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A new report of the uncommon Atlantic ribbon halfbeak Euleptorhamphus velox Poey, 1868 (Beloniformes: Hemiramphidae) from Brazil, with range update of the specie in the Southwestern Atlantic

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Abstract: An adult specimen of *Euleptorhamphus velox* (Hemiramphidae) was captured in March 2021 from southern Brazil (26ºS). This record altogether with vouchers deposited in museum collections (MZUSP and MCZ), extends the published known distribution area of the species in about 3700 km in the southwestern Atlantic.

Key words: pelagic marine fish, distribution expansion, Argentine Zoogeographical Province.

Novo registro do raro peixe agulha-voador Euleptorhamphus velox Poey, 1868 (Beloniformes: Hemiramphidae) para o Brasil, com atualização de ocorrência no Atlântico Sudoeste. Resumo: Um exemplar adulto de *Euleptorhamphus velox* (Hemiramphidae) foi capturado em Março de 2021 no sul do Brasil (26ºS). Este registro, junto com exemplares depositados em coleções de museus (MZUSP e MCZ), estendem a área publicada de distribuição em cerca de 3700 km no Atlântico Sudoeste.

Palavras-chave: peixe marinho pelágico, expansão de distribuição, Província Zoogeográfica Argentina

The family Hemiramphidae (the so called Halfbeaks) has eight genera and about 60 species, mainly coastal marine, several estuarine, and a few restricted to oceanic and freshwater habitats (Nelson *et al*. 2016, Froese & Pauly 2023). The flesh is good, and halfbeaks are utilized as food in many parts of the world where are mainly caught with seines and pelagic trawls, and dipnetted under lights at night (Collette 2004). They are also part of the bycatch of industrial fisheries for oceanic fish such as tunas (Díaz-Siverio 2016, Escalle *et al*. 2019, Sabarros 2020). The genus *Euleptorhamphus* Gill, 1859 is composed of two species, *E. viridis* (Van Hasselt, 1823) distributed in the Indo-Pacific, and *E. velox* Poey, 1868 from the Atlantic Ocean (Whitehead 1984, Nelson *et al.* 2016, Collette & Bemis 2019). *Euleptorhamphus velox* is typically marine, reaching up to 610 mm TL (Hoese & Moore 1977, Claro 1994, Froese & Pauly 2023), has coastal and oceanic behavior, with records around islands (Collette & Bemis 2019), as in the San Andrés Archipelago, Colombia (Bolaños-Cubillos *et al*. 2015), Virgin

Islands (USA) (Robertson *et al*. 2022), in addition to reef environments such as the Alligator reefs in Florida (USA) (Starck *et al*. 2017), or associated with seaweed beds, as in the coast of North Carolina (USA) (Casazza, 2008). Its published distribution on the western Atlantic coast is from Massachusetts (USA), including the Gulf of Mexico and the Caribbean Sea to the state of Pernambuco in Brazil (Gilmore *et al*. 1977, Robins & Ray 1986, Cervigón *et al*. 1992, Randall 1996, Collette 2002, Menezes 2003, Cervigón 2005, Collette & Bemis 2019). In the eastern Atlantic, it occurs off the coast of Africa, in Senegal, Guinea and Cape Verde (Vakily *et al*. 2002). In Brazil, it has records in the north and northeastern coasts, with its southern published limit at Recife, Pernambuco (Collette 2006, Garcia-Junior *et al*. 2015, Collette & Bemis 2019, Marceniuk *et al*. 2021). Recent studies with ichthyoplankton in Brazilian waters indicate the presence of larvae of this species in Pará and Maranhão (Silva 2021), in the continental slope and Oceanic Basin of Ceará (Costa 2017), in the coastal region of Sergipe and Bahia (Castro & Bonecker 2017), and in the Campos Basin, in Rio de Janeiro (Bonecker *et al*. 2014). *E. velox* has little bioecological information, among which it is known to be preyed by the sea birds *Sula leucogaster* (Brown Booby) and *S. dactylatra* (Masked Booby) (Kohlrausch 2003, Schulz-Neto 2004, Flores 2012), and the pelagic fish *Coryphaena hippurus* (Dolphinfish) and *Euthynnus alletteratus* (Little Tunny) (Rose & Hassler 1974, Manooch *et al*. 1984) (Manooch *et al*. 1985).

An adult specimen of *E. velox* (Fig. 1A) was collected by a pair of trawl-fishing boats on the inner shelf of the coast of the state of Santa Catarina (SC), in southern Brazil. The specimen was not caught in the net, but jumped on the deck of the vessel and was kept cold. The event took place on March 24, 2021 at position Lat: 26º15'23"S; Long: 48º01'58"W, in Barra de São Francisco, municipality of São Francisco do Sul-SC (fig. 1A). The specimen was measured (Table 1), identified based on Collette & Bemis (2019) and Marceniuk *et al*. (2021), and deposited at the Scientific Zoological Collection of

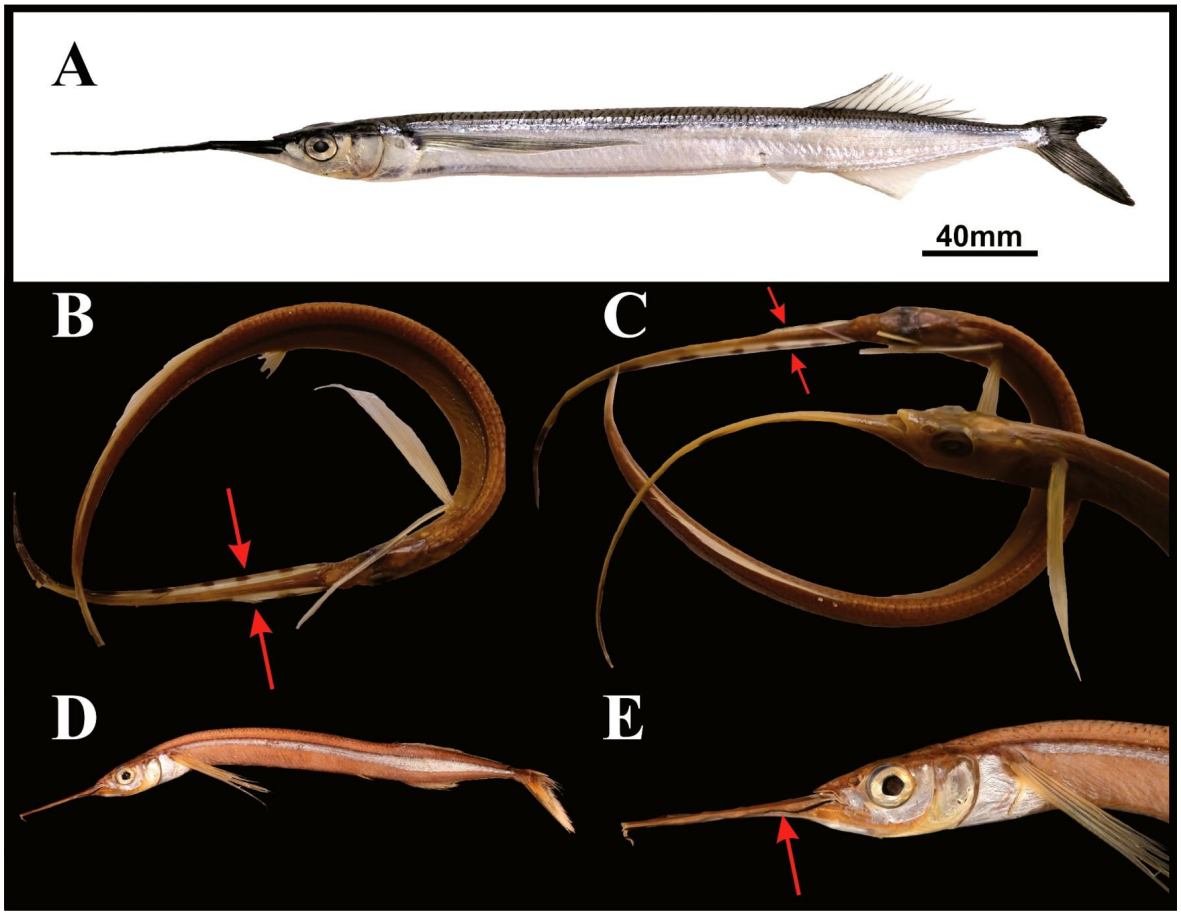

Figure 1. A. The Atlantic ribbon halfbeak *Euleptorhamphus velox* from southern Brazil (AZUSC 6923); **B.** MZUSP 67710; **C.** Comparation of the distended lateral dermal flap in the lower jaw (MZUSP 67710); **D.** MCZ 72049; **E.** head highlight (MCZ 72049). Red arrow: lateral dermal flap collapsed in the lower jaw.

Table 1. Measurements (mm) of *Euleptorhamphus velox* (AZUSC 6923) from Santa Catarina, Brazil.

	with LJ	without LJ	number
Total length	387	302	
Pre-caudal length	351	268	
Fork length	363	281	
Head length	121	36	
Pre-anal length	275	191	
Pre-dorsal length	260	177	
Pre-pectoral length	132	46	
Pre-pelvic length	246	163	
Pre-anus length	266	181	
Orbital diameter	11		
Interorbital	11		
Pectoral fin length	77		
Pelvic fin length	13		
Jaw length	88		
Pectoral fin basal length	68		
Pectoral fin anal length	64		
Median body width	11		
Median body height	22		
Pre-dorsal scales			52
Superior gill arches (1st arch)			6
Inferior gill arches (1st arc)			21
Superior gill arches (2nd arch)			2
Inferior gill arches (2nd arch)			15
Dorsal rays			21
Anal rays			20
Pelvic rays			6
Pectoral rays			7

Santa Cecilia University (AZUSC). Through the Specieslink database (2023) and The Global Biodiversity Information Facility (GBIF, 2023) we verified the existence of other specimens collected in the southwestern Atlantic: MZUSP 67710 (200.2 mm SL from tip of the upper jaw to hypural plate and 289.7 mm FL, including the lower jaw, Fig 1B and C) captured in São Paulo state, Brazil; and MCZ 72049 (315 mm SL and 327 mm FL, Fig 1D and E) and 72051 (215 mm SL from tip of the upper jaw) both captured in Uruguay. The voucher MZUSP 67710 (Fig. 1C) presents a distended lateral dermal flap in the lower jaw, rarely preserved due to the collapse of this structure after the specimens are removed from the water (Bruce Collette, personal comment; Fig 1C and 1E).

The new record (AZUSC 6923) refers to the second adult specimen captured below Recife (southern limit of distribution according to Collette & Bemis 2019). The first record of the specie south to Recife (MZUSP 67710), was captured on 05/15/1976 near the edge of the continental shelf in the Sao Paulo state, although there are larval records along the northeast, east and southeast coast of Brazil (Fig. 2). The vouchers (MZC 72049 and 72051) are older than the above cited records, 03/18/1967 and 03/19/1967 respectively, both captured with neuston net and identified by Bruce B. Collette, but not included in his studies (*e.g.*, Collette 2002, 2004, Collette & Bemis 2019). These vouchers extend the known distribution of *Euleptorhamphus velox* in about 3700 km from the southern limit previously published.

In general, the passive pattern of dispersal of pre-metamorphic eggs and larvae of marine fish is related to currents, tides and climatic events (Montgomery *et al*. 2001), differing from adults that have greater mobility. However, it is important to consider that post-metamorphic larvae of some species (mainly tropical, such as *E. velox*) have good horizontal and vertical swimming ability, overcoming coastal currents and moving long distances to reach nursery areas, avoid predation, and increase foraging (Mouritsen *et al*. 2013, Jørgensen *et al*. 2014, Baptista *et al*. 2019). Thus, it is not possible to affirm that the existing larval records reflected in adults in the same area. Changes in ocean currents due to large-scale weather events (*e.g.,* El Nino and La Niña) influence the dispersal of eggs and larvae and consequently the life history of marine fish (Lacroix *et al*. 2018, Aguilar *et al*. 2019). Stronger currents can favor the recruitment of fish that have little time for metamorphosis, as well as for their settlement. Likewise, higher temperature can amplify the growth rate and consequently increase the larval survival rate (Pankhurst & Munday 2011). Thus, the larval records of *E. velox* may reflect a favorable oceanographic moment for dispersal, but not sufficient for the establishment of a population, because during this life stage, they are more sensitive to different environmental stressors (Harvey *et al*. 2013, Kroeker *et al*. 2013, Maynou *et al*. 2020, Downie *et al*. 2021, Van de Wolfshaar *et al*. 2022).

Considering the northern limit of distribution of *E. velox* in the western Atlantic Ocean (Massachusetts - USA), its occurrence is observed in

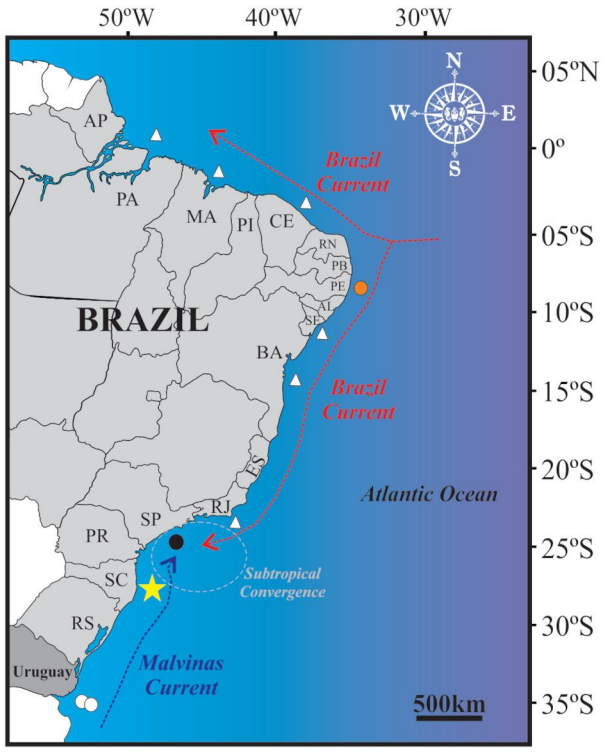

Figure 2. Present records of the *Euleptorhamphus velox* in the southwestern Atlantic. Larval records (white triangle); adults: southern limit of distribution by Collette & Bemis 2019 (CAS-SU 51794) (orange circle), MZUSP 67710 (black circle), AZUSC 6923 (yellow star), and MCZ 72049 and 72051 (white circles).

the transition/overlap zone of the cold Labrador Current with the warm Gulf Current (temperate climate). In contrast, in the southern limit, including the records presented here, *E. velox* crosses the transition/overlap zone (Subtropical Atlantic Convergence - CSA) between the cold Malvinas Current and the warm Brazilian Current, entering the Argentine Marine Zoogeographic Province (temperate climate) (Braga & Niencheski 2006, Castro *et al*. 2006, 2008, Caires 2014, Cousseau *et al*. 2019). Thus, most of the distribution area of *E. velox* is in tropical waters (Gulf and Brazilian Currents), but its limits are in typical temperate areas. The CSA represents an important faunal transition area, being the limit of occurrence of several tropical and temperate species, due to the change in the thermal profile (Menezes *et al.* 2003, Castro *et al.* 2006, 2008, Miloslavich *et al.* 2011). Possibly the records presented here are those of maximum tolerance for *E. velox*.

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Ethical statement

The present study did not involve the use of regulated animals and did not require approval by an ethical Committee

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