

NEW RECORDS OF MARINE FISHES FROM THE AZORES

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ARQUIPÉLAGO



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Five new records of fishes from the Azores are reported: *Cookeolus japonicus*, *Parophidion vassali*, *Scorpaenodes arenai*, *Canthigaster rostrata*, and *Antennarius senegalensis*. The scorpaenid fish *Scorpaenodes arenai* Torchio, 1962, previously known only from the Strait of Messina, is redescribed, based on examination of 6 specimens from the Azores and one of the paratypes. The occurrence of *Zenopsis conchifer*, *Elagatis bipinnulata*, *Lepidocybium flavobrunneum*, *Acanthocybium solandri*, *Stephanolepis hispidus*, and *Chaunax pictus* in Azorian waters is confirmed.

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São registadas pela primeira vez para os Açores cinco espécies de peixes: *Cookeolus japonicus*, *Parophidion vassali*, *Scorpaenodes arenai*, *Canthigaster rostrata* e *Antennarius senegalensis*. O scorpaenídeo *Scorpaenodes arenai* Torchio, 1962, anteriormente conhecido apenas do Estreito de Messina, é redescrito com base em seis exemplares dos Açores. A ocorrência em águas açorianas de *Zenopsis conchifer*, *Elagatis bipinnulata*, *Lepidocybium flavobrunneum*, *Acanthocybium solandri*, *Stephanolepis hispidus* e *Chaunax pictus* é confirmada.

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INTRODUCTION

Although fishing has always been important to the people of the Azores, the scientific collection of fishes in the Azores has been cursory and sporadic. The establishment of a well-supported modern fish collection in the Azores would benefit Azorian ichthyology and it would facilitate biological studies related to fishes (e.g., marine ecology, fisheries science, ornithology, etc.). In addition to housing voucher specimens from ecological studies, an Azorian fish collection would also provide the means for monitoring long-term changes in the Azorian

fish fauna. Because of the oceanic position and character of the Azores, changes in the fish fauna here may reflect large-scale oceanographic and climatic phenomena, such as global warming.

The comprehensive work edited by WHITEHEAD et al. (1986) on the Fishes of the North-eastern Atlantic and the Mediterranean (FNAM) mentions most species that are known from the Azores. There are, however, a few species that were previously reported from the Azores and overlooked by some authors of FNAM. LLORIS et al. (1991) treated the zoogeography of the Macaronesian (Azores, Madeira, Canaries, and Cape Verde Islands)

ichthyofauna, but their analysis included deep-sea fishes with shallow water species. The zoogeographic affinities of the shallow-water (littoral) fishes of the Azores are likely to be different from the deep-sea species. The Red Book of the Vertebrates of Portugal (ICN, 1993) lists several new records of fishes for the Azores, although the sources of those records are not indicated. More recently, WIRTZ (1994) published a photographic guide to the fishes of Macaronesia, where additional new records are made, based on the author's underwater observations.

Our recent discovery of several littoral species not previously recorded from the Azores indicates that the fish fauna of the Azores is still not well known. The use of fish traps, rotenone and SCUBA to sample different habitats is likely to produce several additional new records for the Azores.

METHODS

Unless specified to the contrary, methods of taking counts and measurements follow HUBBS & LAGLER (1964). Specimens are deposited in the Museu Carlos Machado (MCM), Ponta Delgada, São Miguel, Azores and the J.L.B. Smith Institute of Ichthyology (RUSI), Grahamstown, South Africa.

RESULTS

Family ZEIIDAE

Zenopsis conchifer (Lowe, 1852). Fig. 1.

Material: MCM 750, 490 mm SL, São Miguel, Ponta Delgada fish market.

D IX,26; A III,26; the first two anal fin spines set well in advance of the third; P 12; pelvic fins I,5; 7 large bucklers along base of dorsal fin, 5 along base of anal fin and 7 from pelvic fin base to anus; gill-rakers 3+12. Colour: silvery grey with an indistinct dark midlateral spot on flanks.

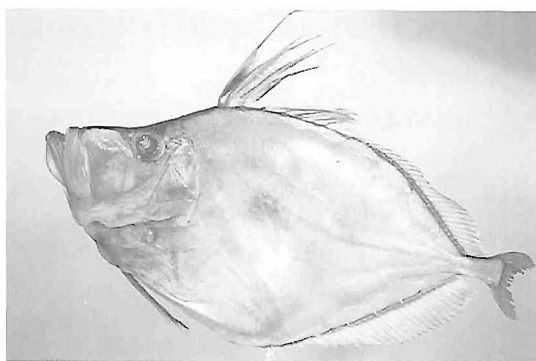


Fig. 1. *Zenopsis conchifer*, 490 mm SL, MCM 750.

Remarks: This species is known from both sides of the Atlantic Ocean (HEEMSTRA 1980); in the eastern Atlantic it occurs from the Atlantic coast of France to South Africa. *Zenopsis conchifer* was originally described from Madeira, and has only previously been reported from the Azores in ICN (1993). It occurs in depths of 90-400 m and is not uncommon in the fish market at Ponta Delgada.

Family PRIACANTHIDAE

Cookeolus japonicus (Cuvier, 1829). Fig. 2.

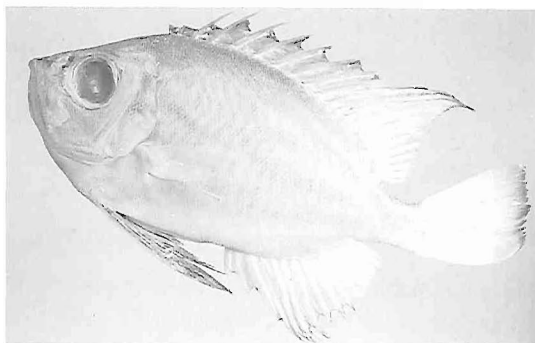


Fig. 2. *Cookeolus japonicus*, 275 mm SL, MCM 697.

Material: MCM 697: 275 mm SL, off Flores (39°34'N, 31°13'W), depth 143 m, December 1993, coll. Luís Henrique Baltazar Gonçalves.

D X,13; A III,13; P 18; branched C rays 7+7; lateral-line scales 58; gill-rakers 5 + 15 plus 2 rudiments at anterior end of lower limb. Measurements (in mm): body depth 134, head

length 92, eye diameter 33, pelvic fin length 110, pelvic fin spine 74, 3rd anal spine 58, 3rd dorsal spine 36, 10th dorsal spine 67, longest dorsal fin ray 88. Caudal fin truncate.

Remarks: This species has a worldwide distribution (STARNES 1988) and is known from St. Helena and South Africa, but it has not previously been reported from the eastern Atlantic or the Mediterranean.

Family CARANGIDAE

Elagatis bipinnulata (Quoy & Gaimard, 1824).
Fig. 3

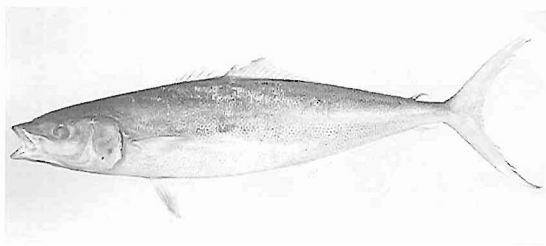


Fig. 3. *Elagatis bipinnulata*, 538 mm FL, MCM 715.

Material: MCM 715: 538 mm FL, São Miguel, Rabo de Peixe, 15 November 1994, coll. António Vieira Bizarrão. MCM 751: 348 mm FL, Ponta Delgada harbour, 2 October 1991, coll. Bruno Medeiros Brum. MCM 752: approx. 35 cm FL (caudal fin missing), São Miguel, Faial de Terra, 12 September 1990, coll. Paulo Jorge Melo.

Data from 348 mm fish (MCM 751): Body depth 75 mm, head length 85; D VI+I,26+2; A I,16+2; P 20; GR 8 + 28.

Remarks: Although this pelagic species occurs worldwide in tropical seas, it appears to be rare in the northeastern Atlantic and Mediterranean (SMITH-VANIZ 1986). Previously recorded for the Azores in ICN (1993).

Family GEMPYLIDAE

Lepidocybium flavobrunneum (Smith, 1849)

Material: MCM 748: 63 cm FL, SW of Pico, near Banco Ponta da Ilha, depth 18-25 m, 1989, coll. Capt. Hans. E. Fjallsbak and Vivaldo da Costa.

MCM 749: 82 cm FL, data as for the previous specimen.

Remarks: Reported from Madeira by PARIN (1986) and for the Azores in ICN (1993). Known from tropical and subtropical seas of all oceans.

Family SCOMBRIDAE

Acanthocybium solandri (Cuvier, 1832)

Material: MCM 747: 145 cm FL, Formigas, 15 September 1990, coll. José Francisco Gonçalves Lima.

Head length 320 mm, body depth 220 mm.

Remarks: This species occurs worldwide in tropical seas, but it is rare in the northeastern Atlantic north of 30°N, where (according to COLLETTE 1986), it was known from only one specimen from Sicily. However it was previously reported from the Azores by FERREIRA (1937) who published a photograph of a 133 cm specimen captured in October 1931 between Faial and Pico. It is also recorded for the Azores in ICN (1993).

Family OPHIDIIDAE

Parophidion vassali (Risso, 1810). Fig. 4.



Fig. 4. *Parophidion vassali*, 134 mm SL, RUSI 36128.

Material: MCM 562: 153 mm SL, São Miguel, Ribeirinha, Porto Santa Iria, depth 12-15 m, 28 June 1990; colls. J. Azevedo et al. MCM 627: 130 mm SL, Formigas, depth 28-31 m, 1 July 1991; colls. J. Azevedo et al. MCM 635: 4 (115-129 mm SL), Pico Manhenha, off harbour, depth 16-17 m, 26 June 91; colls. J. Azevedo et al.

D 130-138; A 111-115; P 17-21; C 7 or 8. Pelvic fins under eye; pelvic fin rays subequal (2 in each fin); small embedded scales present on

top of head (behind eye) and on cheeks; branchiostegals 7; no spine on opercle; short stout teeth on vomer and palatines; first gill arch with 4 elongate gill-rakers on ceratobranchials and 3 short knob-like rakers on epibranchials; no gill-rakers on hypobranchials. Vertebrae 71-74 (precaudal 15 or 16, caudal 56-58). Note that the anal rays are more numerous than the 100-110 count given by NIELSEN (1986) for *P. vassali*. Our counts are all done from radiographs, and it is possible that Nielsen's counts were from the specimens, in which case he might have overlooked a few of the small rays at the rear end of the fin.

Remarks: This species was reported from Madeira and the Canary Islands by MATALLANAS & CASADEVALL (1990). Previously, it was known only from the Mediterranean (NIELSEN 1986). There is some contradiction in the literature regarding the bathymetric distribution of this species. TORTONESE (1964) states that it inhabits the deeper parts of the shelf of the Mediterranean. This statement is quoted by

MATALLANAS & CASADEVALL (1990) and reaffirmed by NIELSEN (1986). However, BINI (1969) mentions that *P. vassali* can be found from depths of a few meters down to 150 m, and NIELSEN (1973) states that this species is found "at rather shallow depths". Our specimens were caught between 12 and 31 m depth.

Family SCORPAENIDAE

Scorpaenodes arenai Torchio, 1962. Figs. 5-8A.

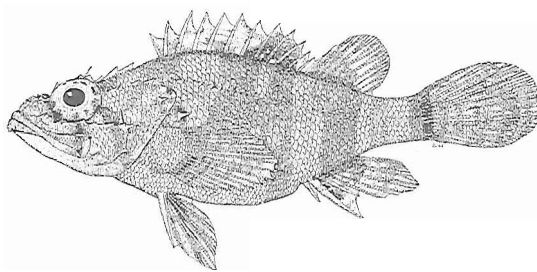


Fig. 5. *Scorpaenodes arenai*, 73 mm SL, MCM 623.

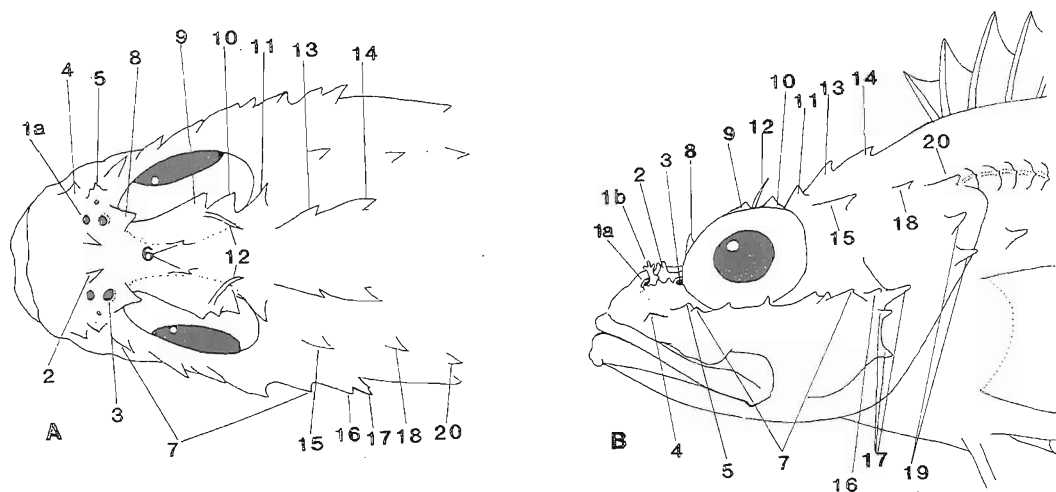


Fig. 6. Lateral (A) and dorsal (B) views of head of *Scorpaenodes arenai* (composite of two specimens, 88 and 98 mm SL). 1a) anterior nostril, 1b) anterior nostril flap (not shown on dorsal view), 2) nasal spine, 3) posterior nostril, 4) lateral preorbital spine, 5) antorbital spine, 6) interorbital spines, 7) suborbital spines, 8) preocular spine, 9) supraocular spine, 10) postocular spine, 11) tympanic spine, 12) supraocular tentacles, 13) parietal spine, 14) nuchal spine, 15) pterotic spine, 16) supplemental preopercular spine, 17) preopercular spines, 18) posttemporal spine, 19) opercular spines, 20) supracleithral spine.

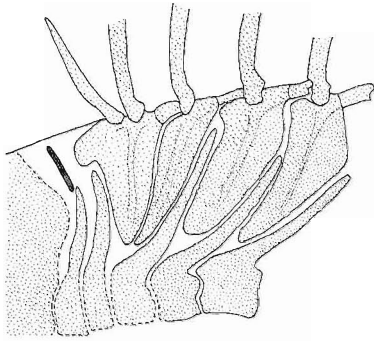


Fig. 7. Anterior vertebrae and dorsal fin pterygiophores of *Scorpaenodes arenai*, 98 mm SL. Camera lucida drawing from radiograph. Supraneural bone black; broken lines represent parts not clear on radiograph.

Material: MCM 577: 84 mm SL, São Miguel, Ponta Delgada, Santa Clara, depth 15 m, 24 March 1993, coll. J. Azevedo. MCM 578: 86 & 92 mm SL, São Miguel, Ponta Delgada, Santa Clara, depth 15 m, 27 March 1993, colls. J. Azevedo and Carlos Rodrigues. MCM 623: 73 mm SL, Formigas, depth 28-31 m, 1 July 1991; colls. J. Azevedo et al. RUSI 46976: 2 (88 & 98 mm SL), data as for MCM 578.

D XIII,8-9; A III,5; last dorsal and anal fin rays double; caudal branched rays 11-13 (6 dorsal + 5-7 ventral); segmented caudal fin rays 8+8; 3-5

dorsal procurent caudal spines and 3-4 ventral procurent caudal spines; P 17-18, the dorsal 2 or 3 rays unbranched, the next 5-7 rays branched and the lower 9-10 rays unbranched and thickened; lateral line scales 23-26; lateral scale series 47-52; gill-rakers 5 + 7-9 (including rudiments); branchiostegal rays 7.

Measurements in % SL: head length 40-45, snout 11, eye diameter 12-14, bony interorbital width 4.8-6.4, upper jaw 20-23, body depth 34-37, predorsal 39-45, pectoral fin length 32-35, pelvic fin 25-30, 1st dorsal fin spine 5.8-7.6, 2nd dorsal spine 9.5-12, 3rd dorsal spine 12-13, 12th spine 7.7-10.5, 13th spine 10-12, 1st anal spine 7.2-8.8, 2nd anal spine 16-19, 3rd anal spine 11-14, pelvic fin spine 16-19, and caudal peduncle depth 10-12%.

Head spines well developed (see Figs. 5-7). Lower edge of preorbital bone with two broad lobes extending over maxilla; suborbital ridge with 5-7 spines, first on preorbital below front edge of eye, second below middle of eye, and last (with 2 or 3 points on some specimens) before supplemental preopercular spine; some specimens with 1 or 2 spines below suborbital spines. Nasal spine(s) well developed (double on left side of 88 mm specimen and double on both sides of 98 mm specimen). Antorbital spine with broad base and 1-3 short points.

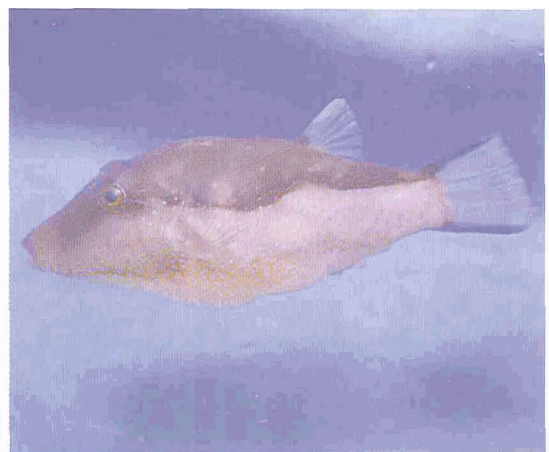
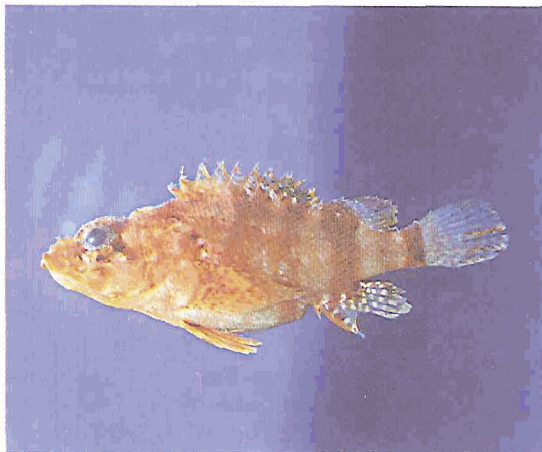


Figure 8. A - *Scorpaenodes arenai* Torchio, 1962, 73 mm SL, MCM 623; B - *Canthigaster rostrata* (Bloch, 1796), 87 mm SL, MCM 763.

Anterior nostril tubular, the rear edge produced into a large flap with several slender filaments (no filaments on nostril flap of 84 mm fish); slender tentacle 1/3 to 2/3 pupil diameter in length arising behind supraocular spine. Larger specimens with a prominent knob on postero-ventral corner of maxilla. Scales distinctly ctenoid, covering body including chest and most of head; scales extending forward over interorbital region to rear nostrils; cheeks and operculum covered with ctenoid scales; dorsal part of maxilla with a few weakly ctenoid scales; lower jaw naked or with a few minute, isolated cycloid scales; small spine at end of lateral-line tube of first 7 lateral-line scales.

Premaxilla and lower jaw with a band of villiform teeth; Y-shaped band of similar teeth on vomer, none on palatines.

Swimbladder of 88 mm adult male well-developed, with 2 large intrinsic muscles running longitudinally along dorsal surface between bladder and peritoneum of dorsal surface of abdominal cavity.

Vertebrae 9 + 15; epipleural ribs on first 8 vertebrae and possibly on 9th but obscured by large first anal fin pterygiophore; one supraneural bone (Fig. 6). Caudal fin skeleton (observations from radiographs) with 3 epurals which (together) support the procurent caudal spines; neural spine of third preural vertebra not reaching procurent spines; no neural spine on second preural vertebra; second uroneurals not apparent; stegural short and fused with terminal vertebral element ("urostylar centrum"); hypurals 1 and 2 fused with one another and (proximally) with parhypural and terminal vertebral element; hypurals 3 and 4 fused with terminal vertebra and (proximally) with hypurals 1 and 2; hypural 5 present; hypurals 3-5 support the dorsal group of 8 segmented fin rays; parhypural closely articulated with hypural and fused with terminal vertebral element; parhypural and hypurals 1+2 support the ventral group of 7 segmented fin rays; haemal spine of second preural vertebra broad and elongated, supporting one segmented ray and 3 procurent spines; haemal spine of third preural vertebra elongated but not reaching procurent spines.

Pterygiophores of soft-rays of dorsal and anal fins bipartite, with middle and proximal elements fused; pterygiophores of dorsal fin spines with middle and proximal parts apparently fused, except for first pterygiophore, which is clearly autogenous. Last dorsal and anal fin rays double (split to their base) but supported by a single pterygiophore.

Fresh colour of 73 mm SL specimen from Formigas (Fig. 8A): Head and body pale reddish orange, body with 6 dark reddish brown bars, first bar extending from nape to base of pectoral fin, second from middle dorsal fin spines to level of pectoral fin, third from black blotch at posterior dorsal fin spines to belly just in front of anus, fourth bar from anterior part of soft-rayed dorsal fin to proximal third of anal fin, fifth (much fainter) on peduncle just behind dorsal fin, and last at base of caudal fin rays. Black blotch covering most of dorsal-fin membrane between 7th and 10th spines; distal two-thirds of soft dorsal fin reddish brown; caudal fin membrane hyaline, the rear half of fin with 3 or 4 concentric transverse reddish bands formed by red spots on fin rays; proximal half of caudal fin rays pale with faint red spots; small, round, intense, black spot at base of ventral caudal rays (this black spot not apparent on specimens from São Miguel); distal two-thirds of anal fin rays with prominent white spots and a few reddish brown spots; pectoral fins yellowish, with numerous reddish spots on rays; pelvic fins reddish orange; head colour like body; dark reddish brown spot on margin of eye and edge of orbit at about 4 o'clock position, and a smaller dark brown spot on orbit at about 6 o'clock and 8 o'clock positions; iris with series of brownish radial bands, each containing a small golden spot. Colour of preserved specimens from São Miguel: head and body pale; 3 faint dark bars on rear part of body as described above; distinct dark bar at base of caudal fin; dark blotch between 8th and 12th dorsal fin spines; dark spots along lateral line and also on pectoral, caudal and anal fins; dark bar across base of pelvic fin rays; dark spot on body below 2nd and 3rd dorsal fin spines; radial series of about 7 dark spots on margin of eye.

also collected it in 30 m at Formigas islets on a rocky bottom with a thick carpet of macroalgae. The 86 mm specimen is an adult female with large ovaries. Our specimens represent the first record of *S. arenai* outside the Mediterranean Sea.

The original description of *S. arenai* was based on 5 specimens from the Strait of Messina (TORCHIO 1962); BERDAR & CAVALIERE (1980) added information on 5 additional specimens, also from the Strait of Messina, and all 10 of these specimens were found washed up on the beach. At this locality, the species probably lives in deep water (> 50 m); and, like many other deep-water fishes that are found on the beaches of this coast, it is occasionally brought to the surface by the turbulent (upwelling) currents of this ichthyologically famous area (MARSHALL 1954: 13). The fresh colour pattern of our specimens was very similar to that shown in the colour photograph of BERDAR & CAVALIERE (1980: Fig. 2).

BREDAR & CAVALIERE (1980: 4) reported 22 vertebrae for the *S. arenai* specimen that they x-rayed; although the first two centra are obscured by the cleithrum and supracleithrum, the neural spines of these two vertebrae are visible on their radiograph (their Fig. 3) and the total vertebral count (including the terminal element ["urostyle" vertebra"]) is 24. According to ESCHMEYER (1969: 4), species of *Scorpaenodes* normally have 24 vertebrae, and the 3 specimens that we x-rayed (including one of the paratypes) also have 24 vertebrae. ESCHMEYER (1969: 4) mentioned that *Scorpaenodes* have "First three interneurals [dorsal fin pterygiophores] fitting between the second and third neural spines." But in our specimens, only the first two pterygiophores are situated between the second and third neural spines.

Family MONACANTHIDAE

Stephanolepis hispidus Linnaeus, 1766. Fig. 9.

Material: MCM 766, 270 mm SL, Ponta Delgada, depth 14 m, 13 April 1995, colls. Paula Aguiar, Carolina Arruda, Marco Henrique, Rita Norberto; MCM 767 and 768, 225 and 320 mm SL, Ponta Delgada, depth 18 m, 13 April 1995, coll. Carlos Rodrigues.

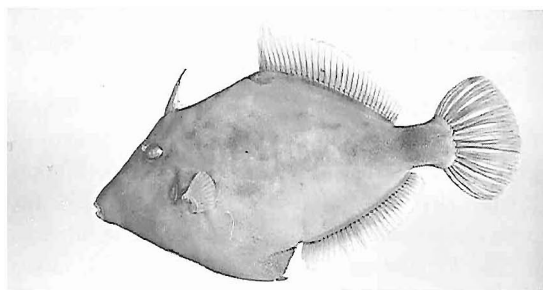


Fig. 9. *Stephanolepis hispidus*, 270 mm SL, MCM 766.

D I + 31-32; A 31-32; P 13-14; C 12. Measurements in percentage of standard length: body depth 57-67; head length 28-31; eye diameter 4.7-6.2; pre D1 length 30-36; pre D2 length 55-63; D2 base 39-41; prepelvic spine length 55-61; preanal length 57-64; anal base 34-36; peduncle height 8.9-11.6; maximum D2 height 11-13; maximum anal fin height 8.9-9.7; pectoral fin length 8.1-9.8.

Remarks: Found in both sides of the tropical Atlantic (HARMELIN-VIVIEN & QUÉRO 1990). This species was reported for the Azores in ICN (1993) and by WIRTZ (1994).

Family TETRAODONTIDAE

Canthigaster rostrata (Bloch, 1796). Fig. 8B.

Material: MCM 763, 87 mm SL, Ponta Delgada, depth 15 m, 15 March 1995, colls. José Azevedo and Hélio Dias.

D 8, A 9, P 15. Measurements (in mm, and following ALLEN & RANDALL 1977): head length 31; postorbital head length 8; eye diameter 7; interorbital width 9; body depth 30; body width 35; caudal peduncle depth 13; caudal peduncle length 18. Colour: dorsal surface of body brown, with darker band running from behind eye to dorsal surface of caudal peduncle; flanks yellow with scattered blue dots, which increase in diameter towards the tail; belly white, with a median blue line; blue lines also around the eyes and the lower surfaces of the mouth and caudal peduncle; fins white, caudal with black upper and lower borders and faint blue dots and horizontal

and lower borders and faint blue dots and horizontal lines. Meristics and colour pattern are similar to specimens from Madeira.

Remarks: Found on both sides of the tropical Atlantic. In the eastern Atlantic, its previously known northern distribution limit was Madeira (SHIPP 1990). Isolated and rare individuals have been observed (and videotaped) in the south coast of São Miguel Island since at least 1993, always in shallow (10-20 m depth) areas of algae-covered rocky substrate. Several other specimens have been observed in the area where the present one was captured.

Family ANTENNARIIDAE

Antennarius senegalensis Cadenat, 1959.
Fig. 10.

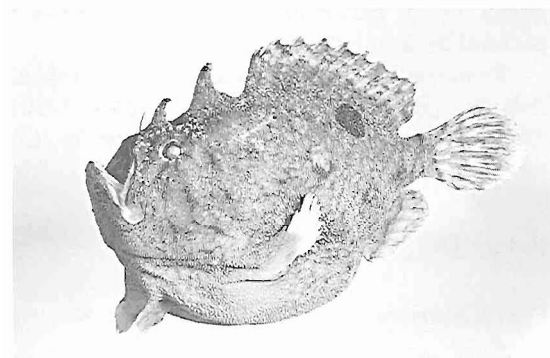


Fig. 10. *Antennarius senegalensis*, 209 mm SL, MCM 698.

Material: MCM 698: SL 209 mm, São Miguel, 2 miles south of Ponta Delgada, depth 130-140 m, 9 March 1994, coll. António Manuel Gomes Meneses.

Illicium 29 mm; eye diameter 14.5 mm. D III+13; A 8; C 9, the middle 7 caudal rays branched. P 13. Pectoral and median fin rays bifurcate. Esca a cluster of slender filaments. Proximal half of second dorsal spine joined to head by membrane. Colour: mottled dark grey; prominent black spot between bases of 7th to 10th D rays.

Remarks: PIETSCH (1986) records this species from Morocco to Cape Morro, Angola. FERREIRA

(1940) mentions a specimen of *Antennarius radiosus* from Velas, São Jorge island, depth 10 m, deposited at the Museum Carlos Machado. Unfortunately, this specimen could not be found. Both *A. radiosus* and *A. senegalensis* belong to the *A. ocellatus* group (PIETSCH & GROBECKER 1987), so it is possible that FERREIRA misidentified his specimen.

Family CHAUNACIDAE

Chaunax pictus Lowe, 1846

Material: MCM 746: SL 193 mm, off Flores (39°23'25"N, 31°52'13"W), depth 521 m, 25 November 1994, coll. Luis Gonçalves.

D 10; A 3; C 8, middle 6 rays branched; P 14. Neuromast counts (following CARUSO 1989): supraorbital (AB) 10; infraorbital (CD) 7; mandibular (EF) 7; hyomandibular (FG) 3; pectoral (GH) 12; premaxillary (AC) 8; maxillary (CF) 1; upper preopercular (BD) 2; lower preopercular (DG) 3; lateral line (BI) 33. Peritoneum black; no pyloric caeca; testes well developed. Colour in alcohol: whitish; illicial cavity blackish; dorsal (anterior) surface of esca blackish, the ventral (posterior) side pale.

Remarks: In CARUSO (1989) key to Atlantic species of *Chaunax*, the anal fin ray count of *C. pictus* is given as 6 or 7, and LOWE (1846) gives a count of 5 anal fin rays for his holotype. Our specimen has only 3 anal fin rays, and the fin is not obviously deformed. Except for the anal fin ray count, our specimen agrees well with the description and illustration of *Chaunax pictus* given by CARUSO (1989); and we assume that the unusually low number of anal rays is an individual anomaly of this specimen.

According to CARUSO (1989), *C. pictus* is known from the western North Atlantic between 27 and 17°N latitudes; in the eastern Atlantic it occurs from Madeira to Gambia. The record of *C. pictus* indicated for the Azores on the distribution map given by CARUSO & PIETSCH (1986) was based on ROULE (1919) report of a specimen collected in 1902 from 3 miles north of Faial, depth 950 m. The identity of ROULE specimen needs to be confirmed, as CARUSO

(1989) reports a Paris Museum specimen (MNHN 1977-39) of his new species, *C. suttkusi*, that was collected off the Azores on 25 October 1971. QUÉRO & DU BUIT (1983) reported *C. pictus* from the Bay of Biscay, but their brief account does not give any descriptive information to determine which of the two species of *Chaunax* known from the eastern Atlantic they had. *Chaunax pictus* is also reported for the Azores in ICN (1993).

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