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A NOTE ON THE DML DISTRIBUTION AND CATCHES OF *Sepia bertheloti* AND *Sepia officinalis* (CEPHALOPODA: SEPIIDAE) ON THE SAHARAN BANK.

by

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ABSTRACT

Cephalopod species were sampled from commercial catches in Saharan Bank waters during August 1989 and March 1990. Biological and fishing data were recorded. In this paper we analyse some of the biological data with respect to *Sepia officinalis* and *S. bertheloti* in the fishing Area 34.1.3, above all the data relative to size distribution and migration pattern of both species.

Sepia officinalis was important in catches only second in importance to *Octopus vulgaris*, whereas *S. bertheloti* was relatively circumstantial in catches. The size distribution of *Sepia officinalis* was similar between both periods, but *S. bertheloti* showed a larger range of sizes in the Summer. On the other hand, while *Sepia bertheloti* migrates to shallow waters to spawn during Summer, *S. officinalis* seems to do so during Winter and Spring.

INTRODUCTION

Along the Saharan coast, between 21° 20'-26° N (Central North-east Atlantic Ocean), there has been intense fishing of cephalopod species, mainly of *Octopus vulgaris*, *Sepia officinalis* and *Loligo vulgaris*, from the early Sixties (Bas *et al.*, 1970). Although other species can also usually be found in the catches such as *Sepia bertheloti*, *Illex coindetii*, *Todaropsis eblanae*, *Todarodes sagittatus*, etc., these are not the object of fishing on an industrial scale.

In relation with the catches of species of the family Sepiidae, *Sepia officinalis* (including the two subspecies *S. officinalis officinalis* and *S. officinalis hierredda*) is the most important species for the Northwest Africa fishery (Fishing Area 34). In 1981, these catches amounted to about 29,000 metric tons, most of which are believed to have been *S. officinalis* (Roper et al. 1984). We have a large amount of biological data on this species as reported in several scientific papers (Hatanaka 1979, Pascual 1978; Caddy 1981, Roper et al. 1984, amongst others). On the other hand, *Sepia bertheloti* is less abundant in the catches and not a great deal is known about the biological parameters of this species in the area under discussion.

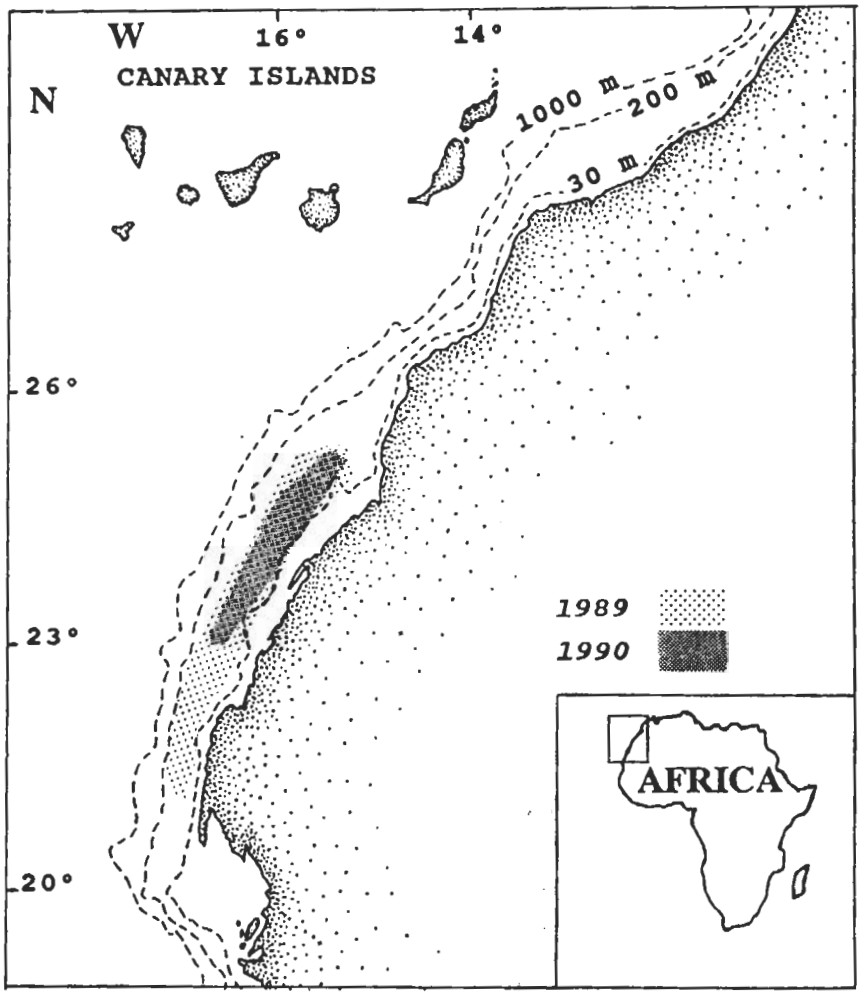

Figure 1.- Positions of thows in 1989 and 1990 surveys.

In this paper we give some biological and fishing data of *Sepia bertheloti* and *Sepia officinalis* in the Fishing Area 34.1.3 of CECAF based on two fishing surveys on board of Spanish commercial bottom trawlers completely devoted to the capture of cephalopods.

MATERIAL AND METHODS

During August of 1989 and March of 1990 samples were taken of the cephalopod species caught by commercial bottom trawl vessels. The fishing gear used was of the traditional type to be expected on this kind of vessel using 60 mm of mesh (measured in diagonal and stretched) at the cod-end. The area from which the samples were taken in the Summer of 1989 extends from 21°25' and 24°55' N and a second area in the Winter 1990 between 23°03' N and 24°51' N (Fig. 1). The range of depths at which the vessels worked was between 16-140 m(August 1989) and 16-100 m (in March 1990).

The samples were taken at random using a box under the cod-end precisely previous to the opening. Due to the small quantity of *Sepia bertheloti* caught, almost all specimens were measured. The dorsal mantle length (DML) of each specimen was recorded to the nearest mm. Moreover, data of the depth at which fished, latitude and the catch of each species and class by throw were also recorded, including those in which cephalopod specimens were not measured.

RESULTS

The range of sizes observed in catches of *Sepia bertheloti* was 7.7-14.6 cm of DML during August 1989 (Fig. 2a) and 6.0-11.0 cm of DML during March 1990 (Fig. 2b). During the fishing survey of August 1989 a high proportion of the *S. bertheloti* were large in size and were caught at depths between 25 and 50 m (Fig. 3a). In March 1990 the majority caught were small in size and were caught over a wider range of depths (25 and 65 m) (Fig. 3b).

The distribution by length of *Sepia officinalis* was less variable during both fishing surveys with none being caught at depths beyond 75 m (Fig. 5a, 6). During August 1989 two well differentiated size categories could be distinguished, with modes in 9 and 16 cm DML followed by a third group which was more poorly represented in catches (28-36 cm DML) (Fig. 4a). However, in March 1990 the differentiation between size classes was less clear with almost complete continuity between 7 and 15 cm DML. A third group was more easily distinguishable on this occasion, with specimens between 22 and 28 cm DML and others still larger (Fig. 4b). The size range observed over both fishing surveys was between 5 and 37 cm DML. This range and the average size are nearly the same that that observed at the begining of 70s (Hernández-García & Bas, 1993).

The analysis of distribution by depth of *Sepia officinalis* shows that during August 1989 there was a tendency on the part of the large specimens to be found at greater depths than the smaller specimens (Fig. 5a and 5b). However, when the same analysis is made in relation with latitude it is observed that the larger specimens are to be found mainly south of 23° N (Fig. 5c) coinciding with catches of octopus of a large size. In March 1990 there

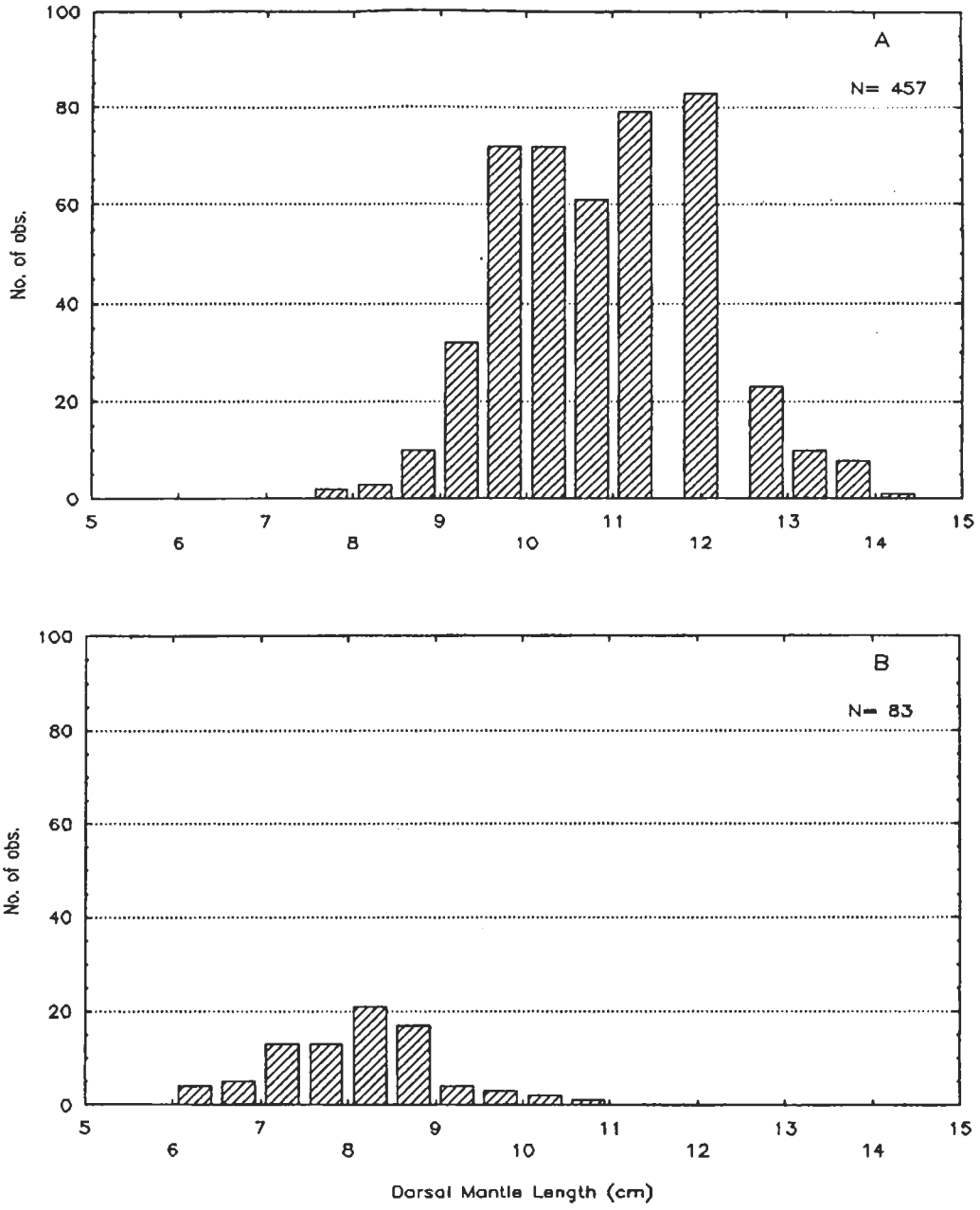

Figure 2.- DML distributions of *Sepia bertheloti* in August 1989 (A) and March 1990 (B). N is the number of specimens measured.

Table 1: Total catch per fishing survey (August 1989 and March 1990) and cephalopod species in kilograms. N is the number of throws.

Year	N	*Octopus*	*vulgaris*	*Loligo*	*vulgaris*	*Sepia*	*officinalis*	*Sepia*	*bertheloti*
		kg	%	kg	%	kg	%	kg	%
1989	86	12645	87.0	1220	8.4	615	4.2	60	0.4
1990	58	4355	71.3	70	1.1	1635	26.8	45	0.7
TOTAL	144	17000	82.3	1290	6.2	2250	10.9	105	0.5

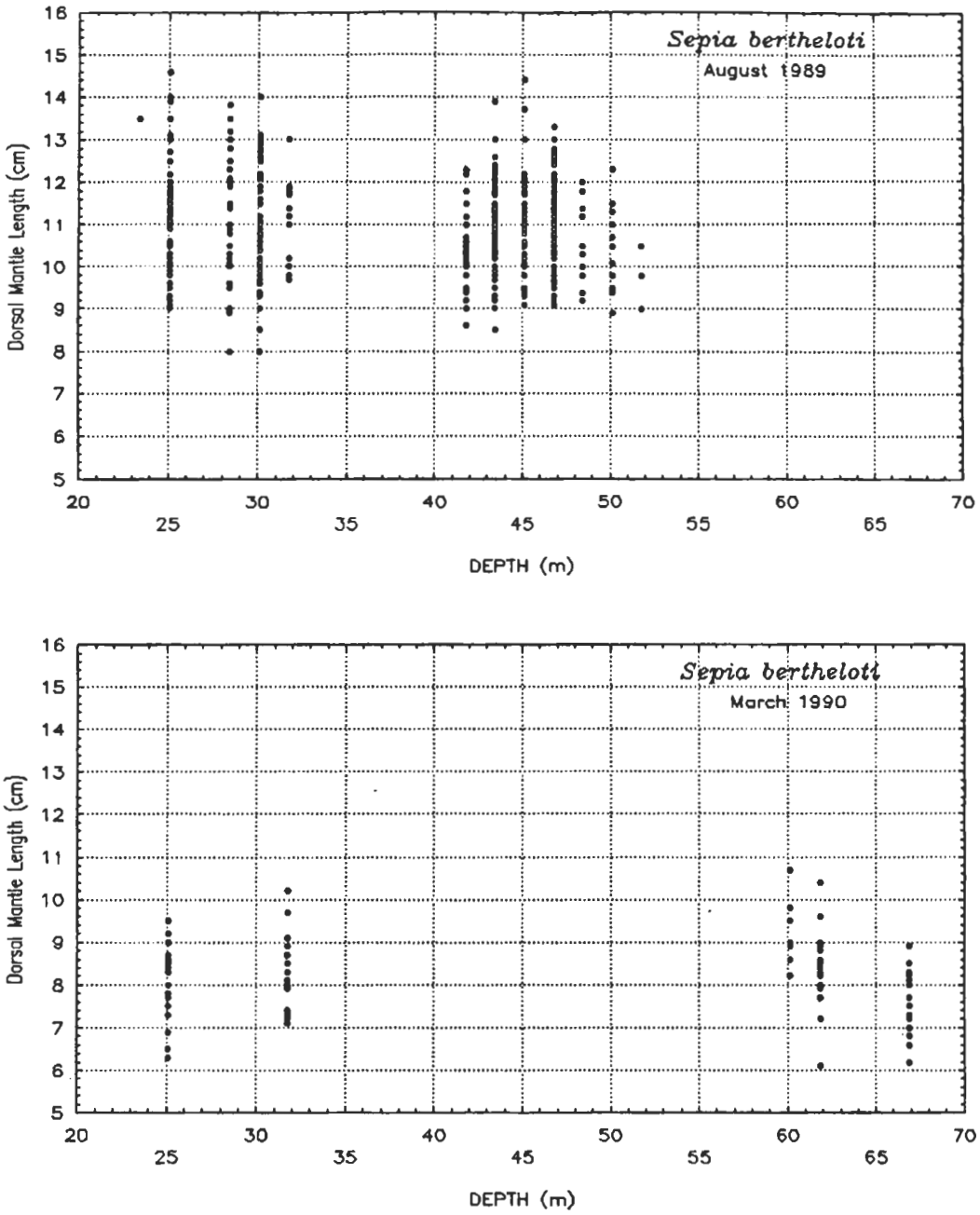

Figure 3.- Size distribution by depth of *Sepia bertheloti* in 1989 (A) and 1990 (B).

is no difference between the latitudinal distribution of small, middle size and large specimens (Fig. 6). During this latter period nearly whole catches of *S. officinalis* were to be found concentrated at between 20 and 34 m depth, being only a small quantity catched dowm 35 m; and though those last specimens were not measured each one, they were bigger than 20 cm DML animals. The contribution of *Sepia bertheloti* to the total catch of cephalopods was poor during both fishing surveys, representing barely 0.5 % (Table 1) whereas the contribution of *S. officinalis* was much more important. The latter represented 10.9 % of total catch although during March 1990, it was 26.8% of the total catch.

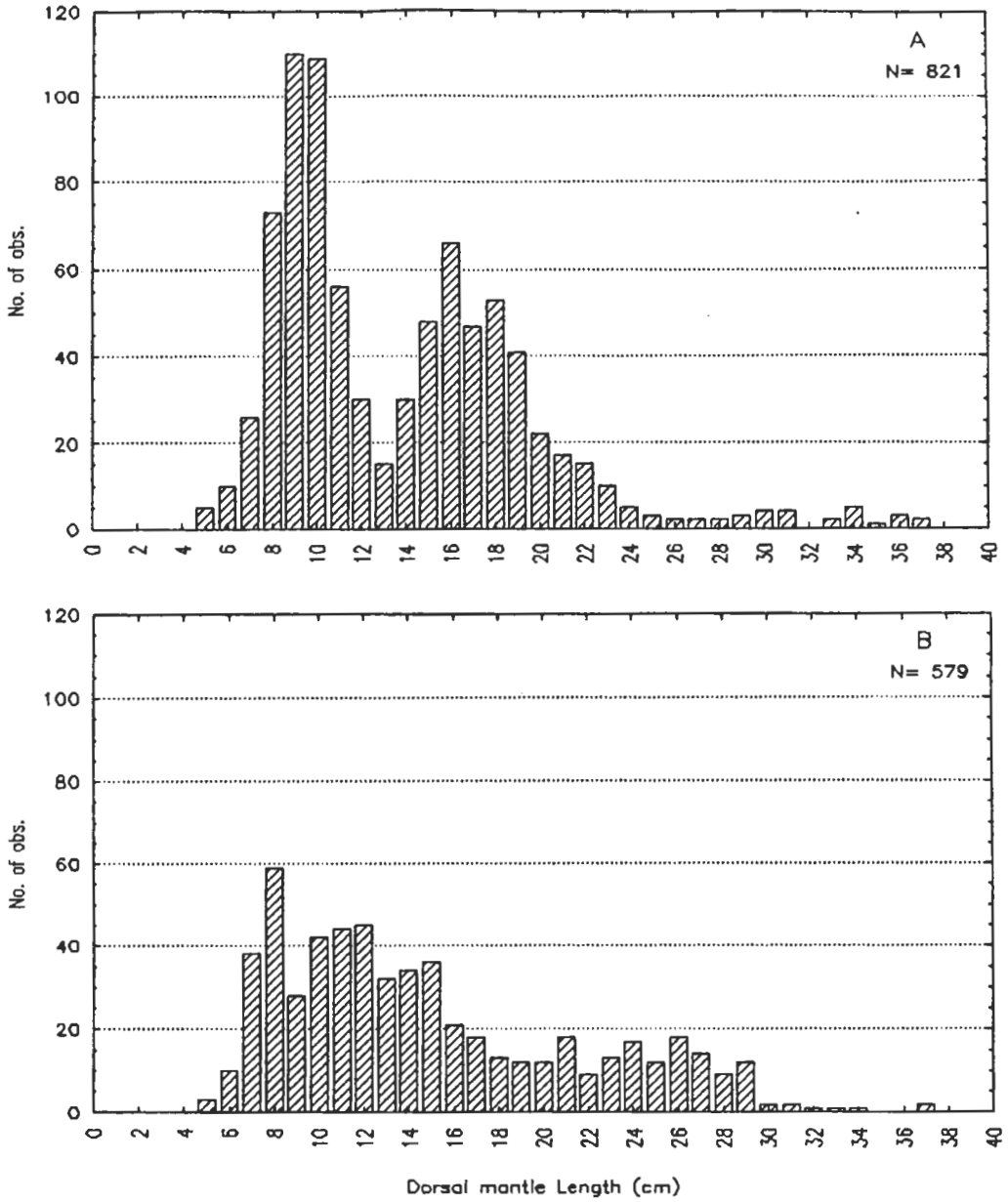

Figure 4.- DML distributions of *Sepia officinalis* in August 1989 (A) and March 1990 (B). N is the number of specimens measured.

DISCUSSION

Sepia officinalis and *S. bertheloti* are demersal, neritic species which are to be found predominantly on sandy to muddy bottoms from the coastline to about 200 m depth. *S. officinalis* is abundant in the upper 100 m whereas *S. bertheloti* is most abundant between 70 and 140 m depth (Roper et al. 1984). Although, during both two fishing surveys the last one species never was fished deepest than 67 m (Fig. 2b).

Sepia bertheloti is found along the coast of West Africa from the Canary Islands (28° N) to southern Angola (14° S), while the spatial distribution of *Sepia officinalis* is from the North Sea, along the coasts of Europe, into the Mediterranean southward to Cape Verde (15° N). The spawning season of *S. bertheloti* extends through Summer and into Autumn while *S. officinalis* spawns on the Sahara Banks between January and April (Roper & Sweeney, 1981).

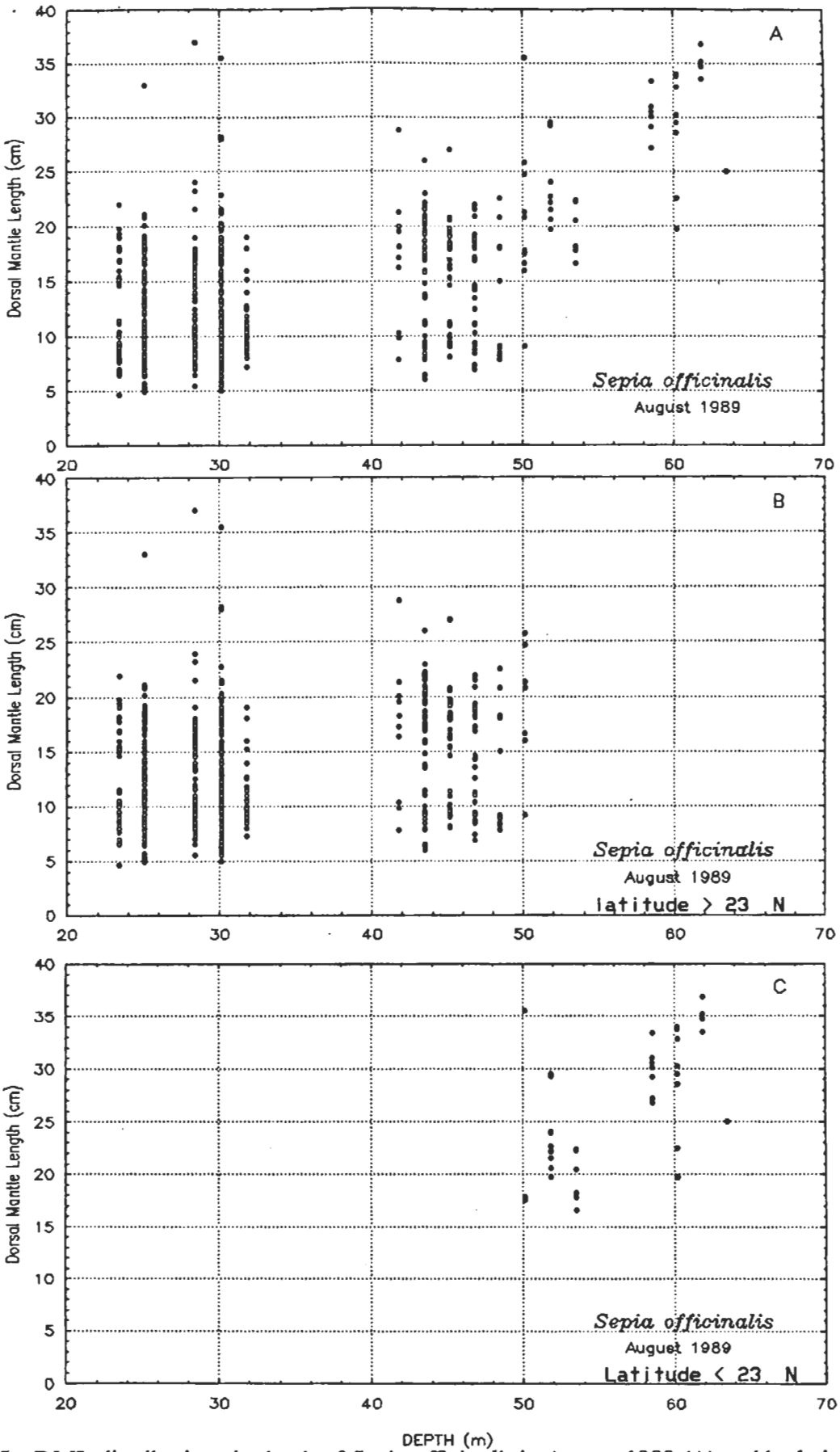

Figure 5.- DML distributions in depth of *Sepia officinalis* in August 1989 (A) and by latitude (B and C).

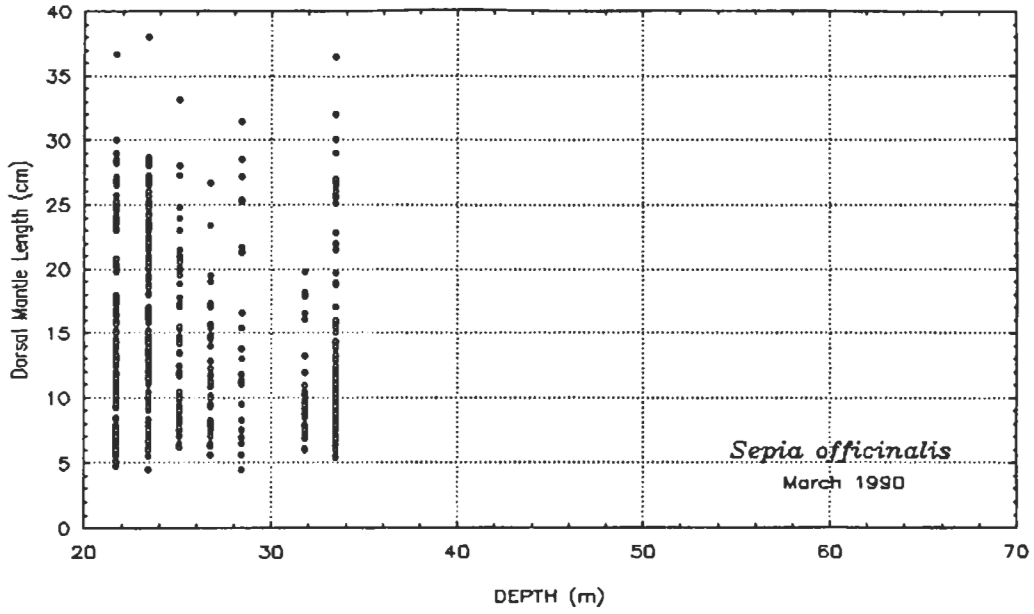

Figure 6.- DML distributions in depth of *Sepia officinalis* in August 1990.

The percentage of *Sepia bertheloti* in the total catch of cephalopods was poor, representing some 0.5 % (Table 1) whereas the contribution of *S. officinalis* ranked second in importance to the *Octopus vulgaris* in the catches with bottom trawls mainly aimed at the capture of benthic cephalopods.

Catches of specimens of a large size of *Sepia officinalis* (heavier than 2000 g) were generally to be found where large-sized specimens of *Octopus vulgaris* (heavier than 2800 g) were also present whereas small-sized specimens (less than 200 g) were generally found together with middle-sized octopus (over 700-1000 g). However, the presence of *Sepia bertheloti* in the throw was generally (except once) related to an absence of *S. officinalis* in the same throw.

The results obtained show an evolution in the distribution by size of *Sepia bertheloti* between March and August, the period in which the larger-sized specimens were to be found. From the data of March 1990 it became evident that we were dealing with small-sized specimens. During the Summer, the spatial distribution of *S. bertheloti* is appreciably more coastal than in the Winter which is possibly due to the displacement of the adult specimens to shallower waters in search of spawning grounds on the rocks, seagrass or seaweed.

The Sepia officinalis has a much more homogeneous distribution by size as can be seen from both of the fishing surveys, with no report of catches beyond 75 m depth. In the August 1989 survey, three clearly differentiated size categories were to be observed (Fig. 4a). This was not the case in the March 1990 survey where the division between size classes was not so obvious, with a marked continuity between 7 and 15 cm DML (Fig. 4b). In this second survey, also, there was a marked presence of a third size group made up of specimens over 22 cm DML (Fig. 2b). The distribution of *S. officinalis* in depth shows a tendency for the larger specimens to be located at greater depths in the August 1989 results. However, if the analysis is graded by latitude, we can observe that the larger specimens tend to be caught

in throws south of 23° N and that they coincide with the catches of large-sized octopus. It was not possible to establish a distribution of size groups by latitude in the March 1990 analysis, due to the fact that adults and juveniles of *S. officinalis* were basically caught at between 20 and 30 m depth with no clearly defined difference in latitude.

Our data suggest a seasonal migration north-south in *Sepia officinalis* similar to that reported by Bakhaykho & Drammeh (1982) in the population of Senegal and which is combined with a displacement from offshore to inshore in the spawning season. The adults leave the deeper areas to spawn in shallow waters at the end of Winter through to the Spring. In the Summer the larger specimens migrate to deeper waters in the South probably in search of food.

REFERENCES CITED

Bakhaykho, M. and O. Drammeh (1982). Eléments de biologie et d'identité des populations de seiches (*Sepia officinalis hierredda*) des côtes Séné-gambiennes. *CECAF/ECAF Ser.*, (82/24): 142-172.

Bas, C., E. Morales y J. San Feliú (1970). Pesquerías de cefalópodos en el Banco Sahariano. *Publ. Téc. Direc. Gen. Pesca Marítima*, Nº 9: 129-151.

Caddy, J.F. (1981). Some factors relevant to management of cephalopod resources off West Africa. Dakar, *FAO/TECH*/81/37: 46 p.

Hatanaka, H. (1979). Spawning season of cuttlefish, *Sepia officinalis officinalis* Linné, off the northwestern coast of Africa. CECAF/ECAF Ser., (78/11): 63-74.

Hernández-García, V. y C. Bas (1993). Análisis de la evolución de las tallas de los cefalópodos explotados en la costa del Sáhara (División 34.1.3 de CECAF) entre los períodos 1967-70 y 1989-90. *Bol. Inst. Esp. Oceanogr.* 9(1): 215-225.

Pascual, E. (1978). Growth and feeding of laboratory reared Sepia officinalis. *Invest. Pesq.*, 42(2): 421-442.

Roper C.F.E. and M.J. Sweeney (1981). Cephalopods. In: *FAO species identification sheets for fishery purposes. Eastern Central Atlantic, fishing areas 34, 47 (in part)*; edited by W. Fischer, G. Bianchi & W.B. Scott, Canada Funds-intrust. Ottawa, Dept. fisheries and Oceans Canada, by arrangement with FAO of United Nations, Vol. 6.

Roper C.F.E., M.J. Sweeney and C.E. Nauen (1984). FAO species catalogue. Vol. 3. Cephalopods of the world. An annotated and illustrated catalogue of species of interest to fisheries. FAO *Fish Synop.*, (125) Vol. 3: 277 p.