

LARVAL STAGES OF *BENTHOCOMETES ROBUSTUS* (OPHIDIIDAE) FROM THE MEDITERRANEAN

by

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ABSTRACT. - Two larvae (SL 20 and 39 mm) caught by the "Dana" expedition in the western Mediterranean are illustrated and described. It is concluded that they are larval *Benthocometes robustus* (Goode & Bean, 1886) an ophidiid species hitherto only known from adult specimens.

RÉSUMÉ. - Deux larves (LS 20 et 39 mm), capturées lors de l'expédition "Dana" dans l'Ouest Méditerranéen, sont illustrées et décrites. Ce sont des larves de *Benthocometes robustus* (Goode & Bean, 1886), un ophidiidé jusqu'à présent uniquement connu d'après des spécimens adultes.

Key-words : Ophidiidae, *Benthocometes robustus*, MED, Western Mediterranean, Larvae.

The ophidiid fish *Benthocometes robustus* (Goode & Bean, 1886) is known from the tropical West Atlantic, from off Northwest Africa, and from the western Mediterranean at depths between 200 and 1000 m. The genus was revised by Bougis and Ruivo (1952 : 155) who concluded that only one species should be recognized, considering *Pteridium armatum* Doederlein, 1886 and *Sirembo muraenolepis* Vaillant, 1888 junior synonyms.

According to Gordon *et al.* (1984 : 311-312), "larvae of the neo-bythitine genus *Benthocometes* (*Pteridium*) were illustrated by Padoa (1956)". This seems not to be the case as Padoa illustrated (pl. XLV, fig. 14) a larval *Pteridium atrum* Filippi & Verany, 1859 which is a synonym of *Oligopus ater* Risso, 1810 and on p. 753 (fig. 650) the juvenile specimen from Emery (1885, pl. X, fig. 21) who with some uncertainty had named it *Pteridium atrum*. However, Cohen (1964 : 7) stated that the latter illustration does not show *Pteridium atrum*, but probably a *Benthocometes robustus*.

During a visit to the Zoological Museum, Copenhagen, one of us (S.E.) found in the "Dana" larval fish collection from the western Mediterranean two ophidiid specimens of a rather distinct type. As discussed below we refer them to *Benthocometes robustus*, showing i.a. that Emery's (1885) specimen (Fig. 1) cannot represent *B. robustus* (Fig. 2) as suggested by Cohen (1964).

MATERIAL

Material examined (2 specimens, both cleared and stained) : ZMUC P77784 (SL c. 20 mm) "Dana" st. 1124 III (37°15'N, 2°55'E), 0-50 m, pelagic, 27 Sept. 1921. - ZMUC P77785 (SL 39 mm) "Dana" st. 1132 II (36°10'N, 2°46'W), 0-60 m, pelagic, 3 Oct. 1921.

Comparative material : Holo- and paratype of *Sirembo muraenolepis* Vaillant, 1888 (MNHN 1886-523 and 524, SL 100 mm) "Talisman" haul 69, off Bojadar, NW Africa, 410 m, bottom trawl, 9 Jul. 1883. - MCZ 39284, 39298, 39299, 39305 (SL 59-95 mm), Harvard-Havanna expedition sts. 2980, 3303, 3325,

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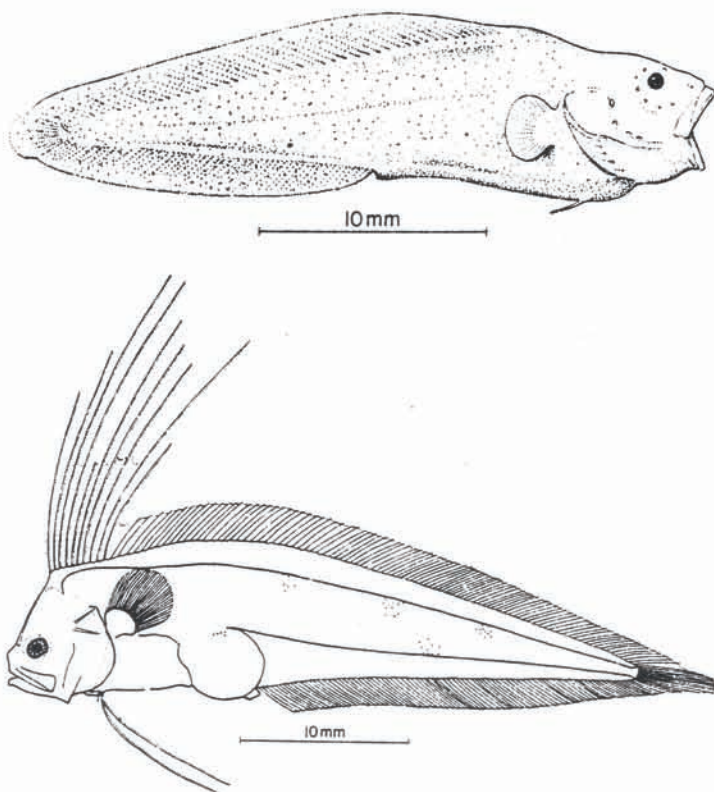


Fig. 1 : *Pteridium atrum* from Emery (1885, pl. X, fig. 21). SL 30 mm. Redrawn.
 Fig. 2 : *Benthocometes robustus*. ZMUC P77785, SL 39 mm. "Dana" st. 1132 II.

3480, off Cuba, 1938-1939. - ISH 1921/68 (SL 100-107 mm) and ZMUC P77683 (SL 95 mm) and P77786 (SL 96 mm), "Walther Herwig" st. 90/68 (24°21'S, 43°45'W), 500 m, bottom trawl, 2 Mar. 1968. - IIPB 348-350/1987 (SL 118-122 mm), 41°30'N, 3°10'E, 400 m, 14 Jun. 1967.

Abbreviations : IIPB : Instituto de Investigaciones Pesqueras, Barcelona, Spain ; IOS : Institute of Oceanographic Sciences, Wormley, Grande-Bretagne ; ISH : Institut für Seefischerei, Hamburg, FRG ; MCZ : Museum of Comparative Zoology, Harvard, USA ; MNHN : Museum National d'Histoire Naturelle, Paris, France ; ZMUC : Zoological Museum, University of Copenhagen, Danmark.

RESULTS AND DISCUSSION

Description

1. The smaller larva (SL c. 20 mm) is in a rather poor condition with broken finrays and damaged snout (Fig. 3). Its main meristic characters are given in Table I. Body elongated and compressed ; part of body with pterygiophores narrow and semitransparent. Head small, upper profile with strong projection above nostrils ; mouth large with posterior edge of upper jaw behind vertical through posterior margin of eye. Operculum posteriorly with two almost equally long spines. Dorsal and anal fins long, fully developed and joined to caudal fin ; origin of dorsal fin

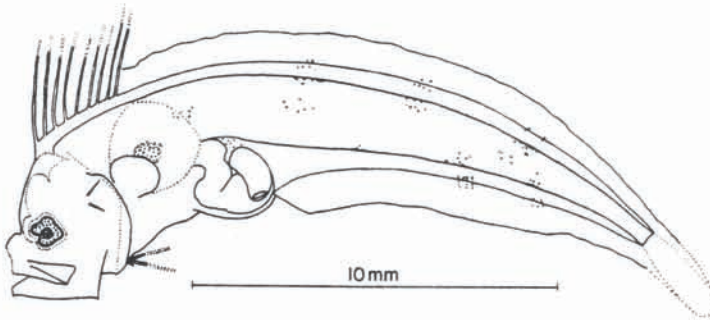


Fig. 3 : *Benthocometes robustus*. ZMUC P77784, SL 20 mm. "Dana" st. 1124 III.

Table I : Meristic characters of *Benthocometes robustus*. 1) Holotype (3rd column) and paratype (4th column) of *S. muraenolepis* Vaillant, 1888.

	Present larvae		OEE NW Africa 1)		W. Mediterranean 3 specimens	West Atlantic 8 specimens
Standard length in mm	20	39	100	100	118-122	59-107
Dorsal finrays	109	107	100	110	95-105	96-111
Predorsal pterygiophores	0	0	9	9	9	8-10
Caudal finrays	11	11	11	11	11	11
Anal finrays	86	86	86	92	79-90	84-94
Pectoral finrays	31	32-33	27	29-30	29-32	29-31
Ventral finrays	1+2	1+2	2	2	2	2
Vertebrae	12+37	11+38	12+38	11+38	11-12+37-38	11+37-39
Long rakers on anterior gill arch	-	7	10-11	10	9-10	6-10
Dorsal fin origin above vertebra no	ant. to 1st vertebra	ant. to 1st vertebra	6	4	6	6-7
Anal fin origin below vertebra no	15	16	15	14	14-16	13-15
Anal fin origin below dorsal finray no	-	29	22	22	17-19	17-21
Pseudobranchial filaments	-	-	6	6	6-7	5-7

slightly posterior to eye ; anterior nine dorsal finrays prolonged ; ventral fins behind lower tip of cleithrum each with a short spine and two longer rays with fused bases. Swimbladder placed below precaudal vertebrae nos. 5-7. Intestine short and thick with compact coil.

The pattern of diffuse spots of pigmentation appears from Fig. 3 : dorsally and ventrally three spots placed partly on caudal myomeres and partly on pterygiophores and one spot above intestinal coil ; internally one spot covering swimbladder and three spots more or less in midline situated at posterior margin of pectoral fin, below anterior dorsal spot and between second and third ventral spot.

2. The larger larva (SL 39 mm) is in a good condition (Fig. 2). Its main meristic characters are given in Table I. Body more elongate and compressed than in smaller specimen. Semitransparent part of body containing pterygiophores of dorsal and anal finrays rather broad, distinctly separated from thick, central muscle band.

Head small, upper profile concave ; strong projection above nostrils visible through skin of snout. Anterior ten dorsal finrays much elongated ; ventral fins each with one short spine and two long rays with fused bases. Swimbladder placed below precaudal vertebrae nos. 7-8.

Opercular bones shown in Fig. 4. Operculum with three arms, middle and lower form opercular spines. Upper arm more like an ossified filament attached to median part of middle arm. Suboperculum thin and incompletely ossified dorsally. Interoperculum rather long with ventral end attached to angularare by strong ligament. Preoperculum large with lower part incompletely ossified one left but fully ossified on right side.

Fewer spots of pigmentation than in smaller specimen : dorsal part of caudal myomeres with three spots, one spot ventrally between second and third dorsal spot and one above intestinal coil.

Comparison with adult fishes

This type of larvae with prolonged anterior dorsal finrays placed far forward on head and with prolonged ventral finrays can be referred to either Pleuronectiformes or Ophidiiformes. In Table II the data for Pleuronectiformes (from Hensley and Ahlstrom 1984 : 674-5) have been split into two in order specifically to show the data for Cynoglossidae, a family which in several meristic characters is similar to many ophidiiforms. Table II shows that the present larvae differ from the Cynoglossidae by the number of ventral finrays and from the remaining Pleuronectiformes in the caudal finray count. Furthermore, the presence of a supramaxillary in these two larvae excludes all flatfishes except for Psettodidae and Citharidae. However, these families differ in several characters *e.g.* number of rays in caudal (21-25) and ventral (I + 5) fins.

Within the Ophidiiformes the combination of the presence of a supramaxillary, the posterior position of the ventral fins, the form of the body and the presence of seven developed rakers on the anterior gill arch place these larvae in the subfamily Neobythitinae of the Ophidiidae. According to Cohen and Nielsen

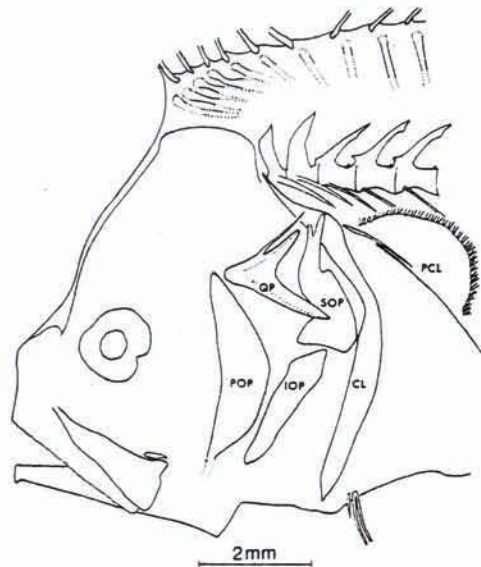


Fig. 4 : *Benthocometes robustus*. Head of ZMUC P77785. CL : cleithrum, IOP : interoperculum, OP : operculum, PCL : postcleithra, POP : preoperculum, SOP : suboperculum.

Table II : Comparison between the present larvae and the Pleuronectiformes.

	Present larvae	Cynoglossidae	Pleuronectiformes excl. Cynoglossidae
Caudal finrays	11	8-14	14-25
Ventral finrays	I-2	0-2 on eyed side 4 on blind side	I+5 or 2-7

(1978:10) and Nielsen (1986:1160) this subfamily is represented in the Mediterranean by one species only, *Benthocometes robustus* (Fig. 5).

Table I shows the main meristic characters of the two larval and the adult specimens from both sides of the Atlantic. The difference between the larvae and adults in pectoral finray counts is probably due to the fact that only the counts from the former are based on alizarin-stained specimens. Another difference is the position of the origin of the anal fin in relation to the dorsal fin. However, this can be explained by comparing Figs. 4 and 6 which show that about ten anterior dorsal finrays have disappeared in the adults leaving 8-10 predorsal pterygiophores. The remaining characters are in such an agreement that we are convinced that the present two larvae belong to *Benthocometes robustus*. This is furthermore supported by the presence of two retrorse, opercular spines in both larvae and adults, a character that is very rarely found among Ophidiiformes.

Emery's description (1885:158, fig. 21) of the juvenile specimen (Fig. 1)

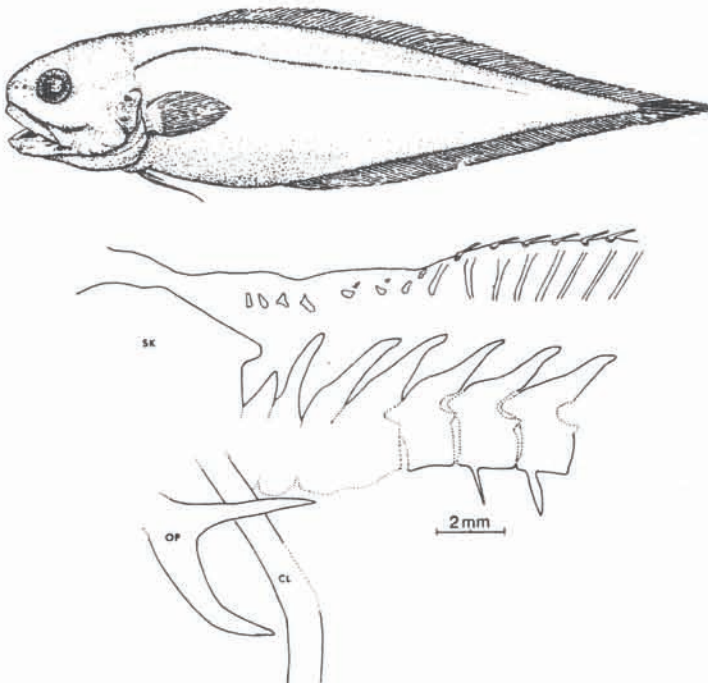


Fig. 5 : *Benthocometes robustus*. TL 125 mm. (From Bougis and Ruivo 1954, fig. 1).

Fig. 6 : *Benthocometes robustus*. Anterior part of vertebral column and dorsal fin. ZMUC P77683, SL 96 mm. Cl : cleithrum, OP : operculum, Sk : skull.

includes but a few meristic characters : number of rays in dorsal fin 96, caudal fin 10, anal fin 72 and ventral fin 1 and a little more than 60 myomeres of which about 23 are precaudal. A comparison to Table I clearly shows that it is different from *B. robustus*.

Remarks on distribution

It is very rare to find a bathyal species with such a disjunct distribution (East and West Atlantic) as shown by *Benthocometes robustus*. The most reasonable explanation is the assumed long pelagic larval stage.

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