geol. Pays Hell., 29, 2, p. 808-840. Athens.

Sondaar, P.Y. (1977) - Insularity and its effect on mammal evolution. In: Hecht, M.K. et al. eds., Major patterns in Vertebrate evolution, p. 671-707, London.

Sondaar, P.Y., M. Sanges, T. Kotsakis & P.L. de Boer (1986) - The Pleistocene deer hunter of Sardinia. Geobios, 19 (1), p. 17-25, Lyon.

Sondaar, P.Y. & M.D. Dermitzakis (1985) - Quaternary insular fossil Mammals and their Paleogeographical implications. Biologia Gallo-Hellenica, vol. 10, p. 369-386. Athens

Y-III1

A CONTRIBUTION TO THE KNOWLEDGE OF SARDINE JUVENILE STAGES IN THE EASTERN ADRIATIC

Ivo KACIC, Gorenka SINOVCIC and Veronica ALEGRIA

Institute of Oceanography and Fisheries, Split (Yugoslavia)

Juvenile sardine (*Sardina pilchardus* Walb.) started to occur in mass along the eastern Adriatic coast at the beginning of May 1983. Mass occurrence of juvenile sardine was recorded from the area of Istra (northern Adriatic) to the bay of Kaštela (middle Adriatic).

Juvenile fish were caught in large quantities completely beyong control. About 500 tons of juvenile sardine were caught from the Novigradsko more (middle Adriatic) that year.

The exact time of the occurrence of juvenile sardine varies from one year to another. Thus they occurred as early as in February in 1981. from June to September in 1983 and from April on in 1984.

All the analysed catch samples showed the fish of length smaller than that permitted by the Marine Fisheries Law.

This situation raises a number of questions to be solved, as to what quantity amounts the total stock of juvenile sardine in the areas where-from they are recorded, for how long to they keep in these areas and wether they hibernate there or not.

The occurrences of juvenile sardine in the close vicinity of the coast were recorded earlier but very rarely and never in mass (Ercegović, 1940, Mužinić, R., 1954, Karlovac,J., 1967, Kačić, 1972).

Already obtained data

The data were collected from the bay Novigradsko more include the length distribution, age structure and weight-length relationship of juvenile sardine population.

The total length of juvenile sardine from the eastern Adriatic ranged from 5,5 cm to 11,0 cm and weight from 2,3 g to 10,6 g.

Length frequency curves are bimodal and unimodal, symetrical prevailing. Dominant modal values were 7,5 cm (50%) and 8,5 cm (33%) (Fig.1).

All the individuals were in the first year of age or a bit older than a year probably due to a rather long spawning time of adult sardine.

Allometric relationship between length (L) and weight (W) of juvenile sardine from the eastern Adriatic was obtained by the expression: $W=aL^b$

Where b is allometric factor and a the constant.

Positive allometry was established (b=3,4260, r^2=0,9966).

As seen in Fig. 2 growth in length is particularly pronounced in juvenile sardine from the eastern Adriatic up to 4,0 cm during what time gain little in weight. From 4,0 cm to 10,0 cm weight gain is much more pronounced and particularly pronounced at lengths exceeding 10,0 cm.

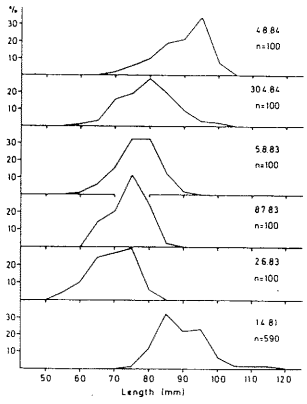

Fig.1. Length frequency distribution in the samples of juvenile sardine catches from Nivigradsko more

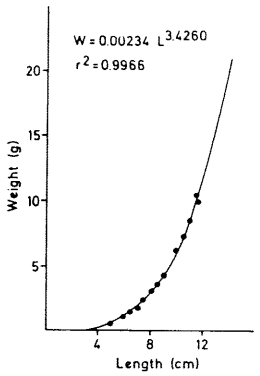

Fig.2. Length-weight relationship of juvenile sardine from Novigradsko more

Bibliography

Ercegović, A., 1940. Ishrana srdele (*Clupea pilchardus* Walb.) u stadiju metamorfoze. God Oceanogr. inst., 2:26-44.

Kačić, I., 1972. The behaviour, distribution and quantity of sardines in the bay of Kaštela. Acta Adriat., 14 (10): 32 p.

Karlovac, J., 1967. Etude de l'oecologie de la sardine, *Sardina pilchardus* Walb., dans la phase planctonique de sa vie en Adriatique moyenne. Acta Adriat., 13 (2): 112 p.

Mužinić, R., 1954. Contribution á l'étude de l'oecologie de la sardine (*Sardina pilchardus* Walb.) dans l'Adriatique orientale. Acta Adriat., 5 (10) : 219.

Y