NOTE/NOTA

POSTLARVAE OF *BATHYSAURUS FEROX* (=*MACRISTIUM CHAVESI*) FROM THE AZORES WATERS

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The postlarvae of *Bathysaurus ferox* (Teleostei: Synodontidae) was described for the first time at the beginning of this century, as *Macristium chavesi*, based on one specimen. In 1998 two "*Macristium*" were caught in the Azores. In all 6 specimens are known. Our specimens are longer than those from the literature and show differences in some morphometric relationships. Both *Macristium* were caught at the surface. One of them was found drifting passively with all the fins expanded, among medusa. In this note we compare all the postlarvae of *B. ferox* reported, establishing a series of developmental stages. Also, we discuss some ecological features of the species, during this life cycle phase.

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Bathysaurus ferox (Teleostei: Synodontidae) foi descrito pela primeira vez, sob o nome de *Macristium chavesi*, no início deste século, com base num único exemplar. No total só são conhecidos 6 espécimes. Os nossos espécimes são maiores do que os referidos na literatura e apresentam algumas variações morfométricas, quando comparados com os obtidos pelos outros autores. Ambos foram encontrados à superfície. Um foi observado vivo derivando passivamente com todas as barbatanas expandidas, entre medusas. Nesta nota nós comparamos as larvas de *B. ferox* registadas e definimos uma série de três estádios de desenvolvimento. São também apresentados alguns comentários acerca da ecologia da espécie, durante esta fase do ciclo de vida.

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Macristium chavesi was described for the first time by REGAN (1903, 1911) based on a specimen caught near the Azores. After that, MARSHALL (1961) and ROSEN (1971) described two more related specimens, prior to the paper of JOHNSON (1974), who established that all those paralarvae are of *Bathysaurus ferox (=B. agassizi)*. More recently, SULAK et al. (1985) reviewing the genus *Bathysaurus* reported an additional postlarva. They described the life history of these fishes (i.e. *B. ferox* and *B. mollis*) including their early life stages. The authors noted that the described postlarvae of *B. ferox* formed a series of developmental stages (ranging from 20 to 110

mm SL) and they compared the relative growth of the fish available.

In this report we record two postlarvae of *Bathysaurus ferox* (112 and 127mm SL) caught in the Azores.

The two "*Macristium*" type fish were caught on 26.03.1998 and 02.05.98. The first was captured close to Pico Island (38°27'30"N; 28°31'30"W) by snorkel. The second was found tangled in a gill net on the shore of Terceira Island (38°38'50"; 27°07'W). They were brought to the laboratory, photographed, preserved, drawn and described.

Comparing meristic and morphometric data of the specimens sampled (Table 1) with those reported previously (REGAN 1911; MARSHALL 1961; ROSEN 1971; JOHNSON 1974; SULAK et al. 1985), it is certain that our specimens belong to *Bathysaurus ferox*. The postlarvae of *B. ferox* here reported are larger than any other. Combining our data with that from previous works (summarised by SULAK et al. 1985), we expand the *B. ferox* early life history. Based on the size of the few postlarvae reported, we defined three developmental stages: 1) 33-40.6 mm SL (two specimens from MARSHALL (1961) and SULAK et al. (1985)); 2) 110-112mm SL (two specimens from REGAN (1911) and this study); 3) one specimen: 127mm SL (this study) (Table 2). The morphometric data presented by REGAN (1911) is limited and the specimen has been lost. ROSEN (1971) did not present morphometric data. It is apparent that body parts grow at different ratios during the three stages. However, it is difficult to conclude about the actual significance of some variations, since size sample is limited. The way in which the relative growth of the external body parts varies is diverse (Table 2). Certain characters seem to grow from stage 1 to the following stage and then decrease again in the older paralarvae, approaching the morphometry of the adult. Others grow allometrically between stage 1 and 2 and then maintain an isometric growth (Fig. 1).

The relative increase, in length, of the posterior dorsal and anal rays is an evident transformation from the larvae to the postlarvae. The array (not the relative size) of the dorsal fin rays of the adults is similar to that found in the largest postlarvae.

Table 1

Meristic and morphometric data of the two postlarvae of *Bathysaurus ferox*, caught in the Azores in March and May 1998, respectively. L = length; D = Distance.

Meristic	n	n
Dorsal fin rays	17	17
Anal fin rays	12	13
Pectoral fin rays	15	15
Pelvic fin rays	8	8
Caudal fin rays	28?	-
Branchiostegal rays	10	8
Myomeres	-	62
Adipose fin	0	0
Morphometric	mm	mm
Total L	133	150
Standard L	112	127.0
Head L	23	27.2
Snout L	8.2	9.5
Ocular diameter	3.2	4.1
Interorbital D	7.5	7.5
Pre-pectoral D	28.4	27.5
Pre- pelvic D	31.0	34.6
Pre- dorsal D	30.5	29.5
Pre-anal D	82.3	98.2
Pre-anus L	78.7	96.0
Base of dorsal L	53.7	59.5
Base of anal L	17.5	23.0
Dorsal fold L		11.5
Anal rays L	44.5	18.0
Dorsal rays L	83.0	85.0
Pelvic rays L	65.0	70.0
Pectoral rays L	32.0	31.5
Upper jaw L	-	9.3
Lower jaw L	-	10.0
Depth at pelvic	17.0	17.7
Depth at anal	12.5	13.8
Depth at peduncle	8.0	7.5
Peduncle L	9.5	11.2
Caudal fin L	22.0	-

The jaws of the larger specimen do not extend over the truly gap of the mouth, as in adults (Fig. 2). However, even the larger specimen we found lacks important anatomic transformations prior to acquiring the body features of the benthic juveniles and adults. Some of these lacking transformations involve elongation of the jaws, head and eyes, development of scales covering the body, reduction of the relative size of the dorsal and anal fins and appearance of branch fin. Those transformations should occur in a short time period, since SULAK et al. (1985) found benthic juveniles from ca. 15 cm in length.

Table 2

Average values of morphometric data (as percentage in relation to standard length) obtained for the 3 stages considered: st1 - 33-40.6mm SL (from MARSHALL (1961) and SULAK et al. (1985)); st2 - 110-112mm SL (from REGAN (1903, 1911) and this study); st3 - 127mm (this study). P = positive allometry; I = isometry; N = negative allometry. Arbitrarily, we considered allometric those variations higher or lower than 10%.

	Avg. st 1	*Avg. st 2*	*% var. (st1/st2)*	*Avg. st 3*	*% var. (st2/st3)*	*Allometry (st1/st2, st2/st3)*
Standard L	36.8	111		127		
Head L	19.5	21.3	9	21.4	0.7	I, I
Snout L	6.2	7.3	19	7.5	2.2	P, I
Ocular diameter	4.3	2.8	-34	3.2	14.1	N, P
Interorbital D	5.9	6.6	14	5.9	-11.2	P, N
Pre-pectoral D	22.6	25.4	12	21.7	-14.6	P, N
Pre-pelvic D	26.7	27.7	4	27.2	-1.6	I, I
Pre-dorsal D	28.2	27.2	-3	23.2	-14.7	I, N
Pre-anal D	70.5	73.5	4	77.3	5.2	I, I
Base of dorsal L	36.7	47.6	30	46.9	-1.5	P, I
Base of anal L	15.5	15.6	1	18.1	15.9	I, P
Anal fin L	26.1	39.7	52	14.2	-64.3	P, N
Dorsal fin L	69.1	74.1	7	66.9	-9.7	I, I
Pelvic fin L	60.8	58.0	-5	55.1	-5.0	I, I
Pectoral fin L	27.2	28.6	5	24.8	-13.2	I, N
Upper jaw L	6.6	-	-	7.3	-	-, -
Lower jaw L	10.1	-	-	7.9	-	-, -
Depth at pelvic	13.2	14.9	13	13.9	-6.7	P, I
Depth at anal	9.4	11.2	19	10.9	-2.6	P, I
Depth at peduncle	5.1	7.1	40	5.9	-17.3	P, N
Peduncle L	15.3	8.5	-44	8.8	4.0	P, I
Caudal fin L	23.0	19.6	-15	-	-	N, -

The fish from Pico was encountered alive and without any signal of injury, at 1 m below the surface. It was floating with all the fins expanded, and associated with a considerable number of jellyfish (e.g. *Pelagia noctiluca*). It was very passive and it was caught by hand, without showing any attempts to escape. The fins were soft and moved in consonance with the water movements. The elongated fins can, probably, increase floating capacity when drifting by providing buoyancy. Its tissues were clear and translucent, with many small melanophores dispersed along the body, head and fins. It appeared gelatinous and very delicate.

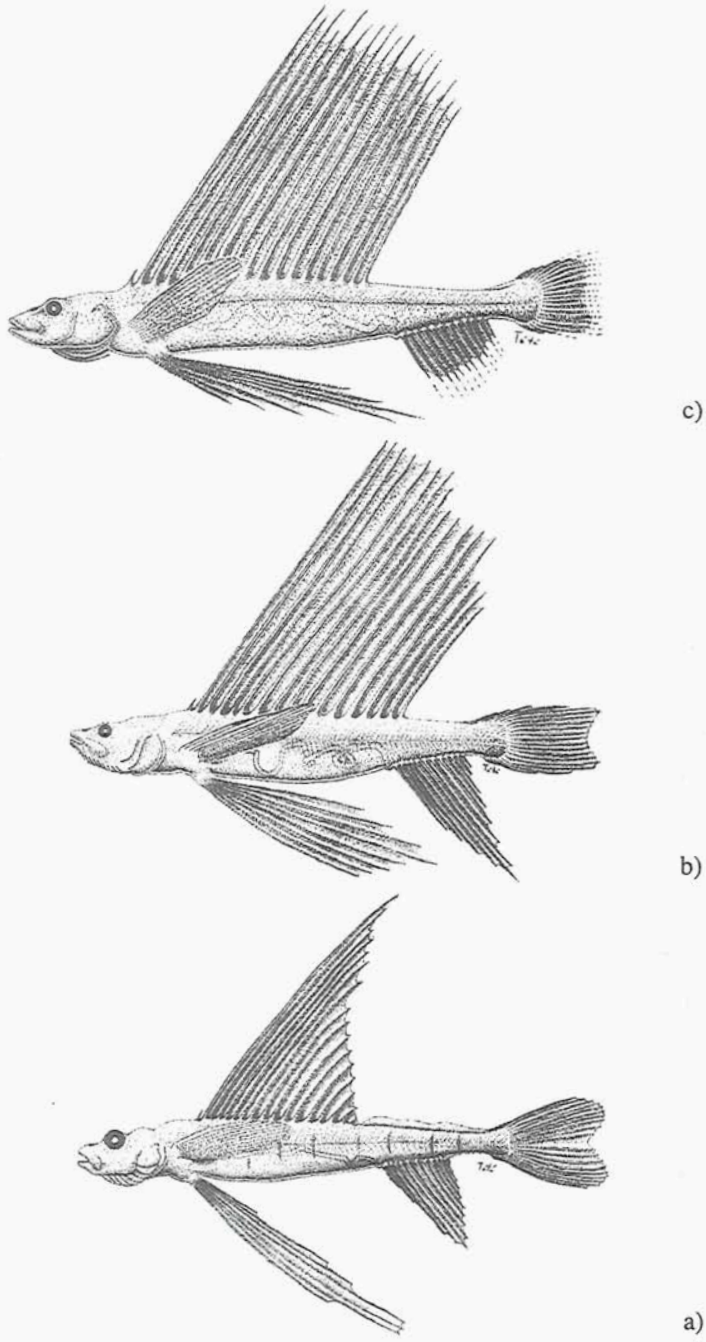

Fig. 1. Representation of the 3 developmental stages of *Bathysaurus ferox* postlarvae, based on data presented in Table 2. Stage 1 (a) is an adaptation from MARSHALL (1961). (Drawings by João Tátá Regala).

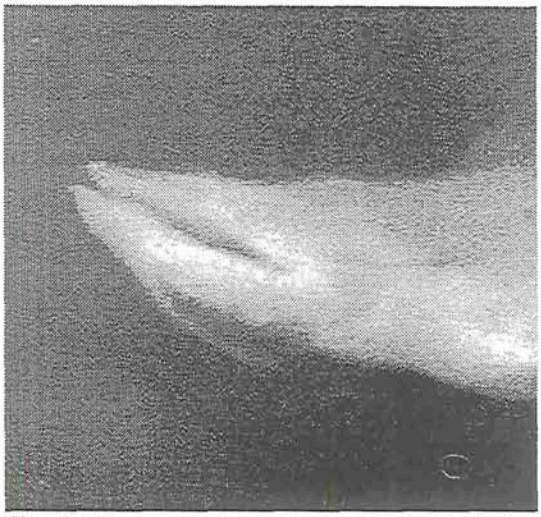

Fig. 2. X-ray showing a detail of the head of a *Bathysaurus ferox* postlarvae (127 mm SL).

Like the specimen of REGAN (1903, 1911) the fish we observed did not have any pigmented vertical bands as reported for the smallest specimens (SULAK et al. 1985).

The information concerning the depth at which the postlarvae of *B. ferox* live is scarce. REGAN (1903, 1911), did not mention any data related to capture. The specimen reported by SULAK et al. (1985) was caught at the surface, and open nets operating between 400 m and the surface took the others. All the data indicate that postlarvae of *B. ferox* live commonly at epipelagic surface waters, probably drifting with currents.

It seems plausible that there is an ecological association between "*Macristium*" and jellyfish. The transparency of the fish can act as a camouflage confounding and avoiding potential predators. Also jellyfish can represent a source of food. Contrarily to the other specimens reported which had only one intestinal coil, the intestines of our specimens has several loops. The meaning of this characteristic is still not clear.

If our larvae were hatched between November to January, as found to be the main reproductive season (SULAK et al. 1985), an age of 14 to 18 months old can be supposed. The same authors suggested that smaller postlarvae had an age of 4-8 months. Unfortunately, Regan did not mention the date of capture of his specimen. However, a long (epi)pelagic life history is an attribute of this fish.

Until new information is gathered the whole early life history of *B. ferox* remains a puzzle.

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