

**NEW RECORDS OF GREY CUTTHROAT, *SYNAPHORANCHUS AFFINIS*
(ACTINOPTERYGII: ANGUILLIFORMES: SYNAPHORANCHIDAE)
FROM THE EASTERN-CENTRAL ATLANTIC OCEAN**

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Abstract. Following a series of surveys with bottom longlines and fish traps along the island slopes off the archipelagos of Madeira, Canaries and Cape Verde, and with bottom trawls along the coast of Morocco and Western Sahara between 2004 and 2006 many specimens of *Synaphobranchus* were caught, revealing the presence of two species. Based on these specimens and Museum preserved specimens from this area grey cutthroat, *Synaphobranchus affinis* Günther, 1877, is recorded for the first time from off Portugal, Madeira archipelago, Great Meteor Seamount, Canary Islands, Morocco, Western Sahara, Cape Verde Islands, and Senegal. It is confirmed that *S. kaupii* is also conspecific in this area. Meristic and morphometric data of the specimens studied are also presented.

Keywords: *Synaphobranchus*, Portugal, Madeira, Canary Islands, Cape Verde Islands, Great Meteor Seamount, NW Africa, distribution

The genus *Synaphobranchus* is represented by three species in the central and eastern North Atlantic Ocean: Kaup's arrowtooth eel, *S. kaupii* Johnson, 1862; grey cutthroat, *S. affinis* Günther, 1877; and shortdorsal cutthroat eel, *S. brevidorsalis* Günther, 1877 (see: Sulak and Shcherbachev 1997, Almeida and Biscoito 2007). Until the new records from the Azores (Almeida and Biscoito 2007), *S. kaupii* was the only species of this genus recorded North of 10°N, in the eastern Atlantic, except for a single record of *S. affinis* from the Strait of Gibraltar (Sulak and Shcherbachev 1997).

During a series of captures with bottom longlines and fish traps along the slopes of the islands of Madeira and Porto Santo, Seine and Unicorn Seamounts (Madeira), Gran Canaria (Canaries), Boavista and Santiago (Cape Verde), and with bottom trawls along the coast of Morocco and Western Sahara (Fig. 1), a large number of specimens of *Synaphobranchus* were caught and deposited in the Museu Municipal do Funchal (História Natural) (MMF) and Museo de Ciencias Naturales de Tenerife (TFMC-BM). A detailed study of these collections, together with others deposited

in the Natural History Museum, London (BMNH), the Muséum national d'Histoire naturelle, Paris (MNHN) and Institut de Ciències del Mar, Barcelona (IIPB), led to the discovery of specimens of *S. affinis*, a species not previously recorded from the above mentioned areas and which is reported herein.

Three hundred and ninety-two specimens of *Synaphobranchus* spp. from the south-western coast of Portugal, the archipelago of Madeira (including the Seine and Unicorn seamounts), the Great Meteor Seamount, the Canary and Cape Verde islands, and from the Atlantic coast of Morocco and Western Sahara, down to Angola (Fig. 1) were examined in the collections of MMF, TFMC-BM, BMNH, MNHN, and IIPB. The *RRS DISCOVERY* specimens examined at the Natural History Museum, London, form a part of a larger collection that has already been reported (Merrett and Marshall 1981, Merrett and Domanski 1985). Some old specimens in the MMF labelled as "from Madeira" bear no other collection details and, according to G. E. Maul (personal communication 1981), they were brought to the Museum by the

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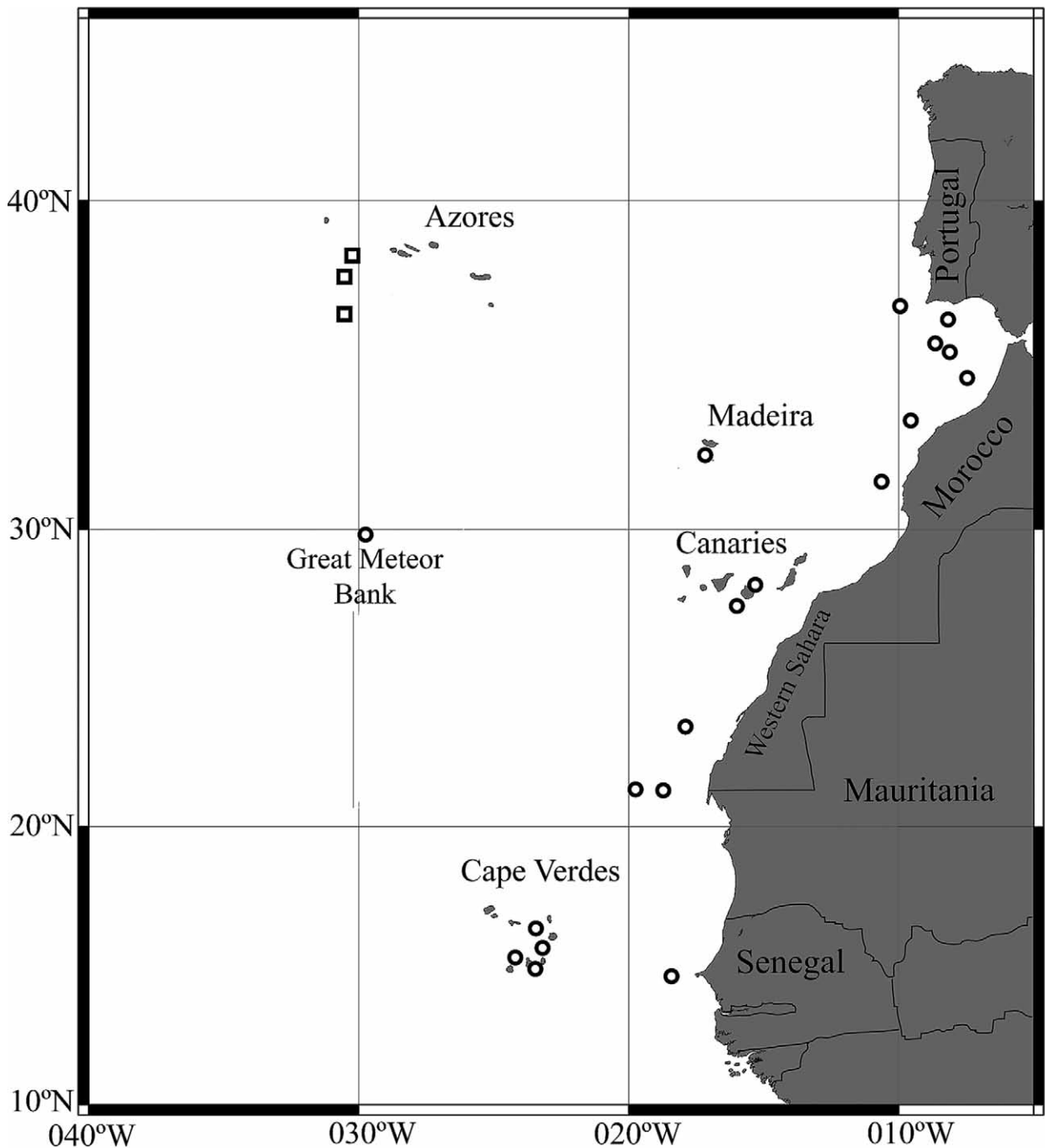


Fig. 1. Collection locations of *Synaphobranchus affinis*. New records (circles) and records from Almeida and Bischoito (2007) (squares)

local black-scabbardfish fishermen and therefore were definitely caught in the waters around Madeira.

Whenever possible, four point-to-point measurements (total length, TL; predorsal length, PD; preanal length, PA; and length of pectoral fin, PL) were made to the millimetre (mm) following Saldanha and Merrett (1982). Forty-five specimens were x-rayed and total vertebral counts made. The shape and distribution of the body scales at level of anus, above and below the lateral line, and their presence or absence on the interradiial membrane of anal fin were observed in each specimen as well as the

number, distribution and size of the teeth on the premaxillary-ethmoid complex (PME) and on the vomer.

Of the 392 specimens studied, 291 evidently belong to *S. kaupii* and 101 to *S. affinis*. One leptocephalus larva assigned to *S. kaupii* by Maul (1976) (MMF 22475x) was not studied.

***Synaphobranchus affinis* Günther, 1877**

Misidentifications: *Synaphobranchus kaupii*: Maul 1976: 18 (in part); Uiblein et al. 1999: 61, Appendix, Plate II (9).

Material examined (number of specimens in parenthesis): BMNH 1853.11.29–24, (1), no data, 1853, Madeira,

602 mm TL. BMNH 1858.4.4.3, (1), no data, 1858, Madeira, 735 mm TL. BMNH 1995.6.1:78, (1), 31°25'N, 10°53'W, 02.08.1976, 1181 m, off Canary Is., 452 mm TL. MMF 71, (1), no data, Madeira, damaged. MMF 2405, (1), Madeira, 626 mm TL. MMF 2672, (1), no data, 1941, Madeira, Câmara de Lobos, damaged. MMF 3402, (1), no data, Madeira, damaged. MMF 3438, (1), Madeira, 624 mm TL. MMF 3824, (1), Madeira, 801 mm TL. MMF 3825, (1), Madeira, 417 mm TL. MMF 15108, (1), Madeira, Câmara de Lobos, 514 mm TL. MMF 22475-G, L, M, (3), 33°12'N, 9°15'W, 1967, 500 m, Morocco, 243–320 mm TL. MMF 30079, (1), 29°53'N, 28°17'W, 1998, 800 m, Great Meteor Seamount, 568 mm TL. MMF 33598, (1), 32°36.1'N, 16°53.5'W, 2000, 800 m, Madeira, Bay of Funchal, 603 mm TL. MMF 35096, (1), 32°36.5'N, 16°53.5'W, 2000, 500 m, Madeira, Bay of Funchal, damaged. MMF 35097, (1), 32°36.5'N, 16°53.5'W, 2000, 600 m, Madeira, Bay of Funchal, 531 mm TL. MMF 35618-21, (4), 32°36.14'N, 16°52.76'W, 25-02-2004, 1000 m, Madeira, Bay of Funchal, 534–695 mm TL. MMF 35631-33, (3), 32°36.16'N, 16°54.06'W, 26-02-2004, 1000 m, Madeira, Bay of Funchal, 547–840 mm TL. MMF 35634-39, (6), 27°38.8'N, 15°49.5'W, 22-11-2003, 1408 m, Canary Is., Arguineguin, 437–708 mm TL. MMF 35968-70, 74, 77, 80, (6), 33°45.5'N, 14°29.8'W, 2004, 1000 m, Seine Seamount, 496–730 mm TL. MMF 36033, (1), 32°58.9'N, 16°26.3'W, 2004, 1000 m, Porto Santo, I. de Fora, 476 mm TL. MMF 36035, (1), 34°35.7'N, 14°28.8'W, 2004, 1500 m, Unicorn Seamount, 600 mm TL. MMF 36104, (1), 34°30.9'N, 14°27'W, 2004, 2000 m, Unicorn Seamount, 587 mm TL. MMF 36132, (1), 33°09.8'N, 16°16.4'W, 31-08-2004, 1000 m, Porto Santo, 522 mm TL. MMF 36133, (1), 33°03.6'N, 16°18.9'W, 28-08-2004, 500 m, Porto Santo, 382 mm TL. MMF 36261-62, (2), 15°14.4'N, 23°46.7'W, 2005, 605 m, Cape Verde Is. (Santiago, Tarrafal), 446–639 mm TL. MMF 36263, (1), 15°04.1'N, 23°25.6'W, 2005, 850 m, Cape Verde Is. (Santiago, A Baleia), 570 mm TL. MMF 36264, (1), 15°54.4'N, 22°51'W, 2005, 602 m, Cape Verde Is. (Boavista, Tarafe) 386 mm TL. MMF 36479, (1), 27°30'N, 13°43'W, 09-02-2006, 800 m, Morocco, 385 mm TL. MMF 36500-02, (2), 32°40.3'N, 16°44.7'W, 2005, 800 m, Madeira, Santa Cruz, 598–622 mm TL. MMF 36569, (1), 32°52'N, 17°00.7'W, 2005, 750 m, Madeira, Ponta Delgada, 656 mm TL. MMF 36576, (1), 33°00.8'N, 16°11.8'W, 2005, 1500 m, Porto Santo, 645 mm TL. MMF 36702, (1), 27°50'N, 13°30'W, 10-02-2006, 849 m, Western Sahara, 610 mm TL. MNHN 1965-0653-54, (2), 05°02'S, 11°21'E, 12-01-1964, 1000 m, Congo, Pointe Noire, 372–517 mm TL. MNHN 1974-0179, (1), 05°00'S, 11°19'E, 15-03-1967, 410 m, Congo, Pointe Noire, 231 mm TL. MNHN 1974-0180A, B, (2), 02°30'S, 08°52'E, 05-09-1963, 400 m, Congo, 278–346 mm TL. MNHN 1974-0181, (6), 05°03'S, 11°22'E, 19-09-1967, 400 m, Congo, 240–308 mm TL. MNHN 1974-0182, (3), 05°02'S, 11°17'E, 18-03-1967, 600 m, Congo, 345–390 mm TL. MNHN 1974-0183, (4), 04°45'S, 11°25'E, 04-1973, 600 m, Congo, Pointe Noire, 330–430

mm TL. MNHN 1974-0185A, B, (2), 05°04'S, 10°13'E, 17-03-1967, 805 m, Congo, Pointe Noire, 422–508 mm TL. MNHN 1974-0220, (13), 05°02'S, 11°15'E, 17-03-1967, 600 m, Congo, Pointe Noire, 262–425 mm TL. MNHN 1974-0221, (3), 04°45'S, 11°25'E, 29-09-1967, 800 m, Congo, Pointe Noire, 445–572 mm TL. MNHN 1987-0995, (1), 03°28'S, 09°28'E, 1980, Congo, 590 mm TL. MNHN 1987-1058, (1), 03°25'S, 09°33'E, 1980, 1030 m, Congo, 444 mm TL. MNHN 1987-1529, (1), 14°21'N, 17°38'W, 1981, Senegal, 482 mm TL. MNHN 1987-1553, (1), 02°41'S, 08°51'E, 1980, 915 m, Congo, 455 mm TL. MNHN 1988-0518, (1), 36°48'N, 09°28'W, 1984, 1192 m, Portugal, off Sagres, 436 mm TL. MNHN 1988-0535, (2), 36°20'N, 07°53'W, 1984, 1140 m, Morocco, 455–590 mm TL. MNHN 2001-0098, (1), 07°22'S, 11°31'E, 25-08-2000, 1289 m, Angola, damaged. MNHN 2006-1523, (1), 34°21'N, 07°24'W, 1984, 895 m, Morocco, 465 mm TL. MNHN 2006-1524, (1), 20°41'N, 18°33'W, 1991, 2114 m, Off Cape Blanc, 546 mm TL. TFMC-BM VP/01361-2, (2), 16°20'N, 23°03'W, 2005, 680 m, Cape Verde Is. (Boavista, P. Sol), 308–455 mm TL. TFMC-BM VP/01578, (1), 30°53'N, 10°33'W, 06-12-2005, 1057 m, Morocco, 292 mm TL.

Morphometric and meristic data of the specimens studied are as follows (number of specimens in parenthesis). In percent of total length: HL: 9.8–14.2 (49); PD: 26.2–36.8 (63); PA: 25.5–39.0 (62); PL: 3.9–6.7 (61). In percent of head length: Snout: 25.3–37.7 (52); Jaw: 41.9–69.0 (51); Eye diameter: 4.5–18.0 (51). Total vertebrae: 131–150 (25). All specimens studied agree well with the descriptions and data given by Karrer (1982), Robins and Robins (1989), and Sulak and Shcherbachev (1997). In the specimens measured, the origin of dorsal fin varied considerably from well behind to slightly in advance of the origin of anal fin, as shown by the variation of PD–PA (11.0–39.0). However, taking the mode, the origin of dorsal fin in our specimens of *S. affinis* is always closer to the origin of anal fin ((PD–PA)/PL = 0.7–1.0).

Distribution. In the north-eastern Atlantic *S. affinis* was known by rare records (Sulak and Shcherbachev 1997, Almeida and Bischoito 2007). It is now recorded for the first time from off southern Portugal south to Senegal, including the archipelagos of Madeira, Canaries and Cape Verde and the Great Meteor Seamount (Fig. 1). The specimens examined were caught between 400 m and 2114 m of depth.

As pointed out by Sulak and Shcherbachev (1997), the identification of the species of *Synphobranchus* is often technically challenging, especially with damaged specimens or in the absence of comparative material. In the course of the present study, the main diagnostic character used to separate the three species was the arrangement of the teeth in the premaxillary-ethmoid complex (PME). The relative position of the dorsal fin origin in relation to the anal fin origin proved to be a useful character separating, in most cases, *S. affinis* from *S. kaupii*. However, the large variation observed in some specimens, which is more important than the one reported by Matsubara and Ochiai (1951) for specimens from Japan and is similar to

the one found by Blache (1972) in specimens from off Congo, necessitated the complementary observation of the teeth in the PME, in order to arrive to a definite identification.

Meristic and morphometric data obtained from the present study enlarge the ranges previously published by Almeida and Biscoito (2007), in particular the eye diameter in % of head length (4.5–18.0 vs. 9.9–13.5). This may be explained not only by the much larger sample used in the present study, but also due to an extension in the size range of the specimens studied.

The scales form and pattern, characters that have been used by several authors to differentiate these species, were also found useful, but only when used on well preserved adult specimens and in the presence of comparative material. In our specimens of *S. affinis*, the interradi- al membrane of the anal fin always beard scales, even at its origin, a character also noted in the specimens studied by Karrer (1982).

The new records of *S. affinis* reported herein not only represent the more northerly ones in the eastern Atlantic Ocean, but also fill a noticeable gap in the distribution of this species between 14°N and the Gibraltar parallel (Fig. 1). This new distribution is most probably due to *S. affinis* has been misidentified as *S. kaupii*, a species now known to be sympatric. *S. affinis* has proved to have a continuous distribution along the tropical and subtropical eastern Atlantic. However, preliminary data obtained by us seem to indicate that both species are not equally abundant in the areas studied, a situation already noted by Sulak and Shcherbachev (1997). Captures with bottom fish traps in the waters of Madeira, the Canary and the Cape Verde Islands seem to be largely dominated by *S. affinis* (a study on the species' relative abundance and depth distribution is under way and its results will be published elsewhere).

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