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## DEEP-SEA PELAGIC FISHES FROM THE AZORES (EASTERN NORTH ATLANTIC) DEPOSITED IN THE MUSEUM OF COMPARATIVE ZOOLOGY

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ABSTRACT. The meso- and bathypelagic fishes collected by the Woods Hole Oceanographic Institution from the Azores Economic Exclusive Zone and stored at the Museum of Comparative Zoology are reviewed and show a total of 9,260 specimens from 120 collections composing 153 species in 56 families. Twenty-eight species in 12 families are new to the area and are documented here in detail. A full list of all species and localities is included.

### INTRODUCTION

The mesopelagic and bathypelagic fishes account for more than 35% of the total number of species reported from the Azores (Santos *et al.*, 1997). These two groups are diverse in the area, and various species can be found in the open ocean as well as in the narrow regions around the islands.

Interest in understanding the oceanography of the Azores resulted in a number of research programs in the region over the past 150 years. However, it was only with the expeditions of *Travailleur* and *Talisman* (Vaillant, 1888) that detailed reports on

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deep-sea fishes began. Late in the last century and during the first decades of this century, the scientific cruises of Prince Albert I of Monaco produced the beginnings of an inventory of the oceanic ichthyofauna of the Azores (e.g., Collett, 1896, 1905; Richard, 1905; Zugmayer, 1911, 1933; Roule, 1919; Roule and Angel, 1924). Other important meso- and bathypelagic material from the Azores was collected by the *Michael Sars* North Atlantic Deep Sea Expedition (e.g., Murray and Hjort, 1912; Koefoed, 1956, 1958; Bolin, 1959) and by several Danish expeditions with *Dana* (e.g., Jespersen, 1915; Regan and Trewavas, 1929; Ege, 1930, 1953; Nafpaktitis, 1968; Bertelsen *et al.*, 1976). Since then, several other countries have been involved in oceanic research programs in the Azorean region (e.g., France, Germany, Portugal, Russia, Sweden, and the United States).

In particular, several oceanographic expeditions to the Azores region were conducted by the Woods Hole Oceanographic Institution (WHOI) between 1928 and 1984. These cruises were aimed at investigations of the pelagic domain and the material collected is now archived at the Museum of Comparative Zoology (MCZ), Harvard University. Most of the specimens were fully identified at WHOI during ecological and biogeographical studies, but only selected parts of the collection have been used in publications (e.g., Borodin, 1931; Haedrich, 1964; Nafpaktitis *et al.*, 1977). Arruda (1997) produced a checklist of Azorean fishes primarily based on literature references. Many of his records are confirmed by the specimens cited in this paper.

We had the opportunity to study the eastern Atlantic collection housed in the MCZ, and based on those studies, we record the first documented occurrence of some meso- and bathypelagic fishes in the Azores region. In addition, we present a complete list of the fishes collected in the Azores by the WHOI expeditions.

## MATERIAL AND METHODS

Following Santos *et al.* (1997) we consider Azorean waters as the Azores Economic Exclusive Zone (EEZ, Fig. 1). A complete listing of all the collecting stations and associated data of the 10 WHOI cruises done in the EEZ are shown in Appendix 1. These stations are also plotted in Figure 1. The station data are arranged

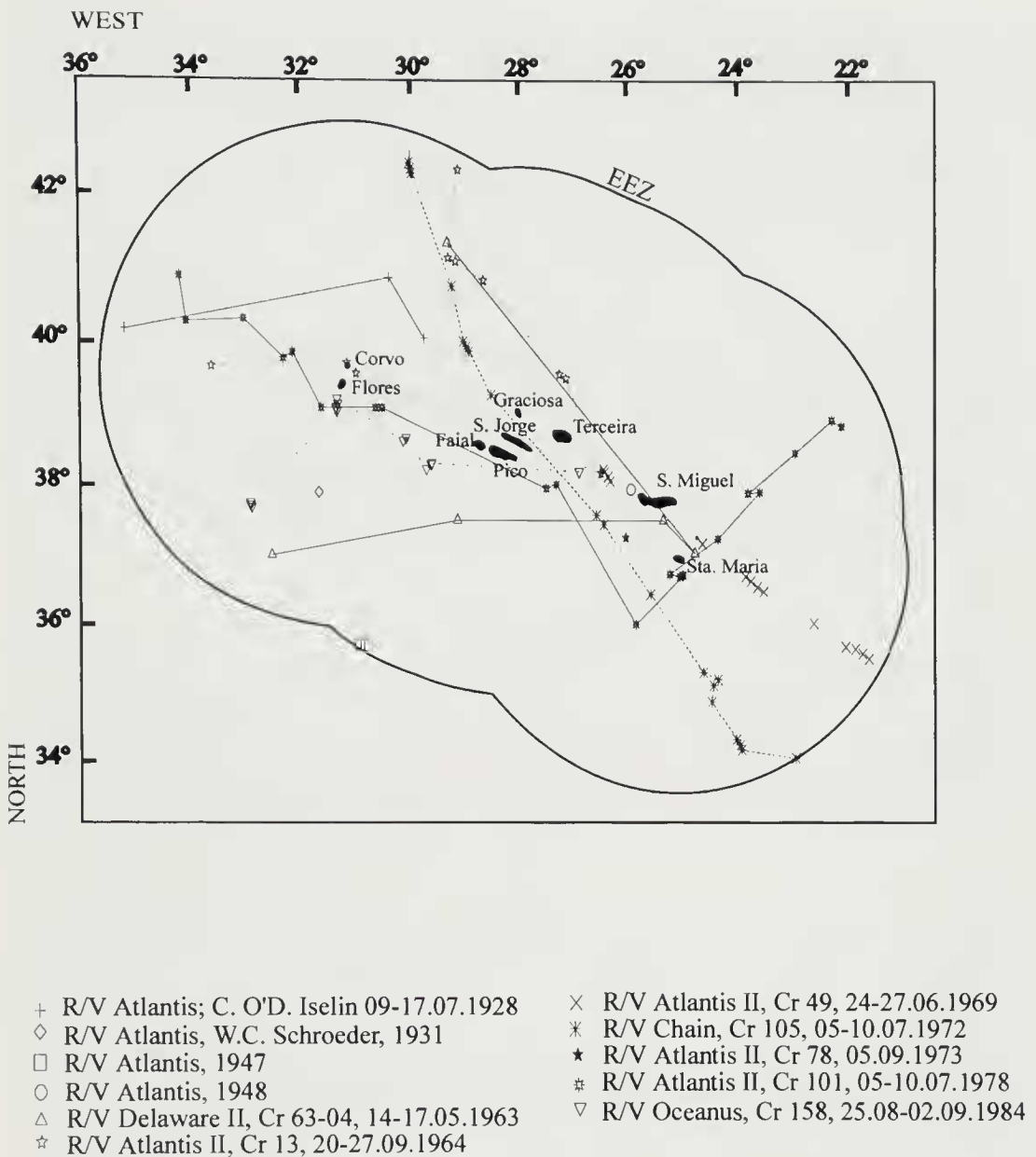


Figure 1.

chronologically by cruise and referenced by field numbers. The field numbers refer to the collectors as follows: CODI refers to collections made by C. O'D. Iselin, RHB to collections made by Richard H. Backus and James E. Craddock, SUN to surface collections that accompanied the RHB stations, CEL to collections made by Charles E. Lea, and KEH to collections made by Karsten E. Hartel. The identification and distribution of the species found in the WHOI collections were reviewed and compared with San-

tos *et al.* (1997), Whitehead *et al.* (1984–1986), Hureau and Monod (1973), Quéro *et al.* (1990a), and numerous primary works. In addition, we compared the specimens with related material in the MCZ collections.

All records of species new to the area are outlined in the following section. Appendix 2 lists all of the remaining species found in the WHOI collections from the Azorean EEZ. Some rare species caught just outside the EEZ are also reported. Full data on MCZ collections are available at <http://www.mcz.harvard.edu/fish>. We follow the family nomenclature and arrangement of Nelson (1994). Fishes that could only be identified to genus or family are usually not included in Appendix 2 except in cases of rarity or of special interest.

## RESULTS

The WHOI/MCZ collections from the Azores were taken at 120 stations fished from the surface to about 1,000 meters, usually with an open net (Appendix 1, Fig. 1). A computer search of the database at MCZ (MUSE) from the EEZ produced 1,198 lots and more than 9,260 specimens with 153 species in 56 families. The majority were mesopelagic (ca. 88%), followed by epipelagic (ca. 9%), and a small number of bathypelagic species.

Myctophidae is the largest family represented with 41 species from 646 collections and 70% of the specimens. Other families, such as the Stomiidae, Sternophychidae, Gonostomatidae, Photichthyidae and Paralepididae, are reasonably well represented, both in terms of their specific diversity and total numbers (see Appendix 2).

*Benthoosema glaciale* is the most numerous fish in any individual collection because it was abundant at two stations (RHB 2535, RHB 2536) made in the northern area of the EEZ. However, *Gonichthys coccoi*, *Lobianchia dofleini*, and *Lampanyctus pusillus* are the most commonly caught fish in the collections (Appendix 2). Of the 20 most abundant species, 65% belong to the Myctophidae. However, fishes in other families (e.g., *Argyropelecus hemigymnus*, *Vinciguerria attenuata*, or *Stomias boa*) are also common. Larvae represent fewer than 20% of the total number of fishes.



The collections add 28 species in 12 families to the Azores ichthyofauna (see below). Bathylagidae and Anotopteridae are new families to the area.

## NEW RECORDS OF FISH SPECIES FOR THE AZORES

### Bathylagidae

#### *Bathylagus bericoides* (Borodin, 1929)

*Comments.* Occurs in tropical, subtropical, and temperate waters of all oceans. Although reported from the northeast Atlantic (Cohen, 1984a), the MCZ material represents the first documented records from the Azores.

*Azores Material.* **61912**, R/V *Atlantis II* 49, RHB1917, 35°34'N 21°54'W, 135–140 m, 0045–0219 h, 25.VI.1969, 1:48 mm SL; **61909**, R/V *Atlantis II* 13, RHB1039, 40°47'N 28°41'W, 450–500 m, 2030–2350 h, 20.IX.1964, 2:29–116 mm SL; **61913**, R/V *Atlantis II* 49, RHB1928, 38°05'N 26°N29'W, 192–202 m, 0231–0408 h, 27.VI.1969, 1:105 mm SL; **149499**, R/V *Atlantis II* 101, CEL7833, 36°37'N 25°04'W, 50–170–80 m, 2146–2345 h, 09.VII.1978, 1:91 mm SL.

#### *Bathylagus greyae* Cohen, 1958

*Comments.* This species is generally tropical (Cohen, 1984a), but we have found numerous records from the Azores and adjacent waters.

*Azores Material.* **66131**, R/V *Atlantis II* 49, RHB1922, 36°32'N 23°49'W, 135–140 m, 0046–0221 h, 26.VI.1969, 1:90 mm SL; **149498**, R/V *Atlantis II* 101, CEL7837, 37°48'N 23°39'W, 350 m, 2211–0045 h, 10–11.VII.78, 1:67 mm SL; **150907**, R/V *Chain* 105, RHB2537, 42°17'N 29°59'W, 225–255 m, 0017–0135 h, 05.VII.1972, 1:33 mm SL; **150908**, R/V *Chain* 105, RHB2540, 39°55'N 29°03'W, 60–70 m, 2135–2250 h, 05.VII.1972, 2:62 mm SL; **150909**, R/V *Chain* 105, RHB2550, 35°03'N 24°30'W, 290–310 m, 0112–0235 h, 08.VII.1972, 1:45 mm SL.

#### *Bathylagus longirostris* Maul, 1948

*Comments.* Known from tropical and subtropical waters of the Atlantic, Pacific, and Indian oceans (Cohen, 1984a). Originally

described from Madeira. Although these are the first two records from the Azores, the species is common just south of the area based on MCZ material.

*Azores Material.* **66184**, R/V *Chain* 105, RHB2552, 34°17'N 24°05'W, 60–70 m, 2158–2305 h, 08.VII.1972, ?; **91356**, R/V *Chain* 105, RHB2553, 34°12'N 24°01'W, 125–135 m, 2355–0105 h, 08–09.VII.1972, 2:90–125 mm SL.

### Opisthoproctidae

#### *Dolichopteryx* spp.

*Comments.* Two forms of this genus, based on distinctive post-larvae, are included here. One of these is probably *D. longipes* which has been reported from Madeira (Cohen, 1984b).

*Azores Material.* **66370**, R/V *Chain* 105, RHB2543, 39°10'N 28°33'W, 250–260 m, 0540–0815 h, 06.VII.1972, 1:27 mm SL; **66348**, R/V *Oceanus* 158, KEH8477, 37°35'N 32°55'W, 600 mwo, 0204–0325 h, 30.VIII.1984, 1:29 mm SL; **66345**, R/V *Atlantis II* 13, RHB1041, 39°24'N 27°11'W, 220–300 m, 1405–1830 h, 21.IX.1964, 1:22 mm SL.

#### *Rhynchohyalus natalensis* (Gilchrist and von Bonde, 1924)

*Comments.* This species was caught on the western edge of the EEZ and is included here because of the broad range suggested by other MCZ specimens from the Canaries (MCZ96900, MCZ66428) and from the western North Atlantic as far north as 39°28'N (MCZ60718). The only other northeast Atlantic record is from the stomach of a tuna fish at Madeira (Maul, 1946; Cohen, 1984c).

*Material.* **66429**, R/V *Atlantis II* 13, RHB1046, 39°30'N 35°58'W, 425–500 m, 0915–1237 h, 27.IX.1964, 1:37 mm SL.

### Alepocephalidae

#### *Belloxia koefoedi* (Parr 1951)

*Comments.* This endemic North Atlantic bathypelagic species lives between 2,500 and 5,850 m (Markle and Quero, 1984; Markle and Sazonov, 1990). An MCZ specimen was caught at the

southwest corner of the EEZ close to the type locality. There are few records of this species for the northeastern Atlantic.

*Azores Material.* **36636**, R/V *Atlantis II*, ATLAN4715, 35°37'N 30°57'W, 3,200 mwo, 1312–? h, 16.VII.1947, 1:135 mm SL.

#### Platytroctidae

##### *Sagamichthys schnakenbecki* (Kreffft 1953)

*Comments.* A 24-mm SL postlarva found in the MCZ material from the middle of the EEZ confirms Quéro *et al.* (1984) mapping. This species was not indicated for the Azores in Matsui and Rosenblatt (1984). The eastern Atlantic MCZ material includes more than 20 records of postlarvae and juveniles from 16°N to 56°N, with some just to the east of the Azores. MCZ material also includes several records from off the east coast of North America that have not been reported previously (e.g., MCZ75508).

*Azores Material.* **128329**, R/V *Chain* 105, RHB2538, 40°42'N 29°15'W, 560–600 m, 0950–1225 h, 05.VII.1972, 1:27 mm SL.

#### Gonostomatidae

##### *Cyclothone livida* Brauer 1902

*Comments.* Recorded from southern Iceland to Angola (Badcock, 1984a; Quéro *et al.*, 1990b). One MCZ collection documents its occurrence in the Azores. Additional MCZ material shows that *C. livida*, formerly thought to be an eastern Atlantic endemic (Miya and Nishida, 1996), actually ranges across the Atlantic to 55°W between 3°N and 12°N.

*Azores Material.* **143321**, R/V *Atlantis II* 49, RHB1924, 37°04'N 24°42'W, 750–830 m, 0808–1005 h, 26.VI.1969, 1:34 mm SL.

##### *Cyclothone pseudopallida* Mukhacheva 1964

*Comments.* A wide-ranging species in all tropical, subtropical, and temperate oceans. *C. pseudopallida* was expected to be in the Azores, but these are the first confirmed records. In the Ca-

naries, this species is a nonmigrant and is restricted to depths between 550 and 800 m (Badcock, 1970).

*Azores Material.* **142489**, R/V *Atlantis II* 13, RHB1036, 42°20'N 29°09'W, 470–520 m, 1600–1830 h, 19.IX.1964, 1:34 mm SL; **142501**, R/V *Atlantis II* 49, RHB1919, 35°56'N 22°40'W, 650–750 m, 0708–1030 h, 25.VI.1969, 3:34–37 mm SL; **142502**, R/V *Atlantis II* 49, RHB1924, 37°04'N 24°42'W, 750–830 m, 0808–1005 h, 26.VI.1969, 3:34–37 mm SL.

### Sternoptychidae

#### *Argyropelecus gigas* Norman 1930

*Comments.* A widespread species in all oceans. Badcock (1984b) infers that the species should occur in the Azores. However, based on the MCZ material, it is rare in the area, with one specimen, but it is progressively more common to the south and east.

*Azores Material.* **137182**, R/V *Atlantis II* 49, RHB1919, 35°56'N 22°40'W, 650–750 m, 0708–1030 h, 25.VI.1969, 1:16 mm SL.

#### *Polyipnus polli* Schultz 1961

*Comments.* The species is included based on a single specimen caught at the northwest edge of the Azores, which is the northernmost record. This eastern Atlantic endemic is also known from the Grand Meteor Bank (Badcock, 1984b), the Canaries (MCZ135280), and further south (Quéro *et al.*, 1990c; Harold, 1994).

*Material.* **149500**, R/V *Atlantis II* 101, CEL7816, 42°05'N 35°35'W, 1,000 m, 2355–0240 h, 03–04.VII.78, 1:25 mm SL.

### Stomiidae

#### *Aristostomias grimaldii* Zugmayer 1913

*Comments.* This species is reported for the Atlantic, Pacific, and Indian oceans but is rarely caught in the eastern North Atlantic. According to Goodyear (1990) this is the second record of *A. grimaldii* for that area. The MCZ material shows a concen-



tration of this species along the east coast of North America, between 40°N and 25°N.

*Azores Material.* **150372**, R/V *Atlantis II* 101, CEL7833, 36°37'N 25°04'W, 350–170–80 m, 2146–2345 h, 09.VII.1978, 1:85 mm SL.

*Astronesthes gemmifer* Goode and Bean 1896

*Comments.* An Atlantic, Pacific, and Indian Ocean species that occurs south of 45°N. Gibbs (1984a) maps the possible occurrence in the Azores area; however, the MCZ material probably represents the first documented records.

*Azores Material.* **133383**, R/V *Atlantis II* 49, RHB1919, 35°56'N 22°40'W, 650–750 m, 0708–1030 h, 25.VI.1969, 1:25 mm SL; **133387**, R/V *Chain* 105, RHB2555, 34°00'N 22°55'W, 470–520 m, 1002–1215 h, 09.VII.1972, 1:20 mm SL.

*Astronesthes micropogon* Goodyear and Gibbs 1970

*Comments.* A member of the “cyaneus” group as defined by Goodyear and Gibbs (1970), who noted that 35°N is the northern limit of its range. We know only one record from the Azores. The specimen is the northernmost record from the eastern Atlantic.

*Azores Material.* **91742**, R/V *Atlantis II* 49, RHB1918, 35°36'N 22°05'W, 169–175 m, 0231–0409 h, 25.VI.1969, 1:73 mm SL.

*Astronesthes neopogon* Regan and Trewavas 1929

*Comments.* *A. neopogon* is restricted to the North Atlantic and was described from just outside the Azorean EEZ. The MCZ specimen seems to be only the third northeastern Atlantic record since Maul (1956) described specimens from Madeira.

*Azores Material.* **149502**, R/V *Atlantis II* 101, CEL7832, 36°N 25°W, 350–190 m, 0050–0345 h, 09.VII.1978, 1:81 mm SL.

*Eustomias macrurus* Regan and Trewavas 1930

*Comments.* The species is known from the Atlantic, Pacific, and Indian oceans. This is the first record for the eastern Atlantic north of 6°N. It probably indicates that *E. macrurus* is more wide-

ly distributed in the eastern Atlantic than previously thought (Gibbs and Barnett, 1990). It is widespread in the western North Atlantic from 30°S to about 42°N (Gibbs and Barnett, 1990).

*Azores Material.* **149504**, R/V *Atlantis II* 101, CEL7838, 37°47'N 23°52'W, 350 m, 0045–0347 h, 11.VII.1978, 1:70 mm SL.

*Melanostomias valdiviae* Brauer 1902

*Comments.* The species is known from all oceans. In the eastern Atlantic it occurs to about 35°N (Gibbs, 1984b), but this is the first confirmed record from the Azores. Additional specimens of the species might be expected in the southern part of the area based on its known distribution.

*Azores Material.* **132155**, R/V *Atlantis II* 49, RHB1918, 35°36'N 22°05'W, 169–175 m, 0231–0409 h, 25.VI.1969, 1:143 mm SL.

*Stomias brevibarbus* Ege 1918

*Comments.* A widespread North Atlantic species that Gibbs (1984c) did not report from the Azores. MCZ material and Coad (1986) record it as far north as Canadian waters in the western Atlantic. MCZ records show the species occurring in the Azores, with other records to the west and southeast of the area. This species was recently reported in the Gulf of Mexico (Sutton and Hopkins, 1996).

*Azores Material.* **128677**, R/V *Atlantis II* 49, RHB1928, 38°05'N 26°29'W, 192–202 m, 0231–0408 h, 27.VI.1969, 1:129 mm SL.

*Trigonolampa miriceps* Regan and Trewavas 1930

*Comments.* This rarely caught species is usually thought to be antitropical in the Atlantic Ocean, but we have seen an MCZ specimen from just off the Gulf of Guinea at 0°30'S. Gibbs and Barnett (1990) and Gibbs (1984b) note the species far north of and far south of the Azores. The MCZ material adds the first records for the Azores based on three specimens, all from the northern portion of the area.

*EEZ Material.* **114690**, R/V *Atlantis II* 13, RHB1039, 40°47'N

28°41'W, 450–500 m, 2030–2350 h, 20.IX.1964, 1:50 mm SL; **62186**, R/V *Chain* 105, RHB2542, 39°47'N 28°57'W, 165–175 m, 0102–0222 h, 06.VII.1972, 1:30 mm SL; **149503**, R/V *Atlantis II* 101, CEL7818, 40°50'N 34°11'W, 1,000 m, 2120–0040 h, 04–05.VII.1978, 1:45 mm SL.

#### Paralepididae

##### *Uncisudis quadrimaculata* (Post 1969)

*Comments.* The species is endemic to the eastern central Atlantic (Post, 1990). The MCZ material contains four lots of larvae from 39°N. Two of these are from within the EEZ and two from just to the west. The samples were caught near the surface at dusk or at night.

*Azores Material.* **68562**, R/V *Atlantis II* 13, RHB1043, 39°28'N 31°00'W, 20–35 m, 1920–2332 h, 23.IX.1964, 5:18–24 mm SL; **68563**, R/V *Atlantis II* 13, RHB1045, 39°34'N 33°37'W, 15–32 m, 1930–2325 h, 26.IX.1964, 2:33–38 mm SL.

#### Anotopteridae

##### *Anotopterus pharao* Zugmayer 1911

*Comments.* This species is antitropical in the Atlantic and Pacific oceans (Maul, 1973a; Post, 1984). Adults are rare in collections, probably due to gear selectivity (Heemstra, 1990). We include the species based on two postlarvae from the Azores. We have seen an additional postlarva (MCZ73016) from just outside the EEZ and one 265-mm SL juvenile (MCZ43141) found in the stomach of an *Alepisaurus brevirostris* at 40°17'N 36°07'W (Haedrich, 1964).

*Azores Material.* **73018**, R/V *Atlantis II* 49, RHB1924, 37°04'N 24°42'W, 750–830 m, 0808–1005 h, 26.VI.1969, 1:15 mm SL; **73020**, R/V *Chain* 105, RHB2549, 35°08'N 24°25'W, 40–50 m, 2340–0102 h, 07.VII.1972, 1:22 mm SL.

#### Myctophidae

##### *Hygophum reinhardtii* (Lütken 1892)

*Comments.* A widely distributed, bipolar species found across the subtropical and tropical Atlantic Ocean to about 40°N (Naf-

paktitis *et al.*, 1977). The MCZ material contains the first confirmed records and shows that the southern Azores region is the northern edge of the range of this species in the eastern Atlantic. *H. reinhardtii* appear to be quite common south of 38°N within the Azores, and based on Nafpaktitis *et al.* (1977) the species would be expected to occur there. All the specimens were caught near the surface at night by neuston net.

*Azores Material.* **114801**, R/V *Atlantis II* 49, SUN1918, 35°36'N 22°05'W, surface, 0000–0330 h, 25.VI.1969, 2:35–45 mm SL; **114802**, R/V *Atlantis II* 49, SUN1920, 36°23'N 23°35'W, surface, 0000–0400 h, 25.VI.1969, 8:15–39 mm SL; **114803**, R/V *Atlantis II* 49, SUN1920, 36°23'N 23°35'W, surface, 0000–0400 h, 25.VI.1969, 2:27–30 mm SL; **114804**, R/V *Atlantis II* 49, SUN1921, 36°27'N 23°42'W, surface, 0000–0415 h, 25.VI.1969, 3:24–31 mm SL; **114805**, R/V *Atlantis II* 49, SUN1921, 36°27'N 23°42'W, surface, 0000–0415 h, 25.VI.1969, 4:20–29 mm SL; **114810**, R/V *Chain* 105, SUN2545, 37°23'N 26°33'W, surface, 0000–0215 h, 07.VII.1972, 1:30 mm SL; **114811**, R/V *Chain* 105, SUN2546, 37°20'N 26°30'W, surface, 0000–0345 h, 07.VII.1972, 4:30–38 mm SL; **114908**, R/V *Atlantis II* 49, RHB1920, 36°23'N 23°35'W, 63–65 m, 2045–2218 h, 25.VI.1969, 2:37–40 mm SL; **114993**, R/V *Chain* 105, RHB2552, 34°17'N 24°05'W, 60–70 m, 2158–2305 h, 08.VII.1972, 1:13 mm SL.

#### *Lampadena anomala* Parr 1928

*Comments.* *L. anomala* occurs in subtropical and tropical waters of the Atlantic, Pacific, and Indian oceans (Nafpaktitis *et al.*, 1977; Bekker, 1983). It is uncommon throughout all of its range. Swinney (1991) reports the occurrence of the species south of Madeira. We here confirm one specimen from the Azores and note others from southeast of the area (MCZ 96916).

*Azores Material.* **149506**, R/V *Oceanus* 158, KEH8489, 38°06'N 29°44'W, 400 mwo, 0010–0103 h, 02.IX.1984, 1:62 mm SL.

#### *Lampanyctus cuprarius* Taning 1928

*Comments.* A bipolar subtropical species (Nafpaktitis *et al.*, 1977) that is found principally south of 42°N on both sides of



the Azores EEZ. MCZ material confirms this species for the Azores.

*Azores Material.* **112931**, R/V *Chain* 105, RHB2553, 34°12'N 24°01'W, 125–135 m, 2355–0105 h, 08.VII.1972, 2:46–65 mm SL; **151346**, R/V *Atlantis II* 101, CEL7838, 37°47'N 23°52'W, 350 m, 0045–0347 h, 11.VII.1978, 4:45–57 mm SL.

*Lepidophanes gaussi* (Brauer 1906)

*Comments.* A bipolar subtropical species that is found principally south of 37°N that was expected to occur in the Azores since the area is on the northernmost part of its range (Nafpaktitis *et al.*, 1977). MCZ material establishes this species for the Azores.

*Azores Material.* **109522**, R/V *Atlantis II* 49, RHB1916, 35°30'N 21°46'W, 39–41 m, 2229–0003 h, 24–25.VI.1969, 8:42–48 mm SL; **109523**, R/V *Atlantis II* 49, RHB1919, 35°56'N 22°40'W, 650–750 m, 0708–1030 h, 25.VI.1969, 3:40–43 mm SL; **109524**, R/V *Atlantis II* 49, RHB1920, 36°23'N 23°35'W, 63–65 m, 2045–2218 h, 25.VI.1969, 3:42–44 mm SL; **109591**, R/V *Chain* 105, RHB2551, 34°49'N 24°32'W, 700–740 m, 1620–1845 h, 08.VII.1972, 1:45 mm SL; **109592**, R/V *Chain* 105, RHB2552, 34°17'N 24°05'W, 60–70 m, 2158–2305 h, 08.VII.1972, 2:40–43 mm SL; **109671**, R/V *Delaware II* 63-04, DL63-04:012, 36°57'N 24°50'W, 180 m, 1730–1815 h, 12.V.1963, 1:42 mm SL.

*Loweina rara* (Lutken 1892)

*Comments.* *L. rara* is known from tropical areas of the Atlantic, Pacific, and Indian oceans (Nafpaktitis *et al.*, 1977; Bekker, 1983). In the Atlantic, the Azores is on the northern edges of its range. Hulley (1984) shows a locality near the Azores, which is confirmed by four stations in the MCZ material.

*Azores Material.* **102770**, R/V *Delaware II*, DL63-04:012, 36°57'N 24°50'W, 180 m, 1730–1815 h, 12.V.1963, 1:41 mm SL; **151184**, R/V *Atlantis II* 101, CEL7822, 39°41'N 32°19'W, 350–170–75 m, 2347–0140 h, 05–06.VII.1978, 2:41 mm SL; **151185**, R/V *Atlantis II* 101, CEL7823, 39°46'N 32°09'W, 350–175–75 m, 0150–0340 h, 06.VII.1978, 1:41 mm SL; **151186**, R/V *Atlan-*

*tis II* 101, CEL7829, 31°54'N 27°22'W, 350–145 m, 0140–0340 h, 08.VII.1978, 1:39 mm SL.

*Myctophum nitidulum* Garman 1899

*Comments.* Occurs in the Indian, Pacific, and Atlantic oceans as a common tropical/subtropical species (Nafpaktitis *et al.*, 1977). Its presence in the area was expected, considering its distribution. The Azores is the northeastern edge of the species' range, but it does not appear to be common in the EEZ.

*Azores Material.* **106197**, R/V *Atlantis II* 49, SUN1921, 36°27'N 23°42'W, surface, 0000–0415 h, 25.VI.1969, 3:29–57 mm SL.

*Notoscopelus caudispinosus* (Johnson 1863)

*Comments.* Occurs in the Atlantic, Pacific, and Indian oceans. Questionably referred to a tropical/subtropical pattern (Nafpaktitis *et al.*, 1977). This species is more common in the western North Atlantic. The Azores represents the northern boundary in the eastern Atlantic, but it is apparently not common in the area.

*Azores Material.* **104073**, R/V *Chain* 105, RHB2552, 34°17'N 24°05'W, 60–70 m, 2158–2305 h, 08.VII.1972, 1:106 mm SL; **104093**, R/V *Chain* 105, RHB2554, 34°08'N 23°59'W, 480–520 m, 0115–0235 h, 09.VII.1972, 1:60 mm SL.

Melamphaidae

*Scopelogadus mizolepis mizolepis* (Günther 1878)

*Comments.* *S. mizolepis* is a bathypelagic species that inhabits the Atlantic, Pacific, and Indian oceans, but it was not previously known for the northeast Atlantic (Ebeling and Weed, 1963, 1973; Maul, 1973b, 1986). This subspecies is widespread in the western North Atlantic and in the eastern tropical Atlantic to South Africa (Ebeling and Weed, 1963, 1973; Ebeling, 1986; Maul, 1990). The juvenile specimens reported here from the western edge of the EEZ might well be waifs from the western Atlantic. Ebeling identified these specimens in 1963.

*Azores Material.* **42891**, R/V *Atlantis* Iselin, CODI/ATL119, 40°05'N 35°10'W, 1260–1440 m, ? h, 07.IX.1928, 2:19–24 mm SL.

## Epigonidae

*Microichthys coccoi* Rüppell, 1852

*Comments.* Seven specimens of this rarely collected fish were caught in Azorean waters by the WHOI expeditions. It is interesting to note that these specimens were the only members of the genus *Microichthys* taken in thousands of WHOI trawls in the North Atlantic. The comparison of these juveniles and postlarvae with other epigonid specimens and illustrations shows that they do not belong to *Epigonus telescopus* since they lack the typical diagonal pigment slash on the caudal peduncle. The MCZ specimens agree very closely with those figured as *Epigonus telescopus* in Kofoed (1952:1, pl. IIA; see Tortonese, 1986). Our records confirm this taxon in the Azores, but they are not the first for the area since all four specimens observed by Kofoed (1952) were caught at the EEZ.

*Azores Material.* **149630**, R/V *Atlantis II* 101, CEL7822, 39°41'N 32°19'W, 350–170 m, 2347–0140 h, 05–06.VII.1978, 1:13 mm SL; **149629**, R/V *Atlantis II* 101, CEL7829, 37°54'N 27°22'W, 350–145 m, 0140–0340 h, 08.VII.1978, 1:21 mm SL; **149631**, R/V *Atlantis II* 101, CEL7834, 36°36'N 25°07'W, 350–170 m, 2355–0142 h, 09–10.VII.1978, 1:19 mm SL; **149632**, R/V *Atlantis II* 101, CEL7837, 37°48'N 23°39'W, 350 m, 2211–0045 h, 10–11.VI.1978, 2:17–20 mm SL; **149633**, R/V *Atlantis II* 101, CEL7838, 37°47'N 23°52'W, 350 m, 0045–0347 h, 11.VII.1978, 1:23 mm SL; **149634**, R/V *Atlantis II* 101, CEL7840, 38°49'N 22°20'W, 350–180 m, 2155–0047 h, 11–12.VII.1978, 1:18 mm SL.

## CONCLUSION

The species reported here for the first time add about 5% to the total Azorean fish fauna and more than 15% to the known mesopelagic fishes (Santos *et al.*, 1997). The WHOI/MCZ Azorean collections represent more than 75% of all species known from the region and are certainly the most extensive documentation of mesopelagic fishes of the area.

The oceanic ichthyofauna of the Azores is primarily subtropical/temperate with a few species from subpolar cold water and

warmer tropical waters. The archipelago is located at the boundary between temperate and subtropical water masses, since the Azores Front meanders through the area around the 35°N separating the two regions. The influence of the Azores Front on the biogeographic patterns of the Azores area has not been assessed. Backus *et al.* (1977), using collections of myctophids, created zoogeographic regions and provinces for the Atlantic. They include the Azores in the Azores–Britain Province of their North Atlantic Temperate Region. The definition of this province, however, raises some questions because faunistic and oceanographic gradients were observed throughout the area considered. Further evaluation of the role of mesoscale oceanographic structures as physical boundaries for mesopelagic fish will be of interest for the future development of an actual biogeographic model.

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APPENDIX 1. DATA FOR THE WHOI CRUISES IN THE AZOREAN EEZ.

Research Vessel	Date	Field No.	Lat.	Long.	Depth (m)	Day/Night
R/V <i>Atlantis</i>	9-14 July 1928	CODI/ATL001	39°58' N	29°46' W	Surface	No data
		CODI/ATL004	40°49' N	30°24' W	No data	No data
		CODI/ATL119	40°05' N	35°10' W	1,280-1,463	No data
R/V <i>Atlantis</i>	1931	ATLAN1931	37°47' N	31°41' W	No data	No data
R/V <i>Atlantis</i>	1947	ATLAN1947:015	35°37' N	30°57' W	3,200 mwo	No data
		ATLAN1947:816	35°37' N	30° 51' W	No data	No data
R/V <i>Atlantis</i>	1948	ATLAN1948:0818	37°50' N	26°00' W	2,520	No data
R/V <i>Delaware II</i>	14-17 May 1963	DL63-04:006	41°20' N	29°20' W	No data	No data
		DL63-04:012	36°57' N	24°50' W	180	No data
		DL63-04:013	37°25' N	25°25' W	Surface	No data
		DL63-04:014	37°25' N	29°10' W	No data	No data
		DL63-04:015	36°55' N	32°32' W	No data	No data
		RHB1036	42°20' N	29°08' W	470-520	D
		RHB1037	41°06' N	29°19' W	355-500	D
		RHB1038	41°03' N	29°11' W	350-450	D
		RHB1039	40°47' N	28°41' W	450-500	N
		RHB1040	36°27' N	27°17' W	320-375	D
		RHB1041	39°24' N	27°11' W	220-330	D
		RHB1042	38°04' N	26°33' W	025-035	N
		RHB1043	39°28' N	31°00' W	020-035	N
	RHB1044	39°37' N	31°10' W	200-475	N	
	RHB1045	39°34' N	33°37' W	015-032	N	
	SUN1043	39°28' N	31°00' W	Surface	N	
	SUN1044	39°37' N	31°10' W	Surface	N	
	SUN1045	39°34' N	33°37' W	Surface	N	

## APPENDIX I. CONTINUED.

Research Vessel	Date	Field No.	Lat.	Long.	Depth (m)	Day/Night
<i>R/V Atlantis II Cr 49</i>	24-27 June 1969	RHB1915	35°26' N	21°39' W	063-067	N
		RHB1916	35°30' N	21°46' W	039-041	N
		RHB1917	35°34' N	21°54' W	135-140	N
		RHB1918	35°36' N	22°05' W	169-175	N
		RHB1919	35°56' N	22°40' W	650-750	D
		RHB1920	36°23' N	23°35' W	063-065	N
		RHB1921	36°27' N	23°42' W	105-110	N
		RHB1922	36°32' N	23°49' W	135-140	N
		RHB1923	36°36' N	23°55' W	240-250	N
		RHB1924	37°04' N	24°42' W	750-830	D
		RHB1925	37°57' N	26°23' W	032-034	N
		RHB1926	38°01' N	26°25' W	048-052	N
		RHB1927	38°07' N	26°30' W	120-125	N
		RHB1928	38°05' N	26°29' W	192-202	N
		SUN1915	35°26' N	21°39' W	Surface	N
		SUN1916	35°30' N	21°46' W	Surface	N
		SUN1917	35°34' N	21°54' W	Surface	N
		SUN1918	35°36' N	22°05' W	Surface	N
		SUN1920	36°23' N	23°35' W	Surface	N
		SUN1921	36°27' N	23°42' W	Surface	N
		SUN1922	36°32' N	23°49' W	Surface	N
		SUN1925	37°57' N	26°23' W	Surface	N
		SUN1926	38°01' N	26°25' W	Surface	N
		SUN1927	38°07' N	26°30' W	Surface	N
		SUN1928	38°05' N	26°29' W	Surface	N

## APPENDIX I. CONTINUED.

Research Vessel	Date	Field No.	Lat.	Long.	Depth (m)	Day/Night
R/V Chain Cr 105	05-10 July 1972	RHB2535	42°26' N	30°01' W	060-065	N
		RHB2536	42°21' N	30°00' W	120-130	N
		RHB2537	42°17' N	29°59' W	225-255	N
		RHB2538	40°42' N	29°15' W	560-600	D
		RHB2540	39°55' N	29°03' W	060-070	N
		RHB2541	39°51' N	29°00' W	075-095	N
		RHB2542	39°47' N	28°57' W	165-175	N
		RHB2543	39°10' N	28°33' W	250-260	N-D
		RHB2544	37°28' N	26°38' W	070-075	N
		RHB2546	37°20' N	26°30' W	200-320	N
		RHB2547	36°21' N	25°39' W	700-760	D
		RHB2548	35°14' N	24°41' W	070-075	N
		RHB2549	35°08' N	24°25' W	040-045	N
		RHB2550	35°03' N	24°30' W	290-310	N
		RHB2551	34°49' N	24°32' W	700-740	D
		RHB2552	34°17' N	24°05' W	060-070	N
		RHB2553	34°12' N	24°01' W	125-135	N
		RHB2554	34°08' N	23°59' W	480-520	N
		RHB2555	34°00' N	22°55' W	470-520	D
		SUN2535	42°26' N	30°01' W	Surface	N
		SUN2536	42°21' N	30°00' W	Surface	N
		SUN2537	42°17' N	29°59' W	Surface	N
		SUN2540	39°55' N	29°03' W	Surface	N
		SUN2541	39°51' N	29°00' W	Surface	N
		SUN2544	37°28' N	26°38' W	Surface	N
SUN2545	37°23' N	26°33' W	Surface	N		



## APPENDIX 1. CONTINUED.

Research Vessel	Date	Field No.	Lat.	Long.	Depth (m)	Day/Night
		SUN2546	37°20' N	26°30' W	Surface	N
		SUN2548	35°14' N	24°41' W	Surface	N
		SUN2549	35°08' N	24°25' W	Surface	N
		SUN2552	34°17' N	24°05' W	Surface	N
R/V <i>Atlantis II</i> Cr 78	05 Sept. 1973	RHB2900	37°09' N	26°06' W	520-000	N
R/V <i>Atlantis II</i> Cr 101	05-10 July 1978	CEL7818	40°50' N	34°11' W	1,000	N
		CEL7819	40°12' N	34°04' W	800	N
		CEL7820	40°14' N	33°02' W	40-20	D
		CEL7821	39°41' N	32°19' W	200-090	N
		CEL7822	39°41' N	32°19' W	350-170-75	N
		CEL7823	39°46' N	32°09' W	350-175-75	N
		CEL7824	38°59' N	31°38' W	35-12	D
		CEL7825	38°59' N	30°39' W	350-220	N
		CEL7826	38°59' N	30°32' W	400-220	N
		CEL7827	37°51' N	27°33' W	120-40-60	N
		CEL7828	37°51' N	27°33' W	120-40-60	N
		CEL7829	37°54' N	27°22' W	350-145	N
		CEL7830	35°55' N	25°55' W	40	D
		CEL7831	36°37' N	25°03' W	350-190	N
		CEL7832	36°36' N	25°07' W	350-190	N
		CEL7833	36°37' N	25°04' W	350-170-80	N
		CEL7834	36°36' N	25°07' W	350-170-80	N
		CEL7835	36°38' N	25°18' W	350-170-180	N
		CEL7836	37°08' N	24°25' W	10-40	D
		CEL7837	37°48' N	23°39' W	350	N

## APPENDIX 1. CONTINUED.

Research Vessel	Date	Field No.	Lat.	Long.	Depth (m)	Day/Night
		CEL7838	37°47' N	23°52' W	350	N
		CEL7839	38°21' N	23°00' W	40	D
		CEL7840	38°49' N	22°20' W	35-180-190	N
		CEL7841	38°44' N	22°09' W	350-180-190	N
R/V <i>Oceanus</i> Cr 158	25 Aug-2 Sept 1984	KEH8475	37°37' N	32°55' W	060 mwo	N
		KEH8476	37°37' N	32°55' W	400 mwo	N
		KEH8477	37°35' N	32°55' W	600 mwo	N
		KEH8478	37°33' N	32°54' W	050 mwo	N
		KEH8479	39°05' N	31°21' W	400 mwo	N
		KEH8480	39°05' N	31°21' W	1,000 mwo	N
		KEH8481	39°01' N	31°20' W	500 mwo	N
		KEH8482	38°58' N	31°22' W	030 mwo	N
		KEH8483	38°57' N	31°22' W	600 mwo	N
		KEH8484	38°55' N	31°21' W	500 mwo	N
		KEH8485	38°32' N	30°06' W	1,500 mwo	N
		KEH8486	38°30' N	30°09' W	1,500 mwo	N
		KEH8487	38°11' N	29°38' W	400 mwo	N
		KEH8488	38°10' N	29°39' W	1,500 mwo	N
		KEH8489	38°06' N	29°44' W	400 mwo	N
		KEH8490	38°04' N	26°57' W	2,000 mwo	N

**APPENDIX 2.** DEEP SEA FISH SPECIES FROM THE AZORES EEZ IN THE MUSEUM OF COMPARATIVE ZOOLOGY. SPECIES REPORTED IN THE PREVIOUS SECTIONS AS NEW TO AREA NOT INCLUDED IN THIS APPENDIX. C, NUMBER OF COLLECTION; S, NUMBER OF SPECIMENS; R, SIZE RANGE (MM SL); D, DEVELOPMENTAL STAGE; LARVAE (L) AND JUVENILES AND ADULTS (A).

Family	Species	C	S	R	D	MCZ catalog number and field number
Notacanthidae	<i>Tiluropsis</i> sp.	1	1	307	L	88684, KEH8477.
Nemichthyidae	<i>Nemichthys curvirostris</i>	1	1	500	A	149501, CEL7832.
	<i>Nemichthys scolopaceus</i>	11	18	310-757	L, A	73846, CEL7827; 73847, CEL7828; 73848, CEL7831; 73849, CEL7832; 149619, CEL7834; 150939, CEL7838; 149611, CEL7840; 147253, RHB2537; 147249, RHB2544; 147275, RHB2546; 73832, RHB2547.
Congridae	<i>Conger conger</i>	5	5	78-119	L	71801, CEL7821; 71802, CEL7827; 71803, CEL7828; 85078, KEH8482; 71790, RHB2549.
Nettastomatidae	<i>Facciolella oxyrinchus</i>	2	2	124-155	L	65337, CEL7835; 65341, RHB1916.
Serrivomeridae	<i>Nettastoma melanura</i>	3	3	36-102	L	60627, RHB1917; 65437, RHB2549; 65445, RHB2550.
	<i>Serrivomer beanii</i>	2	2	120	A	65858, RHB2552; 65550, RHB25505.
Cyematidae	<i>Serrivomer lanceolatooides</i>	1	1	410	A	149511, CEL7818.
	<i>Cyema atrum</i>	4	5	42	L	73935, CEL7832; 73929, RHB2553; 60597, RHB 2551; 60600, RHB2554.
Microstomatidae	<i>Microstoma microstoma</i>	2	2	20-79	L, A	66001, RHB2553; 66009, RHB1041.
Opisthoproctidae	<i>Opisthoproctus grimaldii</i>	5	6	18-50	L, A	66380, RHB1039; 66390, RHB1041; 66386, RHB1924; 66385, RHB2550; 66417, RHB2555.
Alepocephalidae	<i>Opisthoproctus soleatus</i>	6	12	18-36	L, A	66265, RHB1036; 66405, RHB1038; 61958, RHB1039; 66398, RHB1919; 66397, RHB1924; 66422, RHB2555.
	<i>Bathytroctes microlepis</i>	1	1	157	A	040599, ATLANI948:0818.
Platyproctidae	<i>Xenodermichthys copei</i>	1	2	41-49	A	128285, RHB2547.
	<i>Holtbyrnia</i> sp.	2	2	16-20	L	128249, RHB1919; 75472, RHB1924.
	<i>Searsia koefoedi</i>	1	1	25	A	100986, RHB1039.

## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
Gonostomatidae	<i>Bonapartia pedaliota</i>	11	32	15-50	L A	87335, KEH8478, 79892, KEH8483, 79893, KEH8484, 79874, RHB1036, 144629, RHB1037, 144630, RHB1038, 58629, RHB1039, 144631, RHB1041, 79876, RHB1923, 144700, RHB2550, 144701, RHB2554.
	<i>Cyclothone alba</i>	2	2	19-23	A	14142, RHB1036; 148143, RHB1039.
	<i>Cyclothone braueri</i>	7	600	10-31	A	151178, CEL7837; 151304, CEL7840, 143445, RHB1036; 143371, RHB1039, 143372, RHB1041; 143438, RHB1919; 143416, RHB1924.
	<i>Cyclothone microdon</i>	4	64	12-45	A	150980, CEL7818; 143066, RHB1040, 143078, RHB1919, 143079, RHB1924.
	<i>Cyclothone pallida</i>	2	3	29-34	A	142691, RHB1036; 142707, RHB1919.
	<i>Gonostoma bathyphitum</i>	1	4	22-24	L	149544, KEH8485.
	<i>Gonostoma denudatum</i>	10	26	18-60	L A	150896, CEL7818; 150897, CEL7822, 150898, CEL7827; 150899, CEL7828, 150900, CEL7829; 149493, CEL7837, 141752, RHB1045; 141772, RHB1927, 80052, RHB2543; 141785, RHB2549.
	<i>Gonostoma elongatum</i>	12	26	15-215	A	141700, ATLANI948.0818, 149533, CEL7818, 149531, CEL7826; 149530, CEL7831; 149527, CEL7832, 150945, CEL7833; 149528, CEL7838; 141353, RHB1039; 141547, RHB1917; 141298, RHB2537, 141352, RHB2546, 141355, RHB2550; 141299, RHB2553.
	<i>Margrethia obtusirostra</i>	7	7	15-52	L A	149549, CEL7826; 87358, KEH8479, 87359, KEH8480, 96940, RHB1041; 89271, RHB2546; 89287, RHB2550, 89288, RHB2553.
	<i>Argyropelecus aculeatus</i>	27	114	10-60	A	31631, CODI/ATL004; 137858, DL63-04.012, 150941, CEL7818; 150949, CEL7822; 150962, CEL7822; 150963, CEL7825; 150953, CEL7826; 150951, CEL7829; 150955, CEL7831; 150950, CEL7832, 150954, CEL7832; 150956, CEL7833; 150964, CEL7834; 150965, CEL7835; 150966, CEL7837; 150967, CEL7838; 137459, RHB1044, 137805, RHB1915, 137458, RHB1918, 137660, RHB1919, 137819, RHB1922, 137661, RHB1923; 137823, RHB2546; 137688, RHB2547; 137808, RHB2552; 137469, RHB2555; 137848, SUNI915.
Sternoptychidae						



## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
	<i>Argyropelecus henigynus</i>	31	576	6-36	A	150958, CEL7818; 150985, CEL7822; 150986, CEL7825; 150987, CEL7826; 150988, CEL7827; 150989, CEL7832; 150990, CEL7838; 150984, KEH8485; 150957, KEH8489; 137056, RHB1036; 136261, RHB1037; 135838, RHB1038; 135815, RHB1039; 136918, RHB1039; 136262, RHB1044; 136332, RHB1919; 136333, RHB1924; 66657, RHB2537; 136434, RHB2538; 135827, RHB2540; 136435, RHB2541; 136436, RHB2542; 135825, RHB2546; 136437, RHB2547; 136438, RHB2548; 136439, RHB2550; 136440, RHB2551; 136441, RHB2552; 135819, RHB2554; 136442, RHB2555; 136472, RHB2900.
	<i>Argyropelecus olfersi</i>	12	15	10-48	A	31634, CODI/ATL004; 75511, CEL7841; 150935, RHB1037; 135728, RHB1037; 135729, RHB1038; 45291, RHB1039; 135730, RHB1040; 135737, RHB1040; 135731, RHB1919; 135738, RHB1923; 135732, RHB2536; 135739, RHB2542
	<i>Maurolicus muelleri</i> / <i>Maurolicus amestinopunctatus</i>	9	30	12-32	A	92552, RHB1039; 92495, RHB1922; 92496, RHB1927; 92497, RHB1928; 92486, RHB2536; 92510, RHB2540; 92511, RHB2541; 92512, RHB2542; 92513, RHB2550.
	<i>Sternopyx diaphana</i>	1	1	28	A	135218, DL63-04:015,1.
	<i>Valenciennellus tripunctulatus</i>	19	117	18-29	L A	150903, CEL7818; 87349, KEH8477; 87350, KEH8485; 150905, KEH8485; 150906, KEH8489; 133808, RHB1038; 133809, RHB1039; 81446, RHB1041; 133874, RHB1919; 133875, RHB1923; 133876, RHB1924; 133936, RHB2546; 133937, RHB2547; 133938, RHB2551; 133939, RHB2554; 66691, RHB2555; 133705, RHB2555; 133949, RHB2900; 133807, RHB1036.
Photichthyidae	<i>Ichthyococcus ovatus</i>	4	5	16-37	A	140622, RHB1038; 140623, RHB1039; 90874, RHB2550; 90873, RHB2555.

## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
	<i>Vinciguerrtia attenuata</i>	27	270	12-43	L A	80907, KEH8483, 80908, KEH8486; 139479, RHB1038; 80845, RHB1036, 139478, RHB1036; 139480, RHB1039; 80846, RHB1041; 139481, RHB1041; 80847, RHB1043; 139482, RHB1044, 80848, RHB1045; 139547, RHB1919; 80880, RHB1926; 139625, RHB2535; 139626, RHB2536; 139627, RHB2537, 139628, RHB2542; 139629, RHB2547; 80895, RHB2548; 139630, RHB2548; 139631, RHB2551; 80896, RHB2552; 139632, RHB2552; 80897, RHB2553, 80898, RHB2554, 139633, RHB2554; 139634, RHB2555
	<i>Vinciguerrtia nimbaria</i>	3	3	25-39	A	139209, RHB1915; 139210, RHB1920; 139211, RHB1921.
	<i>Vinciguerrtia poweria</i>	22	144	14-38	L A	87369, KEH8479; 87370, KEH8480; 87371, KEH8484; 138106, KEH8484, 80935, RHB1045; 138334, RHB1915; 138335, RHB1917; 138336, RHB1921; 138337, RHB1922; 138338, RHB1923; 138339, RHB1927; 138340, RHB1928, 138457, RHB2535; 138458, RHB2540; 138459, RHB2544; 138460, RHB2548; 138461, RHB2549; 138462, RHB2550, 80982, RHB2552; 138463, RHB2552; 138464, RHB2553; 138465, RHB2554.
<b>Stoniidae</b>	<i>Artistostomias titmani</i>	1	1	77	A	149494, CEL7832.
	<i>Astronesthes niger</i>	16	55	25-82	A	149510, CEL7840; 133146, SUN1917; 133110, SUN2535; 133198, SUN2535; 133111, SUN2536; 133199, SUN2536; 133112, SUN2540; 133113, SUN2540; 133200, SUN2540; 133201, SUN2541; 133202, SUN2545; 133203, SUN2546; 133204, SUN2546; 133205, SUN2546; 133206, SUN2552; 133207, SUN2552.
	<i>Bathophilus nigerrimus</i>	1	1	56	A	149509, CEL7840
	<i>Bathophilus vaillanti</i>	13	19	34-113	A	149540, CEL7835; 149541, CEL7838; 84948, RHB2549; 84949, RHB2554; 84813, RHB1036; 84809, RHB1043; 84812, RHB1918; 84816, RHB1919; 84827, RHB1920; 84828, RHB1921; 84829, RHB1922; 84830, RHB1927; 84831, RHB1928.

## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
	<i>Chauliodus danae</i>	15	40	21-120	A	151016, CEL7826; 151018, CEL7831; 151017, CEL7832; 129247, RHB1917; 55129, RHB1918, 129246, RHB1919; 55116, RHB1922; 129241, RHB1923; 131197, RHB2540; 131198, RHB2546; 58784, RHB2548; 129221, RHB2550, 129208, RHB2551; 129224, RHB2552; 131199, RHB2554.
	<i>Chauliodus sloani</i>	25	79	21-162	A	151021, CEL7818; 151022, CEL7822; 151014, CEL7829; 151025, CEL7832; 151023, CEL7833; 151015, CEL7835; 151024, CEL7837; 150938, CEL7838; 129353, RHB1036; 129282, RHB1041; 129318, RHB1044; 130156, RHB1919; 130157, RHB1921; 130158, RHB1927; 130227, RHB2535; 129329, RHB2536; 129339, RHB2537; 129293, RHB2538; 129325, RHB2540; 130228, RHB2546; 130229, RHB2547; 130230, RHB2549; 130231, RHB2551; 130232, RHB2555, 129094, RHB2900.
	<i>Chirosomias pliopterus</i>	3	3	40-60	A	149608, CEL7834; 132712, RHB1928; 132715, RHB2549.
	<i>Idiacanthus fasciola</i>	10	24	78-302	A	149519, CEL7822; 149524, CEL7826; 149520, CEL7831; 149522, CEL7840; 89619, RHB1921; 89582, RHB1927; 89769, RHB2548; 89803, RHB2550; 89764, RHB2553; 89804, RHB2555.
	<i>Leptostomias gladiator</i>	1	1	112	A	149495, CEL7837.
	<i>Malacosteus niger</i>	2	2	49-110	A	131795, RHB1919; 131810, RHB2547.
	<i>Photonecles margarita</i>	1	1	121	A	149508, CEL7840.
	<i>Photostomias guernei</i>	6	10	50-101	A	149516, CEL7825; 149515, CEL7826; 149514, CEL7832; 149610, KEH8488; 131646, RHB1918; 131647, RHB1919.

## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
	<i>Stomias boa</i>	26	150	30-132	A	151033, CEL7818; 151034, CEL7822; 151035, CEL7827; 151036, CEL7833, 151029, CEL7835; 151037, CEL7835; 151030, CEL7837; 151031, CEL7838, 150942, CEL7840; 129798, RHB1043, 95508, RHB1045; 129808, RHB1915; 129809, RHB1926; 129810, RHB1927; 129811, RHB1928, 129828, RHB2535; 129037, RHB2536; 129829, RHB2536; 95529, RHB2537; 129830, RHB2537; 129831, RHB2538; 129832, RHB2540; 95530, RHB2541; 129833, RHB2542; 129834, RHB2543; 129835, RHB2547.
Bathypteroidae	<i>Bathypterois longipes</i>	1	1	147	A	36634, ATLAN4715.
Scopelarchidae	<i>Benthalbella infans</i>	6	18	35-49	L	150937, CEL7818; 70319, KEH8490; 70340, RHB1037; 70317, RHB1038; 70318, RHB2555; 70329, RHB2900.
	<i>Scopelarchus analis</i>	12	15	13-71	L A	150879, CEL7822; 150880, CEL7831; 150799, CEL7834, 150881, CEL7835; 69269, RHB1036; 69331, RHB1921; 69332, RHB1923, 69333, RHB1928; 69403, RHB2546; 69404, RHB2549; 69405, RHB2551; 69406, RHB2553.
Notosudidae	<i>Ahliesaurus berryi</i>	1	1	81	A	15934, CEL7825.
	<i>Scopelosaurus lepidus</i>	7	10	41-45	L A	150926, CEL7822; 150927, CEL7838; 150928, CEL7840; 83689, RHB2535, 126960, RHB2536; 126961, RHB2537; 126962, RHB2542.
Paralepididae	<i>Arcozenus rissoi</i>	15	29	19-72	L	68774, RHB1036; 68775, RHB1038; 68776, RHB1039; 68777, RHB1044; 67794, RHB1045; 68792, RHB1918; 68814, RHB1924; 67577, RHB2538; 67578, RHB2542; 67579, RHB2543; 67580, RHB2547; 67581, RHB2548; 67582, RHB2551; 67583, RHB2553; 67609, RHB2900.
	<i>Lesitiops jayakari</i>	4	6	24-69	L	68985, RHB1036; 68073, RHB1038; 68074, RHB1039; 68075, RHB1045
	<i>Lesitiops sphyrenoides</i>	3	5	31-49	L	68952, RHB1924, 68953, RHB1926; 68954, RHB1927.
	<i>Paralepis atlantica</i>	1	1	98	A	68708, DL63-04:015.
	<i>Paralepis coregonoides</i>	6	16	10-21	L A	43146, DL63-04:006; 43143, DL63-04:014; 128199, RHB1919; 68716, RHB1036; 68744, RHB1037; 68717, RHB1039; 68746, RHB1927.



APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
Evermannellidae	<i>Sudis hyalina</i>	1	1	8	L	68570, RHB1043.
	<i>Evermannella balbo</i>	11	25	13-33	L A	150882, CEL7828, 150883, CEL7829; 150884, CEL7831; 73191, KEH8476; 73192, KEH8477; 73193, KEH8479; 73194, KEH8483; 73195, KEH8484; 73196, KEH8485; 52336, RHB1041; 52321, RHB1045.
Omosudidae	<i>Omosudis lowei</i>	1	1	8	L	69246, RHB1036.
Alepisauridae	<i>Alepisaurus brevirostris</i>	1	1	98	A	127289, DL63-04.015.
	<i>Benthoosema glaciale</i>	18	975	9-44	A	150996, CEL7823; 150997, CEL7835; 150998, CEL7837; 150999, CEL7838; 151000, CEL7840; 150996, CEL7823; 126015, RHB1039; 126016, RHB1045; 126036, RHB1920; 126037, RHB1924; 125920, RHB2535; 126068, RHB2536; 126069, RHB2537; 126070, RHB2538; 126071, RHB2540; 126072, RHB2541; 126073, RHB2544, 126102, RHB2900.
Myctophidae	<i>Benthoosema suborbitale</i>	14	70	11-29	A	150991, CEL7825; 150992, CEL7828; 150993, CEL7831; 150994, CEL7837; 150995, CEL7838; 125384, RHB1916; 125385, RHB1920; 125429, RHB2547; 125430, RHB2549; 125431, RHB2550; 125432, RHB2551; 125433, RHB2552; 125434, RHB2553; 125435, RHB2554.
	<i>Bolinichthys indicus</i>	29	84	29-45	A	151003, CEL7818; 151004, CEL7822; 151005, CEL7826; 151006, CEL7831; 151007, CEL7833; 151008, CEL7834; 151009, CEL7835; 151010, CEL7837; 151011, CEL7838; 151012, CEL7840; 151013, CEL7841; 151002, KEH8489; 33259, CODI/ATL119; 124444, RHB1919; 124445, RHB1924; 124446, RHB1927; 124561, RHB2535; 124562, RHB2536; 124563, RHB2540; 124564, RHB2541; 124565, RHB2542; 124566, RHB2544; 124567, RHB2547; 124568, RHB2548; 124569, RHB2549; 124570, RHB2550; 124571, RHB2551; 124572, RHB2552; 124573, RHB2553; 124574, RHB2554.

## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
	<i>Ceratoscopelus maderensis</i>	31	613	15-64	A	151038, CEL7818, 151040, CEL7825, 151212, CEL7826; 151213, CEL7826, 151041, CEL7827, 151042, CEL7828; 151043, CEL7831; 151044, CEL7832, 151302, CEL7833; 151045, CEL7837; 151046, CEL7840; 151303, CEL7840, 122809, RHB1036; 122810, RHB1039; 122811, RHB1040; 122812, RHB1041, 122701, RHB1042; 122702, RHB1043; 122813, RHB1044; 122814, RHB1045, 122839, RHB1928; 122906, RHB2535; 122907, RHB2540, 122908, RHB2541, 122909, RHB2546; 122910, RHB2547; 122911, RHB2549; 122912, RHB2550; 122913, RHB2551; 122914, RHB2552; 55531, RHB2900.
	<i>Ceratoscopelus warmingii</i>	9	36	22-63	A	151145, CEL7831; 122234, RHB1920; 121755, RHB1922; 122315, RHB2548; 122316, RHB2549; 122317, RHB2550; 121764, RHB2552; 122318, RHB2553; 122319, RHB2554.
	<i>Diaphus effulgens</i>	2	2	65	A	49172, RHB2538, 110137, RHB2550.
	<i>Diaphus holti</i>	19	57	11-46	A	151049, CEL7822; 151050, CEL7825; 151051, CEL7826; 151052, CEL7829, 151053, CEL7832; 151054, CEL7833; 151055, CEL7838, 120635, DL63-04-012; 120478, RHB1036; 120479, RHB1038; 120480, RHB1039; 120481, RHB1041; 120482, RHB1045; 120505, RHB1923; 120613, RHB2536; 120614, RHB2537, 120615, RHB2542; 120616, RHB2549; 120617, RHB2552.
	<i>Diaphus metopoclampus</i>	5	6	25-74	A	151057, CEL7826, 151058, KEH8485; 120039, RHB1039, 120049, RHB1923, 120067, RHB2550
	<i>Diaphus mollis</i>	5	10	37-48	A	149628, CEL7831; 119798, RHB2547; 119799, RHB2548; 119800, RHB2553; 119801, RHB2554.

APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
	<i>Diaphus rafinesquii</i>	36	117	29-75	A	151062, CEL7818, 151068, CEL7822; 151061, CEL7823; 151063, CEL7829, 151069, CEL7831; 151064, CEL7832; 151070, CEL7833, 151066, CEL7834, 151071, CEL7835, 151059, CEL7837; 151060, CEL7838; 151072, CEL7840, 151073, CEL7841; 151074, KEH8485; 151067, KEH8489; 118625, RHB1036; 118626, RHB1039; 118627, RHB1041; 118628, RHB1044, 118830, RHB1919; 118831, RHB1927; 118904, RHB2536; 118905, RHB2537; 118906, RHB2538; 118658, RHB2540; 118907, RHB2541; 118908, RHB2542; 118909, RHB2544, 118910, RHB2546; 118911, RHB2548; 118912, RHB2550; 118913, RHB2551, 118914, RHB2553; 118915, RHB2554; 118916, RHB2555; 118660, RHB2900.
	<i>Diogenichthys atlanticus</i>	25	350	6-23	A	151105, CEL7822; 151106, CEL7823; 151107, CEL7827; 151108, CEL7828, 151109, CEL7829, 151110, CEL7834; 151111, CEL7835; 151112, CEL7838; 118091, DL63-04:012; 117731, RHB1039; 117732, RHB1044, 117733, RHB1045, 117835, RHB1920; 55530, RHB1926; 117957, RHB2535; 117958, RHB2544, 117959, RHB2546; 117960, RHB2547; 117961, RHB2548; 117962, RHB2549; 117963, RHB2550; 117964, RHB2551; 117965, RHB2552; 117966, RHB2553, 117967, RHB2554.
	<i>Electrona risoi</i>	20	206	4-43	A	151094, CEL7818; 151095, CEL7825; 151096, CEL7826; 151097, CEL7829; 151098, CEL7831; 151099, CEL7832; 151100, CEL7833, 151101, CEL7838; 151102, CEL7840; 151103, CEL7841; 151104, KEH8489; 103048, RHB1036; 103049, RHB1038; 62188, RHB1039; 103050, RHB1041; 103051, RHB1044; 103061, RHB1928; 103074, RHB2543; 103075, RHB2546; 103076, RHB2550.

## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
	<i>Gonichthys coccoi</i>	54	649	8-58	L A	151088, CEL7822; 151089, CEL7827; 151090, CEL7828; 151091, CEL7835; 151092, CEL7837; 109966, DL63-04:012; 117340, DL63-04:013; 116502, RHB1036; 116525, RHB1927; 116559, RHB2538; 116560, RHB2552, 116604, SUN1043, 116793, SUN1044; 116605, SUN1045; 116677, SUN1915; 116883, SUN1915; 116884, SUN1916; 116885, SUN1916; 116678, SUN1917; 116679, SUN1918; 116680, SUN1920; 116681, SUN1920; 116886, SUN1921; 116887, SUN1921; 116888, SUN1922; 116889, SUN1925; 116890, SUN1925; 116891, SUN1926; 116892, SUN1926; 116893, SUN1926; 116894, SUN1927; 116895, SUN1927; 116682, SUN1928; 116957, SUN2535; 116958, SUN2535, 116959, SUN2535; 116960, SUN2536; 116961, SUN2536; 116962, SUN2537; 116963, SUN2537; 116964, SUN2537, 116704, SUN2540; 116965, SUN2540; 116966, SUN2540; 116967, SUN2541; 116968, SUN2544; 116969, SUN2545; 116970, SUN2545; 116971, SUN2545; 116972, SUN2546; 116973, SUN2546, 116974, SUN2546; 116975, SUN2548; 116976, SUN2552.
	<i>Hygophum benoitii</i>	16	258	7-45	A	151209, KEH8485; 116232, RHB1036; 116233, RHB1039; 116234, RHB1043, 116235, RHB1044; 116277, RHB1915; 116278, RHB1916; 116279, RHB1919; 115997, RHB1920; 116280, RHB1923; 116281, RHB1924, 116282, RHB1927; 116317, RHB2544; 116318, RHB2547; 116319, RHB2548; 116320, RHB2551
	<i>Hygophum hygomii</i>	30	129	16-57	A	151075, CEL7823; 151076, CEL7827; 151077, CEL7828; 151078, CEL7833; 151079, CEL7834; 151080, CEL7835; 151081, CEL7838; 151082, CEL7841; 115791, DL63-04:012; 115846, RHB1043; 115847, RHB1044; 115848, RHB1045; 115738, RHB1915; 115739, RHB1916; 115899, RHB1919; 115740, RHB1920; 115900, RHB1923; 115901, RHB1924; 115741, RHB1926; 115929, RHB2546; 115930, RHB2547; 115931, RHB2549; 115932, RHB2551; 115933, RHB2552; 115626, SUN1918; 115631, SUN2535; 115632, SUN2544; 115633, SUN2545; 115634, SUN2546; 115635, SUN2549.



## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
	<i>Lamipadena chavesi</i>	2	2	35-61	A	103095, RHB1044; 103114, RHB2554.
	<i>Lamipadena speculigera</i>	9	24	21-38	A	151084, CEL7823; 151210, CEL7826; 151085, CEL7834; 151086, CEL7837; 151087, CEL7838; 114345, RHB2540; 114346, RHB2541; 114347, RHB2542; 114348, RHB2551.
	<i>Lampanyctus ater</i>	25	87	35-103	A	151187, CEL7822; 151310, CEL7823; 151196, CEL7825; 151188, CEL7826; 151197, CEL7829; 151171, CEL7831; 151189, CEL7832; 151190, CEL7833; 151311, CEL7834; 151312, CEL7837; 151313, CEL7840; 113452, DL63-04-012; 151309, KEH8485; 113371, RHB1921; 113510, RHB1922; 113372, RHB1923; 113373, RHB1927; 113524, RHB2536; 113398, RHB2537; 113399, RHB2540; 113400, RHB2541; 113401, RHB2542; 113402, RHB2544; 113403, RHB2551; 113404, RHB2553.
	<i>Lampanyctus crocodilus</i> .	27	409	18-38	A	151315, CEL7818; 151191, CEL7822; 151316, CEL7823; 151192, CEL7825; 151193, CEL7826; 151317, CEL7827; 151194, CEL7829; 151195, CEL7833; 151319, CEL7834; 151259, CEL7835; 151320, CEL7837; 151321, CEL7838; 151322, CEL7840; 151323, CEL7841; 151314, KEH8485; 113284, RHB1924; 113216, RHB2536; 113217, RHB2537; 113218, RHB2540; 113314, RHB2541; 113315, RHB2542; 113316, RHB2544; 113317, RHB2547; 113318, RHB2548; 113319, RHB2549; 113320, RHB2552; 113321, RHB2554.
	<i>Lampanyctus festivus</i>	2	3	64-76	A	151208, CEL7831 158261, CEL7832.
	<i>Lampanyctus intricarius</i> .	17	184	26-68	A	151325, CEL7818; 151326, CEL7823; 151327, CEL7827; 151207, CEL7833; 151328, CEL7834; 151260, CEL7835; 151329, CEL7837; 151330, CEL7838; 151331, CEL7840; 151332, CEL7841; 112384, DL63-04-012; 112355, RHB2536; 151324, KEH8485; 112356, RHB2537; 112369, RHB2540; 112370, RHB2541; 112357, RHB2542.

## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
	<i>Lampanyctus photototus</i>	13	39	47-64	A	151307, CEL7823; 151204, CEL7825; 151205, CEL7826; 151308, CEL7827, 111907, RHB1043; 112019, RHB2540; 112020, RHB2544; 111848, RHB2548; 112021, RHB2549; 112022, RHB2550; 111849, RHB2552; 111850, RHB2553; 112031, RHB2900.
	<i>Lampanyctus pusillus</i>	47	732	14-40	A	151334, CEL7818; 151198, CEL7822; 151335, CEL7823; 151199, CEL7825, 151200, CEL7826; 151336, CEL7827; 151201, CEL7829; 151262, CEL7831; 151202, CEL7832; 151203, CEL7833; 151338, CEL7834; 151263, CEL7835; 151339, CEL7837; 151340, CEL7838; 151341, CEL7840; 151342, CEL7841; 151333, KEH8485; 151264, KEH8489; 33267, CODI/ATL119, 111535, DL63-04:012; 111271, RHB1036; 110934, RHB1039; 111272, RHB1043; 111273, RHB1044; 110935, RHB1045; 111345, RHB1915; 111346, RHB1918; 111347, RHB1919; 111348, RHB1923; 111349, RHB1924; 111350, RHB1927; 110961, RHB1928; 110976, RHB2535; 111477, RHB2536; 111478, RHB2537; 110977, RHB2540; 111479, RHB2541; 111480, RHB2542; 111481, RHB2544; 111482, RHB2546; 111483, RHB2547; 110978, RHB2548; 111484, RHB2549; 111485, RHB2550; 111486, RHB2551; 110979, RHB2552; 111487, RHB2554, 111516, RHB2900.
	<i>Lepidophanes guentheri</i>	1	1	53	A	108641, RHB1044.

## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
	<i>Lobianchia dofleini</i>	48	639	6-40	A	151114, CEL7818; 151115, CEL7822; 151125, CEL7823; 151116, CEL7826; 151117, CEL7827; 151118, CEL7828; 151119, CEL7829; 151120, CEL7831; 151121, CEL7832; 151128, CEL7833; 151122, CEL7834; 151123, CEL7835; 151126, CEL7837; 151127, CEL7838; 151129, CEL7840; 151124, CEL7841; 151113, KEH8485; 107995, DL63-04-012; 107718, RHB1036; 107617, RHB1038; 107719, RHB1041; 107720, RHB1042; 107721, RHB1043; 107722, RHB1044; 107723, RHB1045; 107801, RHB1915; 107802, RHB1916; 107661, RHB1920; 107803, RHB1921; 107804, RHB1923; 107805, RHB1924; 107806, RHB1927; 107919, RHB2535; 107920, RHB2536; 107921, RHB2540; 107922, RHB2541; 107923, RHB2544; 107924, RHB2546; 107925, RHB2547; 107926, RHB2548; 107927, RHB2549; 107928, RHB2550; 107929, RHB2551; 107930, RHB2552; 107685, RHB2553; 107931, RHB2554; 107932, RHB2555; 107954, RHB2900
	<i>Lobianchia gemellarii</i>	12	19	27-43	A	151130, CEL7825; 151131, CEL7831; 151132, CEL7834; 107136, RHB1038; 107137, RHB1044; 107233, RHB1921; 107234, RHB1922; 107235, RHB1923; 107286, RHB2541; 107287, RHB2544; 107288, RHB2547; 107289, RHB2550
	<i>Loweina interrupta</i>	2	3	24-28	A	151179, CEL7823; 149505, CEL7837.
	<i>Myciophum punctatum</i>	29	192	19-79	A	151134, CEL7818; 151135, CEL7822; 151136, CEL7823; 151137, CEL7826; 151138, CEL7828; 151139, CEL7833; 151140, CEL7834; 151146, CEL7837; 151141, CEL7838; 151142, CEL7840; 151143, CEL7841; 49552, DL63-04-012; 105666, DL63-04-013; 105424, RHB1039; 105484, RHB1926; 105454, RHB2540; 105520, SUN1043; 105618, SUN1044; 105619, SUN1045; 105547, SUN1918; 105638, SUN1920; 105550, SUN1925; 105525, SUN1926; 105542, SUN2535; 105493, SUN2536; 105496, SUN2540; 105545, SUN2540; 105505, SUN2544

## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
<i>Notolychnus valdiviae</i>		25	249	15-25	A	151147, CEL7818; 151148, CEL7823; 151149, CEL7825; 151211, CEL7826; 151150, CEL7832; 151151, CEL7833; 151152, CEL7834; 151153, CEL7835; 151154, CEL7837; 151155, CEL7838; 151156, CEL7841; 104818, RHB1036; 104819, RHB1039; 104820, RHB1041; 104821, RHB1045; 104919, RHB1915; 105067, RHB2538; 105068, RHB2540; 105069, RHB2541; 105070, RHB2542; 105071, RHB2544; 105072, RHB2548; 105073, RHB2549; 105074, RHB2552; 105075, RHB2553.
		14	33	26-103	A	151158, CEL7822; 151159, CEL7823; 151160, CEL7833; 151161, KEH8485; 151162, KEH8489; 104021, RHB1915; 104022, RHB1916; 104023, RHB1920; 104024, RHB1925; 104025, RHB1926; 104026, RHB1927; 104031, RHB2540; 104032, RHB2541; 103997, RHB2546.
<i>Notoscopelus bolini</i>		1	1	27	A	104268, RHB2537.
<i>Notoscopelus elongatus</i>		18	129	8-67	L.A.	151163, CEL7831; 151164, CEL7835; 151165, CEL7841; 103732, DL63-04-012; 103822, RHB1044; 103786, RHB1915; 103876, RHB1916; 103877, RHB1917; 103787, RHB1920; 103878, RHB1921; 103879, RHB1922; 103788, RHB1926; 103948, RHB2544; 103802, RHB2548; 103949, RHB2549; 103803, RHB2552; 103950, RHB2553; 103958, RHB2900.
<i>Protomyctophum arcticum</i>		1	1	15	A	103011, RHB1039.
<i>Symbolophorus veranyi</i>		17	29	25-111	A	151166, CEL7822; 151170, CEL7826; 151167, CEL7829; 151168, CEL7837; 151169, CEL7838; 103390, RHB1039; 103246, RHB1045; 103400, RHB1927; 103415, RHB2540; 103302, SUN1925; 103281, SUN1926; 103319, SUN1927; 103303, SUN1928; 103324, SUN2536; 103283, SUN2545; 103284, SUN2546.

## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
Trachipteridae	<i>Zu cristatus</i>	1	1	8	L	84699, KEH8482.
Carapidae	<i>Echiodon drummondi</i>	1	1	64	A	149546, CEL7838.
Macrouridae	<i>Odontomacrus murrayi</i>	2	2	71-240	L A	149621, CEL7826; 62187, KEH8485.
Melanonidae	<i>Melanonus zugmayeri</i>	4	5	44-69	A	149547, CEL7838; 149618, KEH8481; 147027, RHB2553; 147028, RHB2554.
Lophiidae	<i>Lophius piscatorius</i>	1	2	63	A	43152, DL63-04:015.
Oneirodidae	<i>Chaenophirynne longiceps</i>	1	1	4	L	49878, RHB1045.
Ceratidae	<i>Cryptopsaras couesi</i>	1	1	28	L	51209, RHB2547.
Scomberesocidae	<i>Nanichthys simulans</i>	1	1	38	A	150933, CEL7831.
	<i>Scomberesox saurus</i>	1	14	23-47	A	57652, DL63-04:013.
Exocoetidae	<i>Exocoetus obtusirostris</i>	1	1	19	L	149627, KEH8476.
Melamphaidae	<i>Melamphaes sinus</i>	1	1	27	A	14320, RHB2554.
	<i>Melamphaes typhlops</i>	3	3	15-20	A	145512, RHB1036; 145748, RHB1915; 145513, RHB1041.
	<i>Poromitra megalops</i>	3	5	15-16	A	42884, CODI/ATL119; 150946, KEH8485; 146202, RHB1039
	<i>Scopeloberyx opisthopterus</i>	1	1	26-36	A	31621, CODI/ATL119.
	<i>Scopelogadus beanii</i>	2	3	19-101	A	31655, CODI/ATL119; 150944, KEH8485.
Anoplogastridae	<i>Anoplogaster cornuta</i>	2	2	123	A	31666, CODI/ATL119; 151386, RHB1039.
Diretmidae	<i>Diretmus argenteus</i>	3	4	32-37	A	83171, RHB2554; 83175, SUN1927; 83192, SUN2540



## APPENDIX 2. CONTINUED.

Family	Species	C	S	R	D	MCZ catalog number and field number
Caproidea	<i>Caprus aper</i>	2	2	35-38	A	149526, CEL7835, 149525, CEL7837.
Acropomatidae	<i>Howella brodiei</i>	5	12	18-48	A	149545, CEL7837, 49780, RHB1044, 75793, RHB1045, 86160, RHB2553, 86159, RHB2544.
Carangidae	<i>Naucrates ductor</i>	3	7	6-18	L	83806, SUN1043, 83807, SUN1044, 83808, SUN1045.
	<i>Trachurus picturatus</i>	5	48	11-124	A	149536, CEL7824, 149535, CEL7828, 150930, CEL7837, 149534, CEL7838, 55179, RHB1042.
Bramidae	<i>Brama brama</i>	1	1	127	A	76125, RHB2554.
Caristiidae	<i>Platyberyx opalescens</i>	1	1	20	L	150936, CEL7825.
Chiasmodontidae	<i>Pseudoscopus altipinnis</i>	1	1	101	A	49086, RHB1039.
Centrolophidae	<i>Schedophilus medusophagus</i>	3	4	32-74	A	149614, DL63-04:014, 149613, RHB1918, 149612, RHB1970.
Nomeidae	<i>Cubiceps gracilis</i>	4	5	49-87	A	133275, RHB1918, 79269, SUN1915, 135282, SUN1918, as <i>Aphareus obtusirostris</i> : 32119, CODI/ATL001.
Tetragonuridae	<i>Tetragonurus cavieri</i>	1	1	105	A	149507, CEL7834, 31667, CODI/ATL119.
Cynoglossidae	<i>Symphurus nigrescens</i>	1	1	7	L	78505, RHB1042.