

Elopomorpha leptocephali from Southern Brazil: a new report of *Albula* sp. (Albulidae) and first record of *Elops smithi* (Elopidae) in Brazilian waters

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Resumo

Leptocephali de Elopomorpha do Sul do Brasil: nova ocorrência de *Albula* sp. (Albulidae) e primeiro registro de *Elops smithi* (Elopidae) em águas brasileiras. Embora exemplares adultos de *Albula* e *Elops* já tenham sido capturados na costa do estado do Rio Grande do Sul, Região Sul do Brasil, a ocorrência de suas larvas *leptocephali* é registrada pela primeira vez. Duas leptocephali (44,5 e 47,1mm CP) de *Albula* sp. e cinco (25 a 33,1mm CP) de *Elops smithi* capturadas na praia de Tramandaí, próximo à região estuarina, são apresentadas. A espécie *E. smithi* (conhecida como malacho em sua área de ocorrência) é registrada pela primeira vez no litoral brasileiro, tendo sua distribuição consideravelmente ampliada desde o norte da América do Sul, região do Caribe, Golfo do México e ao longo da Costa Leste da América do Norte até o Sul do Brasil. É provável que os registros de *Elops saurus* no Brasil correspondam a *E. smithi*.

Palavras-chave: Estado do Rio Grande do Sul; Larvas; Malacho; Peixes; Ubarana

Abstract

Although adult specimens of *Albula* and *Elops* have already been captured in the coast of the State of Rio Grande do Sul, Southern Brazil, the occurrence of their larvae *leptocephali* is recorded for the first time. Two leptocephali (44.5 and 47.1mm SL) of *Albula* and five (25 to 33.1mm SL) of *Elops smithi* collected at Tramandaí beach, near the estuarine region, are presented. The species *E. smithi* (known as malacho in its area of occurrence) is recorded for the first time in the Brazilian coast, considerably increasing its distribution from northern South America, the Caribbean region, Gulf of Mexico, and along the East Coast of North America to Southern Brazil. It is likely that the records of *Elops saurus* in Brazil correspond to *E. smithi*.

Key words: Fishes; Larvae; Malacho; State of Rio Grande do Sul; Ubarana

The larval form leptocephalus is characteristic of the subdivision Elopomorpha, a group including the orders Anguilliformes, Saccopharyngiformes, Elopiformes, and Albuliformes (NELSON, 2006). Leptocephali are distinct from other forms of larvae because they have a laterally compressed transparent body with diverse morphological features (SMITH, 1989; MILLER, 2009). In southern South America, the anguilliforms are well represented by leptocephali (FIGUEROA; EHRlich, 2006). Leptocephali of Elopiformes and Albuliformes are not usual, there are few records in the eastern coast of Brazil (CASTRO; BONECKER, 2005).

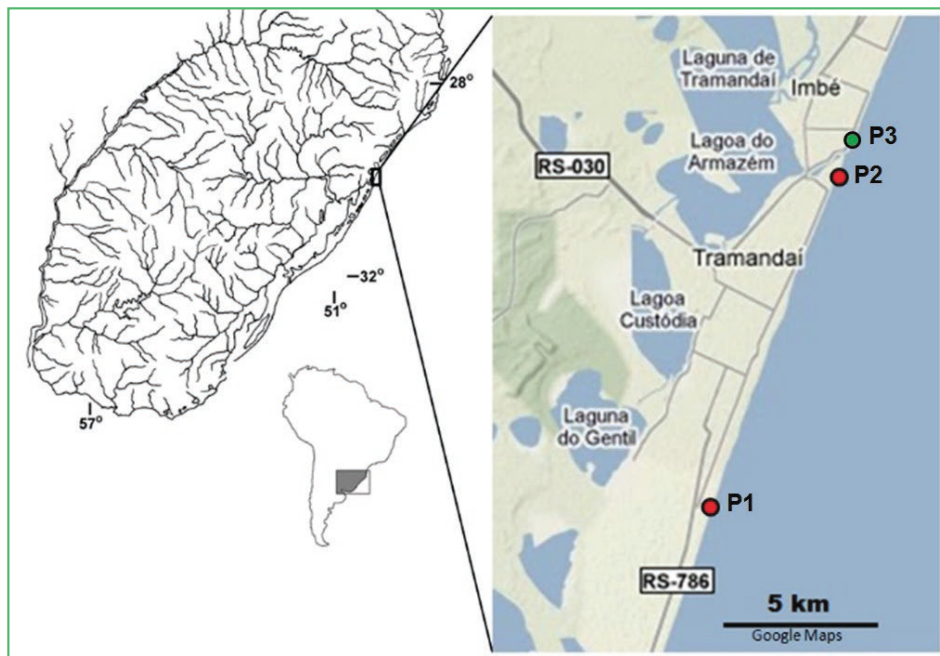
With the aim of determining the occurrence and abundance of fishes in the coastal waters along a sandy beach, 15 perpendiculars drags were made toward the beach with a dragnet (50 x 15m, mesh = 5mm), from August to November 2010, in Tramandai beach, Rio Grande do Sul, Brazil (Figure 1) at two sampling stations (P1 and P2). Permission for collecting specimens was granted by IBAMA (number 2412-1). Although the collection of these larvae were not the purpose of samplings, they were captured on November 6, 2010

(station 1 – P1, 29°59'07"S, 50°07'15"W) and November 21, 2010 (station 2 – P2, 30°05'12"S, 50°09'50"W) (Figure 1). The specimens were killed by overdose of clove oil (eugenol), preserved in 70% alcohol, and taken to the laboratory for identification. Salinities at our collection sites ranged from 29.32 to 32.69 PPM and water temperature ranged from 15.5°C to 18.5°C.

In the laboratory, the five leptocephali larvae were identified as the malacho *Elops smithi* (MCBRIDE et al., 2010) and deposited in the fish collection of Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul (MCP 46004). The main features shown by the leptocephali of *Elops* Linnaeus are the presence of caudal fin furcated and the relative positions of the dorsal and anal fins, something which characterizes them as belonging to the genus (CASTRO; BONECKER, 2005).

Four larvae (ca. 25 to 27mm standard length, SL) were much damaged, making it difficult to count myomeres and to take other measurements. The counting of visible myomeres and other measurements were carried out only with the leptocephalus in a better

FIGURE 1: Map with the location of the new occurrence of leptocephali of *Elops smithi* and *Albula* sp. Tramandai beach, Rio Grande do Sul, Southern Brazil. P1-3 stations.



condition, the largest one (33.1mm SL). It presented a total of 74 myomeres (56 predorsal; ca 65 preanal), last vertical blood vessel at myomere 48, head length ca. 2mm, predorsal length ca. 28mm, and preanal length ca. 31mm (Figure 2). Other meristic features which were possible to determine in the same specimen were: anal fin with ca. 12-13 rays, dorsal fin with ca. 17-24 rays (both fins not totally developed), and caudal fin with a total of 19 rays. The pectoral fin was developed only in the largest specimen. The myomeres count helped us identifying the species as *Elops smithi*, as defined by McBride et al. (2010), being this the first report of the species in Southern Brazil and the Southwestern Atlantic. According to these authors, *E. smithi* has 73-80 centra (total number of vertebrae), usually 75-78 centra; *E. saurus* has 79-87 centra, usually 81-85 centra. The total myomere number of the leptocephalus equals that of total vertebrae (MCBRIDE; HORODYSKY, 2004).

By examining the fish collection of Universidade Federal do Rio Grande do Sul we found two leptocephali (UFRGS 15692), later on identified as *Albula* sp. (Figure 3). They were captured near the same beach and identified as *E. smithi*, close to the mouth of Tramandai Lagoon on March 2011 (P3 in Figure 1). Some morphometric and meristic data were taken. Specimen A showed the

following features: 44.5mm SL, head length 4.1mm, predorsal length 35.2mm, and preanal length 42.2mm, a total of 70 myomeres (52 predorsal; 64 preanal), dorsal fin with 16 rays, anal ca 8 rays, pectoral fin ca. 14 rays, and caudal fin 19 principal rays. Specimen B showed the following features: 47.1mm SL, head length 3.7mm, predorsal length 35.8mm, and preanal length 45.7mm, a total of 71 myomeres (50 predorsal; 63 preanal), dorsal fin with 17 rays, anal fin ca 8 rays, pectoral fin ca. 13 rays, pelvic fin ca 13 rays, and caudal fin 19 principal rays. Both specimens with pectoral and pelvic fins not totally developed and the vertical blood vessels extending to 67 or 68 myomeres.

All specimens of *E. smithi* and *Albula* sp. had a series of dark chromatophores scattered on the ventral region of the body, from throat to anus. Based on some characteristics found in our specimens, they may belong to the early metamorphic larvae or the first metamorphic stage.

The family Albulidae is very similar to the Elopiformes larvae, differing mainly by the position of the anal fin, which begins just behind the dorsal fin, and by the number of anal fin rays (total rays 8-10 vs. 16-19) (SMITH, 1989).

FIGURE 2: Leptocephalus of *Elops smithi*, MCP 46004, 33.1mm SL. Tramandai beach, Southern Brazil. Scale bar = 0.5mm.

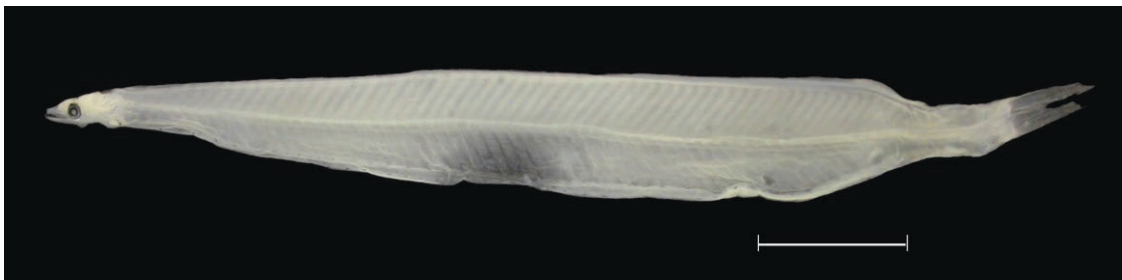


FIGURE 3: Leptocephalus of *Albula* sp., UFRGS 15692, 47.1mm SL. Tramandai beach, Southern Brazil. Scale bar = 0.5mm.



In the western Atlantic, *Elops saurus* Linnaeus, 1766 and *E. smithi* are the only registered species of the family Elopidae. The other five species of the genus *Elops* occur in the eastern Atlantic Pacific and in the Indian oceans (ESCHMEYER; FRICKE, 2011).

To date, *Elops smithi* occurs along the northern coast of South America, in the Caribbean Sea, throughout the Bahamas, Gulf of Mexico, and along the eastern seaboard of North America. It occurs sympatrically with *E. saurus* in the Gulf of Mexico and along the eastern seaboard of North America (MCBRIDE et al., 2010). Besides our specimens, we found an unreported specimen of *Elops smithi* at the United States National Museum, Washington D.C. collection (USNM 104256, 137mm SL, collected by Rudolph Von Ihering, at Recife, Pernambuco, Brazil in 1932), previously reported as *Elops saurus* and renamed after McBride et al. (2010). The specimen was kindly X-rayed by Dr. David Smith (USNM) and showed 76 vertebrae, including the hypural. Therefore, it is within the range of *E. smithi*, which has 73-80. Thus, it is possible that most, if not all, reports of *E. saurus* from the Brazilian coast correspond to *E. smithi*. In Brazilian waters, *Elops* is more common off the North and Northeast coast (FIGUEIREDO; MENEZES, 1978), but it can reach the Southern coast (MENEZES, 2003). Silva (1982) has reported (as *E. saurus*) three adult specimens, 26.5 to 39.5cm total length, in Tramandai Lagoon (unfortunately not located).

Two species of *Albula* Scopoli are recorded in the Brazilian coast: *A. nemoptera* Fowler, 1911 and *A. vulpes* Linnaeus, 1758. The first occurring in the eastern Pacific (Mexico to Panamá) and western Atlantic (Caribbean to Salvador, Bahia, Brazil) and the second widely distributed in the oceans (MENEZES, 2003; MENEZES; FIGUEIREDO, 2003). In Southern Brazil, *A. vulpes* is registered in the states of Santa Catarina (LUCENA; LUCENA, 1981) and Rio Grande do Sul (LOEBMANN; VIEIRA, 2005 as *A. nemoptera*). Both reports refer to adult specimens. The distribution and taxonomy of *Albula* spp. in the Western Atlantic is still confusing (BOWEN et al., 2007). As a result, we chose to identify the leptocephali larvae found as *Albula* sp.

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References

- BOWEN, B. W.; KARL S. A.; PFEILER, E. Resolving evolutionary lineages and taxonomy of bonefishes (*Albula* spp.). In: AULT, J. S. (Ed.). **Biology and management of the world tarpon and bonefish fisheries**. Boca Raton: CRC Press, 2007. p. 147-154.
- CASTRO, M. S. de; BONECKER, A. C. T. Leptocephali collected off the eastern coast of Brazil (12°–23°S). **Zootaxa**, Auckland, n. 935, p. 1-28, 2005.
- ESCHMEYER, W. N.; FRICKE, R. **Catalog of fishes electronic version**. San Francisco, CA: California Academy of Sciences. Available at: <<http://research.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>>. Accessed in: 27 October 2011.
- FIGUEIREDO, J. L.; MENEZES, N. **Manual de peixes do sudeste do Brasil**. II. Teleostei (1). São Paulo: Museu de Zoologia da Universidade de São Paulo. 1978. 110 p.
- FIGUEROA, D. E.; EHRLICH, M. Systematics and distribution of leptocephali in the western south Atlantic. **Bulletin of Marine Science**, Miami, v. 78, p. 227-242, 2006.
- LOEBMANN, D.; VIEIRA, J. P. Distribuição espacial e abundância das assembléias de peixes no Parque da lagoa do Peixe, Rio Grande do Sul, Brasil. **Revista Brasileira de Zoologia**, Curitiba, v. 22, n. 3, p. 667-675, 2005.
- LUCENA, C. A. S.; LUCENA, Z. M. Catálogo dos peixes marinhos do museu de Ciências da Pontifícia Universidade Católica do Rio Grande do Sul. Elasmobranchiomorphi. Teleostomi (1ª Parte). **Comunicações do Museu de Ciências**, Porto Alegre, n. 21, p. 1-66, 1981.
- MCBRIDE, R. S.; HORODYSKY, A. Z. Mechanisms maintaining sympatric distributions of two ladyfish (Elopidae: *Elops*) morphs in the Gulf of Mexico and western North Atlantic Ocean. **Limnology and Oceanography**, Newfoundland, v. 49, p. 1173-1181, 2004.

- MCBRIDE, R. S.; ROCHA C. R., RUIZ-CARUS, R.; BOWEN, B. W. A new species of ladyfish, of the genus *Elops* (Elopiformes: Elopidae), from the western Atlantic ocean. **Zootaxa**, Auckland, n. 2346, p. 29-41, 2010.
- MENEZES, N. Família Elopidae. In: BUCKUP, P.; MENEZES, M.; FIGUEIREDO, J. L.; MOURA, R. (Ed.). **Catálogo dos peixes marinhos do Brasil**. São Paulo: Museu de Zoologia da Universidade de São Paulo. 2003. p. 31.
- MENEZES, N.; FIGUEIREDO, J. L. Família Albulidae. In: BUCKUP, P.; MENEZES, M.; FIGUEIREDO, J. L.; MOURA, R. (Ed.). **Catálogo dos peixes marinhos do Brasil**. São Paulo: Museu de Zoologia da Universidade de São Paulo, 2003. p. 32.
- MILLER, M. J. Ecology of anguilliform leptocephali: remarkable transparent fish larvae of the ocean surface layer. **Aqua-BioScience Monographs**, Tokyo, v. 2, p. 1-94, 2009.
- NELSON, J. S. **Fishes of the world**. New Jersey: John Wiley & Sons Inc., 2006. 601 p.
- SILVA, C. P. Ocorrência, distribuição e abundância de peixes na região estuarina de Tramandaí, Rio Grande do Sul. **Atlântica**, Rio Grande, v. 5, p. 49-66, 1982.
- SMITH, D. G. 1989. Order Elopiformes: Families Elopidae, Megalopidae, and Albulidae: Leptocephali. In: BÖHLKE, E. B. (Ed.). **Fishes of the Western North Atlantic**. New Haven: Memoir Sears Foundation for Marine Research, 1989. p. 691-972.