

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

International Council for
the Exploration of the Sea

C.M.1976/G:5
Demersal Fish (Southern)
Committee, Ref. Plankton
Committee

EGGS AND LARVAE OF TWO SPECIES OF SOLEIDAE FROM OFF NW AFRICA:
MICROCHIRUS OCELLATUS AND M. AZEVIA (PISCES, PLEURONECTIFORMES).

by

M.I. PALOMERA* and P. RUBIES*

INTRODUCTION

The ATLOR III oceanographic cruise, carried out by the R/V "Cornide de Saavedra" in April-May, 1973 on the Saharan continental shelf, is part of a program for the analysis of the ecosystem of this area of upwelling. Ichthyoplankton studies are one of the subjects concerned.

Analyzing the samples from the above-mentioned expedition, two types of Soleidae larvae which were not yet described in the literature appeared. Their identification and description are given in the present article.

The location of the stations visited during the cruise and the hydrographic data obtained can be found in CRUZADO and MANRIQUEZ (1974).

MATERIALS AND METHODS

Fish eggs and larvae were sorted out from plankton samples preserved in 6% formalin, neutralized with sodium tetra-

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

borate. These samples were obtained from each station using a 60 cm diameter Bongo net fitted with a 333 μ m and a 505 μ m mesh size nets.

Standard length (SL) was measured in all larvae using an ocular micrometer and series of the most representative stages were selected for description.

Drawings were made with a Wild drawing attachment. Some advanced-stage specimens were cleared and stained using the trypsin-alizarin method according to TAYLOR (1967) in order to determine the meristic counts (vertebrae and fin ray numbers).

RESULTS

Microchirus ocellatus (L.)

329 specimens from 1.98 to 8.43 mm SL have been observed, from yolk-sac to metamorphosing larvae.

1.98 mm (fig. 1B). This is a yolk-sac larva with a small yolk sac and a few oil globules and pigment spots on it. Eyes are still unpigmented and symmetrical. The gut forms a right angle just behind the yolk sac and there does not seem to exist any communication with the exterior. The mouth is not yet formed. Some individual chromatophores are present on the head and along the body, with a small group of them on the caudal peduncle. The pigmentation of the primordial fin, which is fairly large, is a very important and characteristic feature of this species, for it remains constant in the course of development as far as the beginning of metamorphosis. It consists of three dorsal and two ventral spots.

2.30 mm (fig. 1C). The eyes are presently pigmented and the yolk material has been absorbed. Mouth and anus are open. The gut has the usual shape in Soleidae, with its characteristic coil. The air-bladder is clearly visible. Pectoral fins have appeared. There is an increase in pigmentation, but the distribution of the pigment is similar to that in the preceding

stage. The five spots on the primordial fin seem to be constituted by some stelliform chromatophores. Likewise, a line of pigment appears on both the dorsal and ventral body margins and the abdominal pigmentation is more abundant.

3.83 mm (fig. 1D). The number of chromatophores increases, especially on the dorsal and ventral body margins, where they form two rows of stelliform chromatophores. The air-bladder and pectoral fins have increased in size and there are some dispersed pigment spots on them.

4.56 mm (fig. 1E). The urostyle flexion and the formation of caudal fin rays have started, and the same can be said about the pterygiophores of dorsal and anal fins. Abdominal and lateral pigmentation of the head is heavier.

5.14 mm (fig. 2A). The formation of dorsal, anal and caudal fin rays is occurring. The urostyle flexion is nearly completed and the group of chromatophores on it is disappearing. The remaining pigmentation maintains its position and quantity, similar to the preceding stage, with an increase of pigment spots on body margins.

6.79 mm (fig. 2B). At this stage the formation of dorsal, anal, and caudal fin is achieved, but we are unable to determine whether the ossification of the vertebrae is fully completed or not. Dorsal and anal fins still remain joined to the caudal fin. The anterior portion of dorsal fin is separating from the head to allow the migration of the left eye (indicated in the figure by transparency). The pigmentation is similar to the preceding stages, but the chromatophores on the dorsal and anal fins are dispersing. The abdominal area is reduced and below it the ventral fins have appeared.

8.24 mm (fig. 2C). The specimen represented is in metamorphosis. Both eyes are on the right side, but the migration of the eye is not yet completed. Small groups of chromatophores appear on the bases of the dorsal and anal fins. The ventral fins continue to develop.

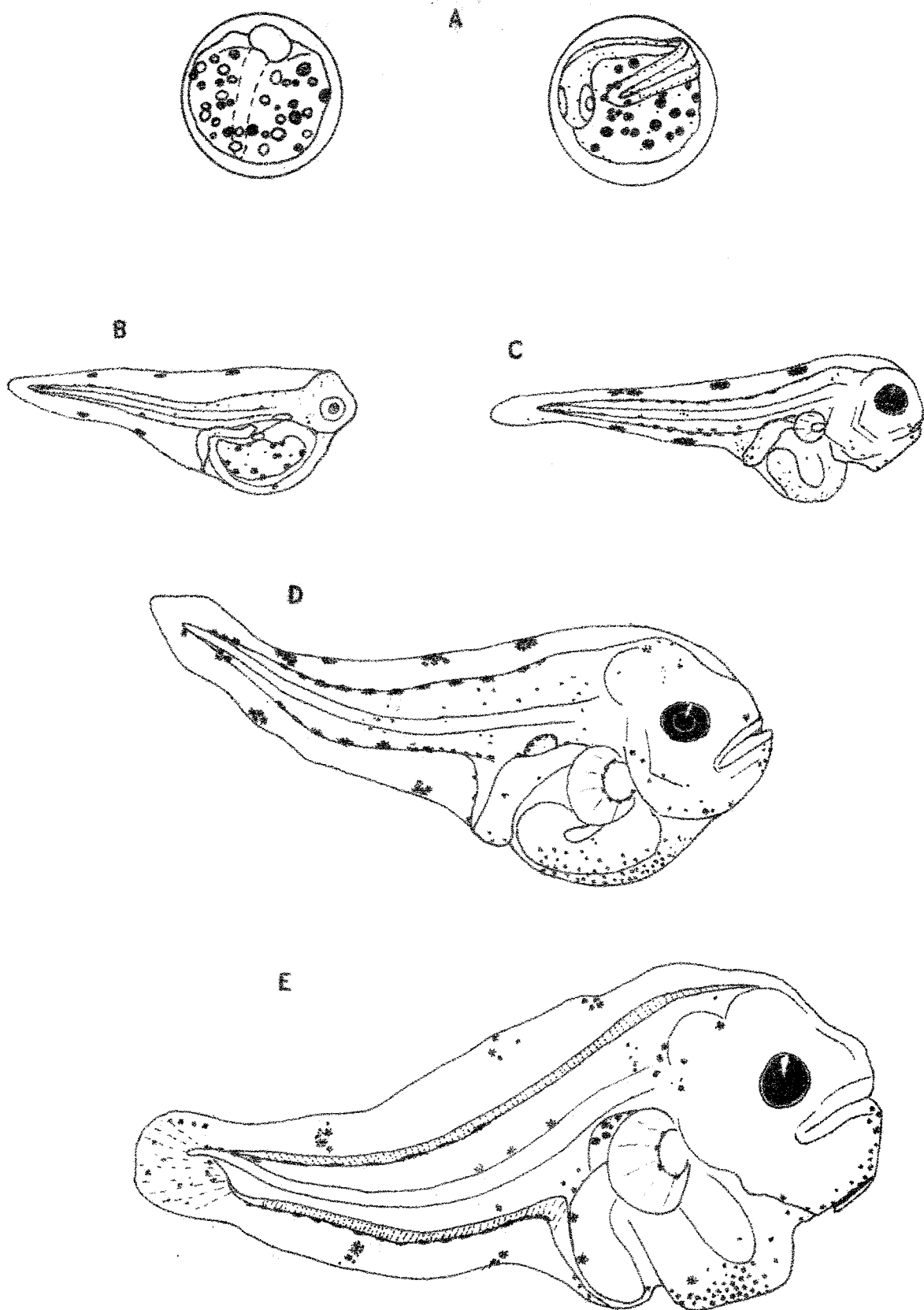
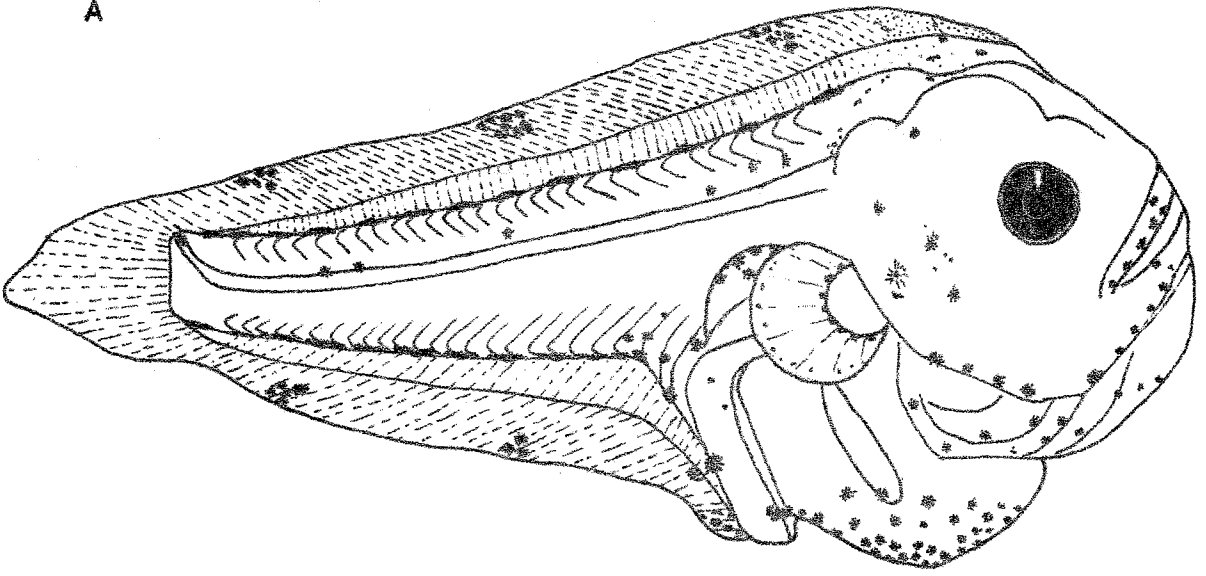
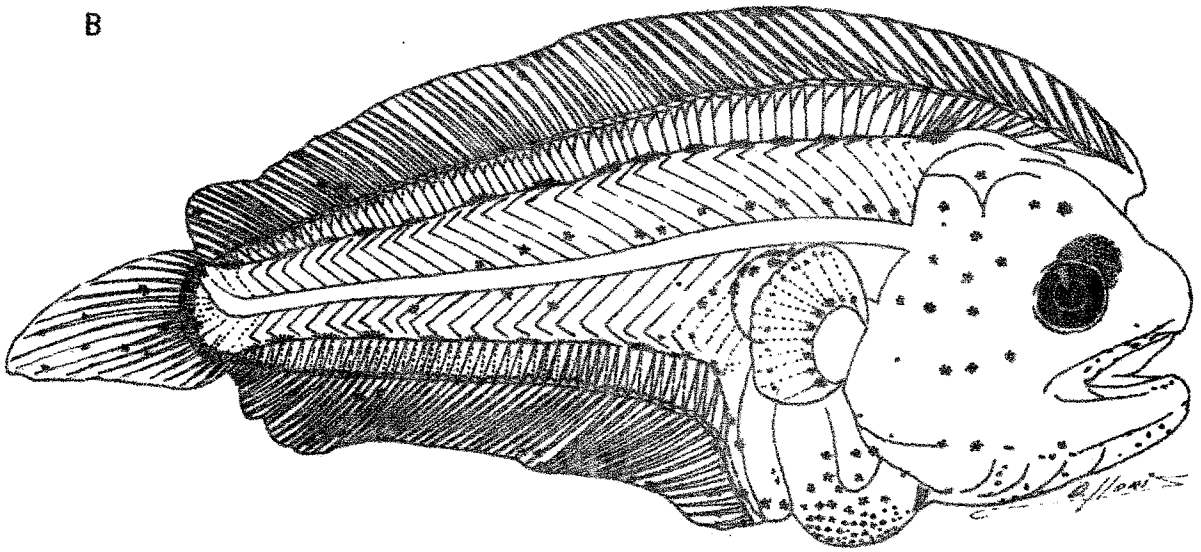


Fig. 1.- Microchirus ocellatus. A) Egg, 0.98 mm. diam. Two different stages of development. B) Yolk-sac larva, 1.98 mm. SL. C) Larva, 2.30 mm.SL. D) Larva, 3.83 mm.SL. E) Larva, 4.56 mm.SL.

A



B



C

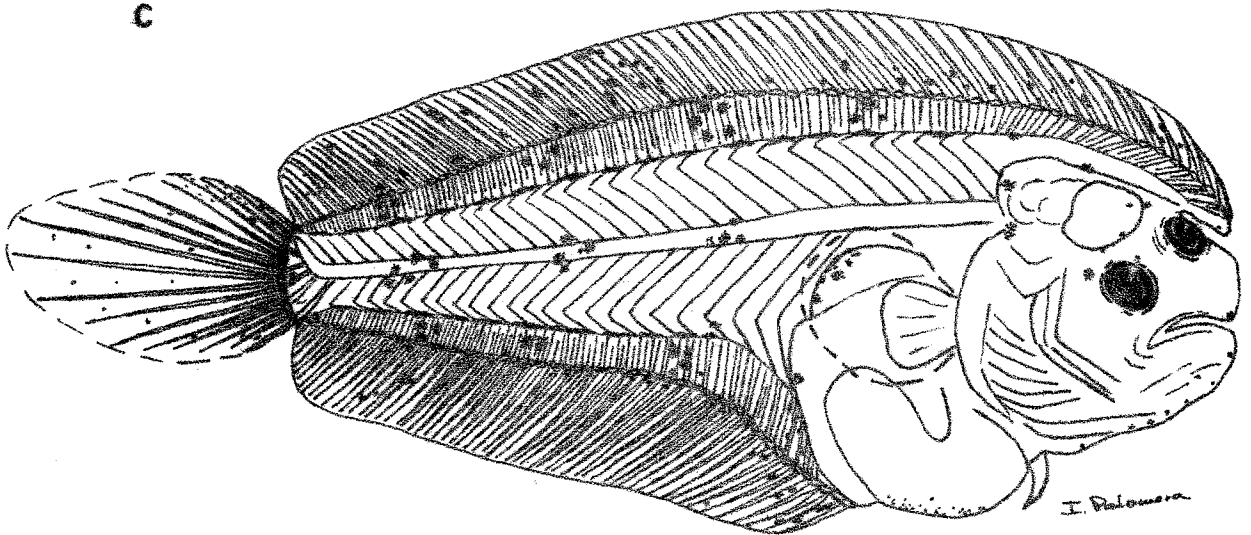


Fig. 2.- Microchirus ocellatus. A) Larva, 5.14 mm.SL. B) Larva, 6.79 mm.SL. C) Metamorphosing larva, 8.24 mm. SL.

The series displayed above, especially its characteristic pigment pattern, does not agree with any larval development described in the literature. Since we had some advanced larvae with well-formed and highly ossified fin rays and vertebrae, it was possible to obtain the meristic data from cleared and stained specimens.

The results obtained are as follows:

Dorsal fin : 72-73 rays
Anal fin : 56-57 rays
Vertebrae : 34-37 (8-9 abd. + 26-28)

According to these data, and taking into consideration the Soleidae present in the area studied, our larvae could belong to any of the following species: Microchirus ocellatus, Solea hexophthalma, and Buglossidium luteum. S. hexophthalma has a slightly greater number of vertebrae and, according to ABOUSSOUAN (1972), the pigment pattern is different, whereas B. luteum, described in PADOA (1956), is well known and easily recognizable, clearly distinct from the larvae discussed here.

These considerations together with the lack of a description of the larval development of M. ocellatus in the literature (TORCHIO, 1973), lead us to the conclusion that the larvae belong to this species. Furthermore, adult specimens of M. ocellatus were caught by trawls made during this and other cruises in the same area.

This species ranked first in abundance among Soleidae larvae taken in the course of this cruise (68%). At the same time a kind of Soleidae egg not fitting former descriptions was very abundant in our samples. Indeed, among the Soleidae eggs obtained in this manner, 80% were of this type. A comparison with yolk-sac larvae, together with the fact that it was very abundant at the same stations where M. ocellatus larvae were caught, allow us to assume that this egg belongs to the same species.

It is a spherical egg (fig. 1A) measuring 0.9-1.1 mm in diameter (mean = 0.98). Its characteristics include a very narrow perivitelline space, a segmented yolk mass and from 30-40 oil globules, often arranged in small groups of two or three droplets. There are punctiform pigment spots distributed over the yolk mass. The embryo shows a pigment line on the primordial fin and a small group of pigment spots in the caudal region of the trunk, agreeing with the pigment pattern of the yolk-sac larva described herein.

Microchirus azevia (CAPELLO)

60 larvae of this type, ranging from 3 to 7.17 mm SL, have been caught. Our developmental series is not complete, for no yolk-sac larva has been found.

3.40 mm (fig. 3A). The pigmentation is abundant and distributed over the body. The primordial fin has a great number of pigment spots, which seem to coalesce in groups at the external margins. There are two rows of chromatophores on the trunk margins, large and separated in the dorsal row, smaller and more numerous in the ventral one. On the upper part of the head there is a large, characteristic chromatophore. The air-bladder is small, with some pigment spots on it. The pectoral fins are large. The gut has the usual shape, with its coil, being considerably thicker at its end.

4.75 mm (fig. 3B). At this stage the urostyle flexion and the differentiation of the caudal fin are going on, with the formation of some caudal rays. The pectoral fins are much larger than in M. ocellatus. The pigment pattern is similar to the preceding stage, but the pigment spots on the primordial fin become more marginal.

7.17 mm (fig. 3C). This is the largest specimen in our samples. Dorsal and anal fin rays are formed, as well as the vertebrae. The caudal fin has completed its development. The left eye starts to migrate to the right side. The air-bladder remains small and pigmented. The remaining pigmentation has

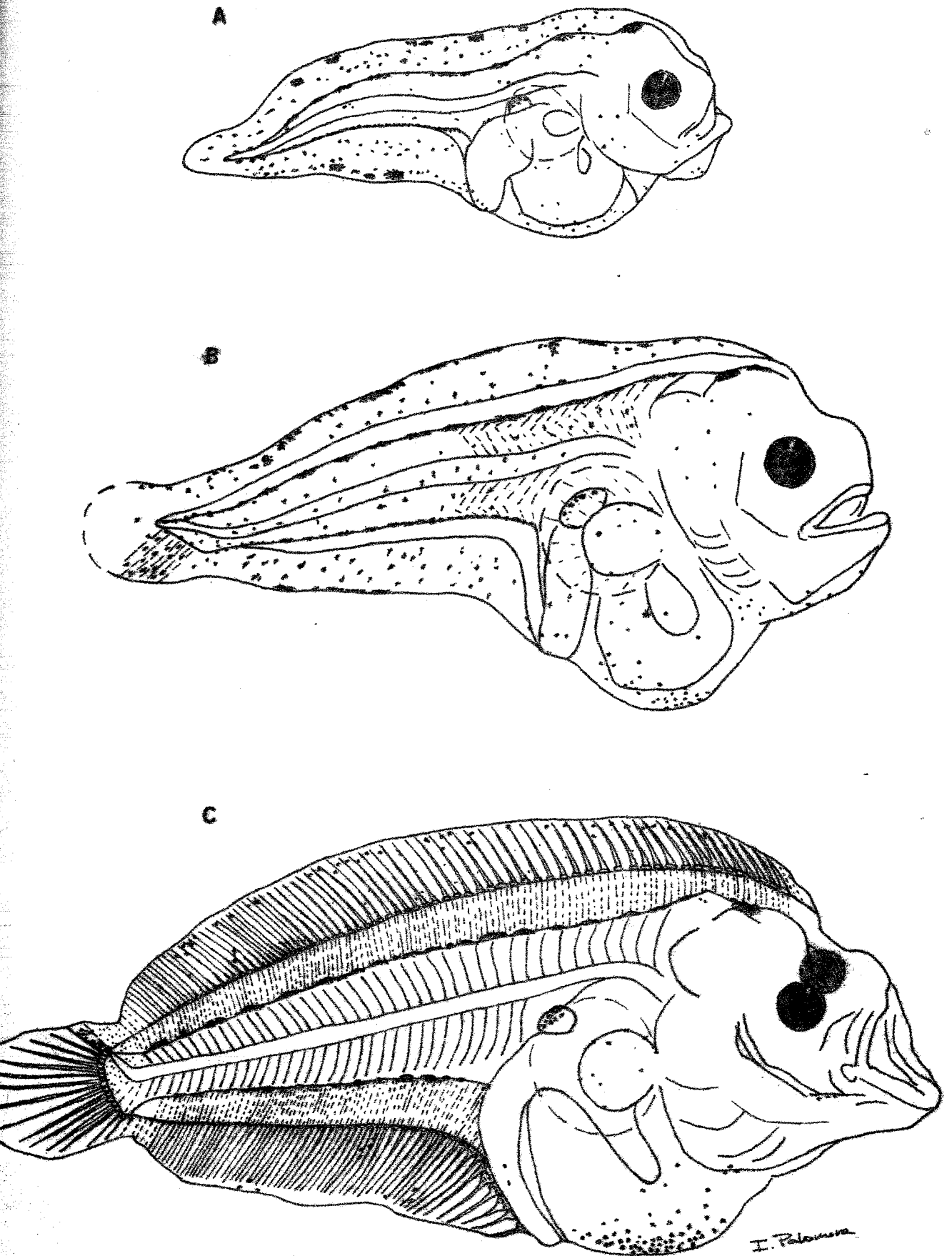


Fig. 3.- Microchirus azevia?. A) Larva, 3.46 mm.SL. B) Larva, 4.75 mm.SL. C) Larva, 7.17 mm.SL.

decreased considerably, but the large star-like chromatophore on the head remains in place.

In general, it can be said that the different developmental events take place in this species at somewhat larger sizes than they do in M. ocellatus.

The meristic counts obtained for this species are as follows:

Dorsal fin : 74-77 rays
Anal fin : 56-61 rays
Vertebrae : 41-43 (9 abd. + 32-34)

Among the Soleidae living in the area, the meristics of three species fall within these ranges: Solea senegalensis, Microchirus variegatus, and Microchirus azevia.

The possibility that these larvae belong to M. variegatus is easily rejected, for its larval development is well-known and does not agree with that of our larvae. Moreover, M. variegatus is notoriously lacking an air-bladder. With regard to S. senegalensis, the number of anal fin rays does not agree very well with our results. In addition, the pigment pattern given by ABOUSSOUAN (1972), is different.

On the other hand, the meristic data obtained from our larvae agree very well with those for M. azevia. Nothing is known about the larval development of this species and, in other respects, it turns out to be very common in the area sampled. To our knowledge CONAND (1970) has published the only notice of the occurrence of larval stages of this species, in waters off Senegal, but he does not give any description of his larvae.

ACKNOWLEDGEMENT

We are indebted to A. ABOUSSOUAN for his experienced advice and helpful discussions enabling the identification of larvae. Nevertheless, any error in our conclusions is entirely our own responsibility.

ABSTRACT

The study of plankton samples taken during the ATLOR III oceanographic cruise (April-May 1973) on the Saharan continental shelf revealed the presence of two types of Soleidae larvae not described in the literature. Their identification and description are given in the present article.

Larvae of M. ocellatus ranging from 1.98 to 8.43 mm SL were found including yolk-sac to metamorphosing specimens. The principal distinguishing feature of these larvae is the presence of three pigment spots on the dorsal fin and two on the anal fin which is maintained in the course of development. Moreover, a pelagic egg of 0.9-1.1 mm in diameter was identified as belonging to this species.

The developmental series described for M. azevia is less complete for it lacks the yolk-sac stage and the egg remains unknown. Our specimens range between 3 and 7.17 mm SL. In this case, there is not a specific distinguishing feature for these larvae, but, rather, a set of characters.

In both cases a discussion of larval identification is presented.

RESUME

DESCRIPTION DES OEUFES ET LARVES DE DEUX ESPECES DE SOLEIDES DES COTES DU N.O. DE L'AFRIQUE: MICROCHIRUS OCELLATUS ET M. AZEVIA (PISCES: PLEURONECTIFORMES).

L'examen des échantillons de plancton obtenus pendant la croisière océanographique ATLOR III (avril-mai 1973) effectuée sur le plateau continental saharien, montra la présence de deux types de larves de Soléidés non décrits dans la littérature. Leur identification et description sont données dans la présente note.

Nous avons trouvé des larves de M. ocellatus entre 1.98 et 8.43 mm de longueur (LS), allant de la larve lécitotrophique à la métamorphose. Le principal caractère distinctif de ces larves est la présence de trois taches de pigment sur la nageoire dorsale et deux autres sur la nageoire anale, ce qui demeure constant au cours du développement. Aussi, on a identifié un oeuf pélagique de 0.9-1.1 mm. de diamètre comme appartenant à cette espèce.

La série de développement décrite comme M. azevia est moins complète puis-qu'il n'y a pas de larve lécitotrophique et l'oeuf demeure inconnu. Nos spécimens vont de 3 à 7.17 mm. LS. Ici on ne trouve aucune structure distinctive spécifique de ces larves, mais un ensemble de caractères.

Dans les deux cas on discute l'identification des larves.

REFERENCES

- ABOUSSOUAN, A., 1972. "Oeufs et larves de Téléostéens de l'Ouest Africain. XII. Les larves d'Heterosomata récoltées aux environs de l'île de Gorée (Senegal)". Bull. I.F.A.N. t.34, ser. A, num. 4, pp. 974-1003.
- CONAND, F., 1970. "Distribution et abondance des larves de quelques familles et espèces de poissons des côtes sénégalaises en 1968". Doc. Sci. Prev. ORSTOM Dakar-Thiaroye, num. 26.
- CRUZADO, A. y M. MANRIQUEZ, 1974. "Datos hidrográficos de la campaña ATLOR III en la región de afloramiento entre Cabo Bojadores y Punta Durnford". Res. Exp. Cient. B/O Cornide, num. 3, pp. 89-116.
- PADOA, E., 1956. "Heterosomata. In: Uova, larve e stadi giovanili di Teleostei". Fauna e Flora del Golfo di Napoli, 38 Monografia, 3, 2.

REFERENCES

- ABOUSSOUAN, A., 1972. "Oeufs et larves de Téléostéens de l'Ouest Africain. XII. Les larves d'Heterosomata récoltées aux environs de l'île de Gorée (Senegal)". Bull. I.F.A.N. t.34, ser. A, num. 4, pp. 974-1003.

TAYLOR, W.R., 1967. "An enzyme method of clearing and staining small vertebrates". Proc. U.S. Nat. Mus. Smithsonian Institution. Washington, D.C. vol. 122, num. 3596.

TORCHIO, M., 1973. "Soleidae. In: Check-list of the fishes of the north-eastern Atlantic and of the Mediterranean (CLOFNAM, I-II)". U.N.E.S.C.O. Ed. Hureau & Monod. Paris.