

**FIRST RECORD OF *HYDROLAGUS AFFINIS* (HOLOCEPHALI:
CHIMAERIFORMES: CHIMAERIDAE) FROM MADEIRA AND THE SEINE SEAMOUNT
(NORTH ATLANTIC OCEAN)**

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Abstract. The small-eyed rabbitfish, *Hydrolagus affinis* (de Brito Capello, 1868) (Chimaeridae), is recorded from the archipelago of Madeira for the first time, based on seven specimens caught between 1200 and 2500 m depth. This record extends the previously known range of distribution of this species, and also confirms its vertical distribution down to 2500 m. Additional material collected from the Canary Islands and the Azores was used for comparison.

Keywords: Chimaeridae, *Hydrolagus affinis*, Madeira, NE Atlantic

The family Chimaeridae comprises two genera, *Chimaera* L. (with a separate anal fin, sharply marked off from the caudal fin by a deep notch) and *Hydrolagus* Gill, 1862 (without a separate anal fin) (Bigelow and Schroeder 1953). *Hydrolagus* is represented by 22 described species (James et al. 2009, Eschmeyer 2010), four of them known from the north-east Atlantic: *Hydrolagus affinis* (de Brito Capello, 1868), *H. lusitanicus* Moura, Figueredo, Borlado-Machado, Almeida et Gordo, 2005, *H. mirabilis* (Collett, 1904), and *H. pallidus* Hardy et Stehmann, 1990.

Hydrolagus affinis was first described from a single specimen caught off Setúbal, east Portugal (Capello 1868). It is a benthopelagic species occurring on continental slopes and deep-sea plains from 300 to 2400 m (Stehmann and Bürkel 1984). Its distribution extends from East Greenland (61°50'N), Rockall Trough, Bay of Biscay and off Portugal to 22°52'N to off northwest Africa, including the Canary and the Cape Verde Islands in the East Atlantic (Stehmann and Bürkel 1984, Hardy and Stehmann 1990, Brito et al. 2002, Møller et al. 2004). It is also distributed from Canada (lat 62°55'N) to Cape Cod in the West Atlantic (Hardy and Stehmann 1990, Møller et al. 2004). The species has also been reported from the

Mid-Atlantic Ridge (lat 37°18'N), off the Azores (Marques and Porteiro 2000).

Hydrolagus affinis can be separated from the other three congeneric species occurring in the NE Atlantic by a number of morphologic characters, including its uniform darker colouration, purplish-brown at all life stages (Hardy and Stehmann 1990, Moura et al. 2005).

Following several deepwater surveys off the Madeira Islands and the nearby Seine Seamount, this species was caught and is here recorded for the first time.

Two longline surveys of the benthic fauna of the Madeira Islands and the Seine Seamount between 750 m and 2500 m of depth were carried out (Fig. 1). All the specimens studied were caught during these two cruises on board the Portuguese *R/V ARQUIPÉLAGO*: Recprofmad-1 (October 11–November 9, 2004) and Chacmad-1 (September 30–October 21, 2005). On average, bottom longlines were deployed for 4–6 h. Bait used was salted Atlantic chub mackerel (*Scomber colias*).

Voucher specimens were deposited in the collections of the Museu Municipal do Funchal (História Natural) (MMF) and the Museo de Ciencias Naturales de Tenerife (TFMC). Additional material deposited in MMF from the

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Lucky Strike hydrothermal vent field (off the Azores) was also examined. Finally, unpreserved material sampled in the Canary Islands was included in the present study for comparison purposes.

All specimens were measured to the nearest mm following Didier and Séret (2002).

Hydrolagus affinis (de Brito Capello, 1868) (Fig. 2)

Material examined: 13 *H. affinis* specimens. Archipelago of Madeira and Seine Seamount: MMF35996, 1023 mm total length (TL), female, Bay of Funchal, Madeira, 32°33'N, 16°50'W, 2500 m, cruise Recprofnad-1, sta. 5, 16 Oct 2004; MMF36085, 1075 mm TL, male, and MMF36089, 1268 mm TL, female, Seine Seamount, 33°45'N 14°22'W, 2500 m, cruise Recprofnad-1, sta. 34, 4 Nov 2004; MMF36786, 1068 mm TL, male, off Ilhéu de Baixo, SE of Porto Santo, 33°01'N, 16°12'W, 1500 m, cruise Chacmad-1, sta. 10, 6 Oct 2005; MMF8639, 1097 mm TL, female, 16 Jun 1956,

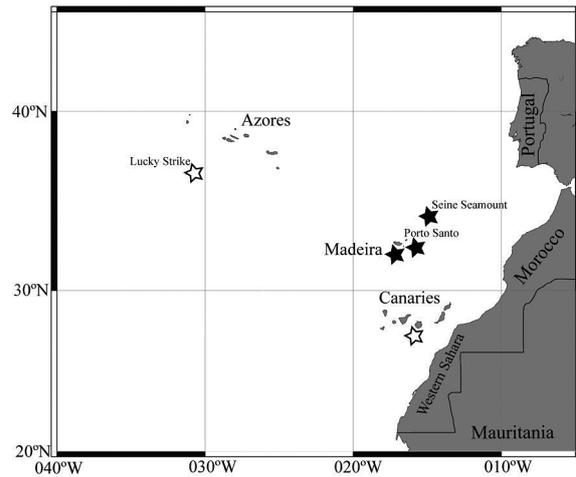


Fig. 1. Collection locations of *Hydrolagus affinis*: ★ new specimens (Madeira and Seine seamount), ☆ specimens from Azores and Canary Islands used for comparisons

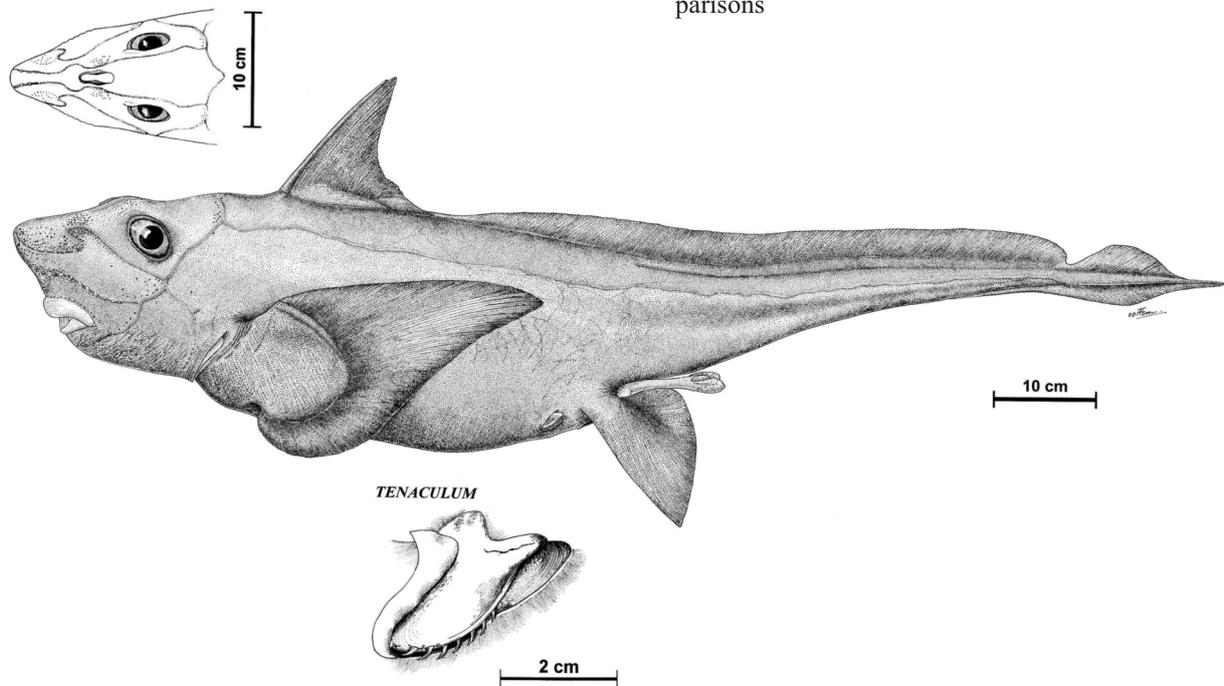


Fig. 2. *Hydrolagus affinis* from Madeira (MMF25291, 1155 mm TL, 804 mm BDL, Ponta do Sol, 1700 m) (courtesy of H. Encarnação)

Table 1

Selected body proportions of *Hydrolagus affinis* from Madeira Islands and Seine Seamount, the Canary Islands and the Azores (Lucky Strike hydrothermal vent) compared with data from literature

Area	Madeira and Seine Seamount	Canary Islands	Azores (Lucky Strike hydrothermal vent)	NE Atlantic
Reference	PRS	PRS	PRS	H and S
No. of specimens	7	5	4	20
BDL [mm]	675–913	704–770	645–908	151–885
HDL in BDL	25.6–31.0	24.8–29.3	27.0–28.6	19.6–29.4
HDL in TL	17.8–20.7	16.8–21.1	16.1–18.7	—
BDL in TL	64.9–69.6	63.0–67.7	59.6–66.8	—

PRS = presently reported study, H and S = Hardy and Stehmann, 1990, BDL = body length range, HDL in BDL = % head length in body length, HDL in TL = % head length in total length, BDL in TL = % Body length in total length.

and MMF24350, 913 mm TL, female, off Câmara de Lobos, Madeira, 32°37'N 16°59'W, 800–1200 m, 29 Apr 1989; MMF25291, 804 mm TL, male, off Ponta do Sol, Madeira, 32°34'N 17°07'W, 1700 m, 21 Oct 1992. Canary Islands: TFMCBM-VP/01426, 1118 mm TL, female, 1973 m, and TFMCBM-VP/01427, 1100 mm TL, male, 1953 m, 27°37'N 15°53'W, off Arguineguín, SW of Gran Canaria, cruise Recprofcan-4, sta. 3, 16 Oct 2004. Azores: MMF33918, 1100 mm TL, male, 1600 m, 2 Jul 2001, MMF33921, 1360 mm TL, female, 1600 m, 2 Jul 2001. Azores: MMF33923, 1000 mm TL, male, 1700 m, 1 Jul 2001, cruise Ventaco-1; MMF33920, 1160 mm TL, male, 1700 m, 22 Sep. 2001, cruise Ventaco-2, sta. 3; all from Lucky Strike hydrothermal vent field, Mid-Atlantic Ridge off Azores, 37°18'N 32°16'W.

Additional material: 3 specimens *H. affinis*, (2 males, 1 female), 1113–1223 mm TL, off Arguineguín, SW of Gran Canaria, 27°37'N 15°53'W, 1943–2292 m, cruise Recprofcan-4, sta. 3 and 4.

Remarks: Selected body proportions of the specimens studied are shown in Table 1 and are compared with data from the literature.

All specimens examined fit Hardy and Stehmann's (1990) redescription. The body length (BDL)/head length (HDL) relation is similar when comparing Canary, Madeiran and Azorean individuals. Also this Macaronesian BDL/HDL relationship is similar to that obtained from the northeast Atlantic (Hardy and Stehmann 1990) and Greenland (Møller et al. 2004) material. Some differences observed in specimens from the northeast Atlantic can be explained by the inclusion of very small individuals (sized from 151 mm BDL) in the Hardy and Stehmann's (1990) material.

Moreover, the TL/BDL relation is similar when comparing Canary, Madeiran and Azorean individuals. Also, this Macaronesian TL/BDL relation is similar to that obtained from Greenland (Møller et al. 2004) material. Some differences observed in specimens from Greenland waters can be explained by the inclusion of very large individuals (more than 913 mm BDL) in the material studied by Møller et al. (2004).

This species commonly occurs on continental slopes and deep-sea plains (Stehman and Bürkel 1984). The results of this study confirm that *H. affinis* also inhabits oceanic islands and seamounts.

Hydrolagus affinis is recorded for the first time from Madeira Island. These records not only enlarge the previously known area of distribution of this species, but also confirm its depth distribution down to 2500 m of depth.

In 2009 a new project called MARPROF (PCT MAC 2007–2013, MAC/2/065) started and new research surveys are planned to continue the exploration of the deep-sea biodiversity in the waters of the Azores, Madeira and the Canary Islands.

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