

This paper not to be cited without prior reference to the authors

International Council for
the Exploration of the Sea

C.M.1977/L:7
Plankton Committee
Ref. Pelagic Fish
(Southern) Committee

ABUNDANCE AND DISTRIBUTION OF SARDINE EGGS AND LARVAE
OFF NORTHWEST AFRICA, APRIL - MAY 1973.

by .

P. RUBIES* and I. PALOIERA*

INTRODUCTION

During the last decade the distribution area of sardine (Sardina pilchardus WALB.) along the coast of NW Africa has been considerably extended southwards, especially since 1972, and has become the most abundant and the most economically important pelagic species between Cabo Bojador and Cap Blanc. This expansion has been recorded and its causes discussed by several authors (CONAND, 1975; HOLZLOHNER, 1975; BLACKBURN and NELLEN, 1976; DOMANEVSKY and BARKOVA, 1976).

ATLOR III cruise, on board the R/V "Cornide de Saavedra" in April-May 1973, was the first one of a series in which we made an intensive study of the ichthyoplankton in this area. The hydrographic conditions and other oceanographic data observed during the cruise can be found in CRUZADO (1974) and CRUZADO and MANRIQUEZ (1974). In this paper, the results on the distribution of sardine eggs and larvae are presented.

* Instituto de Investigaciones Pesqueras, Paseo Nacional s/n
BARCELONA, SPAIN.

MATERIAL AND METHODS

A total of 46 oblique hauls were made with a 60 cm. diameter Bongo net fitted with a 333 μ m and a 505 μ m mesh size nets. The hauls were made from 300 m. or bottom to surface. The speed of the ship during the haul was 2 knots, and the fishing gear was hauled at 10 m./min. when the station depth was 100 m. or less, and at 20 m./min. in all other cases.

The amount of water filtered was estimated by means of one T.S.K. flowmeter placed at each net opening.

RESULTS AND DISCUSSION

The distribution of eggs and larvae per square meter of sea surface (number per cubic meter multiplied by the maximum depth reached during the haul) is shown in the figures.

In the case of eggs, the distribution shown is the result of computing the average between both nets, having verified previously that there was no significant difference between them.

With regard to larvae, they have been represented separately owing to the different capturing capacity of both nets. Actually, the 505 μ m mesh size net allows part of the larvae smaller than 3.5 mm.SL to escape through the mesh. It is somewhat more effective, however, in capturing larvae larger than 9 mm.SL than the 333 μ m net (RUBIES and PALOMERA, 1975).

The distribution of the eggs shows that spawning takes place mainly over depths from 25 to 80 m. in accordance with previous observations (FURNESTIN and FURNESTIN, 1959; BLACKBURN and NELLEN, op. cit.). The distribution of eggs, but, in general, showing a displacement in the direction of the prevailing currents (SW). Furthermore, their occurrence is extended to the shelf edge area, where practically no eggs were found. In this case, we are concerned, in general, with the larger larvae.

An interesting point in the distribution obtained is the existence of two clearly delimited spawning zones - the first one, in the neighbourhood of Cabo Bojador, and the second, much less important, in the southern part of the studied area. These zones remain separated by a great central empty space where no sardine eggs and larvae were found. However, we do not think this reflects the existence of two independent populations having distinct spawning grounds, although this possibility can not be disregarded. Nevertheless, the sardine population living in the area studied belongs to the so-called stock C during the CECAF meeting held in February 1976 (BRAVO DE LAGUNA et al., 1976). This stock is distributed from Cabo Bojador to the south of Cap Blanc. On the other hand, the reason that could explain the absence of sardine eggs and larvae in the central zone does not appear clear so far. The distribution of the different oceanographic variables obtained during the cruise does not seem to provide any satisfactory explanation, as it would be the existence of upwelling centers in this zone, or inadequate temperatures for the spawning of this species. It could simply be a transient situation due to rather fugacious environmental conditions. It should be said, finally, that the samples of this zone were also very poor in zooplankton in general.

All the possibilities considered above should be taken into account in the future. The results of subsequent cruises, in course of study at present, will provide further information on this matter.

As for the intensity of spawning, it can be considered as very strong if we take into account that the main spawning period in this area occurs in November-December, and the season in which our study was made corresponds to the spring maximum, much less important than the winter one. Concretely, the amount of spawning in April 1973 according to DOMANEVSKY and BARKOVA (op. cit.) represented about 8 % of the annual total.

RESUME

ABONDANCE ET DISTRIBUTION D'OEUFs ET LARVES DE SARDINE DANS LES CÔTES DU NW D'AFRIQUE, AVRIL-MAI 1973.

La population de sardine du NW. d'Afrique s'est considérablement étendue vers le Sud au cours des dernières années, devenant l'espèce économiquement plus importante dès Cabo Bojador au Sud de Cap Blanc. Les oeufs et larves de ce poisson récoltés pendant la croisière ATLOR III font l'objet de cette note.

La distribution des oeufs et larves montre l'existence de deux aires de ponte. On discute les différentes possibilités qui pourraient expliquer cette distribution.

REFERENCES

- BLACKBURN, M. and W. NELLEN, 1976. "Distribution and ecology of pelagic fishes studied from eggs and larvae in an upwelling area off Spanish Sahara". U.S. Fish. Bull., 74 (4): 885-896.
- BRAVO DE LAGUNA, J., M.A.R. FERNÁNDEZ y J.C. SANTANA, 1976. "Actividad de la flota pesquera española en aguas del banco Sahariano durante 1975. Estado actual de las poblaciones de animales de interés comercial". Inf. Pesq., 6, 35 pp.
- CONAND, F., 1975. "Distribution et abondance des larves de clupéidés au large des côtes du Sénégal et de la Mauritanie en septembre, octobre et novembre 1972". I.C.E.S., C.M. 1975/3:4, 9 pp.
- CRUZADO, A., 1974. "Coastal upwelling between Cape Bojador and Point Durnford (Spanish Sahara)". Tethys, 6 (1-2) 133-142.
- CRUZADO, A. y M. MANRIQUEZ, 1974. "Datos hidrográficos de la campaña "ATLOR III" en la región de afloramiento entre Cabo Bojador y Punta Durnford". Res. Exp. Cient. B/O Cornide, 3: 89-115.

RESUME

ABONDANCE ET DISTRIBUTION D'OEUFs ET LARVES DE SARDINE DANS LES COTES DU NW D'AFRIQUE, AVRIL-MAI 1973.

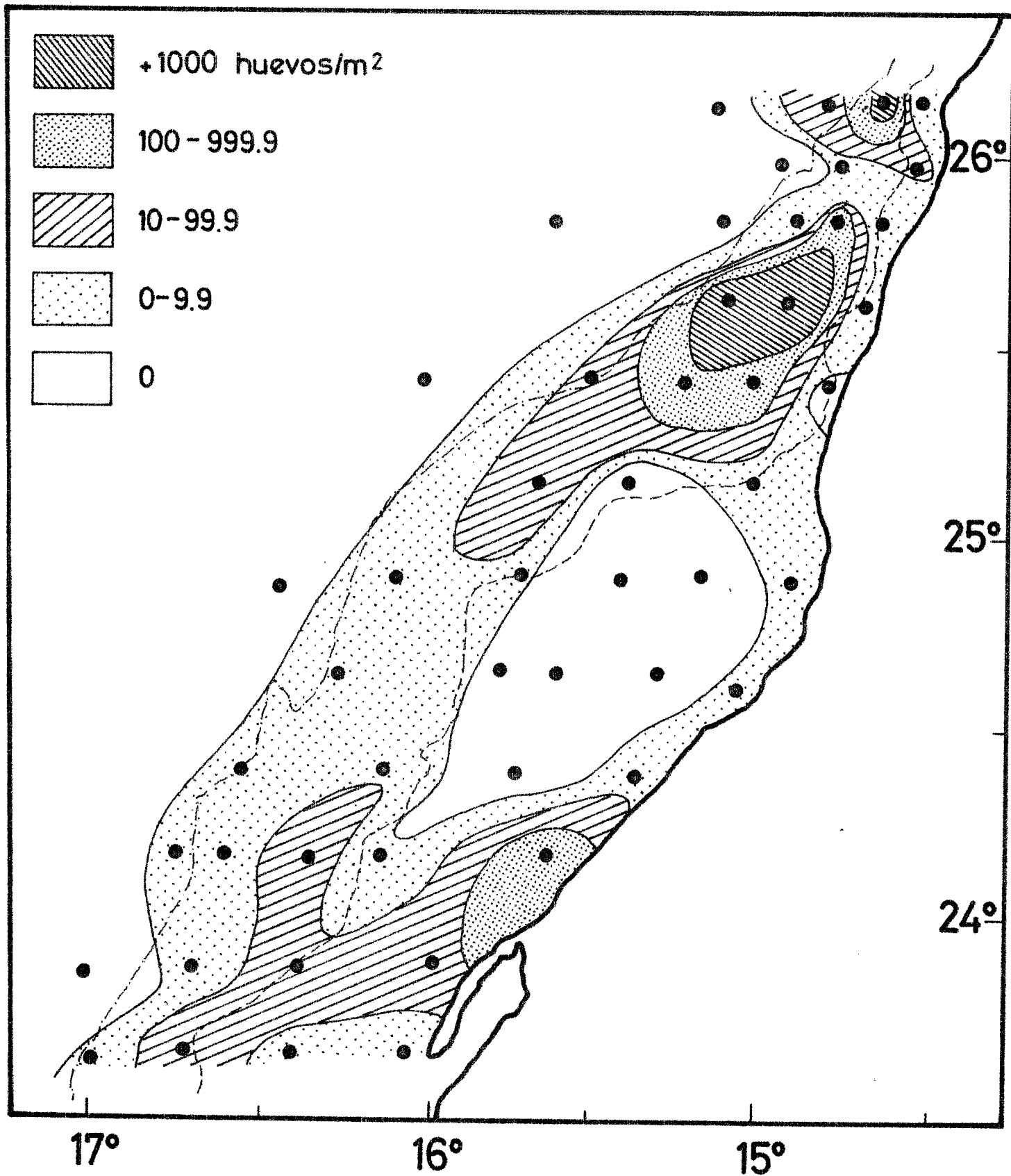
La population de sardine du NW. d'Afrique s'est considérablement étendue vers le Sud au cours des dernières années, devenant l'espèce économiquement plus importante dès Cabo Bojador au Sud de Cap Blanc. Les oeufs et larves de ce poisson recoltés pendant la croisière ATLOR III font l'objet de cette note.

La distribution des oeufs et larves montre l'existence de deux aires de ponte. On discute les différentes possibilités qui pourraient expliquer cette distribution.

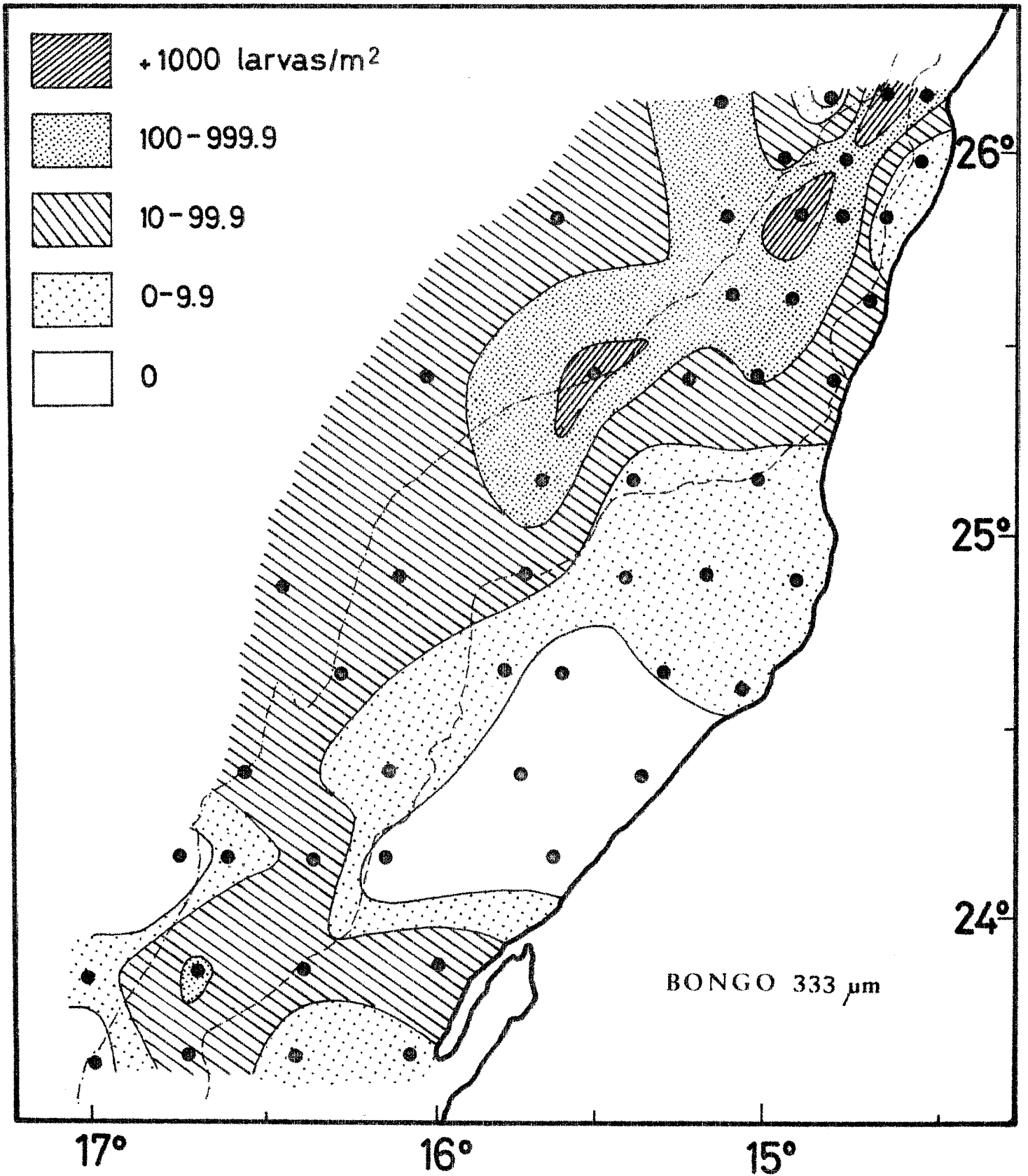
REFERENCES

- BLACKBURN, M. and W. NELLEN, 1976. "Distribution and ecology of pelagic fishes studied from eggs and larvae in an upwelling area off Spanish Sahara". U.S. Fish. Bull., 74 (4): 885-896.
- BRAVO DE LAGUNA, J., M.A.R. FERNANDEZ y J.C. SANTANA, 1976. "Actividad de la flota pesquera española en aguas del banco Sahariano durante 1975. Estado actual de las poblaciones de animales de interés comercial". Inf. Pesq., 6, 35 pp.
- CONAND, F., 1975. "Distribution et abondance des larves de clupéidés au large des côtes du Sénégal et de la Mauritanie en septembre, octobre et novembre 1972". I.C.E.S., C.M. 1975/J:4, 9 pp.
- CRUZADO, A., 1974. "Coastal upwelling between Cape Bojador and Point Durnford (Spanish Sahara)". Tethys, 6 (1-2) 133-142.
- CRUZADO, A. y M. MANRIQUEZ, 1974. "Datos hidrográficos de la campaña "ATLOR III" en la región de afloramiento entre Cabo Bojador y Punta Durnford". Res. Exp. Cient. B/O Cornide, 3: 89-115.

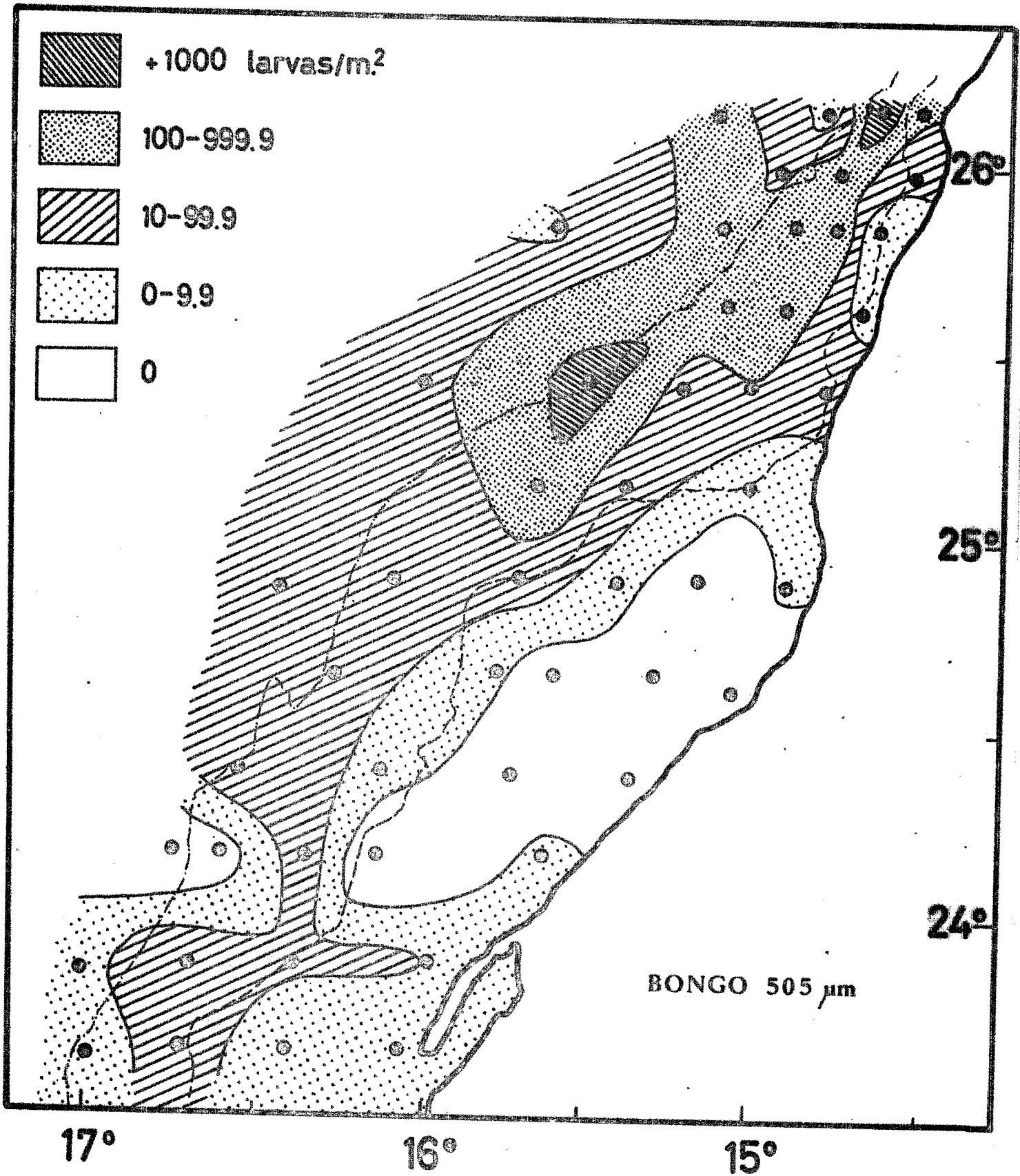
- DOMANEVSKY, L.N. and N.A. BARKOVA, 1976. "Some peculiarities of sardine (Sardina pilchardus WALBAUM) distribution and spawning along the Northwest Africa". I.C.E.S., C.M. 1976/J:6, 15 pp.
- FURNESTIN, J. et M.L. FURNESTIN, 1959. "La reproduction de la sardine et de l'anchois des côtes atlantiques du Maroc (saisons et aires de ponte)". Rev. Trav. Inst. Pêches marit., 23 (1): 79-104.
- HOLZLOHNER, S., 1975. "On the recent stock development of Sardina pilchardus WALBAUM off Spanish Sahara". I.C.E.S., C.M. 1975/J:13, 17 pp.
- RUBIÉS, P. et I. PALOMERA, 1975. "Variation journalière dans la capture d'ichthyoplancton sur une station du plateau continental saharien (croisière ATLOR III, avril-mai 1973)". I.C.E.S., C.M. 1975/L:3, 9 pp.



Distribution of sardine eggs. Average numbers between 333 μm and 505 μm mesh size nets.



Distribution of sardine larvae captured by the 333 μm mesh size net.



Distribution of sardine larvae captured by the 505 μm mesh size net.