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IDENTIFICATION GUIDE TO THE MESOPELAGIC FISHES OF THE CENTRAL AND SOUTH EAST ATLANTIC OCEAN



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IDENTIFICATION GUIDE TO THE MESOPELAGIC FISHES OF THE CENTRAL AND SOUTH EAST ATLANTIC OCEAN

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PREPARATION OF THIS DOCUMENT

This identification guide was conceived and supported by the EAF-Nansen Programme “*Supporting the Application of the Ecosystem Approach to Fisheries Management considering Climate and Pollution Impacts*”, in close collaboration with the FishFinder Programme of the Marine and Inland Fisheries Branch (FIAF), Fisheries and Aquaculture Department, Food and Agriculture Organization of the United Nations (FAO).

With the expanded scope of the Programme objectives, the key areas for research work have also been widened to address emerging issues. The Programme’s science plan guides the research work of the EAF-Nansen Programme and Theme 3 is fully dedicated to improving understanding of mesopelagic fish and their abundance. Because of their potential importance for fishmeal production, there has been increasing interest during the last decade in commercial exploitation of these fish. Over 900 mesopelagic fish species belonging to about 30 families have been identified across the World Ocean, where they play an important ecological role as a major link in the food webs. At the same time, very little is known about their diversity, ecology and abundance. Mesopelagic fish species identification can be problematic due to a number of reasons, such as the often slight phenotypic differences within and among species, their soft bodies that are easily damaged in the nets, and the lack of comprehensive keys to species and specific training in their use. Based on the observation that in the central and south east Atlantic Ocean existing identification tools are either outdated, have a limited geographical coverage or do not include keys to the identification of many mesopelagic fish taxa, the EAF-Nansen Programme set up a project to produce this identification guide.

The activities started in early 2018 with the formation of a team of experts who defined criteria for the selection of species and recommended that illustrated dichotomous keys to all taxa be developed. In 2019, an advanced draft of the guide was tested at sea during dedicated surveys in the southern Africa region, and a training workshop in Swakopmund, Namibia was organized.

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ABSTRACT

This identification guide includes 552 species of mesopelagic fishes (i.e. those fishes residing primarily between 200-1000 m depth during daytime) that are known to occur in the central and south east Atlantic Ocean. Fully illustrated dichotomous keys to all taxa are provided. Species are treated in detail, with accounts including the scientific name, FAO common name in English (where available), other useful characters, size, a distribution map, and one or more illustrations. To facilitate even further the identification of the taxa, captions and arrows are added to help users quickly locate their key morphological features. The guide is intended for both specialists, and non-specialists who have a working knowledge of ichthyology.

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The authors thank Edoardo Mostarda for his outstanding organization of this project and Manuela D'Antoni for her excellent illustrations. We also thank several colleagues for help with certain taxonomic groups (listed in parentheses): Jon Moore and Richard Jones (Paralepididae), Ofer Gon (Bathylagidae), April Cook and Marcelo Roberto Souto de Melo (Chiasmodontidae), José Gonzalez (Platyroctidae). We also thank Keri Baker for literature assistance. Special thanks go to José Gonzalez for draft review, support during the RV *Dr. Fridtjof Nansen* 2019 mesopelagic fish survey off Namibia, and assistance at the training workshop on mesopelagic fish identification in Swakopmund, Namibia, in June 2019.

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CONTENTS

Introduction	xi
Key to the orders of mesopelagic fishes occurring in the area	1
Order LAMNIFORMES	13
Pseudocharchariidae	13
Order SQUALIFORMES	13
Key to the families of Squaliformes	13
Dalatiidae	14
Key to the genera of Dalatiidae	14
Key to the species of <i>Isistius</i>	16
Etmopteridae	17
Order ANGUILLIFORMES	19
Key to the families of Anguilliformes	19
Derichthyidae	20
Key to the genera of Derichthyidae	20
Key to the species of <i>Nessorhamphus</i>	21
Nemichthyidae	22
Key to the genera of Nemichthyidae	22
Key to the species of <i>Avocettina</i>	23
Key to the species of <i>Nemichthys</i>	24
Serrivomeridae	25
Key to the genera of Serrivomeridae	25
Key to the species of <i>Serrivomer</i>	25
Order SACCOPHARYNGIFORMES	27
Key to the families of Saccopharyngiformes	27
Cyematidae	27
Eurypharyngidae	27
Order OSMERIFORMES	29
Key to the families of Osmeriformes	29
Bathylagidae	30
Key to the genera of Bathylagidae	30
Key to the species of <i>Bathylagichthys</i>	31
Key to the species of <i>Bathylagus</i>	33
Microstomatidae	33
Key to the genera of Microstomatidae	33
Key to the species of <i>Nansenia</i>	34
Opisthoproctidae	37
Key to the genera of Opisthoproctidae	37
Key to the species of <i>Dolichopteryx</i>	39

Order ALEPOCEPHALIFORMES	41
Key to the families of Alepocephaliformes	41
Alepocephalidae	41
Key to the genera of Alepocephalidae	41
Key to the species of <i>Bajacalifornia</i>	42
Key to the species of <i>Rouleina</i>	43
Platyroctidae	44
Key to the genera of Platyroctidae	45
Key to the species of <i>Holtbyrnia</i>	48
Key to the species of <i>Maulisia</i>	50
Key to the species of <i>Normichthys</i>	51
Order STOMIIFORMES	53
Key to the families of Stomiiformes	53
Gonostomatidae	54
Key to the genera of Gonostomatidae	55
Key to the species of <i>Cyclothone</i>	57
Key to the species of <i>Gonostoma</i>	61
Key to the species of <i>Margrethia</i>	61
Key to the species of <i>Sigmops</i>	62
Phosichthyidae	63
Key to the genera of Phosichthyidae	63
Key to the species of <i>Ichthyococcus</i>	65
Key to the species of <i>Polymetme</i>	66
Key to the species of <i>Vinciguerria</i>	67
Sternoptychidae	68
Key to the genera of Sternoptychidae	69
Key to the species of <i>Argyropelecus</i>	71
Key to the species of <i>Maurolicus</i>	74
Key to the species of <i>Sternoptyx</i>	75
Stomiidae	77
Key to the genera of Stomiidae	77
Key to the species of <i>Aristostomias</i>	84
Key to the species of <i>Astronesthes</i>	86
Key to the species of <i>Bathophilus</i>	93
Key to the species of <i>Borostomias</i>	96
Key to the species of <i>Chauliodus</i>	97
Key to the species of <i>Eustomias</i>	99
Key to the species of <i>Grammatostomias</i>	112
Key to the species of <i>Idiacanthus</i>	113
Key to the species of <i>Leptostomias</i>	114
Key to the species of <i>Malacosteus</i>	116

Key to the species of <i>Melanostomias</i>	117
Key to the species of <i>Neonesthes</i>	120
Key to the species of <i>Odontostomias</i>	121
Key to the species of <i>Photonectes</i>	122
Key to the species of <i>Photostomias</i>	125
Key to the species of <i>Stomias</i>	126
Order AULOPIFORMES	129
Key to the families of Aulopiformes	129
Alepisauridae	130
Key to the species of Alepisauridae	130
Anotopteridae	131
Key to the species of Anotopteridae	131
Evermannellidae	132
Key to the genera of Evermannellidae	132
Key to the species of <i>Evermannella</i>	133
Giganturidae	134
Key to the species of Giganturidae	134
Notosudidae	135
Key to the genera of Notosudidae	135
Key to the species of <i>Scopelosaurus</i>	136
Omosudidae	138
Paralepididae	139
Key to the genera of Paralepididae	139
Key to the species of <i>Lestidiops</i>	142
Key to the species of <i>Macroparalepis</i>	145
Key to the species of <i>Magnisudis</i>	147
Key to the species of <i>Paralepis</i>	147
Key to the species of <i>Stemonosudis</i>	148
Key to the species of <i>Sudis</i>	149
Key to the species of <i>Uncisudis</i>	150
Scopelarchidae	151
Key to the genera of Scopelarchidae	151
Key to the species of <i>Scopelarchus</i>	153
Order MYCTOPHIFORMES	155
Key to the families of Myctophiformes	155
Neoscopelidae	155
Key to the genera and species of Neoscopelidae	156
Myctophidae	157
Key to the genera of Myctophidae	158
Key to the species of <i>Benthoosema</i>	169
Key to the species of <i>Bolinichthys</i>	170

Key to the species of <i>Ceratoscopelus</i>	172
Key to the species of <i>Diaphus</i>	173
Key to the species of <i>Diogenichthys</i>	186
Key to the species of <i>Electrona</i>	187
Key to the species of <i>Gonichthys</i>	188
Key to the species of <i>Gymnoscopelus</i>	189
Key to the species of <i>Hygophum</i>	190
Key to the species of <i>Lampadena</i>	193
Key to the species of <i>Lampanyctus</i>	196
Key to the species of <i>Lepidophanes</i>	204
Key to the species of <i>Lobianchia</i>	205
Key to the species of <i>Loweina</i>	206
Key to the species of <i>Myctophum</i> / <i>Dasyscopelus</i>	207
Key to the species of <i>Notoscopelus</i>	211
Key to the species of <i>Protomyctophum</i>	213
Key to the species of <i>Symbolophorus</i>	215
Key to the species of <i>Taaningichthys</i>	219
Order STYLEPHORIFORMES	221
Stylephoridae	221
Order LAMPRIFORMES	221
Key to the families of Lampriformes	221
Radiicephalidae	222
Lophotidae	223
Key to the genera of Lophotidae	223
Key to the species of <i>Lophotus</i>	223
Regalecidae	225
Key to the genera and species of Regalecidae	225
Trachipteridae	226
Key to the genera of Trachipteridae	226
Key to the species of <i>Trachipterus</i>	227
Key to the species of <i>Zu</i>	228
Order GADIFORMES	229
Key to the families of Gadiformes	229
Bregmacerotidae	229
Key to the species of Bregmacerotidae	229
Melanonidae	230
Key to the species of Melanonidae	230
Order LOPHIIFORMES	231
Key to the families of Lophiiformes	231
Ceratiidae	231

Key to the genera of Ceratiidae	231
Key to the species of <i>Ceratias</i>	232
Melanocetidae	233
Key to the species of Melanocetidae	233
Order BERYCIFORMES	235
Melamphaidae	235
Key to the genera of Melamphaidae	235
Key to the species of <i>Melamphaes</i>	236
Key to the species of <i>Poromitra</i>	242
Key to the species of <i>Scopeloberyx</i>	245
Key to the species of <i>Scopelogadus</i>	246
Order TRACHICHTHYIFORMES	247
Key to the families of Trachichthyiformes	247
Anoplogastridae	247
Diretmidae	248
Key to the species of Diretmidae	248
Order OPHIDIIFORMES	251
Parabrotulidae	251
Key to the genera and species of Parabrotulidae	251
Order SCOMBRIFORMES	253
Key to the families of Scombriformes	253
Scombridae	253
Scombrolabracidae	254
Centrolophidae	255
Key to the genera of Centrolophidae	255
Key to the species of <i>Schedophilus</i>	255
Gempylidae	257
Key to the species of Gempylidae	257
Nomeidae	261
Key to the genera of Nomeidae	261
Key to the species of <i>Cubiceps</i>	263
Key to the species of <i>Psenes</i>	265
Tetragonuridae	267
Key to the species of Tetragonuridae	267
Trichiuridae	267
Key to the species of Trichiuridae	267
Order PERCIFORMES	269
Key to the families of Perciformes	269
Bramidae	270
Key to the genera of Bramidae	270

Key to the species of <i>Brama</i>	271
Key to the species of <i>Pteraclis</i>	273
Key to the species of <i>Pterycombus</i>	274
Key to the species of <i>Taractes</i>	275
Caristiidae	276
Key to the genera of Caristiidae	276
Key to the species of <i>Caristius</i>	277
Key to the species of <i>Paracaristius</i>	279
Key to the species of <i>Platyberyx</i>	281
Chiasmodontidae	283
Key to the genera of Chiasmodontidae	283
Key to the species of <i>Chiasmodon</i>	284
Key to the species of <i>Pseudoscopelus</i>	285
Howellidae	288
Key to the genera of Howellidae	288
Key to the species of <i>Howella</i>	289
References	291
Further readings	298
Technical terms and measurements	311
Glossary of technical terms	315
Index of scientific names	319
Index of FAO English common names	325

INTRODUCTION

Underutilized fish resources, such as mesopelagic fishes, have been identified as a means to augment or replace production from traditionally exploited stocks of wild-caught fishes, many of which are overexploited (FAO, 2001; IMR *et al.*, 2017). Increased utilization of this resource must be balanced against the critical intermediate ecosystem services mesopelagic fishes provide. Through the act of diel vertical migration, described below, mesopelagic fishes are key components of the ‘biological pump’ (Robinson *et al.*, 2010), which facilitates carbon sequestration in the deep ocean. Without this pump, the partial pressure of atmospheric CO₂ would be twice its current value (Maier-Reimer *et al.*, 1996). Hoagland *et al.* (2019) valued this ecosystem service of mesopelagic fishes to be in the 100’s of billions to trillions of US dollars globally. As predators on plankton and prey for large fishes, marine mammals, seabirds and others, mesopelagic fishes are also the direct link between plankton and high-level predators, many of which are commercially fished (e.g., tunas, billfishes, toothfish, seamount-associated demersal fishes; Koslow *et al.*, 2000; Choy *et al.*, 2013; Young *et al.*, 2015; Drazen and Sutton, 2017; Subramaniam *et al.*, 2020).

The abundance and biomass of oceanic fishes generally declines with increasing depth (Angel and Baker, 1982, Wei *et al.*, 2010). However, because of the sheer volume of the mesopelagic domain and evidence of mesopelagic fish biomass increases near large topographic structures (e.g., upwelling-favorable continental shelf breaks, seamounts, mid-ocean ridges, volcanic islands; Hulley and Lutjeharms, 1989; Porteiro and Sutton, 2007; Sutton *et al.*, 2008; Wienerroither *et al.*, 2009), the global abundance and biomass of mesopelagic fishes is massive. Studies based on acoustics estimate mesopelagic fish biomass in the non-polar World Ocean at roughly 7–10 billion metric tonnes (Koslow *et al.*, 1997; Kaartvedt *et al.*, 2012, Irigoien *et al.*, 2014), which is at least an order of magnitude higher than previous estimates (Gjosæter and Kawaguchi, 1980) and equally higher than the total reported global commercial fish landings (Irigoien *et al.*, 2014). In contrast to the majority of fisheries that mostly harvest for direct consumption, mesopelagic fisheries seek sources for fishmeal, which is in great demand from the expanding aquaculture and animal feed industries, as well as potential source material for the derivation of pharmaceuticals and nutraceuticals (Remesan *et al.*, 2019; Hildalgo and Browman, 2019; Alvheim *et al.*, 2020). Thus, there is a potential confluence of increasing human need and untapped resource availability.

In order to extract mesopelagic fish resources sustainably, management strategies must include assessment of species-level and population-level vital rates (St. John *et al.*, 2016). The necessary foundation of fishery assessments is accurate identification during and after fishing (prior to processing and/or reduction). This is particularly important for lanternfishes (Myctophidae), the dominant biomass component of deep-scattering layers (ergo, targeted by commercial trawling), but is also important for all taxa given the indiscriminate collection nature of midwater trawling.

Here we present an illustrated identification guide to all known primarily mesopelagic fishes of the Central and South East Atlantic, with the proviso that the mesopelagic zone worldwide is chronically under-explored (Webb *et al.*, 2010; St. John *et al.*, 2016) and thus new distributional records and species descriptions are likely in the future. Juveniles of primarily demersal/benthic fish taxa are not included in the guide, though they may be collected in small numbers during midwater sampling. Fishes residing at bathypelagic depths are included in cases where distributions span the meso- and bathypelagic zones.

BACKGROUND

The mesopelagic fish fauna

In this guide we focus on fishes whose centers of abundance occur within mesopelagic depths (200-1000 m)(Fig. 1) during daytime, with the latter distinction arising from the prevalence of diel

vertical migration (DVM) among the majority of mesopelagic fish species (see references in Sutton, 2013). Mesopelagic fishes undertaking DVM ascend shortly before sunset, in most cases into the epipelagic zone (0-200 m), to feed.

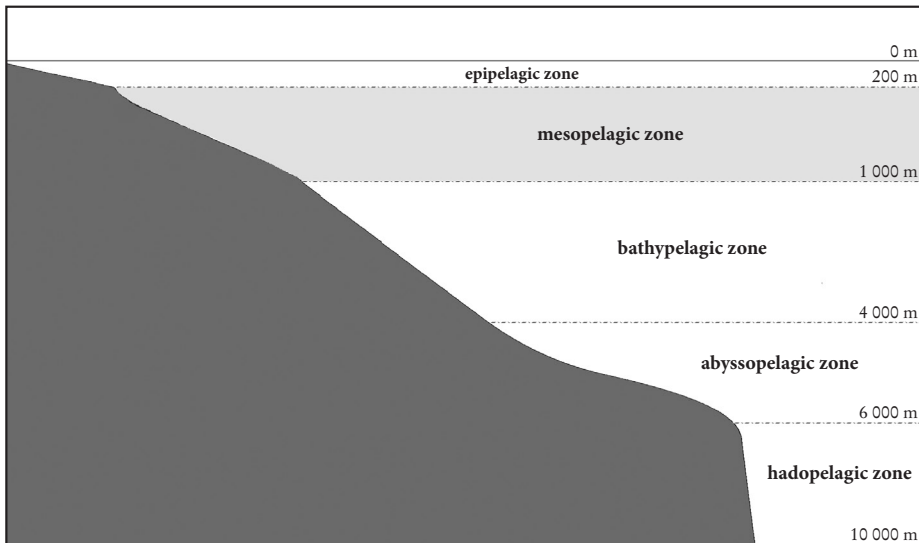


Figure 1. Open-ocean depth zone schema used to define mesopelagic species in this guide.

Migration speeds are a function of diel cycle and daytime depth of occurrence; the downward component that initiates just before dawn is faster than the upward at dusk, and deeper living fishes have higher migration velocities than shallower (Bianchi and Mislin, 2015). DVM dynamics can be viewed synoptically as echograms of acoustic backscatter, a proxy for fish biomass (see references and summary in Klevjer *et al.*, 2016; Dornan *et al.*, 2019). Mesopelagic fishes tend to aggregate in ‘deep-scattering layers’, that will most likely be the targets of commercial fishing. A notable exception to the preponderance of DVM among mesopelagic fishes is the stomiiform genus *Cyclothone*, whose members likely outnumber all other mesopelagic fishes combined on a global scale (Priede, 2017).

Two orders, the Stomiiformes and Myctophiformes, dominate the global mesopelagic fish fauna in terms of abundance, biomass, and species richness, with the ranking of the two varying on biogeographical scales. To wit, of the 552 species from 18 orders treated in this guide, over half (300 spp.) are stomiiforms (173 spp.) or myctophiforms (127 spp.). Three additional taxa, the Aulopiformes (eight families), the Melamphaidae (variously placed in either the Beryciformes or Stephanoberyciformes), and the Bathylagidae (variously placed in either the Osmeriformes or the Argentiniformes), combine with the previous two orders to form the bulk of the global mesopelagic fish species richness, abundance, and biomass (Marshall, 1971; Priede, 2017). Along ocean margins, pelagic eels (e.g., snipe eels, Nemichthyidae) can also be numerically, and biomass dominant mesopelagic fishes (Feagans-Bartow and Sutton, 2014).

Mesopelagic fishes deviate morphologically from the body plan of the more familiar, spiny-finned fishes that dominate coastal ecosystems. The most widespread morphological difference in the majority of mesopelagic fish species is the presence of photophores, organs used for bioluminescence (Herring, 1987; Haddock *et al.*, 2010; Widder, 2010). The importance of photophores in the evolution and ecology of mesopelagic fishes is manifest in the evolution of intrinsic (light production without the aid of bacterial symbiosis) bioluminescence itself. Of the

eight cases where intrinsic bioluminescence has independently evolved in ray-finned fishes (Davis *et al.*, 2016), seven comprise mesopelagic taxa, with the eighth being limited to 14 species of the genus *Porichthys*. Photophores and related luminescent appendages (e.g., mental barbels of dragonfishes, dorsal illicia/escae of female anglerfishes) are key elements of the taxonomy of mesopelagic fishes, particularly in taxa that show exceptional species richness with respect to their clade age (e.g., Stomiidae, Myctophidae; Davis *et al.*, 2014). These morphological characters are featured prominently in this guide. Other deviations include the lack of fin spines in almost all taxa, tubular eyes (Opisthoproctidae, Stylephoridae, Scopelarchidae, Giganturidae, some Sternoptychidae and Microstomatidae), elongated, sharp fang-like teeth (Stomiidae, Evermannellidae, Scopelarchidae, Alepisauridae, Omosudidae, Giganturidae, Anoplogastridae, Melanocetidae, Chiasmodontidae), and greatly enlarged gapes (e.g., malacosteine Stomiidae, Eurypharyngidae). Regarding coloration, mesopelagic fishes have a highly reduced palette compared to coastal fishes, with silver-to-brown-to-black being the ‘standard’ colour morphs for fishes residing in upper-, mid-, and lower-mesopelagic depth strata, respectively. Due to the propensity of mesopelagic fishes to be skinned or damaged during trawl capture, colour is rarely used as a taxonomic character excepting scaleless forms with pigment banding (e.g., *Polyipnus* spp.).

The Central and South East Atlantic area

The geographical area covered by this guide comprises the open-ocean waters off the west coast of Africa (Fig. 2), though it should be noted that mesopelagic fish assemblages are not necessarily contained within these boundaries, but may travel through them on an ocean basin time-space scale. The ‘northern box’ contains waters south of the entrance of the Mediterranean Sea to the equator and east of 30° W longitude. This area contains one of the most productive regions of the World Ocean due to upwelling (Mittelstaedt, 1983).

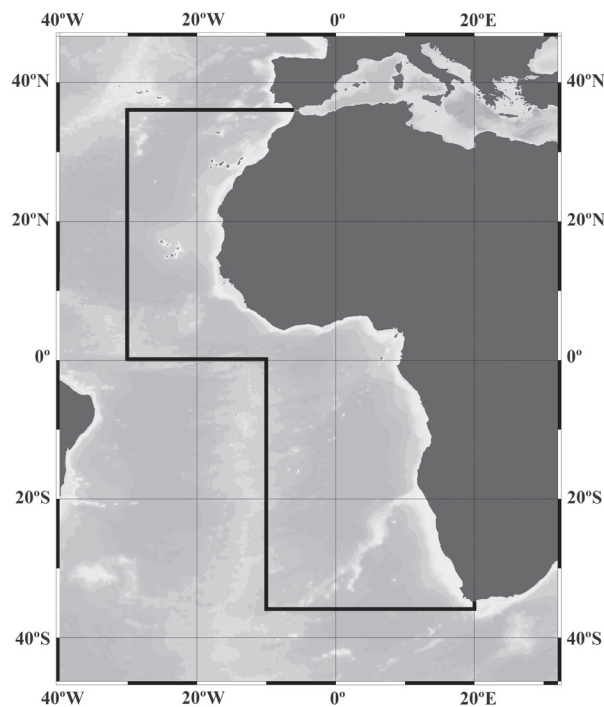


Figure 2. Geographic area covered in this guide, with the proviso that mesopelagic water masses and fish assemblage can move freely in and out of the area.

Mesopelagic waters within this area also can be hypoxic due to established oxygen minimum zones (Ekau *et al.*, 2010; Olivar *et al.*, 2017). The ‘southern box’ contains waters south of the equator to the southern tip of Africa and east of 10° W longitude. The combined boxes contain all or parts of seven ecoregions (*sensu* Sutton *et al.*, 2017): Central North Atlantic, Tropical/West Equatorial Atlantic, Mauritania/Cape Verde, Guinea Basin/East Equatorial Atlantic, Benguela Upwelling, South Atlantic, and Agulhas Current (Fig. 3).

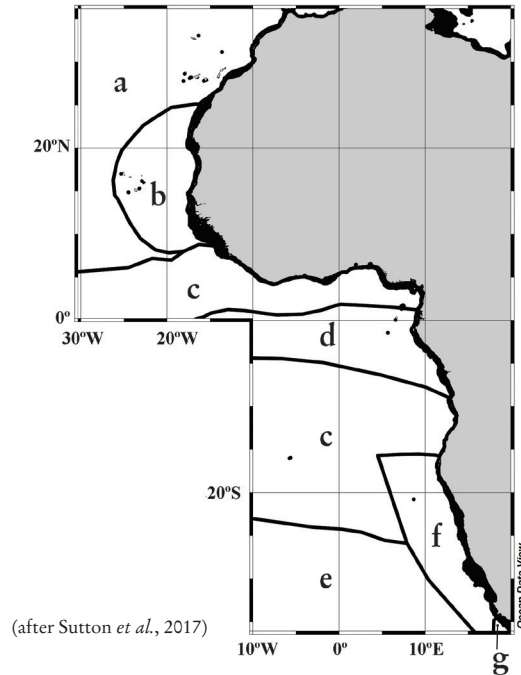


Figure 3. Proposed mesopelagic ecoregions of the Central and South East Atlantic area: a) Central North Atlantic, b) Mauritania/Cape Verde, c) Tropical/West Equatorial Atlantic, d) Guinea Basin/Equatorial Atlantic, e) South Atlantic, f) Benguela Upwelling, g) Agulhas Current. Areas with depths less than 250 m are shaded in black.

Mesopelagic fish species richness across the area follows global patterns, with highest values in equatorial waters, followed by subtropical, temperate, and high-latitude waters (Krefft, 1974; Backus *et al.*, 1977). The Mauritania/Cape Verde ecoregion has a distinct mesopelagic fauna including endemics and relic populations of ‘cool water’ taxa (Briggs, 1970). The Benguela region is highly productive, and the fauna is strongly ‘pseudo-oceanic’ (Hulley, 1986; Hulley and Prosch, 1987; Hulley, 1992). Species’ distributional records within the area are annotated in each species account, again with the proviso that the mesopelagic fauna is wholly under-studied relative to the coastal fauna, and that species absences in regions within the study area may be a function of sampling/reporting as much as ecological constraints.

PRESENTATION AND FORMAT

The identification of mesopelagic fish species can be difficult, and it is often challenging for even the more experienced researchers. In order to facilitate the identification process, the authors agreed that the guide should be entirely based on fully illustrated dichotomous keys. These keys present relevant information in a structured form and often allow users to skip over the many taxa that do not possess certain characters. Moreover, they are useful by telling users what to look for. “Dichotomous” means divided into two parts, and therefore the dichotomous keys always present

pairs or couplets of contrasting characteristics. Users should read both couplet options, and then select the option that reflects the characteristics shown by the organism they are trying to identify and proceed either to the next couplet or to the correct taxon.

Users should start the identification process from the first dichotomous key, the Key to the orders of mesopelagic fishes occurring in the area (p. 1). In the example below (Fig. 4), users have to decide whether the specimen they are trying to identify has either “multiple gill slits, teeth not fused to jaws, and a skeleton consisting of cartilage” or “a single gill opening, and teeth usually fused to jaw.” In the former case (1a), users would have to proceed to couplet 2, check for the presence or absence of the anal fin, and continue either with the Lamniformes (2a) or Squaliformes (2b) section. In the latter case (1b), they would be directed to couplet 3, and so on until the correct taxon is reached.

Each Ordinal section starts with a key to the families, and users should follow the same procedure

KEY TO THE ORDERS OF MESOPELAGIC FISHES OCCURRING IN THE AREA

1a. Multiple gill slits; teeth not fused to jaws; skeleton consists of cartilage (Figs. 1 & 2)	→ 2
1b. Single gill opening; teeth usually fused to jaw	→ 3
2a. Anal fin present (Fig. 1)	Lamniformes (p. 13)
2b. Anal fin absent (Fig. 2).	Squaliformes (p. 13)

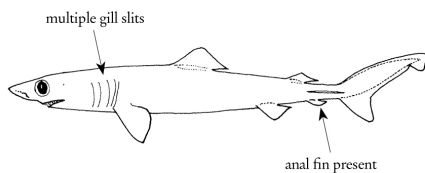


Fig. 1 Lamniformes

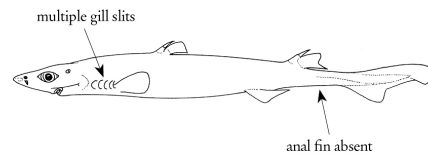


Fig. 2 Squaliformes

Figure 4. Starting point of the key to the orders of mesopelagic fishes occurring in the area

explained above. Family sections are usually presented in alphabetical order. They are introduced by a dichotomous key to the genera, species of monotypic genera (genera that contain only one described species), or the sole representative of genera in which only one species occurs in the study area. A number of families are also accompanied by a schematic illustration of the main body parts of a typical representative species and some measurements and technical terms of general use. Finally, keys to the species are presented.

Text for each species contains information on names (**scientific name** with authorship, and **FAO name** in English, where available), maximum known **size** (expressed usually as standard length [SL], unless otherwise specified as total length [TL]), **other characters** that are not diagnostic but can further help users, **remarks** (where available), a **distribution map** based on known occurrences, and one or more illustrations which are complemented by captions and arrows pointing to the main characters. Users who require more detailed information on specific terms and characters used throughout the guide can consult the illustrated technical terms section (p. 311) and the glossary (p. 315). Finally, a list of scientific literature used to compile the dichotomous keys is provided by family (p. 298).

PRESERVATION OF SPECIMENS

Preserved fish specimens are central to documenting and describing global biodiversity over time. Worldwide, museum and university collections provide irreplaceable resources and have an enduring role in taxonomic, ecological, biogeographical, and evolutionary studies. It is therefore important that the correct preservation procedures be followed to ensure the quality and longevity

of preserved fish specimens. Mesopelagic fishes are usually characterized by having soft bodies that are easily damaged by traditional sampling gears. Therefore, fishes should be handled as little as possible, processed quickly and kept cold during the process (chilled seawater works well). After tissue sample excision for genetic and/or biogeochemical analysis (if appropriate), specimens should be preserved in a 10% formalin solution upon capture (1-part full strength formalin (37%) with 9-parts seawater) for at least three days. If freshwater is used, formalin solution should be buffered to neutrality with sodium borate. Fish specimens, when possible, should be fixed in a natural posture, with the body straightened and mouth closed prior to fixation. The specimens should be placed headfirst into a wide-mouthed jar filled with enough formalin solution to cover the fish. Before fixing large specimens, it is advisable to inject formalin into the body cavity (through the vent) or to make a lateral incision on the right side of the body cavity to allow the fixative into the body cavity. Formalin is the best available fixative and is widely available worldwide. However, it contains formaldehyde, a hazardous chemical, so it is highly toxic, and its fumes should not be inhaled. Rubber gloves should be worn while using formalin or handling formalin-fixed specimens. If you get formalin on your skin or in your eyes wash it off with large amounts of water. Always use formalin outdoors or in a well-ventilated area (i.e., fume hood if used indoors). After formalin fixation, specimens should be washed with freshwater and transferred to an alcoholic solution (70% ethanol:30% fresh water). Alcohol is usually safe to handle, but can cause irritation to the skin in cases of prolonged contact and is highly flammable. Always rinse hands thoroughly with water after working with alcohol.

Fish eggs and fish larvae are traditionally fixed and preserved in a buffered 2.2% formalin in sea water solution (Ahlstrom, 1976), but due to advances in clearing and staining procedures and in DNA analyses, alternative methods are now being used (Schnell *et al.*, 2016; Gordeeva *et al.*, 2019). If for some reasons, specimens cannot be immediately fixed via formalin, ethanol, or alternative solution, they should be blast frozen in seawater, but still fixed when defrosted. Otherwise, most specimens will rapidly deteriorate when examined. Jars or vials should always be properly and clearly labelled. A waterproof paper label should be placed in the jar noting the sample number, collection date and species name. It is also useful to write the sample and haul number on the jar/vial cap. Alcohol is prone to rapid evaporation, and jars should be securely covered, and not be opened unnecessarily.

To facilitate studies involving otolith and/or biochemical studies (e.g., age and growth, otolith morphometry, otolith microchemistry, stable isotope analysis), select specimens should be identified at sea, labeled, and frozen separately in sealable bags or vials. In all cases where trawl samples are divided via subsampling, it is imperative that a master database be established at sea that connects parent/daughter samples via identifier codes so that entire trawl samples can be ‘reconstructed’ in databases after full laboratory analyses to provide quantitative data for community ecology and population dynamics studies.

COLLECTION OF TISSUE FOR GENETIC ANALYSIS

Genetic “barcoding” is a useful tool for defining a species as distinct, especially in cases of species demonstrating cosmopolitan ranges and/or a dearth of readily identifiable structures (e.g., lacking photophores or luminescent appendages). Readers are referred to Hanner *et al.* (2011) for more detailed information and methods.

KEY TO THE ORDERS OF MESOPELAGIC FISHES OCCURRING IN THE AREA

- 1a. Multiple gill slits; teeth not fused to jaws; skeleton consists of cartilage (Figs. 1 & 2) → 2
- 1b. Single gill opening; teeth usually fused to jaw → 3

- 2a. Anal fin present (Fig. 1) **Lamniformes (p. 13)**
- 2b. Anal fin absent (Fig. 2). **Squaliformes (p. 13)**

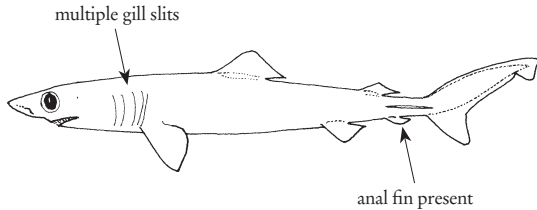


Fig. 1 Lamniformes

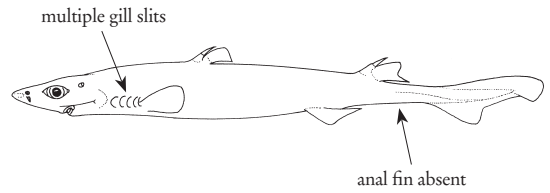


Fig. 2 Squaliformes

- 3a. Fin spines absent, fin elements consist solely of soft (segmented) rays (Fig. 3) → 4
- 3b. Fin spines (Fig. 4) present, in addition to rays . . . → 23

- 4a. Body eel-like; pelvic fins absent; gill slits small and narrow; dorsal and anal fins very long, generally continuous with caudal fin (if present); premaxilla, vomer, and ethmoid bones joined into a single bone → 5
- 4b. Combination of characters not as above → 6

- 5a. Gill openings ventral; ribs, opercular bones, and branchiostegal rays absent; eyes very small; gape of mouth extremely large, opening to several times body diameter, extending well behind eye (Figs. 5a & 5b) **Saccopharyngiformes (p. 27)**

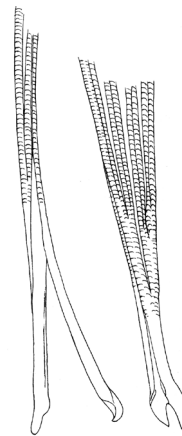


Fig. 3 Soft rays

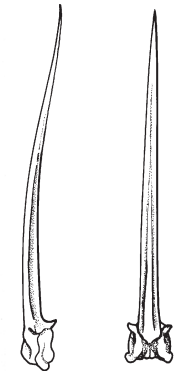
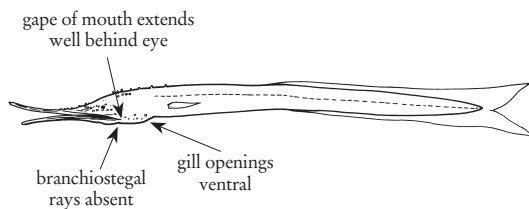
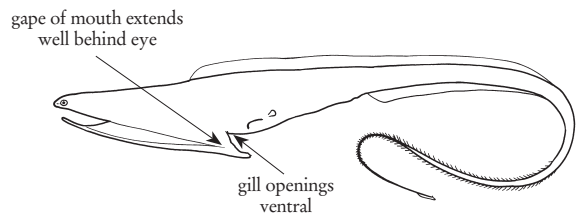


Fig. 4 Fin spines



a) Cyematidae



b) Eurypharyngidae

Fig. 5 Saccopharyngiformes

5b. Branchiostegal rays present; other characters not as above (Figs. 6a & 6b). . . Anguilliformes (p. 19)

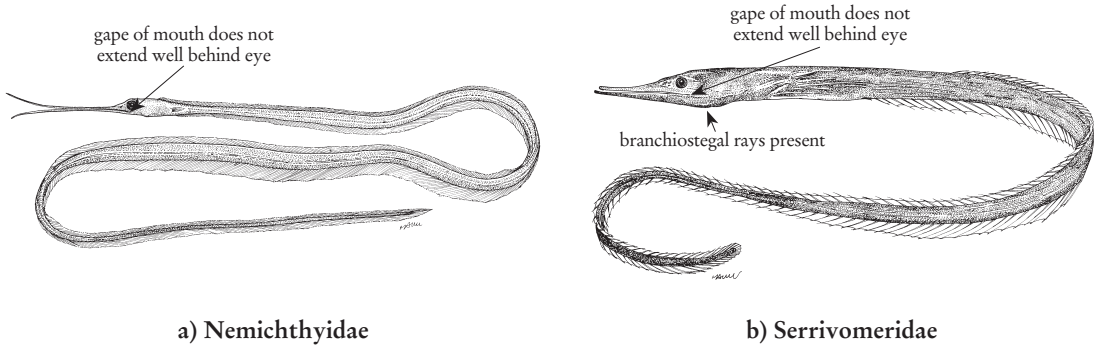


Fig. 6 Anguilliformes

- 6a. Photophores generally present on body and head → 7
- 6b. Photophores generally absent on body and head → 9
- 7a. Photophores not in linear series, either scattered along body flank or as isolated organs along ventral margin (Figs. 7a & 7b). . . Alepocephaliformes (in part: some Alepocephalidae and Platytroctidae)(p. 41)
- 7b. Photophores arranged in linear series along ventral margin and/or flanks (Figs. 8 & 9) → 8

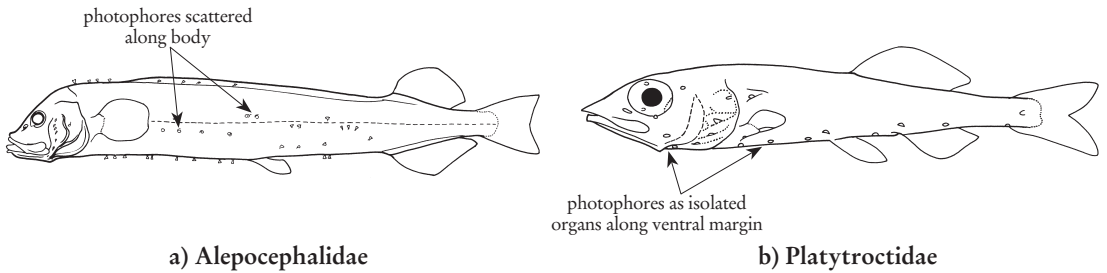


Fig. 7 Alepocephaliformes

- 8a. Premaxilla and maxilla included in gape of mouth and bearing teeth (Fig. 8a); photophores generally present in 2 straight lateral series on ventral half of trunk (Fig. 8b)[note: only a single ventral series in *Bonapartia pedaliota* (p. 56); photophores absent in *Cyclothone obscura* (p. 57)]; dorsal-fin location highly variable Stomiiformes (p. 53)

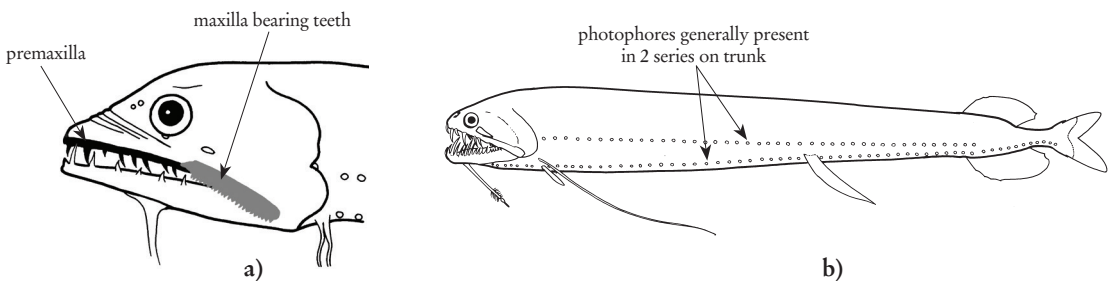


Fig. 8 Stomiiformes

8b. Only premaxilla in gape of mouth and bearing teeth (Fig. 9a); photophores either present in 2 straight lateral series on ventral half of trunk (**Neoscopelidae**, Fig. 9b) or in single series along ventral margin of trunk with lateral photophores perpendicular or oblique to this series (**Myctophidae**, Fig. 9c)[**note:** photophores absent in *Scopelengys tristis* (p. 156) and *Taaningichthys paurolachnus* (p. 219)]; single dorsal fin located at about midlength **Myctophiformes (p. 155)**

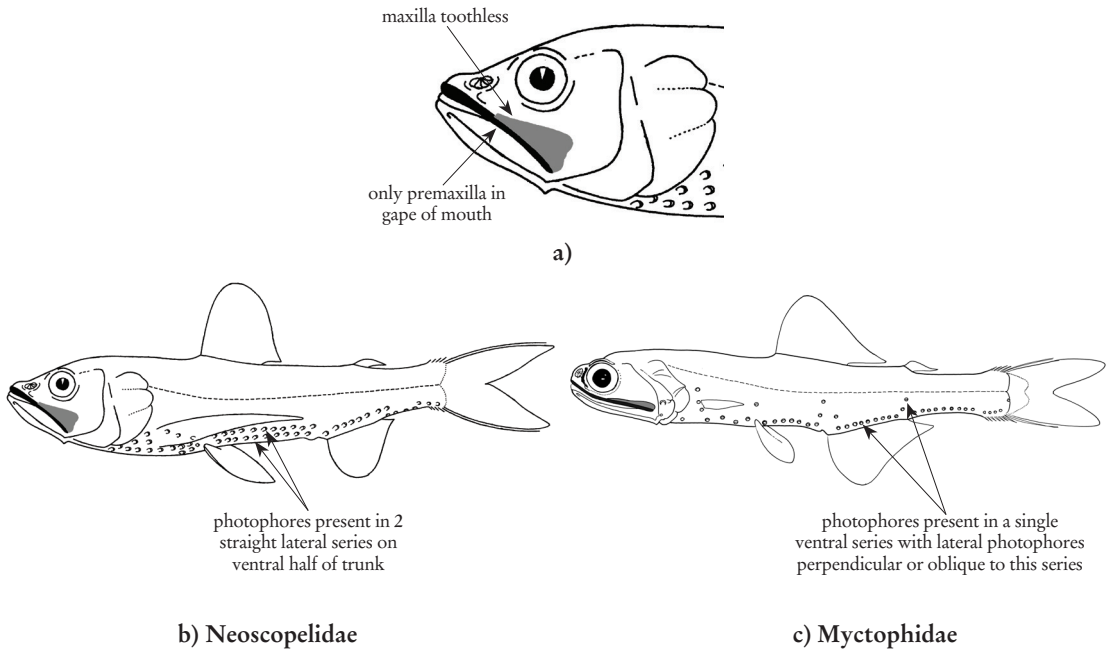


Fig. 9 Myctophiformes

- 9a. Eyes tubular, directed forward or upward (Figs. 10 & 11) → 10
- 9b. Eyes not tubular and generally directed laterally → 14
- 10a. **More than 100 soft dorsal-fin rays in adults** (Fig. 10); mouth greatly protrusible; lower jaw length equal to head length; caudal fin greatly reduced, with highly elongated ventral rays (often broken during collection, but thickened relative to other caudal-fin rays) **Stylephoriformes (p. 221)**
- 10b. **(Much) fewer than 100 soft dorsal-fin rays;** caudal fin normally developed, with or without extended caudal filaments (Fig. 11) → 11

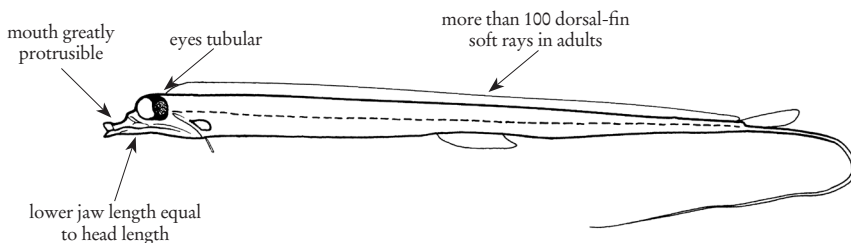


Fig. 10 Stylephoriformes

- 11a. Pelvic fins absent; ventral caudal-fin rays greatly elongated (often broken during collection)(Fig. 11).
 **Aulopiformes** (in part: **Giganturidae**)(p. 129)
- 11b. Pelvic fins present; no elongated caudal-fin rays (Fig. 12) → 12

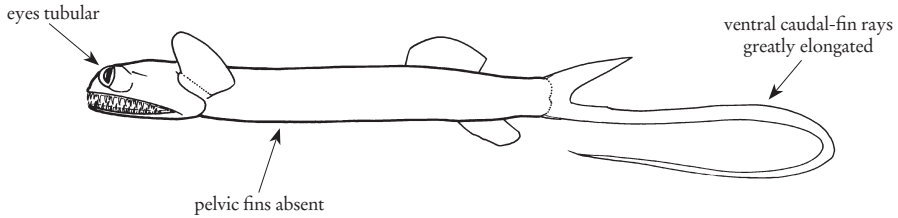


Fig. 11 Aulopiformes (Giganturidae)

- 12a. Tongue with strong and usually hooked teeth . . . **Aulopiformes** (in part: **Scopelarchidae**)(p. 129)
- 12b. Tongue teeth absent or small, not hooked → 13

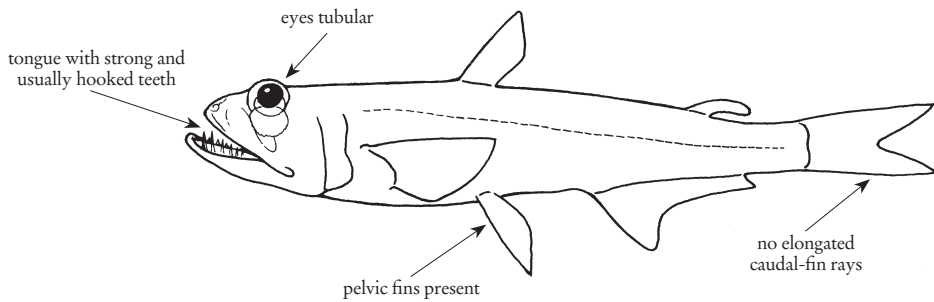


Fig. 12 Aulopiformes (Scopelarchidae)

- 13a. No large teeth or fangs (Figs. 13a & 13b).
 **Osmeriformes** (in part: **Opisthoproctidae** and **Microstomatidae** [*Xenophthalmichthys*])(p. 29)

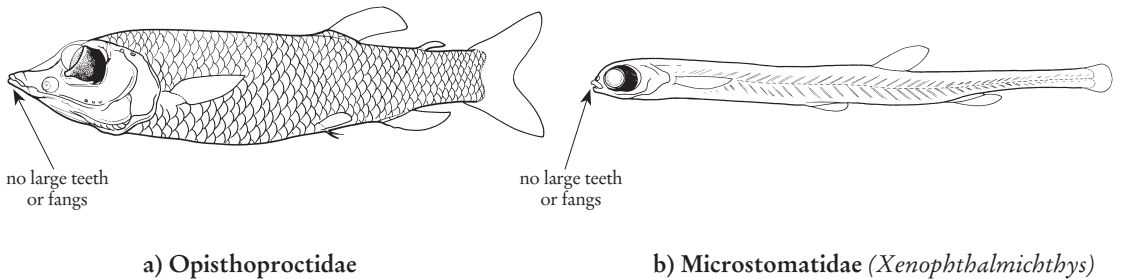
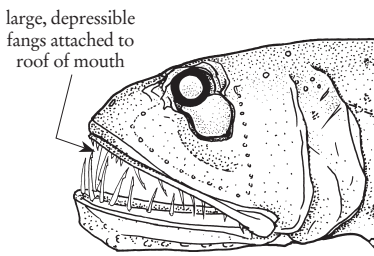
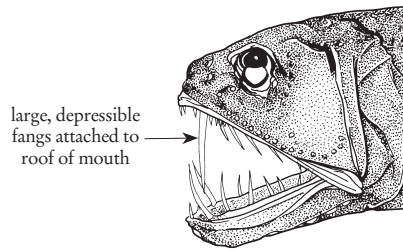


Fig. 13 Osmeriformes

13b. Large, depressible fangs attached to roof of mouth (Figs. 14a & 14b)
 Aulopiformes (in part: Evermannellidae [*Evermannella*, *Coccorella*])(p. 129)



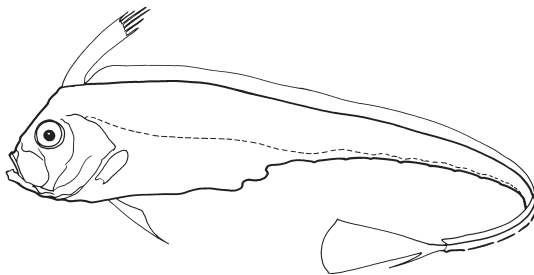
a) *Evermannella*



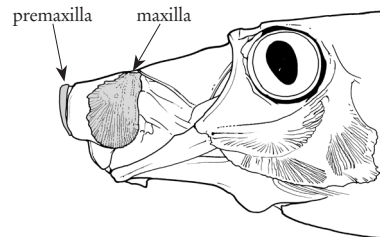
b) *Coccorella*

Fig. 14 Aulopiformes

14a. Maxilla excluded from gape and free to move with premaxilla well away from snout during jaw protrusion (no ligamental attachment)(Fig. 15b) Lampriformes (p. 221)
 14b. Maxilla included in gape or bound by ligament such that it pivots during jaw protrusion but does not move fully away from snout → 15



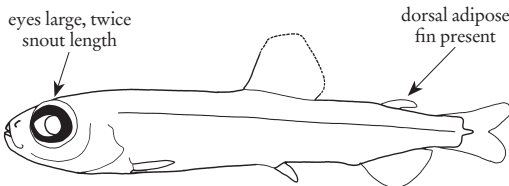
a) Trachipteridae



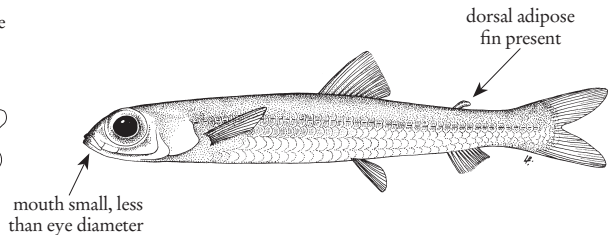
b) protracted mouth

Fig. 15 Lampriformes

15a. Dorsal adipose fin present (Figs. 16 & 17) → 16
 15b. Dorsal adipose fin absent → 17
 16a. Eyes large, twice snout length; mouth small, less than eye diameter (Figs. 16a & 16b)
 Osmeriformes (in part: Bathylagidae, Microstomatidae [*Nansenia*])(p. 29)



a) Bathylagidae



b) Microstomatidae (*Nansenia*)

Fig. 16 Osmeriformes

16b. Eye diameter less than snout length; mouth large to very large (Figs 17a & 17b)
 **Aulopiformes** (in part: seven families)(p. 129)

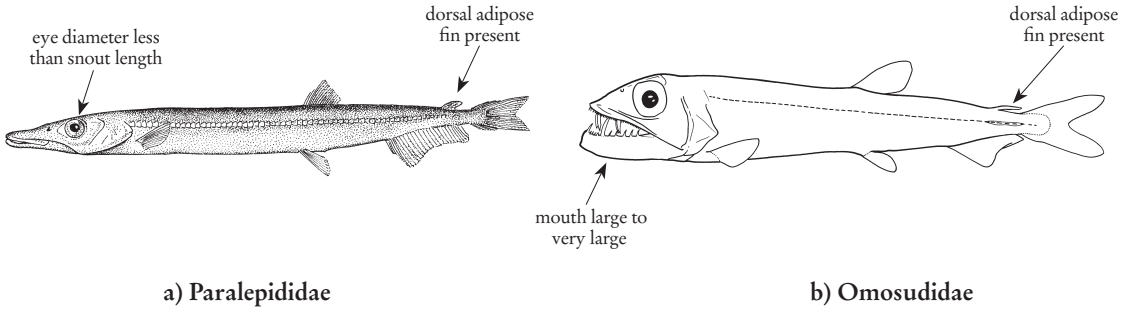


Fig. 17 Aulopiformes

17a. Eye large, more than twice the length of snout; mouth small; lateral line extending onto caudal fin (Fig. 18) **Osmeriformes** (in part: **Microstomatidae** [*Microstoma*])(p. 29)
 17b. Combination of characters not as above → 18

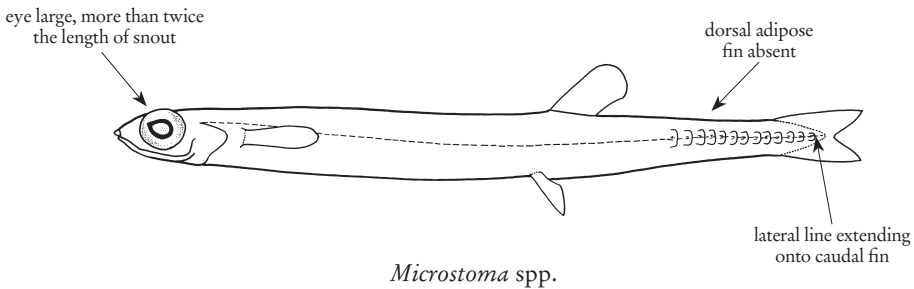


Fig. 18 Osmeriformes (Microstomatidae)

18a. Conspicuous tubular papilla in shoulder region, just under lateral line and above pectoral fin (Fig. 19) **Alepocephaliformes** (in part: **Platytroctidae**)(p. 41)
 18b. No conspicuous tubular papilla in shoulder region → 19

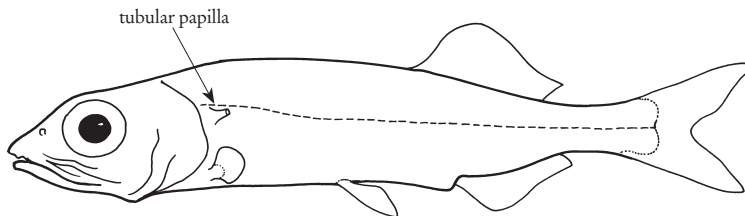


Fig. 19 Alepocephaliformes (Platytroctidae)

- 19a. Lower jaw with a prominent knob directed ventrally (Fig. 20a) teeth small; gill rakers long and numerous (Fig. 20b). **Alepocephaliformes** (in part: **Alepocephalidae** [*Bajacalifornia*])(p. 41)
 19b. Combination of characters not as above → 20

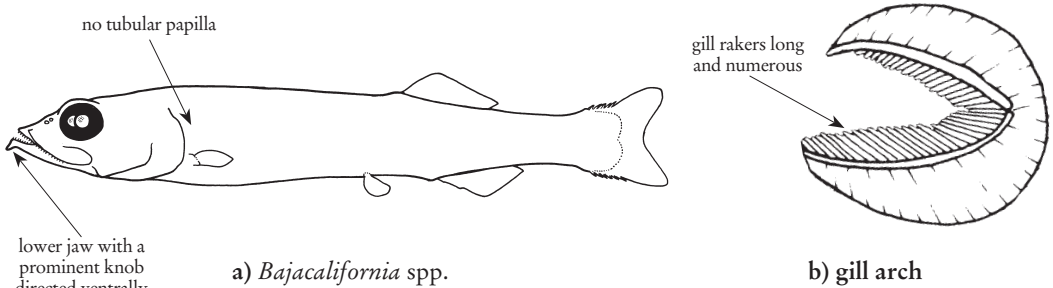


Fig. 20 Alepocephaliformes (Alepocephalidae)

- 20a. Pelvic fins thoracic or jugular (Figs. 21a & 21b) → 21
 20b. Pelvic fins absent (Fig. 23) → 22
 21a. Body elongate; dorsal and anal fins long-based; posterior aspect of premaxilla notched (Figs. 21a & 21b) **Gadiformes** (in part: **Bregmacerotidae**, **Melanonidae**)(p. 229)

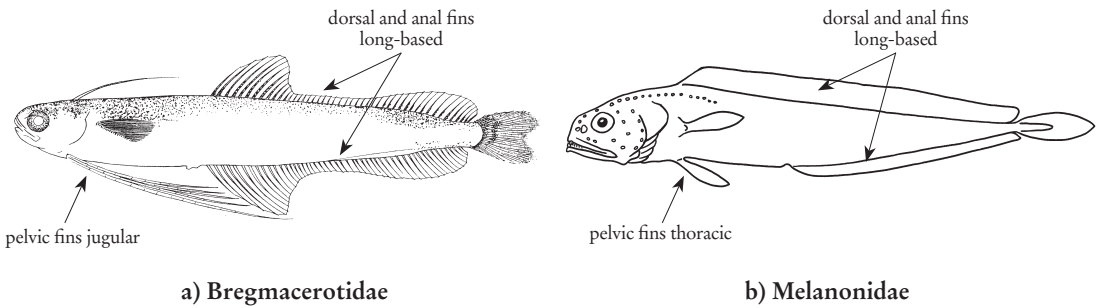


Fig. 21 Gadiformes

- 21b. Body globose; anal fin short-based; head very large, jaw teeth produced into enormous fangs in adults (Fig. 22) **Trachichthyiformes** (in part: **Anoplogastridae**)(p. 247)

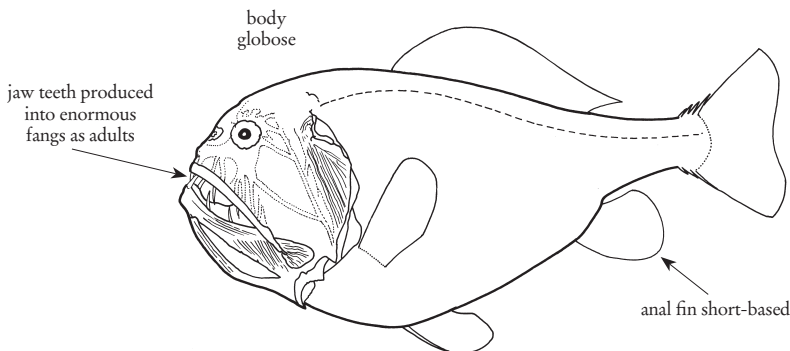


Fig. 22 Trachichthyiformes (Anoplogastridae)

22a. Dorsal and anal fins confluent with caudal fin; body eel-like; mouth small, terminal, lower jaw protruding in front of upper; scales absent; pelvic fins absent (Fig. 23) Ophidiiformes (in part: Parabrotulidae)(p. 251)

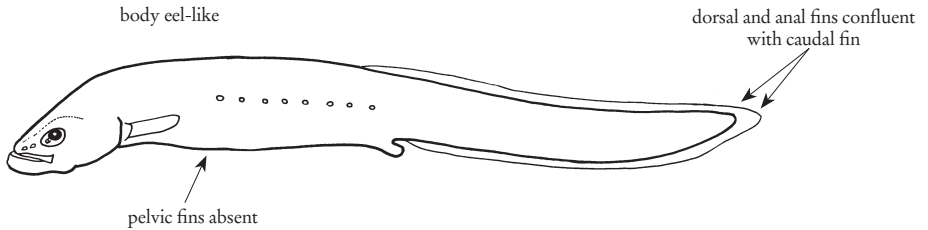


Fig. 23 Ophidiiformes (Parabrotulidae)

22b. First dorsal-fin element anteriorly isolated, forming a “fishing rod and lure” (illicium and esca, respectively); mouth superior, large to very large; gill opening located either behind or below pectoral fin; dorsal and anal fins generally posteriorly located and similar in shape and position; pelvic fins absent (Figs. 24a & 24b) Lophiiformes (in part: Ceratiidae, Melanocetidae)(p. 231)

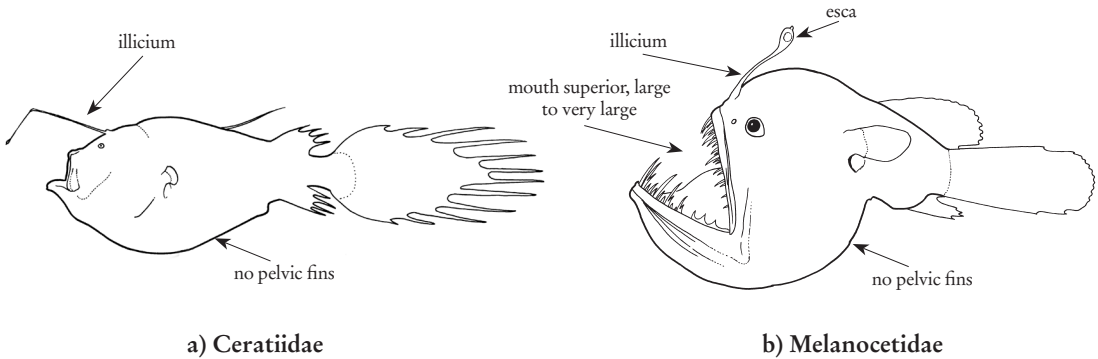


Fig. 24 Lophiiformes

23a. Dorsal-fin spines absent; mouth superior, nearly vertical; 1 laminar serrate pelvic-fin spine; anal-fin spines absent (Fig. 25) Trachichthyiformes (in part: Diretmidae)(p. 247)
23b. Dorsal-fin spines present → 24

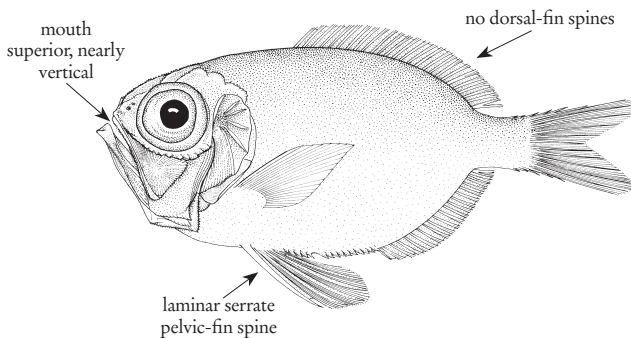


Fig. 25 Trachichthyiformes (Diretmidae)

- 24a. Pelvic fins with 1 spine and 6-8 soft rays; dorsal fin with 1-3 weak spines; caudal fin with 3-4 procurvent spines; lateral line absent, or limited to 1-2 pored scales; scales often large and deciduous (Fig. 26).
 **Beryciformes** (in part: **Melamphaidae**)(p. 235)
- 24b. Combination of characters not as above. → 25

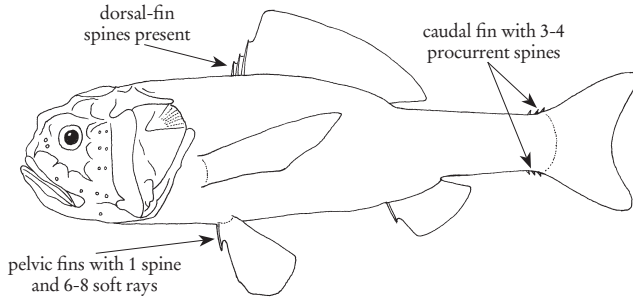


Fig. 26 Beryciformes (Melamphaidae)

- 25a. Series of finlets behind second dorsal and anal fins (Fig. 27).
 **Scombriformes** (in part: most **Gempylidae** and *Thunnus obesus*)(p. 253)
- 25b. No finlets behind second dorsal and anal fins → 26

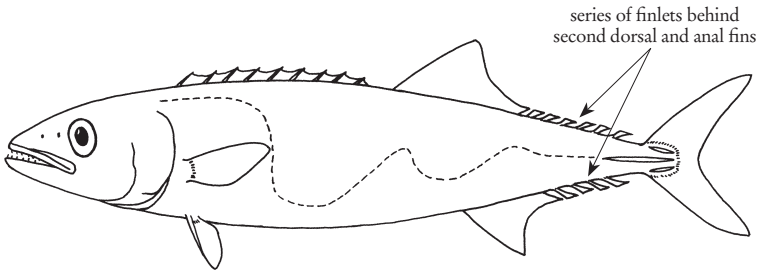


Fig. 27 Scombriformes (Gempylidae)

- 26a. More than 30 dorsal-fin spines, 26 dorsal-fin rays, 24 anal-fin rays; 2 anal-fin spines (Figs. 28a & 28b)
 **Scombriformes** (in part: **Trichiuridae**, **Gempylidae** [*Diplospinus*, *Paradiplospinus*])(p. 253)
- 26b. Combination of characters not as above. → 27

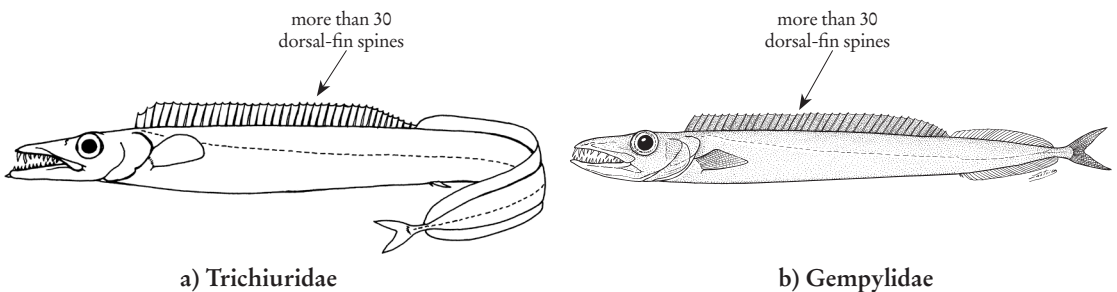


Fig. 28 Scombriformes

- 27a. Caudal peduncle square in cross section, with 2 low keels (Fig. 29) Scombriformes (in part: Tetragonuridae)(p. 253)

 27b. Combination of characters not as above. → 28

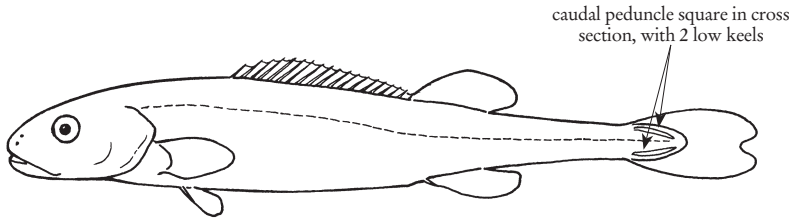


Fig. 29 Scombriformes (Tetragonuridae)

- 28a. Lacrimal bone almost completely covering maxilla when mouth is closed, only the end of the maxilla can remain exposed; snout blunt to very blunt; pelvic fins fold into shallow grooves (Fig. 30) → 29
 28b. Combination of characters not as above. → 30
 29a. Dorsal fin continuous, with either 5-9 spines weakly developed (sometimes difficult to distinguish from the soft rays) graduating in length to the soft rays and 23-60 rays or 5-9 stout dorsal-fin spines, shorter than and not graduating to the dorsal-fin rays and 19-39 rays (Fig. 30) Scombriformes (in part: Centrolophidae)(p. 253)

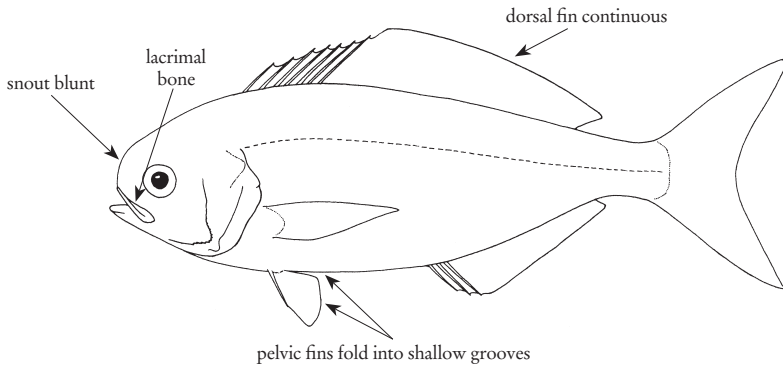


Fig. 30 Scombriformes (Centrolophidae)

- 29b. Dorsal fins separate, first dorsal fin with 9-12 spines and folds into groove, second dorsal fin with 1-2 weak spines and 15-30 rays (Fig. 31) Scombriformes (in part: Nomeidae)(p. 253)

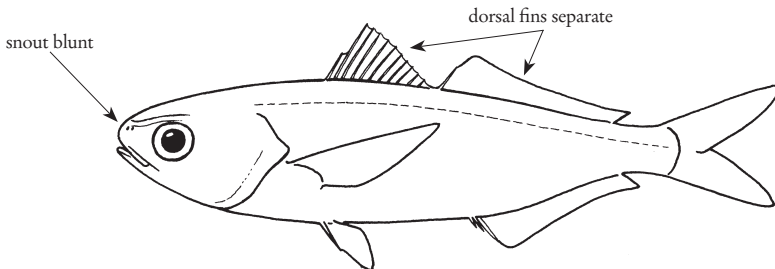


Fig. 31 Scombriformes (Nomeidae)

30a. Pectoral fins large and nearly reaching anal-fin origin; lower limb of first gill arch with 4-5 finely toothed gill rakers; jaw teeth large, slender, and pointed; first dorsal fin longer than second; body elongate and compressed (Fig. 32). Scombriformes (in part: Scombrolabracidae)(p. 253)

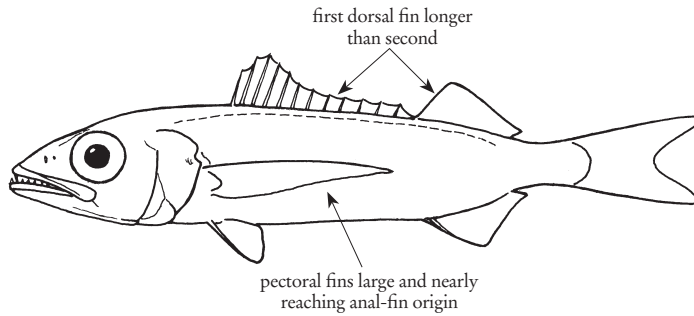


Fig. 32 Scombriformes (Scombrolabracidae)

30b. Combination of characters not as above Perciformes (in part: 4 families)(p. 269)

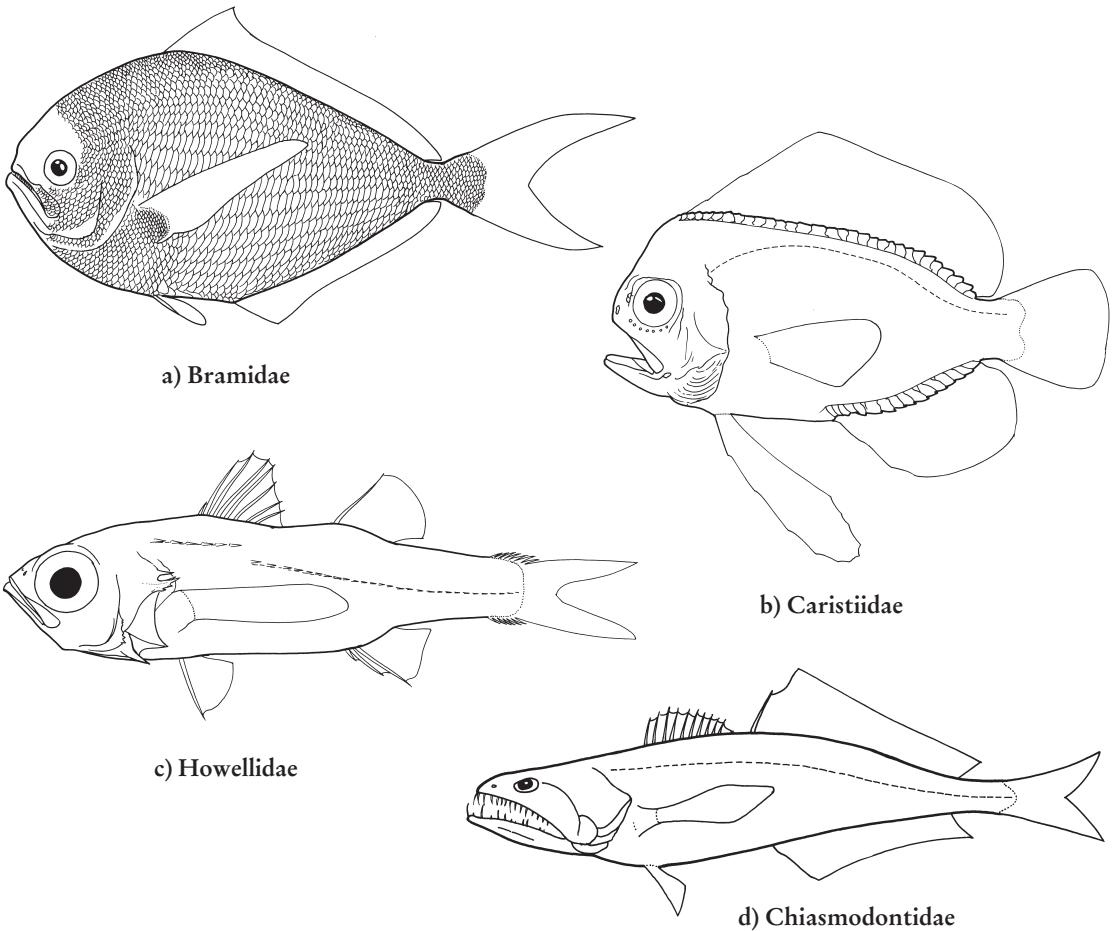


Fig. 33 Perciformes

LAMNIFORMES - PSEUDOCARCHARIIDAE

Crocodile shark

Note: A single species in this family.

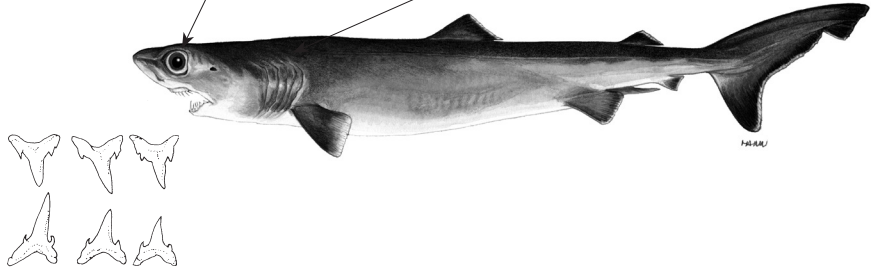
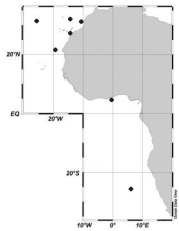
Pseudocarcharias kamoharai (Matsubara, 1936)

Crocodile shark

Other characters: no information.

Remarks: the crocodile shark can protrude its jaws well forward from its mouth.

eyes very large, without nictitating eyelids
 large gill slits with their upper ends extending onto dorsal surface of head



upper and lower teeth

Size: 110.0 cm TL

SQUALIFORMES

Dogfish sharks

KEY TO THE FAMILIES OF SQUALIFORMES OCCURRING IN THE AREA

- 1a. Upper teeth with a cusp but without lateral cusplets; underside of body, flanks and tail without conspicuous black markings and light organs (Fig. 1) **Dalatiidae (p. 14)**
- 1b. Upper teeth with a cusp and lateral cusplets; ventral surface of body, flanks and sides of tail usually with more or less conspicuous dense black markings indicating the presence of numerous light organs (photophores)(Fig. 2) **Etmopteridae (p. 17)**

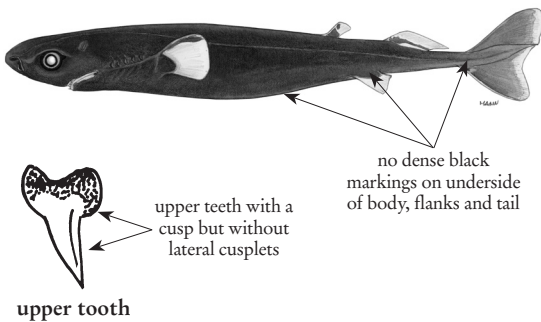


Fig. 1 Dalatiidae

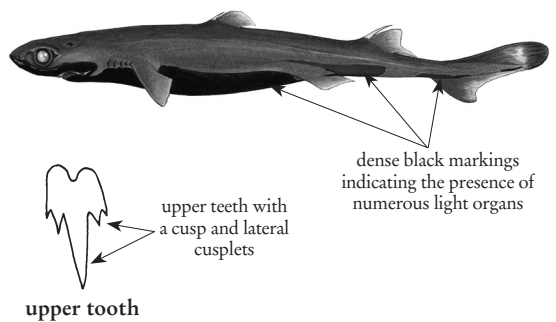


Fig. 2 Etmopteridae

DALATIIDAE

Kitefin sharks

KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF DALATIIDAE OCCURRING IN THE AREA

- 1a. Gill openings of uniform or near-uniform width; second dorsal-fin origin posterior to pelvic-fin origins → 2
 1b. Gill openings increasing in width posteriorly, the 5th very wide; second dorsal-fin origin anterior to pelvic-fin origins *Euprotomicroides zantedeschia*

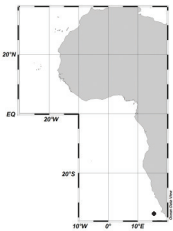
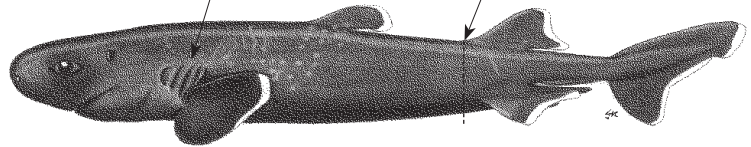
Euprotomicroides zantedeschia Hulley & Penrith, 1966

Taillight shark

Other characters: the cloaca of this shark is greatly expanded into a gland with internal villi that secrete a blue luminous substance.

Remarks: only a single specimen was collected in 1963 west of Cape Town, South Africa.

gill openings increasing in width posteriorly second dorsal-fin origin anterior to pelvic-fin origins



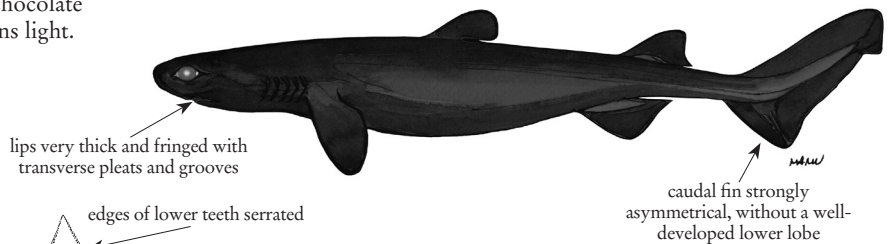
Size: 42.0 cm TL

- 2a. First dorsal-fin insertion about over pelvic-fin origins *Isistius* (p. 16)
 2b. First dorsal-fin insertion well anterior to pelvic-fin origins → 3
 3a. Lips fringed; edges of lower teeth serrated; caudal fin strongly asymmetrical, without a well-developed lower lobe. *Dalatias licha*
 3b. Lips not fringed; edges of lower teeth smooth; caudal fin slightly asymmetrical, with a strong lower lobe → 4

Dalatias licha (Bonnaterre, 1788)

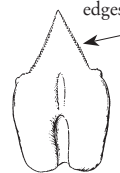
Kitefin shark

Other characters: body a uniform dark grey or chocolate brown, rear edges of fins light.

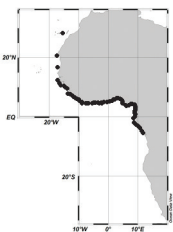


lips very thick and fringed with transverse pleats and grooves
 edges of lower teeth serrated

caudal fin strongly asymmetrical, without a well-developed lower lobe



lower tooth



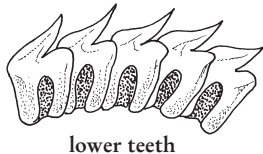
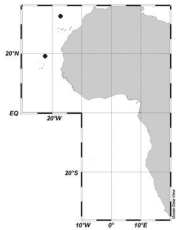
Size: 160.0 cm TL

- 4a. First dorsal fin with a low spine, second dorsal fin spineless *Squaliolus laticaudus*
 4b. Both dorsal fins without spines → 5

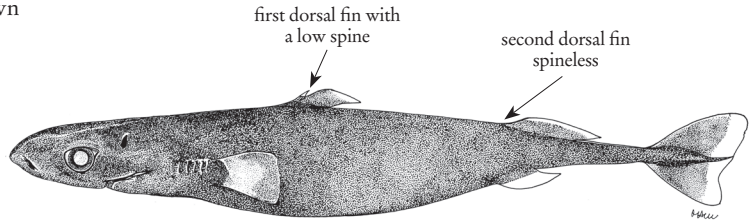
Squaliolus laticaudus Smith & Radcliffe, 1912

Spined pigmy shark

Other characters: body dark brown to black, with light fin margins.



lower teeth



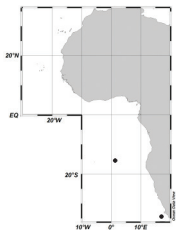
Size: 25.0 cm TL

- 5a. Second dorsal-fin base at least twice as long as first dorsal-fin base *Euprotomicrus bispinatus*

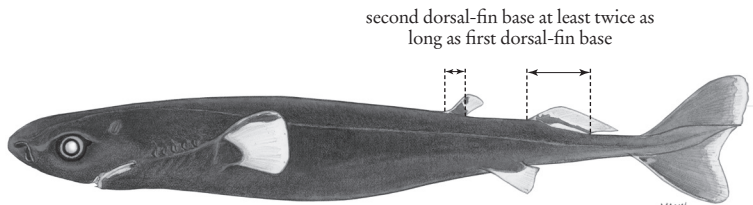
Euprotomicrus bispinatus (Quoy & Gaimard, 1824)

Pigmy shark

Other characters: body colour blackish with conspicuously light-edged fins.



lower tooth



Size: 27.0 cm TL

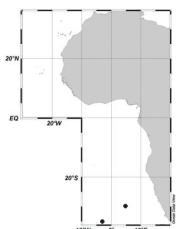
- 5b. Second dorsal-fin base as long as first dorsal-fin base or shorter *Heteroscymnoides marleyi*

Heteroscymnoides marleyi Fowler, 1934

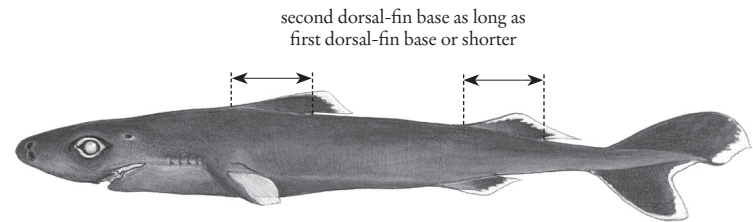
Longnose pigmy shark

Other characters: body colour brown with conspicuous light and dark banded fin margins.

Remarks: a rare species known from six individuals.



lower tooth



Size: 36.5 cm TL

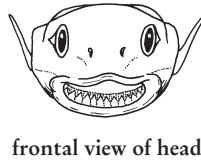
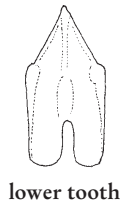
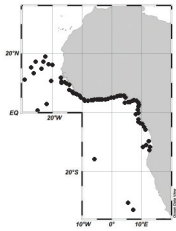
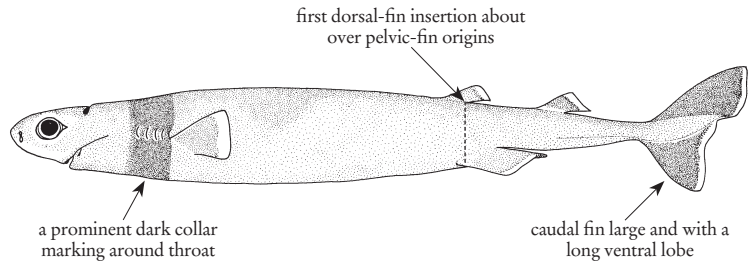
KEY TO THE SPECIES OF *ISISTIUS* OCCURRING IN THE AREA

1a. Lower teeth in 25-32 rows; caudal fin large and with a long ventral lobe; a prominent dark collar marking around throat. *Isistius brasiliensis*

Isistius brasiliensis (Quoy & Gaimard, 1824)

Cookie cutter shark

Other characters: body colour pale brown above, becoming lighter below; fins dark, but with pale to translucent edges.



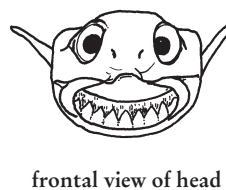
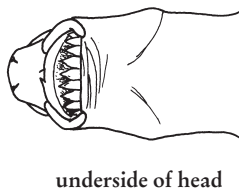
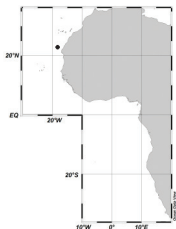
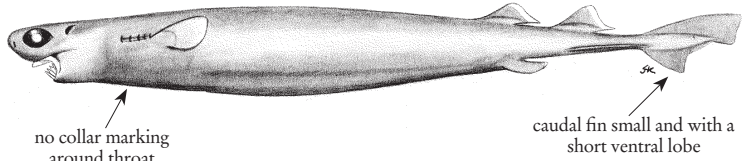
Size: 56.0 cm TL

1b. Lower teeth in 17-19 rows; caudal fin small and with a short ventral lobe; no collar marking on throat. *Isistius plutodus*

Isistius plutodus Garrick & Springer, 1964

Largetooth cookiecutter shark

Other characters: body colour plain dark brown, with translucent margins on the fins and sparsely scattered light-emitting photophores on the belly.



Size: 42.0 cm TL

ETMOPTERIDAE

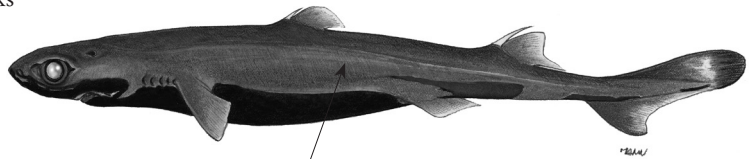
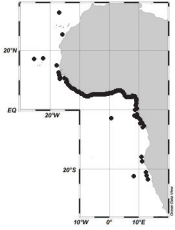
Lantern sharks

Note: one mesopelagic lantern shark known to occur in the area.

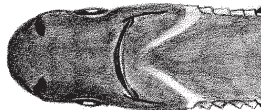
Etmopterus pusillus (Lowe, 1839)

Smooth lanternshark

Other characters: caudal photomarks present and inconspicuous.



dermal denticles on sides of body truncated, without cusps; body with a smooth texture



underside of head



dermal denticles
(dorsal view)



upper and lower tooth

Size: 50.0 cm TL

ANGUILLIFORMES

Eels

KEY TO THE FAMILIES OF ANGUILLIFORMES OCCURRING IN THE AREA

- 1a. Anus far forward, either under pectoral fin or less than 1 head length behind it; jaws and snout produced into a long, non-occlusible beak in females and immatures (Fig. 1a), short in mature males (Fig. 1b) **Nemichthyidae (p. 22)**
- 1b. Anus far behind pectoral fin (Figs. 2 & 3) → 2

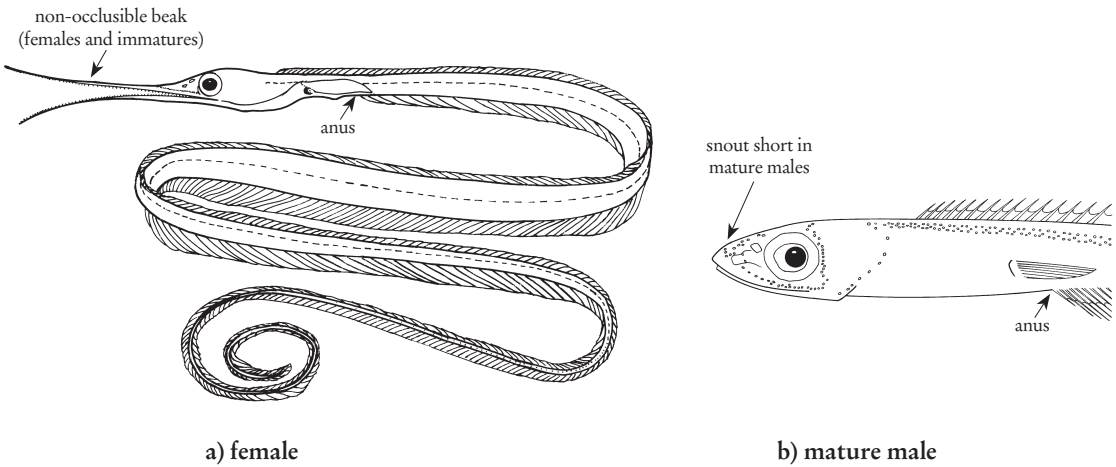


Fig. 1 Nemichthyidae

- 2a. Snout either short with constricted neck (*Derichthys serpentinus*) or markedly elongate with posterior nostrils located far forward (*Nessorhamphus*); lateral line complete, pore system on head well-developed (Figs. 2a & 2b) **Derichthyidae (p. 20)**

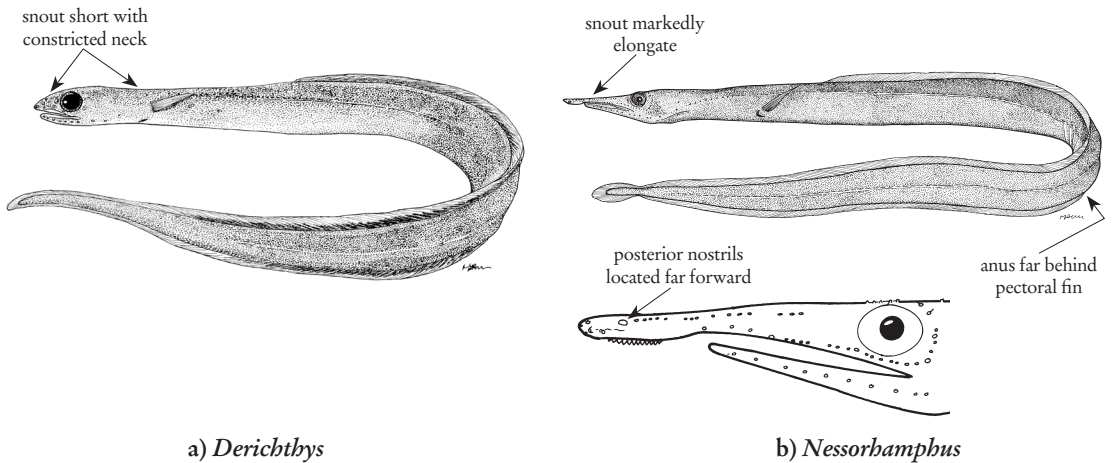


Fig. 2 Derichthyidae

2b. Snout and jaws elongate and pointed; anterior and posterior nostrils close together, immediately in front of eye; lateral line reduced, pores on body absent and on head limited to 3 small pores between anterior and posterior nostrils (Fig. 3) **Serrivomeridae (p. 25)**

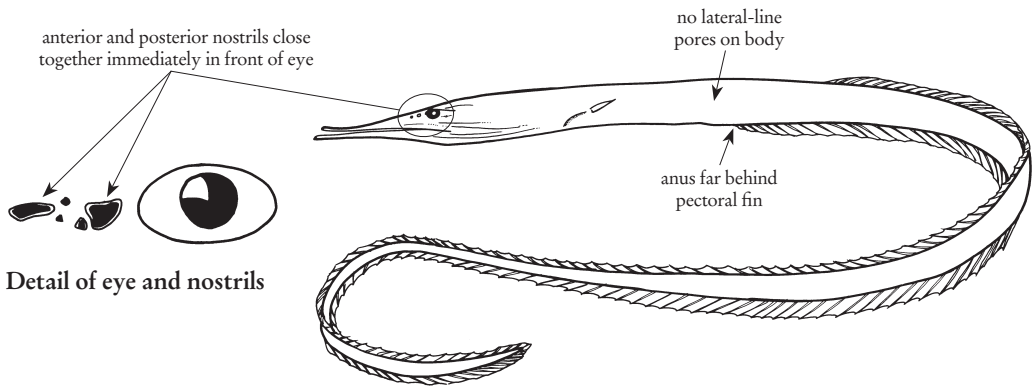


Fig. 3 Serrivomeridae

DERICHTHYIDAE

Longneck eels

**KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF
DERICHTHYIDAE OCCURRING IN THE AREA**

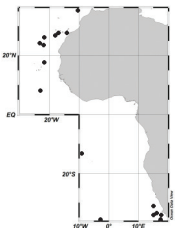
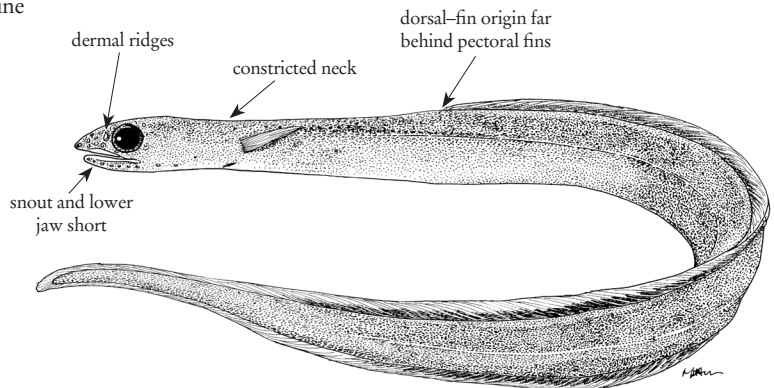
1a. Snout and lower jaw short, snout approximately equal to eye diameter; tip of snout not produced and not spatulate, extends beyond lower jaw by a distance less than eye diameter . . . *Derichthys serpentinus*

1b. Snout and lower jaw long, 3-6 times eye diameter; tip of snout produced and spatulate, extends beyond lower jaw by a distance equal to or greater than eye diameter *Nessorhamphus* (p. 21)

Derichthys serpentinus Gill, 1884

Narrownecked oceanic eel

Other characters: black in colour with lateral-line pores light; lateral-line pores before anus about 55.



Size: 40.0 cm TL

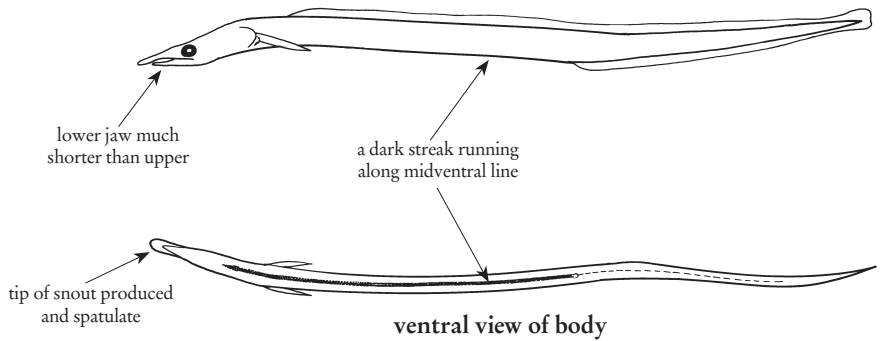
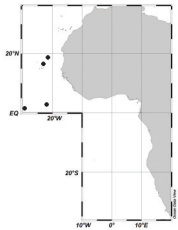
KEY TO THE SPECIES OF *NESSORHAMPHUS* OCCURRING IN THE AREA

1a. Snout relatively short, 3-4 times eye diameter; a dark streak running along midventral line
 *Nessorhamphus danae*

Nessorhamphus danae Schmidt, 1931

Blackbelly spoonbill eel

Other characters: eyes pigmented.



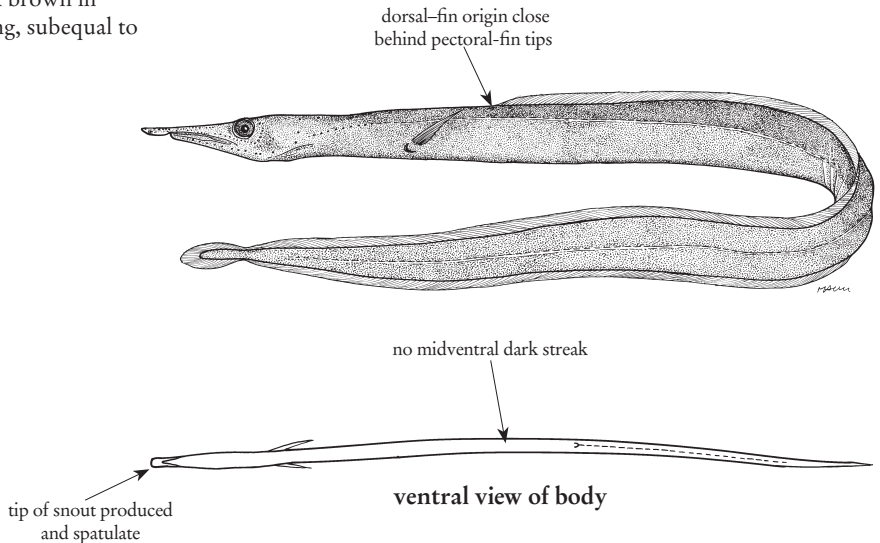
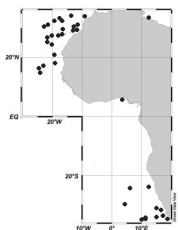
Size: 30.0 cm TL

1b. Snout longer, about 6 times eye diameter; midventral line without a dark streak.
 *Nessorhamphus ingolfianus*

Nessorhamphus ingolfianus (Schmidt, 1912)

Duckbill oceanic eel

Other characters: dark brown in colour; pectoral fins long, subequal to snout; eyes pigmented.



Size: 60.0 cm TL

NEMICHTHYIDAE

Snipe eels

KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF NEMICHTHYIDAE OCCURRING IN THE AREA

- 1a. Caudal region extremely elongated and thread-like, a distinct caudal fin absent (Fig. 1a); 3 rows of lateral-line pores (Fig. 1b); no dermal ridges on head (Fig. 1c) *Nemichthys* (p. 24)
- 1b. Caudal region not thread-like, a small caudal fin present (Fig. 2a); 1 row of lateral-line pores (Fig. 2b); small, longitudinal dermal ridges on head (Fig. 2c) → 2

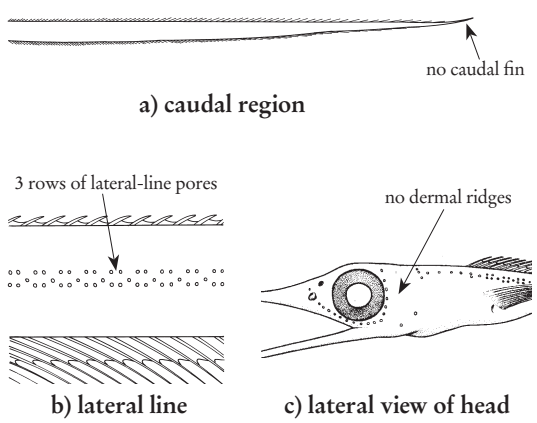


Fig. 1 *Nemichthys*

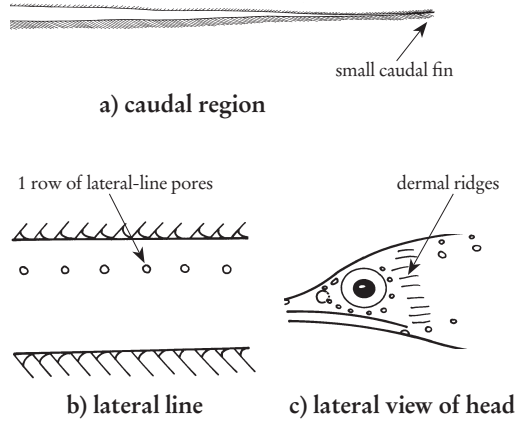


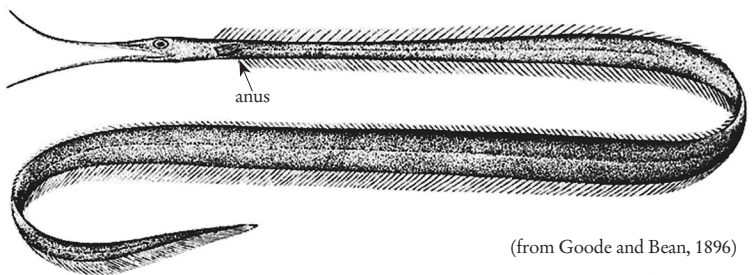
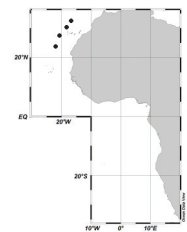
Fig. 2 *Labichthys*

- 2a. Anus located under pectoral fin *Labichthys carinatus*
- 2b. Anus located behind pectoral fin (see illustration of *Avocettina acuticeps*, p. 23) *Avocettina* (p. 23)

Labichthys carinatus Gill & Ryder, 1883

Shortgut fintail snipe eel

Other characters: body uniformly light brown; tube of anterior nostrils dark.



(from Goode and Bean, 1896)

Size: 80.0 cm TL

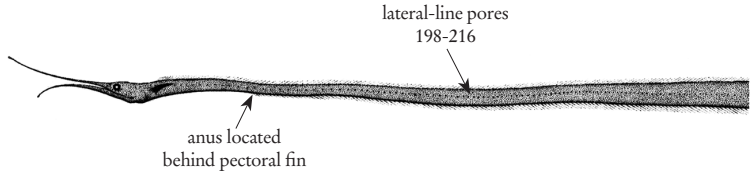
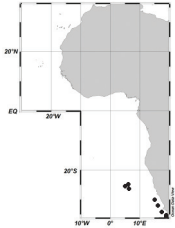
KEY TO THE SPECIES OF *AVOCETTINA* OCCURRING IN THE AREA

1a. Lateral-line pores 198-216 *Avocettina acuticeps*

Avocettina acuticeps (Regan, 1916)

Southern fintail snipe eel

Other characters: body dark brown to black in colour.



posterior portion of body

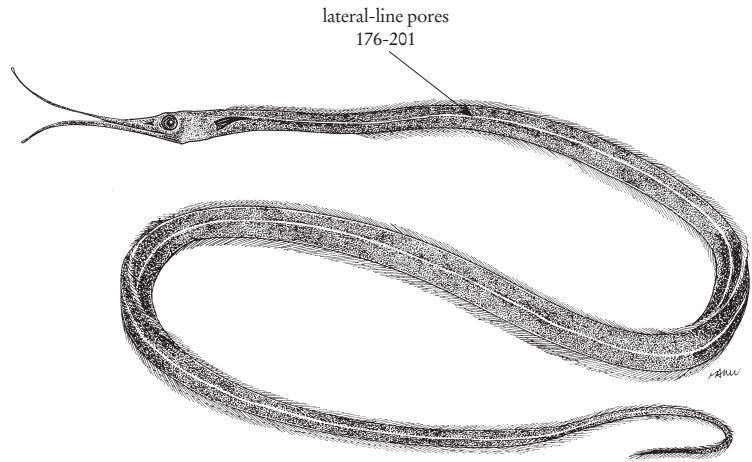
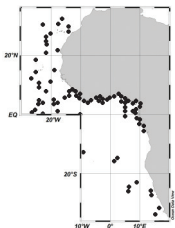
Size: 77.0 cm TL

1b. Lateral-line pores 176-201 *Avocettina infans*

Avocettina infans (Günther, 1878)

Avocet snipe eel

Other characters: body brown, with an intensification of pigment along lateral line; mature males somewhat darker.



Size: 80.0 cm TL

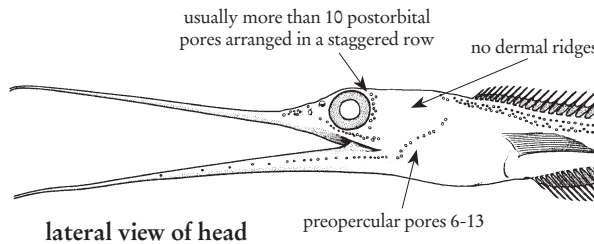
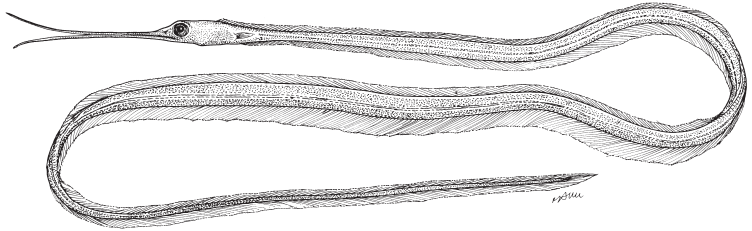
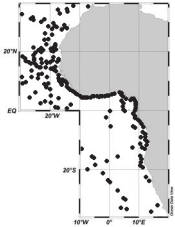
KEY TO THE SPECIES OF *NEMICHTHYS* OCCURRING IN THE AREA

1a. Body dark brown or counter-shaded; postorbital pores 6-17, usually more than 10, arranged in a staggered row; preopercular pores 6-13 *Nemichthys scolopaceus*

Nemichthys scolopaceus Richardson, 1848

Slender snipe eel

Other characters: anal fin and tips of pectoral fins almost black.



lateral view of head

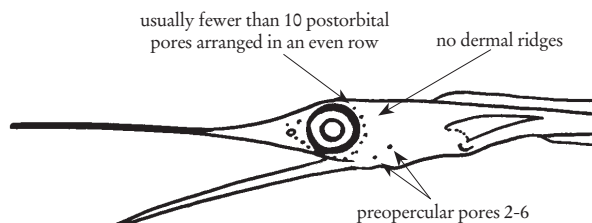
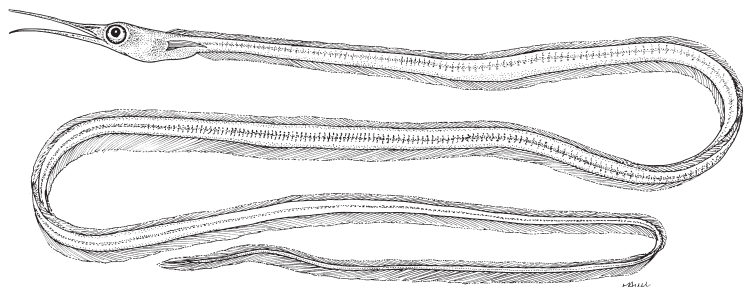
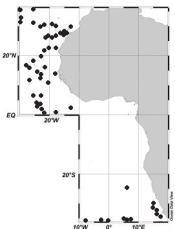
Size: 130.0 cm TL

1b. Body pale with a cluster of black spots below stomach and dark subcutaneous vertical bars between vertebrae; postorbital pores 5-14, usually fewer than 10, arranged in an even row; preopercular pores 2-6. *Nemichthys curvirostris*

Nemichthys curvirostris (Strömman, 1896)

Pale threadtail snipe eel

Other characters: body pale with large melanophores on belly and subcutaneous, vertical, black bars between vertebrae.



lateral view of head

Size: 143.0 cm TL

SERRIVOMERIDAE

Sawtooth eels

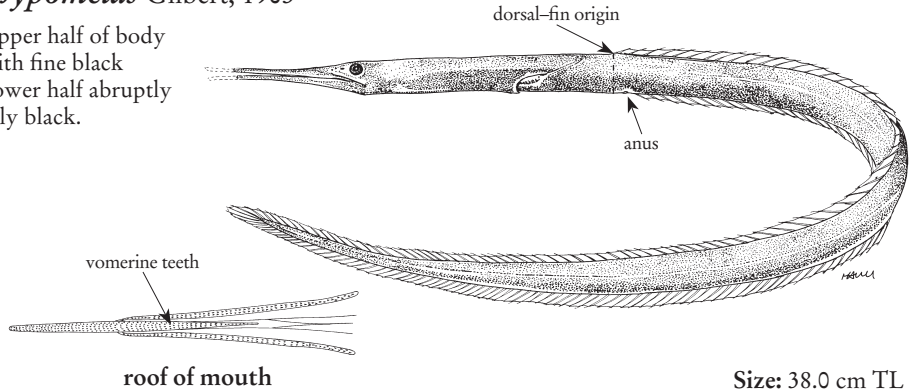
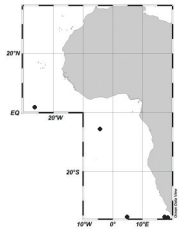
KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF SERRIVOMERIDAE OCCURRING IN THE AREA

- 1a. Dorsal-fin origin over or slightly ahead of anus; vomerine teeth small and granular and in several rows *Stemonidium hypomelas*
- 1b. Dorsal-fin origin behind anus; vomerine teeth enlarged and forming a saw-toothed row *Serrivomer* (p. 25)

Stemonidium hypomelas Gilbert, 1905

Other characters: upper half of body light grey covered with fine black specks of pigment; lower half abruptly jet black; head entirely black.

Black serrivomerid eel



Size: 38.0 cm TL

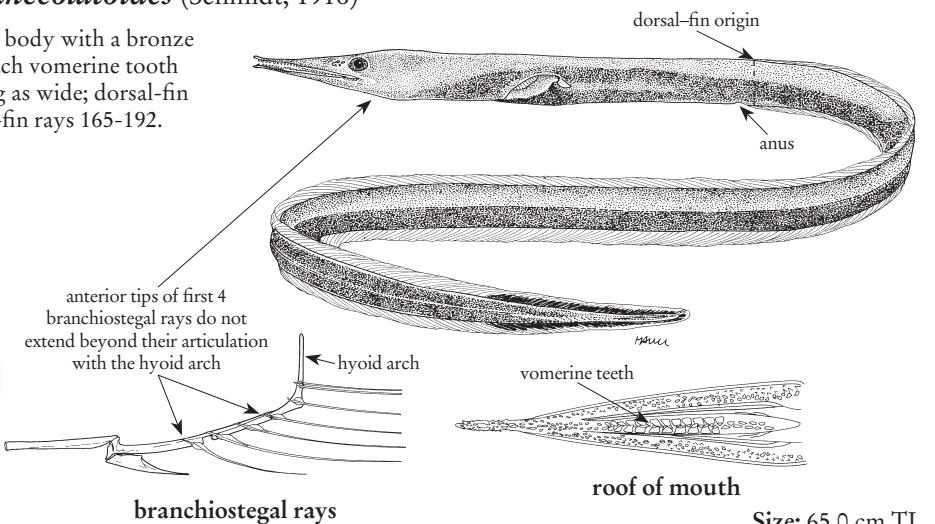
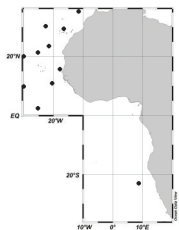
KEY TO THE SPECIES OF SERRIVOMER OCCURRING IN THE AREA

- 1a. Anterior tips of first 4 branchiostegal rays do not extend beyond their articulation with the hyoid arch. *Serrivomer lanceolatoides*
- 1b. Anterior tips of first 4-5 branchiostegal rays extend beyond their articulation with the hyoid arch → 2

Serrivomer lanceolatoides (Schmidt, 1916)

Other characters: body with a bronze epidermal layer; each vomerine tooth about twice as long as wide; dorsal-fin rays 175-200; anal-fin rays 165-192.

Bronze sawtooth eel



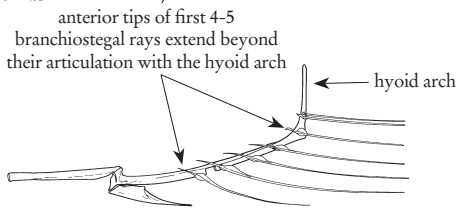
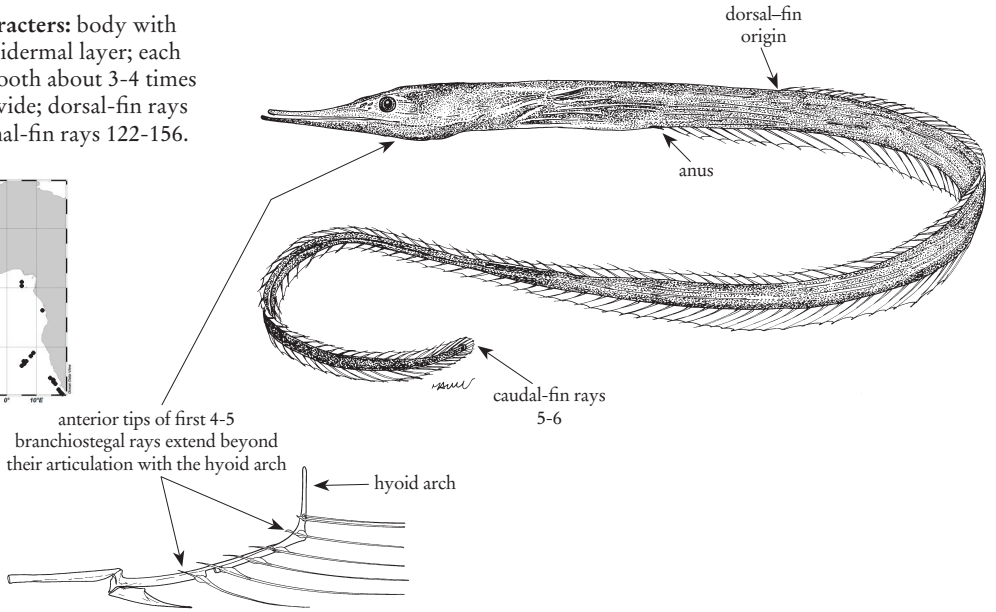
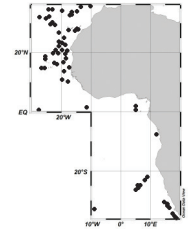
Size: 65.0 cm TL

2a. Caudal-fin rays 5-6. *Serrivomer beanii*

Serrivomer beanii Gill & Ryder, 1883

Bean's sawtooth eel

Other characters: body with a silvery epidermal layer; each vomerine tooth about 3-4 times as long as wide; dorsal-fin rays 142-173; anal-fin rays 122-156.



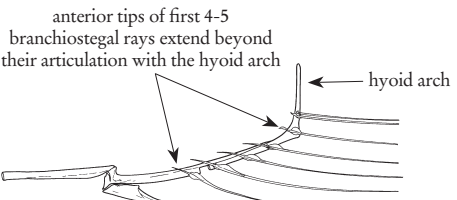
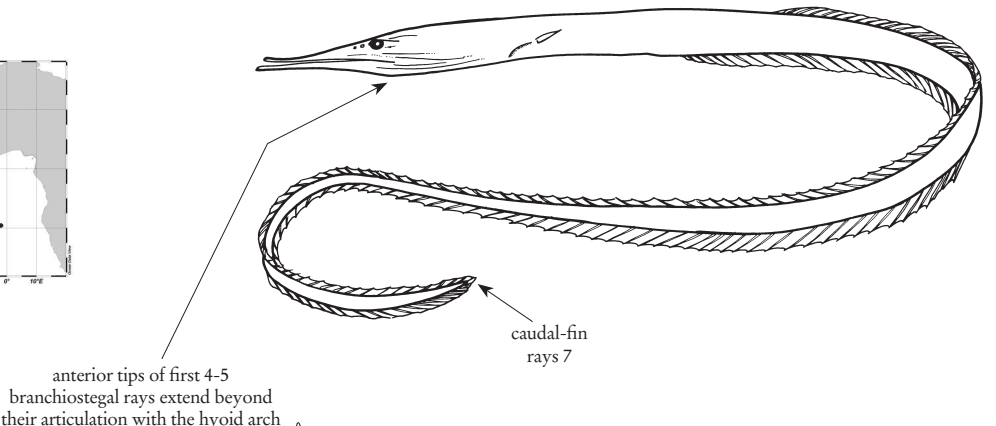
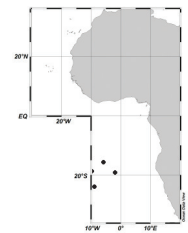
branchiostegal rays

Size: 75.0 cm TL

2b. Caudal-fin rays 7. *Serrivomer schmidti*

Serrivomer schmidti Bauchot, 1953

Other characters: no information.



branchiostegal rays

Size: 67.3 cm TL

SACCOPHARYNGIFORMES

Bobtail and Pelican eels

KEY TO THE FAMILIES OF SACCOPHARYNGIFORMES OCCURRING IN THE AREA

- 1a. Jaws long and slender, diverging toward tips; body short, truncated, arrow-like . . . Cyematidae (p. 27)
- 1b. Jaws extremely long, not diverging toward tip; body elongate Eurypharyngidae (p. 27)

CYEMATIDAE

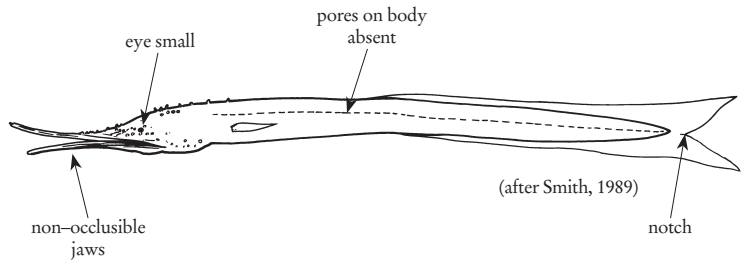
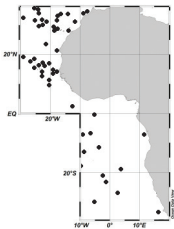
Bobtail eels

Cyema atrum Günther, 1878

Bobtail eel

Other characters: black in colour.

Remarks: two species in this family. *Neocyema erythrosoma* is also known to occur in the area but it mostly has a bathypelagic distribution.



Size: 15.0 cm TL

EURYPHARYNGIDAE

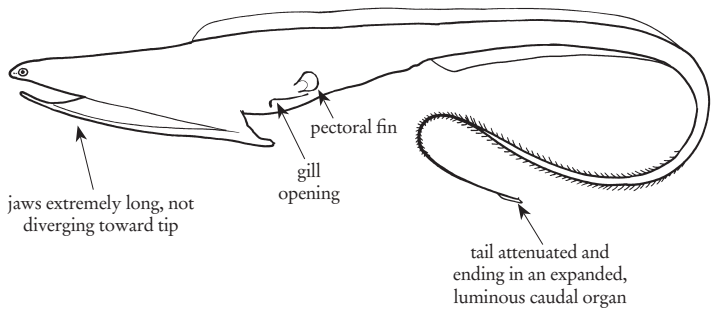
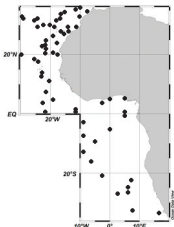
Pelican eels

Eurypharynx pelecanoides Vaillant, 1882

Pelican eel

Other characters: colour black with no markings.

Remarks: a single species in this family. *E. pelecanoides* could be confused with members of the bathypelagic family Saccopharyngidae (genus *Saccopharynx*). In *Saccopharynx* the dorsal-fin origin is far behind the pectoral fin.



Size: 180.0 cm TL

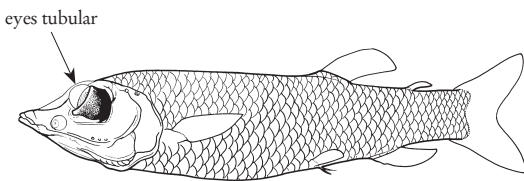
OSMERIFORMES

Barreleyes, Deepsea smelts, Pencilsmelts

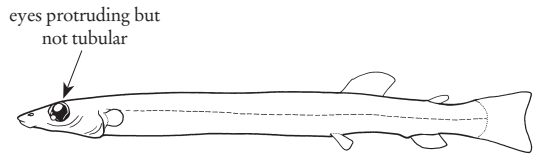
KEY TO THE FAMILIES OF OSMERIFORMES OCCURRING IN THE AREA

1a. Eyes tubular in all but one species (*Bathylchynops brachyrhynchus* [p. 38], which has protruding non-tubular eyes), directed anteriorly, dorsally or dorsolaterally (Figs. 1a & 1b) . . . **Opisthoproctidae (p. 37)**

1b. Eyes not tubular in all but one species (**Microstomatidae: *Xenophthalmichthys danae***)(Figs. 2, 3a & 3b) → 2



a) *Winteria telescopa*



b) *Bathylchynops brachyrhynchus*

Fig. 1 Opisthoproctidae

2a. Pectoral-fin base low on body; anal-fin rays 10-28 (Fig. 2). **Bathylagidae (p. 30)**

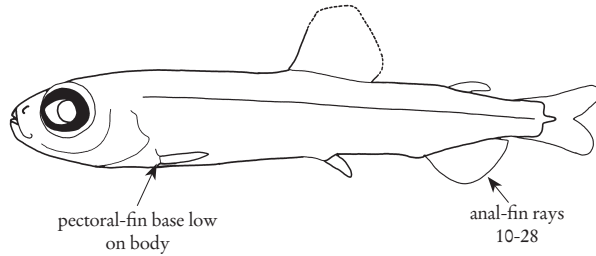
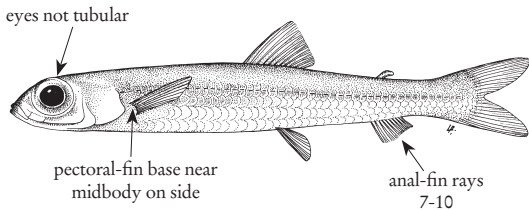
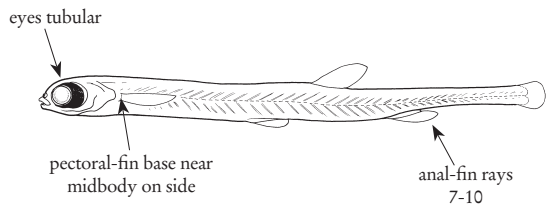


Fig. 2 Bathylagidae

2b. Pectoral-fin base near midbody on side; anal-fin rays 7-10 (Figs. 3a & 3b) . . . **Microstomatidae (p. 33)**



a) *Nansenia oblita*



b) *Xenophthalmichthys danae*

Fig. 3 Microstomatidae

BATHYLAGIDAE

Deepsea smelts

KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF BATHYLAGIDAE OCCURRING IN THE AREA

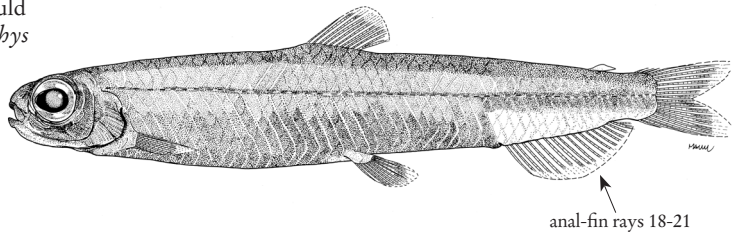
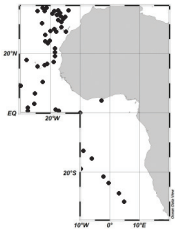
- 1a. Body light in colour; appears scaleless but light-colored scale pockets may be present. → 2
- 1b. Body dark in colour, scaled or with ragged, dark scale pockets (be aware that *Bathylagus* species may lose most of their scale pockets in the trawls) → 4
- 2a. Anal-fin rays 18-21; vertebrae 48-53 *Dolicholagus longirostris*
- 2b. Anal-fin rays fewer than 17; vertebrae 46 or fewer → 3

Dolicholagus longirostris (Maul, 1948)

Longsnout blacksmelt

Other characters: lateral line indistinct.

Remarks: despite its common name, head and body are silver in fresh specimens. Records south of 20°S could be misidentifications of *Bathylagichthys* species.



Size: 17.5 cm SL

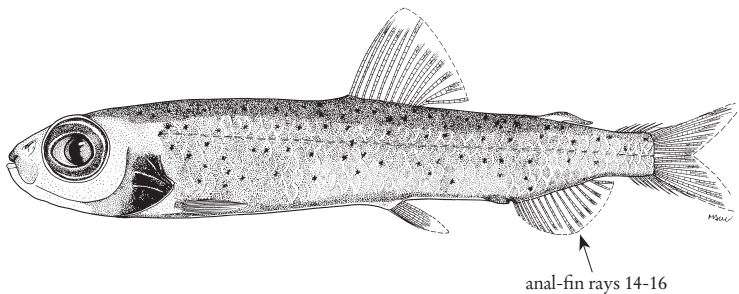
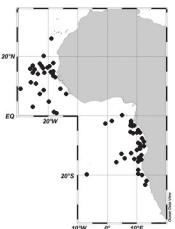
- 3a. Anal-fin rays 14-16; about 4 rudimentary gill raker-like structures on inner surface of first epibranchial; pyloric caeca 8 or fewer *Bathylagoides argyrogaster*
- 3b. Anal-fin rays 10-13; no rudimentary gill raker-like structures on inner surface of first epibranchial; pyloric caeca 10 or more *Bathylagichthys* (p. 31)

Bathylagoides argyrogaster (Norman, 1930)

Silver deepsea smelt

Other characters: no information.

Remarks: records south of 20°S could be misidentifications of *Bathylagichthys* species.



(after Kobylansky, 1985)

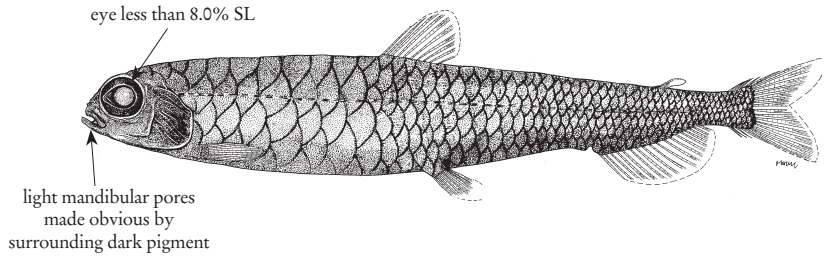
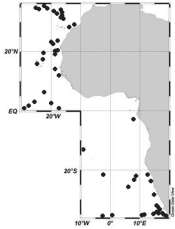
Size: 11.0 cm SL

- 4a. Eye diameter less than 8.0% Standard Length; light mandibular pores made obvious by surrounding dark pigment; about 50 lateral-line scales or scale pockets *Melanolagus bericoides*
 4b. Eye diameter more than 8.5% Standard Length; mandibular pores not obvious or outlined by dark pigment; about 30-40 lateral-line scales *Bathylagus* (p. 33)

Melanolagus bericoides (Borodin, 1929)

Bigscale deepsea smelt

Other characters: head and body black when fresh; scale pocket markings jet black.



Size: 20.0 cm SL

KEY TO THE SPECIES OF *BATHYLAGICHTHYS* OCCURRING IN THE AREA

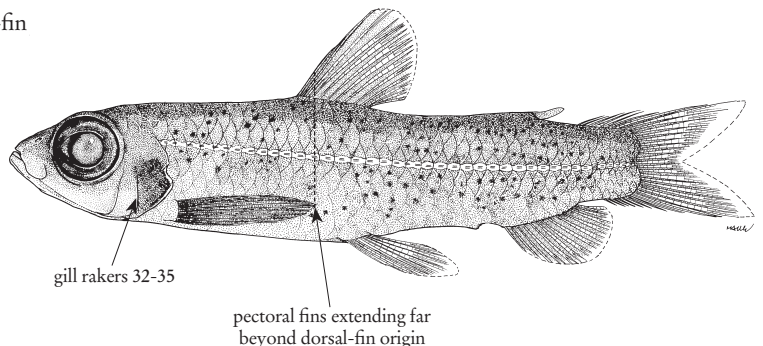
Note: only adult specimens (> 8.0 cm SL) have all the characters required by the key to achieve correct identification.

- 1a. Pectoral fins extending far beyond dorsal-fin origin; gill rakers 32-35; vertebrae 42
 *Bathylagichthys longipinnis*
 1b. Pectoral fins not extending beyond dorsal-fin origin; gill rakers less than 32; vertebrae more than 42 → 2

Bathylagichthys longipinnis (Kobyliansky, 1985)

Other characters: body depth at dorsal-fin origin 18-23% SL; dorsal-fin base longer than anal-fin base.

Remarks: not yet recorded in the area; nearest record at 33.4°S, 13.1°E.



Size: 12.2 cm SL

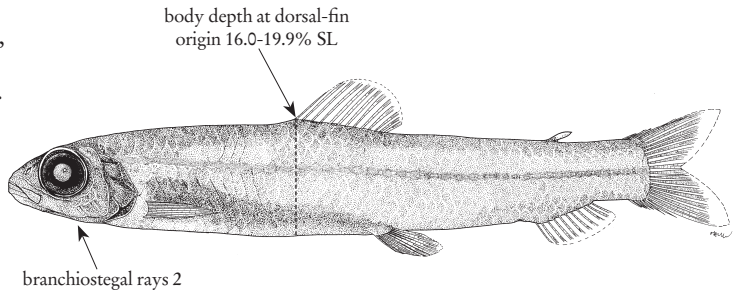
- 2a. Body depth at dorsal-fin origin 16.0-19.9% SL; vertebrae 43-45 (usually 44) *Bathylagichthys kobylianskyi*

 2b. Body depth at dorsal-fin origin less than 16.0% SL; vertebrae usually more than 45 → 3

Bathylagichthys kobylianskyi Gon & Stewart, 2014

Other characters: colour when fresh (without scales and skin partially lost), pale brown, darker dorsally, peppered with dark brown dots of various sizes.

Remarks: *B. kobylianskyi* was described from specimens collected off New Zealand. Its presence off South Africa is currently being confirmed (Gon, in prep.).



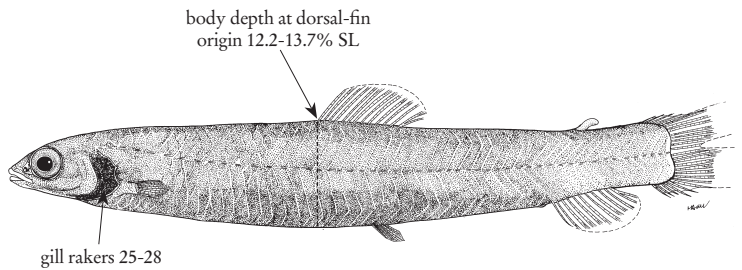
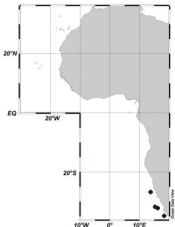
Size: 15.0 cm SL

- 3a. Vertebrae 49-51; gill rakers 25-28 *Bathylagichthys problematicus*

Bathylagichthys problematicus (Lloris & Rucabado, 1985)

Other characters: no information.

Remarks: this species is likely to have 3 branchiostegal rays and not 2 as reported by Lloris and Rucabado, 1985 (Gon, pers. comm.).



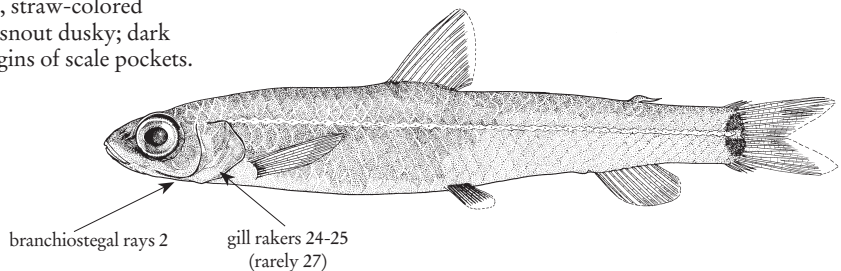
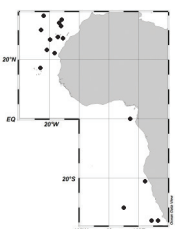
Size: 26.6 cm SL

- 3b. Vertebrae 45-47 (usually 46); gill rakers 24-25 (rarely 27) *Bathylagichthys greyae*

Bathylagichthys greyae (Cohen, 1958)

Grey's deepsea smelt

Other characters: body depth at dorsal-fin origin 12.25-15.7% SL; pale, straw-colored ground colour; opercle and snout dusky; dark pigment distributed on margins of scale pockets.



Size: 16.0 cm SL

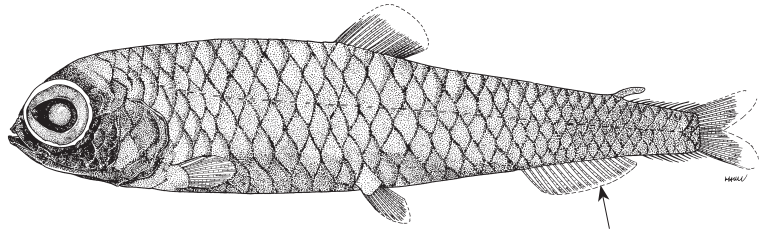
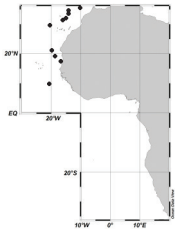
KEY TO THE SPECIES OF *BATHYLAGUS* OCCURRING IN THE AREA

Note: additional *Bathylagus* species, such as *B. niger*, *B. tenuis* and *B. antarcticus* have records from the study area but these have been considered doubtful. Specimens of *Bathylagus* have been collected off Namibia in 2019 and are currently being analyzed by Ofer Gon (SAIAB, Grahamstown, South Africa).

1a. Anal-fin rays 16-19; anal-fin base length 15-19% Standard Length. *Bathylagus euryops*

Bathylagus euryops Goode & Bean, 1896

Other characters: no information.



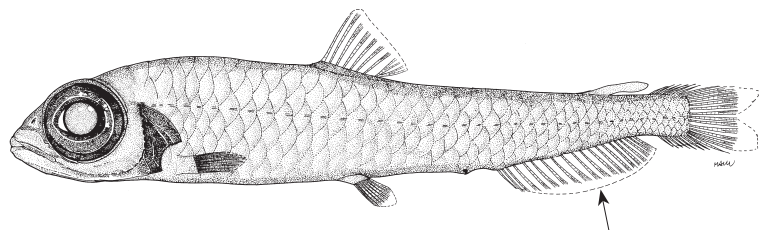
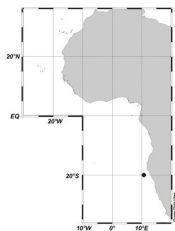
Size: 13.0 cm TL

1b. Anal-fin rays 18-23; anal-fin base length 18-24% Standard Length. *Bathylagus andriashewi*

Bathylagus andriashewi Kobylansky, 1986

Other characters: no information.

Remarks: also recorded in the Mid-Atlantic (4°16'S, 12°4'W).



Size: 8.6 cm SL

MICROSTOMATIDAE

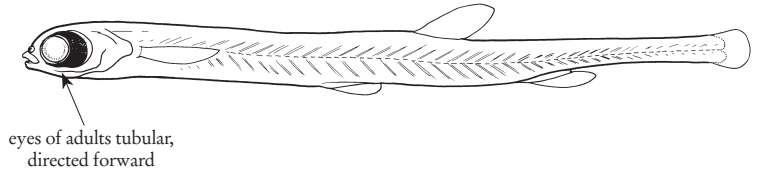
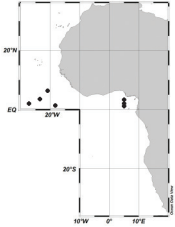
Pencilsmelts

KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF MICROSTOMATIDAE OCCURRING IN THE AREA

- 1a. Eyes of adults tubular, directed forward *Xenophthalmichthys danae*
- 1b. Eyes of adults not tubular, lateral → 2

Xenophthalmichthys danae Regan, 1925

Other characters: lateral-line scales large and arch-like, forming a cylinder over lateral-line organs; colour dark brownish and brassy ventrally and on sides.



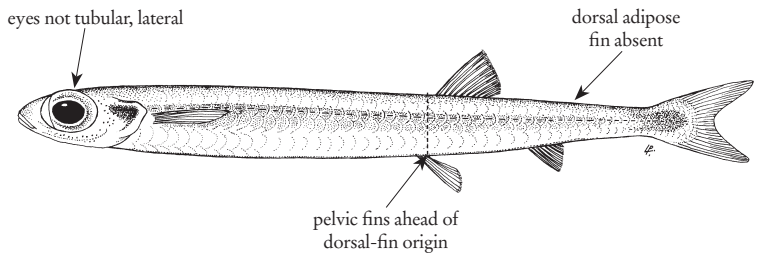
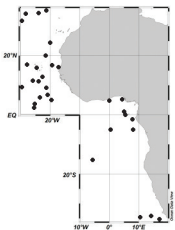
Size: 10.0 cm SL

- 2a. Dorsal adipose fin absent; pelvic-fin insertion ahead of dorsal-fin origin . . . *Microstoma microstoma*
 2b. Dorsal adipose fin present; pelvic-fin insertion behind dorsal-fin origin *Nansenia* (p. 34)

Microstoma microstoma (Risso, 1810)

Slender argentine

Other characters: branchiostegal rays 2; body silvery, darker near tail.



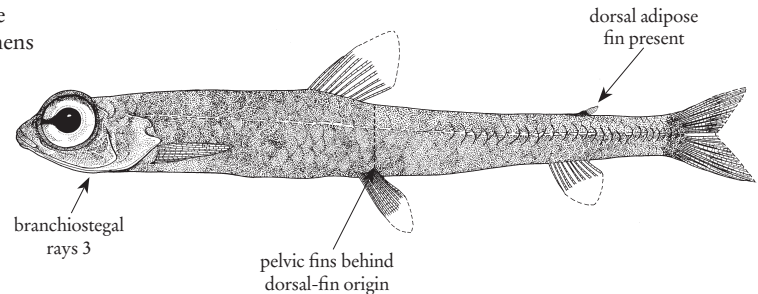
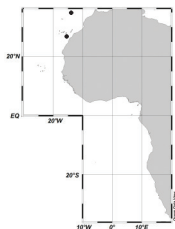
Size: 21.0 cm SL

KEY TO THE SPECIES OF *NANSENIA* OCCURRING IN THE AREA

- 1a. Branchiostegal rays 3 *Nansenia groenlandica*
 1b. Branchiostegal rays 4 → 2

Nansenia groenlandica (Reinhardt, 1840)

Other characters: vertebrae 43-45; gill rakers on first arch 37-45; caudal-fin base and posterior part of caudal peduncle densely pigmented, sparser in specimens larger than 10.0 cm SL

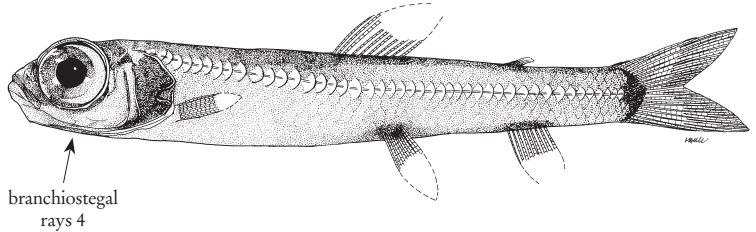
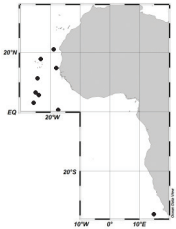


Size: 24.5 cm SL

- 2a. Vertebrae 38-39 *Nansenia pelagica*
 2b. Vertebrae 41 or more → 3

Nansenia pelagica Kawaguchi & Butler, 1984

Other characters: head length 27-30% SL; a dark pigment spot on the gular area that becomes obscure with growth in specimens larger than 9.0 cm SL.

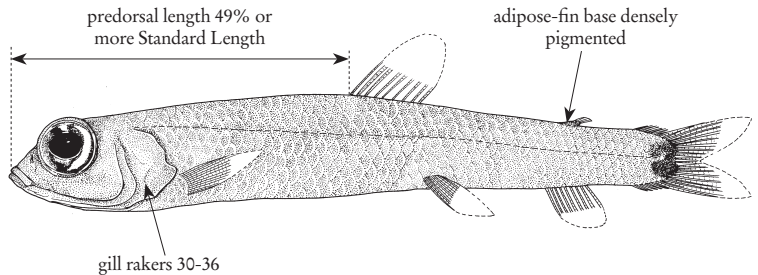
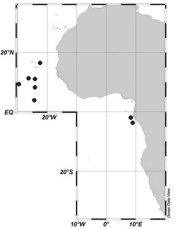


Size: 10.8 cm SL

- 3a. Predorsal length 49% or more Standard Length → 4
 3b. Predorsal length 48% or less Standard Length → 5
 4a. Proximal part of dorsal adipose fin densely pigmented; gill rakers 30-36; vertebrae 41-42.
 *Nansenia atlantica*

Nansenia atlantica Blache & Rossignol, 1962

Other characters: head length 20-26% SL body skin brown and easily rubbed off; caudal-fin base densely pigmented.

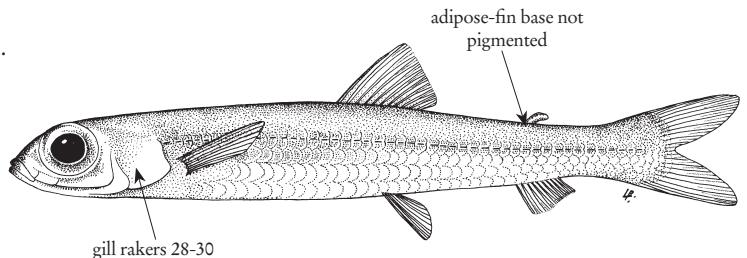
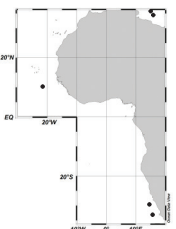


Size: 16.8 cm SL

- 4b. Proximal part of dorsal adipose fin not pigmented; gill rakers 28-30; vertebrae 42-45 *Nansenia oblita*

Nansenia oblita (Facciola, 1887)

Other characters: base of caudal and procurrent caudal-fin rays pigmented.

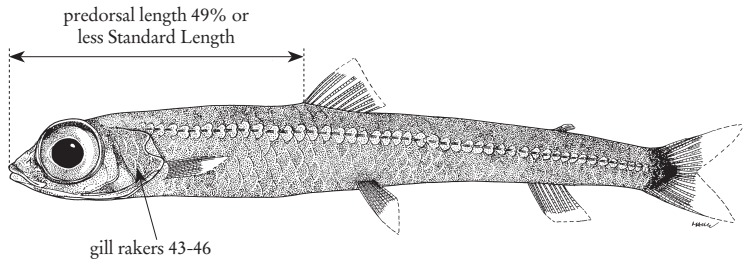
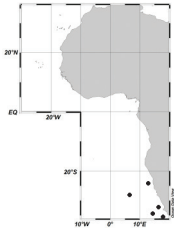


Size: 18.0 cm SL

- 5a. Gill rakers 43-46; vertebrae 42-43 *Nansenia tenera*
 5b. Gill rakers 27 or less; vertebrae 44-50 → 6

Nansenia tenera Kawaguchi & Butler, 1984

Other characters: body surface, especially the ventral side, sparsely covered with guanine, which resembles silver powder; caudal-fin base densely pigmented.

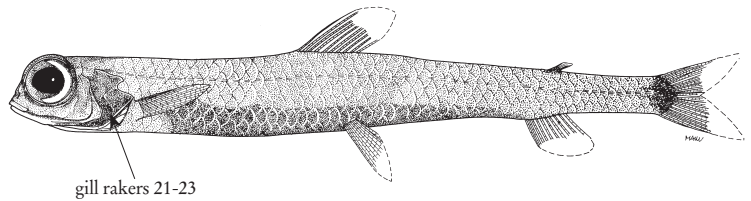
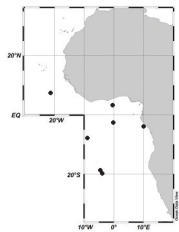


Size: 11.2 cm SL

- 6a. Gill rakers 21-23; vertebrae 44-45 *Nansenia megalopa*

Nansenia megalopa Kawaguchi & Butler, 1984

Other characters: eyes very large, eye diameter to snout length ratio > 2.8 to 1.

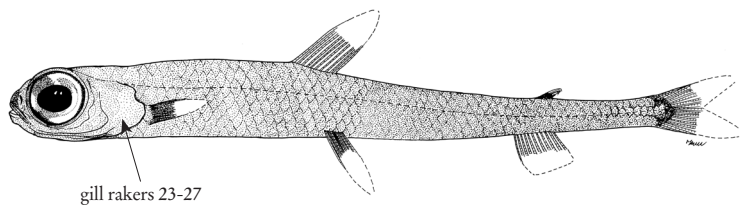
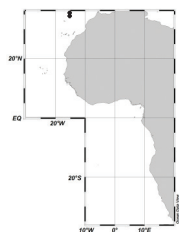


Size: 14.0 cm SL

- 6b. Gill rakers 23-27; vertebrae 47-50 *Nansenia longicauda*

Nansenia longicauda Kawaguchi & Butler, 1984

Other characters: tip of snout, upper jaw, anterior part of gular area, and bases of pelvic and caudal fins densely pigmented.



Size: 13.3 cm SL

OPISTHOPROCTIDAE

Barreleyes (spookfishes)

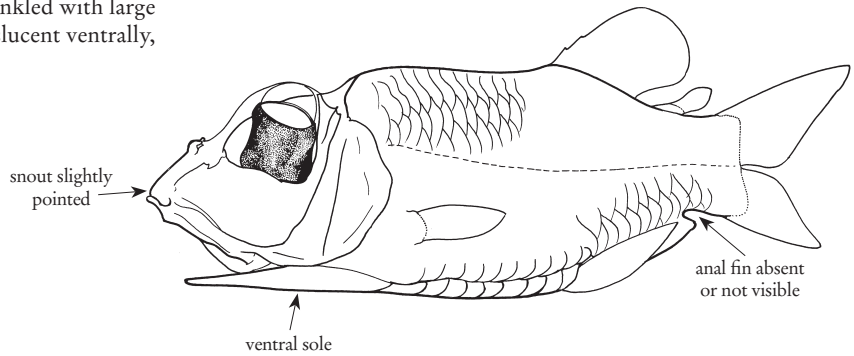
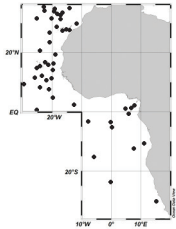
KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF OPISTHOPROCTIDAE OCCURRING IN THE AREA

- 1a. Body laterally compressed and moderately to extremely short → 2
- 1b. Body subcylindrical and elongate → 5
- 2a. Belly with a flattened scaly ventral sole from head to anus; anus behind pelvic-fin bases → 3
- 2b. Belly without ventral sole; anus between pelvic-fin bases → 4
- 3a. Snout slightly pointed, relatively rounded, not protruding into a tube; anal fin retrorse, often absent or not visible. *Opisthoproctus soleatus*

Opisthoproctus soleatus Vaillant, 1888

Barrel-eye

Other characters: sides of body dark; head below and behind eye sprinkled with large melanophores; snout translucent ventrally, transparent dorsally.



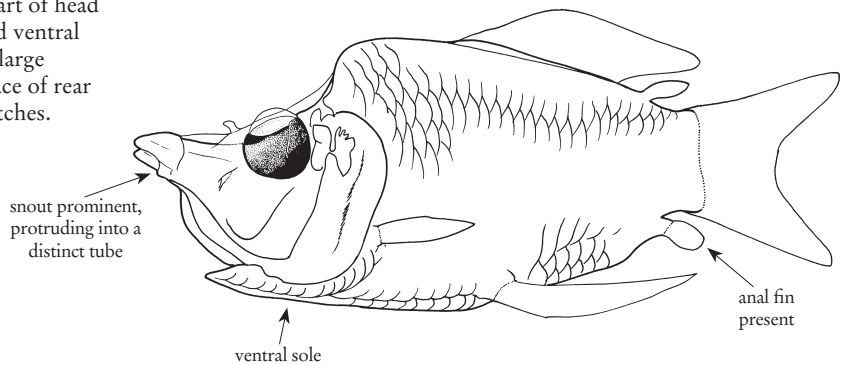
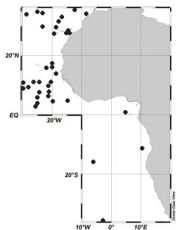
Size: 11.0 cm SL

- 3b. Snout prominent, protruding into a distinct tube; anal fin present, easily discernible, situated on posterior outer margin of sole *Monacoa grimaldii*

Monacoa grimaldii (Zugmayer, 1911)

Mirrorbelly

Other characters: dorsal part of head transparent, ventral part and ventral 2/3 of body peppered with large melanophores; ventral surface of rear part of sole with 4 dark blotches.



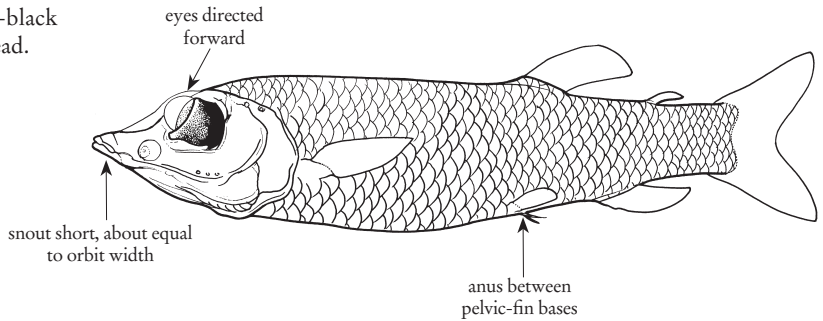
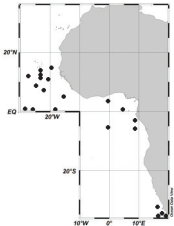
Size: 8.0 cm SL

4a. Snout short, about equal to orbit width; eyes directed forward. *Winteria telescopa*

Winteria telescopa Brauer, 1901

Binocular fish

Other characters: dark blue-black with silvery reflections on head.



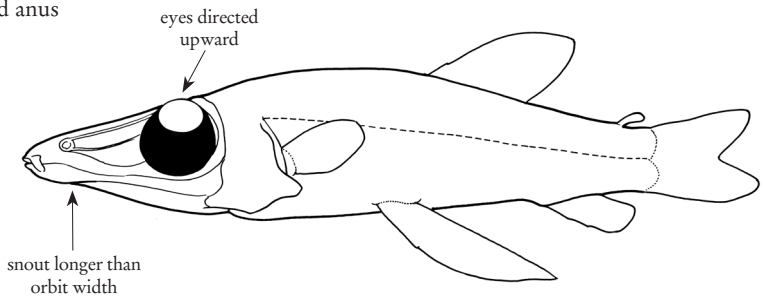
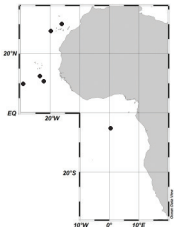
Size: 15.0 cm SL

4b. Snout longer than orbit width; eyes directed upward. *Rhynchobyalus natalensis*

Rhynchobyalus natalensis (Gilchrist & von Bonde, 1924)

Glasshead barreleye

Other characters: scattered melanophores ventrally; pelvic fins and area around anus black; head translucent.



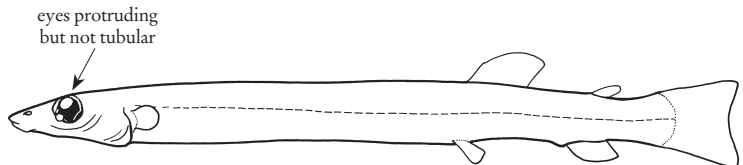
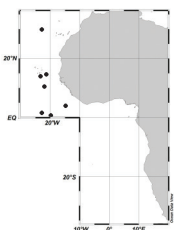
Size: 16.0 cm SL

5a. Eyes protruding but not tubular, with pearly accessory corneal bodies; vomer with a single tooth row; vertebrae 80-84 *Bathylchnops brachyrhynchus*

5b. Eyes tubular, directed upward, without accessory corneal bodies; vomer with two or more tooth rows; vertebrae 40-52 → 6

Bathylchnops brachyrhynchus (Parr, 1937)

Other characters: a dark blotch on caudal-fin base, and 7-8 faint, dusky transverse bars along the sides.



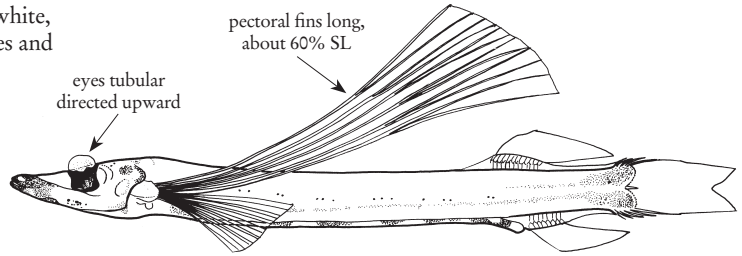
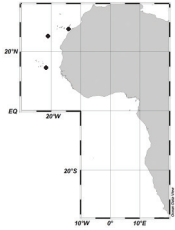
Size: 30.0 cm SL

6a. Pectoral fins long, about 60% Standard Length *Dolichopteroides binocularis*

6b. Pectoral fins short, much less than 60% Standard Length if not damaged *Dolichopteryx* (p. 39)

Dolichopteroides binocularis (Beebe, 1932)

Other characters: body transparent white, dark muzzle, five large ventral blotches and a midline dark chromatophore.



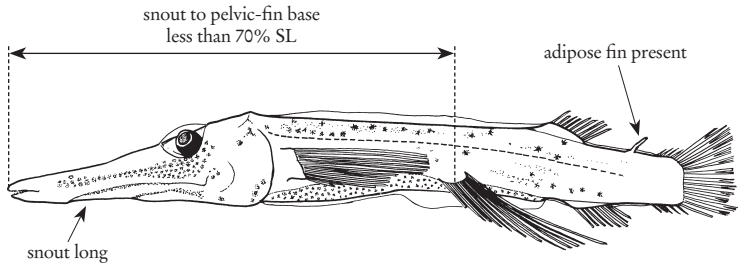
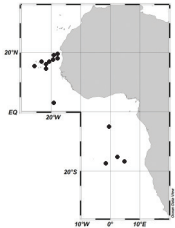
Size: 24.2 cm SL

KEY TO THE SPECIES OF *DOLICHOPTERYX* OCCURRING IN THE AREA

1a. Adipose fin present; snout long, snout to pelvic-fin base less than 70% SL . . . *Dolichopteryx rostrata*

Dolichopteryx rostrata Fukui & Kitagawa, 2006

Other characters: a clear longitudinal suborbital brownish band extending forward from behind posterior margin of orbit to snout tip.

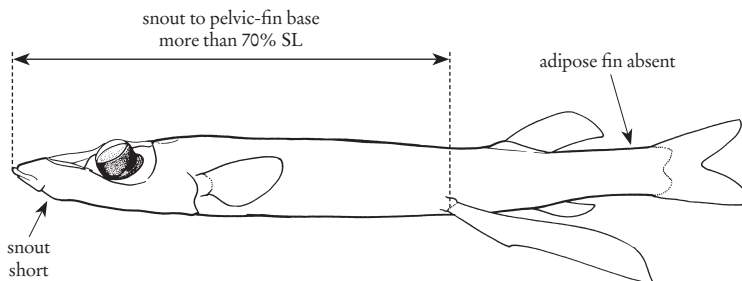
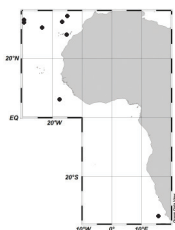


Size: 6.6 cm SL

1b. Adipose fin absent; snout short, snout to pelvic-fin base more than 70% SL . . . *Dolichopteryx longipes*

Dolichopteryx longipes (Vaillant, 1888)

Other characters: line of dark chromatophores along the body below lateral line.



Size: 18.0 cm SL

ALEPOCEPHALIFORMES

Slickheads and Tubeshoulders

KEY TO THE FAMILIES OF ALEPOCEPHALIFORMES OCCURRING IN THE AREA

- 1a. Large luminescent gland just under lateral line and above pectoral fin (secretes luminous fluid through conspicuous tubular opening)(Fig. 1) **Platytroctidae (p. 44)**
- 1b. No large luminescent gland between lateral line and pectoral-fin base (Fig. 2) **Alepocephalidae (p. 41)**

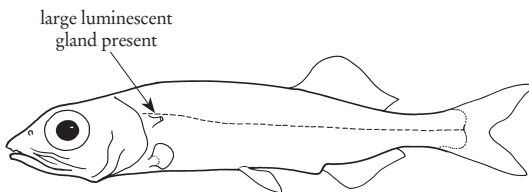


Fig. 1 Platytroctidae

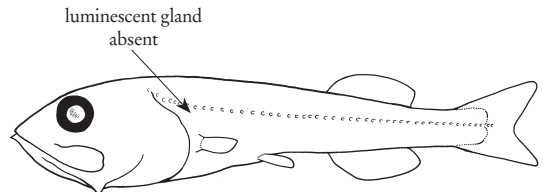
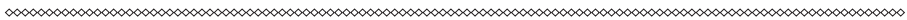


Fig. 2 Alepocephalidae



ALEPOCEPHALIDAE

Slickheads

KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF ALEPOCEPHALIDAE OCCURRING IN THE AREA

- 1a. Body entirely or partly scaled (Fig. 1) **Bajacalifornia (p. 42)**
- 1b. Body completely scaleless (except for ring-like lateral-line scales in *Rouleina*)(Fig. 2) → 2
- 2a. Lateral line in a tube supported by modified ring-like scales (Fig. 2) **Rouleina (p. 43)**
- 2b. Lateral line, if present, without modified scales as above; light organs present on body → 3

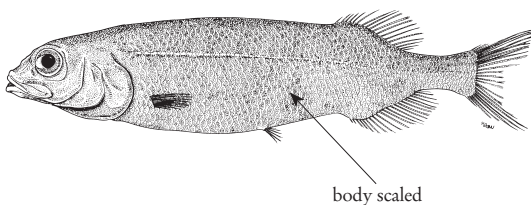


Fig. 1 *Bajacalifornia*

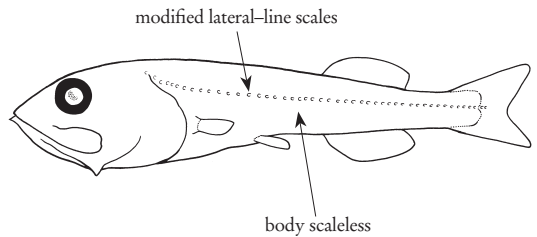


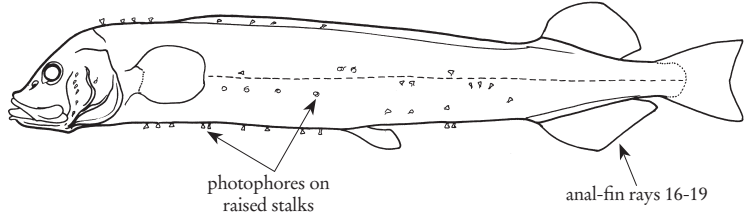
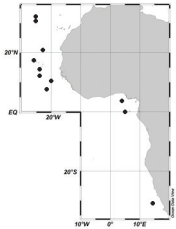
Fig. 2 *Rouleina*

3a. Photophores on raised stalks; ventral outline of upper jaw with obtuse angle at end of premaxilla; anal-fin rays 16-19 *Photostylus pycnopterus*

Photostylus pycnopterus Beebe, 1933

Starry smooth-head

Other characters: no information.



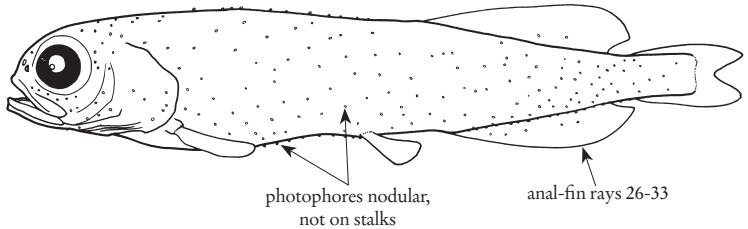
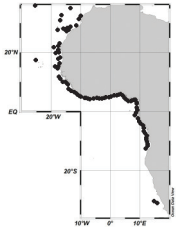
Size: 13.0 cm SL

3b. Photophores nodular, not on stalks; ventral outline of premaxilla and maxilla approximately straight; anal-fin rays 26-33 *Xenodermichthys copei*

Xenodermichthys copei (Gill, 1884)

Bluntsnout smooth-head

Other characters: no information.



Size: 31.0 cm TL

KEY TO THE SPECIES OF *BAJACALIFORNIA* OCCURRING IN THE AREA

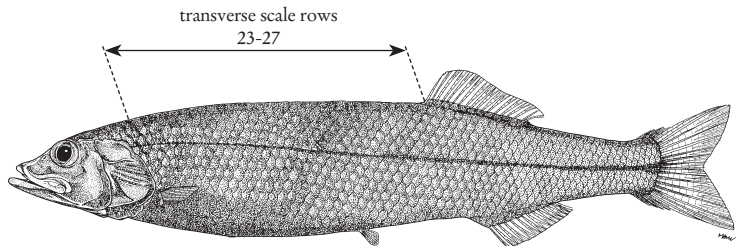
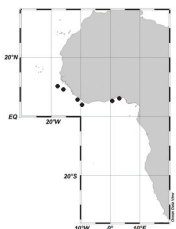
1a. Transverse scale rows from the first lateral-line scale to dorsal-fin origin 23-27; vertebrae 57-60 *Bajacalifornia calcarata*

1b. Transverse scale rows from the first lateral-line scale to dorsal-fin origin 17-25; vertebrae 47-51 → 2

Bajacalifornia calcarata (Weber, 1913)

Brown slickhead

Other characters: no information.



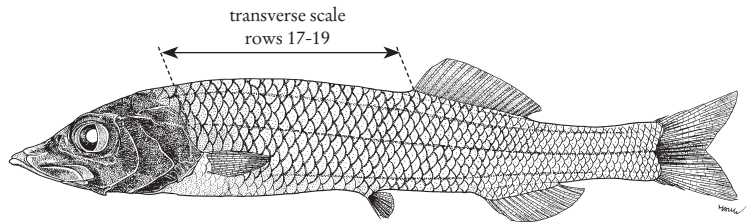
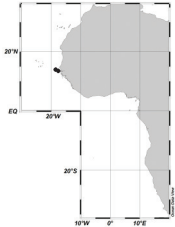
Size: 38.0 cm SL

2a. Scales relatively large, transverse scale rows from the first lateral-line scale to dorsal-fin origin 17-19; gill rakers 4 + 1 + 17 = 22; vertebrae 47 *Bajacalifornia arcylepis*

Bajacalifornia arcylepis Markle & Krefft, 1985

Network slickhead

Other characters: no information



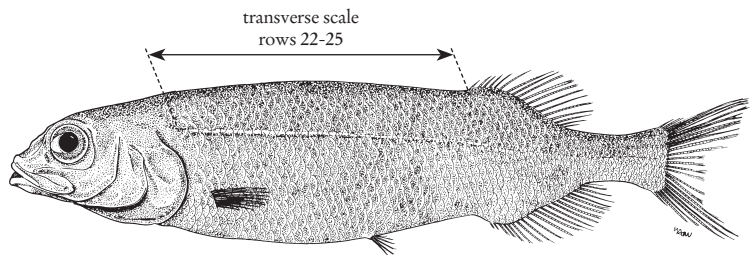
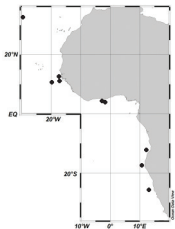
Size: 21.6 cm SL

2b. Scales moderate, transverse scale rows from the first lateral-line scale to dorsal-fin origin 22-25; gill rakers 6-7 + 1 + 18-22 = 25-29; vertebrae 49-51 *Bajacalifornia megalops*

Bajacalifornia megalops (Lütken, 1898)

Bigeye smooth-head

Other characters: no information.



Size: 40.0 cm SL

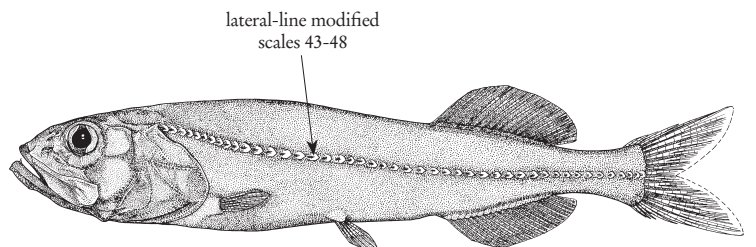
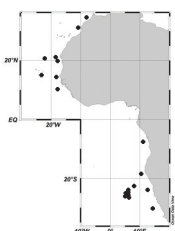
KEY TO THE SPECIES OF *ROULEINA* OCCURRING IN THE AREA

1a. No photophores present; lateral line with 43-48 modified ring-like scales *Rouleina attrita*

Rouleina attrita (Vaillant, 1888)

Softskin smooth-head

Other characters: males with testes ribbonlike with many convolutions in mature specimens but folds always connected, never with separate lobes.



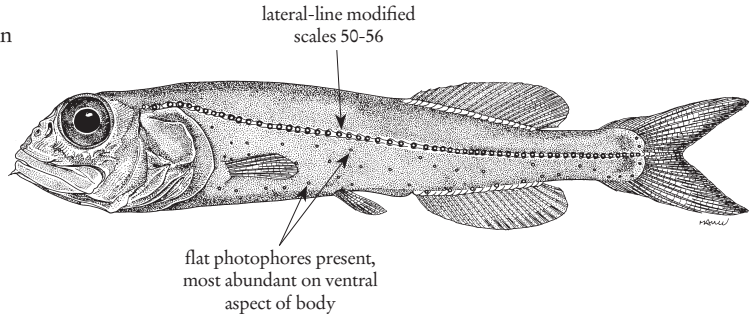
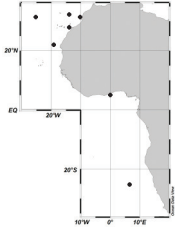
Size: 48.0 cm SL

1b. Flat superficial photophores present, most abundant on ventral aspect of body; lateral line with 50-56 modified ring-like scales. *Rouleina maderensis*

Rouleina maderensis Maul, 1948

Madeiran smooth-head

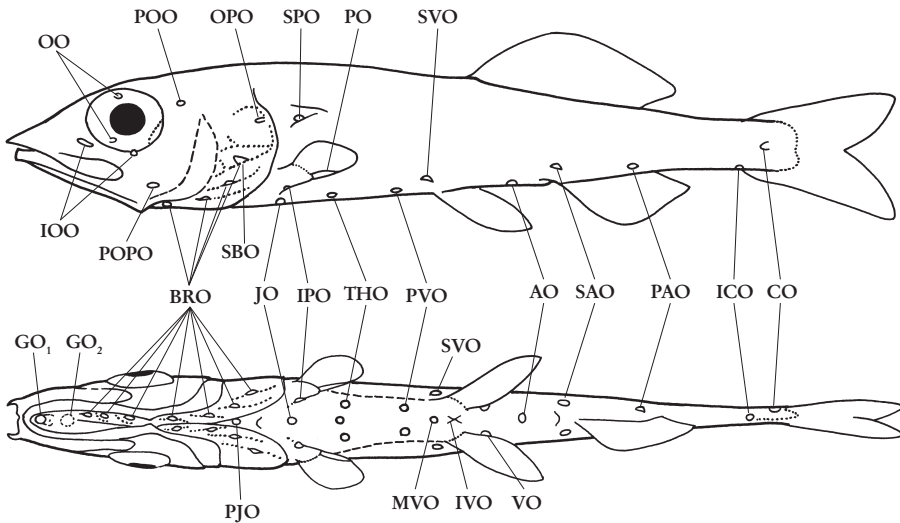
Other characters: males with testes discrete and separate lobes even when immature.



Size: 32.0 cm SL

PLATYTROCTIDAE

Tubeshoulders



- | | | | | |
|--------------------------|----------------------------|---------------------------|--|---|
| AO - anal organ | BRO - branchiostegal organ | CO - caudal organ | GO ₁ - anterior gular organ | GO ₂ - posterior gular organ |
| ICO - infracaudal organ | IOO - infraorbital organ | IPO - infrapectoral organ | IVO - interventral organ | JO - jugular organ |
| MVO - midventral organ | OPO - opercular organ | OO - orbital organ | PAO - postanal organ | PJO - prejugular organ |
| PO - pectoral organ | POO - postorbital organ | POPO - preopercular organ | PVO - preventral organ | SAO - supra-anal organ |
| SBO - subopercular organ | SPO - suprapectoral organ | SVO - supraventral organ | THO - thoracic organ | VO - ventral organ |

General distribution and terminology of the luminous organs (photophores)

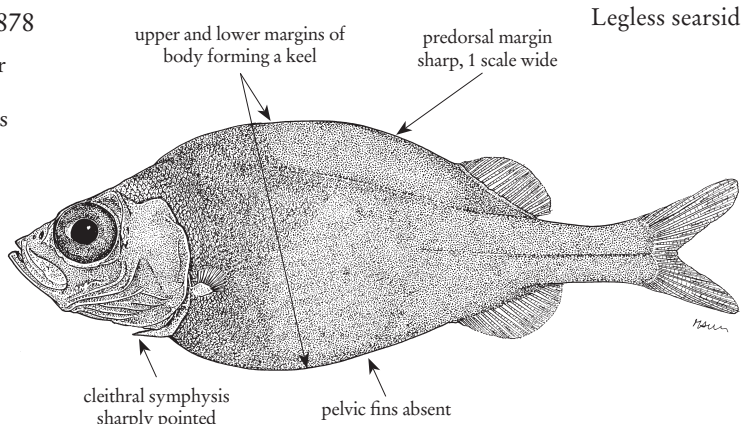
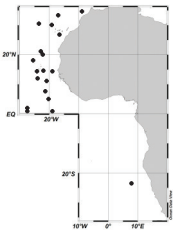
after Matsui and Rosenblatt, 1987

KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF PLATYTROCTIDAE OCCURRING IN THE AREA

- 1a. Pelvic fins absent; body deep (2.5-3.0 in SL) and strongly compressed, upper and lower margins forming a keel; predorsal margin sharp, 1 scale wide *Platytroctes apus*
- 1b. Pelvic fins present; body shallow to deep (3.5-6.5 in SL), moderately compressed to round in cross-section, upper and lower keels shallow or absent; predorsal margin more than 1 scale wide → 2

Platytroctes apus Günther, 1878

Other characters: body flabby; upper and lower edges of caudal peduncle fringed by black presumably luminous tissue; body dark brown; opercular region, shoulder luminous organ, and anus black.



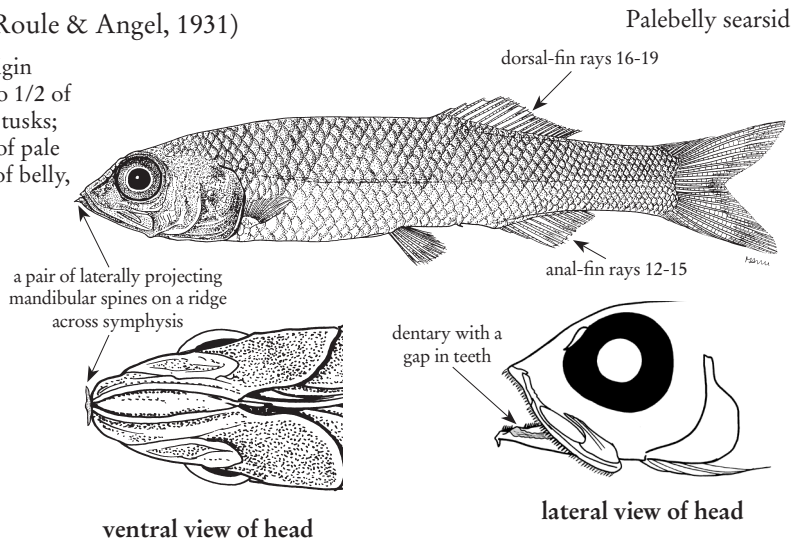
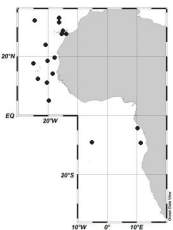
Size: 18.0 cm SL

- 2a. Dentary with a gap in teeth caused by lower jaw ligament; vomerine teeth well separated; palatine teeth lateral to vomerine teeth; a pair of laterally projecting mandibular spines on a ridge across symphysis; scales large, about 50-56 in midline *Barbantus curvifrons*
- 2b. Dentary without a gap in teeth or ligament; vomerine teeth closely spaced; palatine teeth, when present, posterior to vomerine teeth; scales smaller, usually more than 70 in midlateral series (except *Mentodus facilis* with 47-58) → 3

Barbantus curvifrons (Roule & Angel, 1931)

Other characters: dorsal-fin origin ahead of anal-fin origin by 1/4 to 1/2 of dorsal-fin base; no premaxillary tusks; light organs absent, but a series of pale opalescent scales along midline of belly, possibly luminous.

Remarks: shallowest record caught at 525 m depth, but usually below 1 000 m.



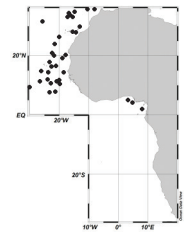
Size: 13.0 cm SL

- 3a. Cleithral symphysis normal, not produced as a spine; pelvic-fin rays usually 9 (except 6-8 in *Searsia koefoedi*); about 50 modified scales in lateral line (except *Searsia koefoedi* with no modified scales and ICO double) → 4
- 3b. Cleithral symphysis ending in a blunt spine (see illustration of *Maulisia argipalla*, p. 51)(not present in *Mentodus facilis*); pelvic-fin rays 6-8; lateral line without modified scales (except in *Maulisia microlepis* and *Mentodus mesalirus*) → 7
- 4a. Maxilla ending between mideye and posterior margin of eye; ICO double, JO absent; dorsal fin 1/4 or less in advance of anal-fin origin; anus opposite to anal-fin origin; pelvic-fin rays 6-8 (usually 7); single curved premaxillary tusk *Searsia koefoedi*
- 4b. Maxilla ending behind eye; ICO single (rudimentary in *Holtbyrnia anomala*); pelvic-fin rays 8-10 (usually 9); premaxillary tusks rudimentary or large and pointing straight forward; dorsal fin 1/3 or more in advance of anal-fin origin → 5

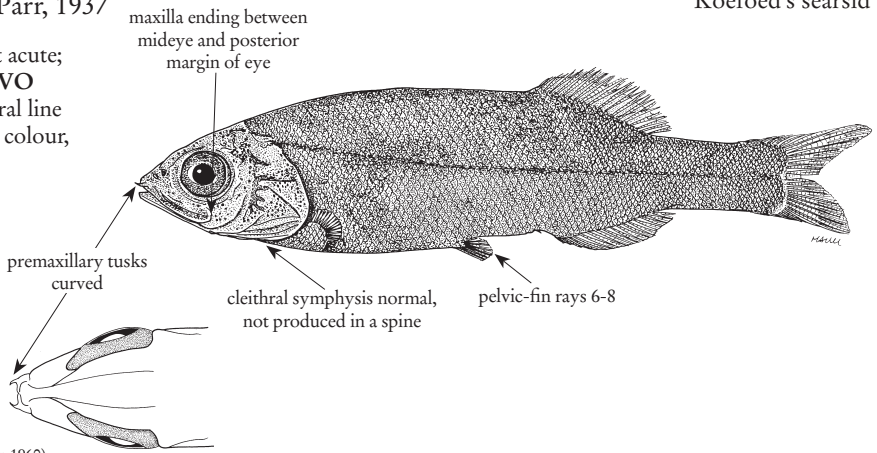
Searsia koefoedi Parr, 1937

Koefoed's searsid

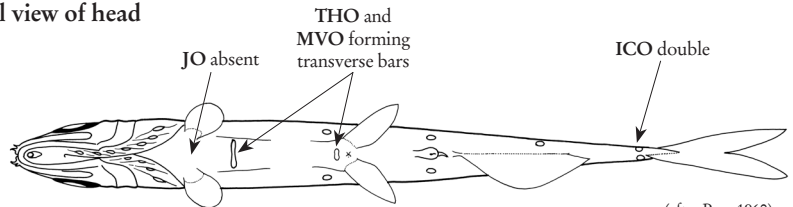
Other characters: snout acute; photophores present; MVO transverse or round; lateral line without modified scales; colour, uniform dark.



(after Parr, 1960)



dorsal view of head



(after Parr, 1960)

ventral view of body

Size: 15.0 cm SL

- 5a. Premaxillary tusks present, large and uncurved, pointing straight forward (Fig. 1); JO round or as longitudinal bar, never transverse (photophores rudimentary, except for PO in *Holtbyrnia anomala*) → 6

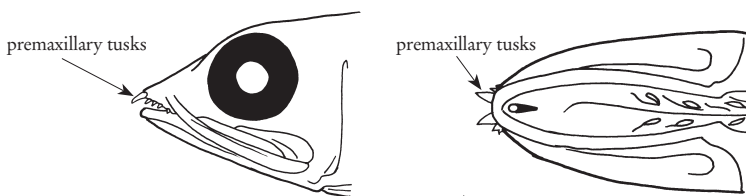


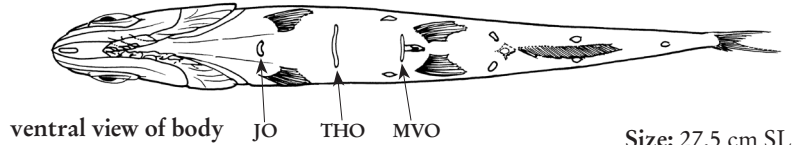
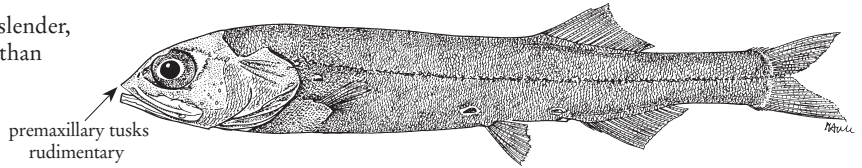
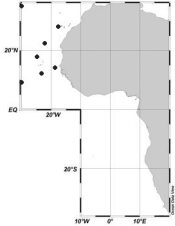
Fig. 1 lateral and ventral view of head

5b. Premaxillary tusks rudimentary; photophores present, JO, THO and MVO as a transverse bar. *Sagamichthys schnakenbecki*

Sagamichthys schnakenbecki (Kreffft, 1953)

Schnakenbeck's searsiid

Other characters: body slender, elongate, head much less than 1/3 body length.



Size: 27.5 cm SL

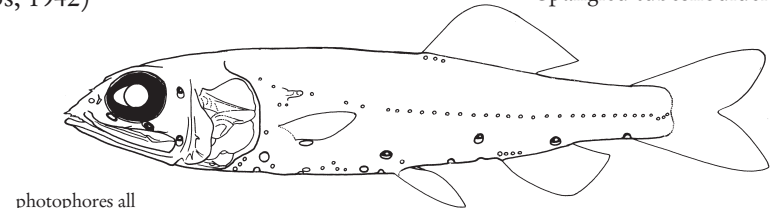
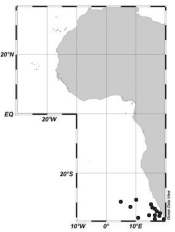
6a. Photophores all elliptical or round, THO position marked by 3 separate round organs, JO single and round, and PVO present; total gill rakers about 38-40 on 1st arch (10-12 + 26-30). *Persparsia kopua*

6b. Photophores present (rudimentary in *Holtbyrnia anomala*), JO as a longitudinal bar, THO and MVO as a transverse bar, PVO absent (Fig. 1, p. 49); total gillrakers 21-31 on 1st arch (6-10 + 15-21) *Holtbyrnia* (p. 47)

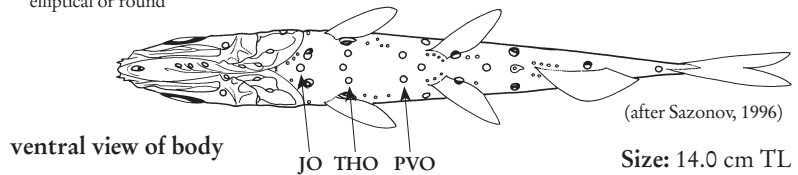
Persparsia kopua (Phillipps, 1942)

Spangled tubeshoulder

Other characters: branchiostegal rays 7.



photophores all elliptical or round



Size: 14.0 cm TL

7a. Frontal bones expanded laterally in a broadly triangular, horizontal wing over each orbit, the interorbital space reaches a maximum width just behind mideye, narrowing anteriorly and posteriorly; the skull is diamond-shaped when viewed from above (Fig. 2) *Maulisia* (p. 50)

7b. Frontal bones widest at posterior end of eye to behind eye, narrowing to about half as wide over eye, with sides nearly straight (Fig. 3). → 8

frontals expanded laterally with interorbital space reaching a maximum just behind mideye

frontal bones widest at posterior end of eye to behind eye, narrowing to about half as wide over eye

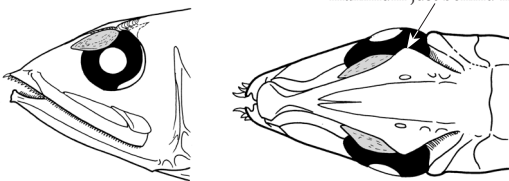


Fig. 2 *Maulisia* - lateral and dorsal view of head

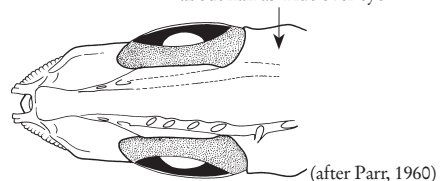
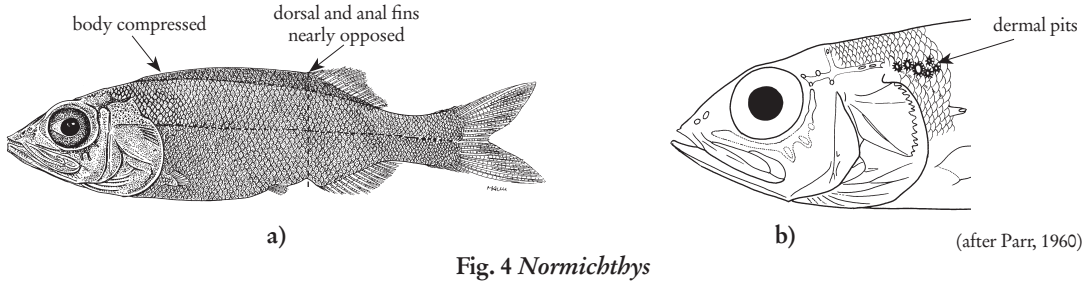
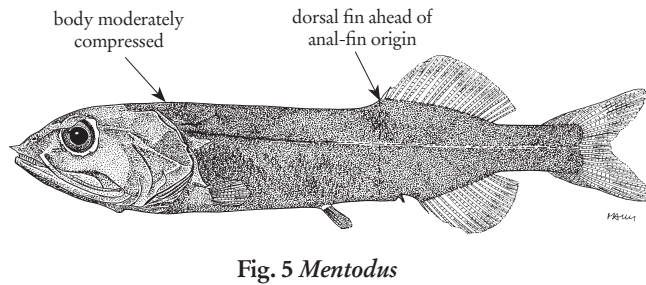


Fig. 3 *Mentodus* - dorsal view of head

8a. Body compressed, dorsal margin relatively sharp (about 1-2 scale rows in width along dorsal margin); dorsal and anal fins nearly opposed, dorsal ahead of anal-fin origin by 1/4 or less of dorsal-fin base (Fig 4a); several large subcutaneous pores (dermal pits) in the scalepockets behind supracleithrum, the largest the size of one or two scales (Fig. 4b); photophores rudimentary or absent *Normichthys* (p. 51)



8b. Body moderately compressed, dorsal margin rounded; dorsal fin ahead of anal-fin origin by 1/4 to 1/3 of dorsal-fin base; no dermal pits behind supracleithrum; photophores absent (Fig. 5) *Mentodus* (species belonging to this genus are known to occur in the bathypelagic zone, and are therefore not treated in detail)



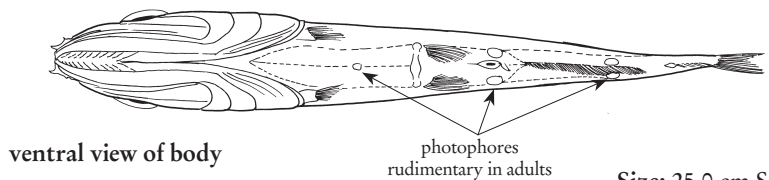
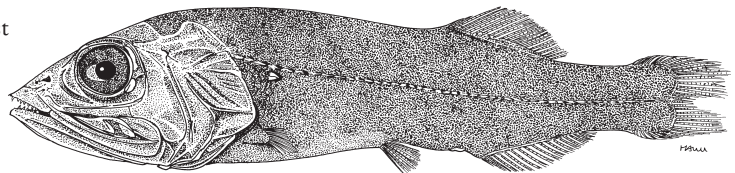
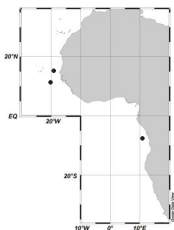
KEY TO THE SPECIES OF *HOLTBYRNIA* OCCURRING IN THE AREA

- 1a. Photophores absent in young, rudimentary in adults (except PO) *Holtbyrnia anomala*
- 1b. Photophores well developed in adults → 2

Holtbyrnia anomala Krefft, 1980

Bighead searsid

Remarks: meso- to bathypelagic, most often between 700 and 2 700 m.



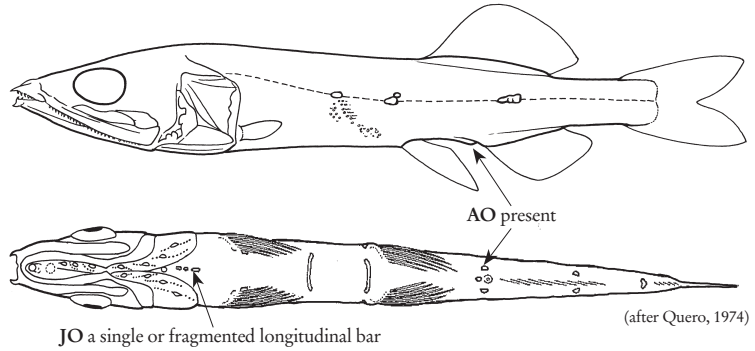
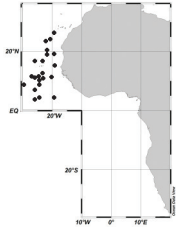
Size: 25.0 cm SL

2a. Anal organ (AO) present; total gill rakers 28-31 on 1st arch *Holtbyrnia cyanocephala*

Holtbyrnia cyanocephala (Kreffft, 1967)

Bluehead tubeshoulder

Remarks: meso- to bathypelagic, from 150 to 1 500 m.



ventral view of body

Size: 22.1 cm SL

2b. Anal organ (AO) absent; total gill rakers 22-29 on 1st arch (Fig. 1). → 3

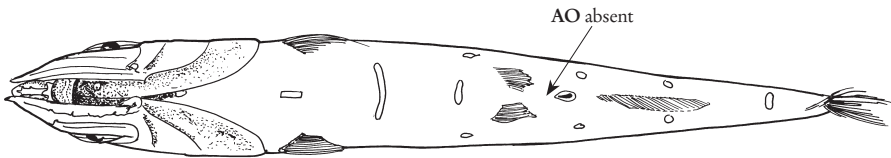


Fig. 1 *Holtbyrnia* spp. - ventral view of body

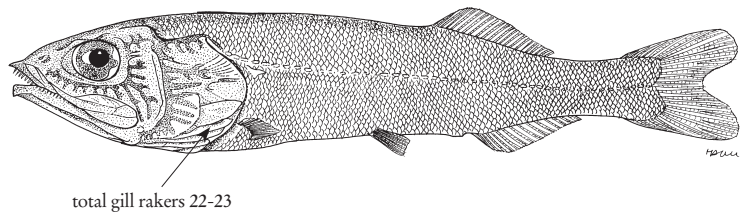
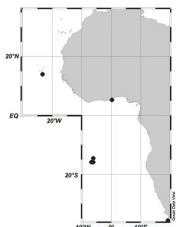
3a. Total gill rakers 22-23 on 1st arch; scales in midlateral series 94-104 *Holtbyrnia innesi*

3b. Total gill rakers 24-29 on 1st arch; scales in midlateral series 100-145 → 4

Holtbyrnia innesi (Fowler, 1934)

Teardrop tubeshoulder

Remarks: mesopelagic between 150 and 1 000 m.



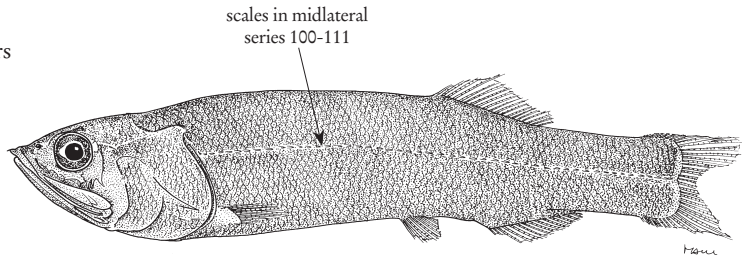
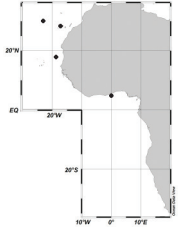
Size: 24.0 cm SL

4a. Scales in midlateral series 100-111; total gill rakers 27-29 *Holtbyrnia macrops*

Holtbyrnia macrops Maul, 1957

Bigeye searsid

Remarks: mesopelagic between 300 and 1 000 m; rises to shallower waters (< 200 m) at night.



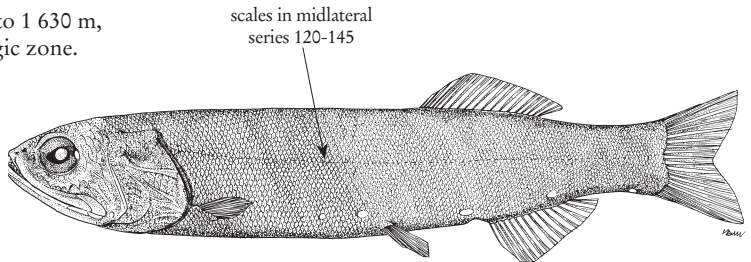
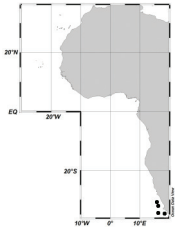
Size: 20.0 cm SL

4b. Scales in midlateral series 120-145; total gill rakers 24-27 *Holtbyrnia laticauda*

Holtbyrnia laticauda Sazonov, 1976

Tusked tubeshoulder

Remarks: bathypelagic, from 1 140 to 1 630 m, but probably rising to the mesopelagic zone.



Size: 30.0 cm TL

KEY TO THE SPECIES OF *MAULISIA* OCCURRING IN THE AREA

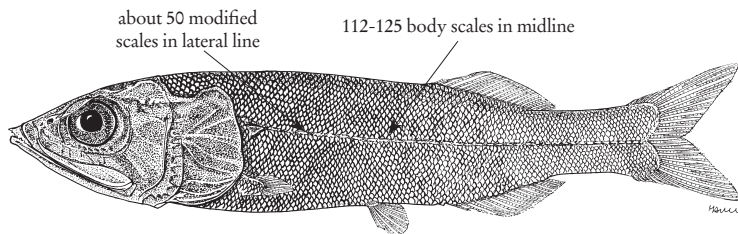
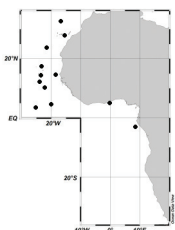
1a. Photophores absent; approximately 50 modified scales in lateral line; shoulder pit (large opening several scale rows wide behind supracleithrum, see illustration of *Maulisia mauli*) absent; 112-125 body scales in midline. *Maulisia microlepis*

1b. Photophores present; lateral line without modified scales marked by papillae anteriorly, or neuromasts posteriorly, or unmarked; shoulder pit present; 77-95 body scales in midline → 2

Maulisia microlepis Sazonov & Golovan, 1976

Smallscale searsid

Other characters: no information.



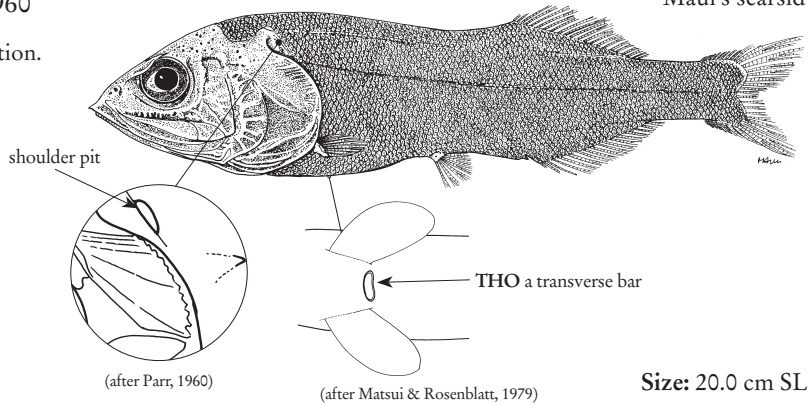
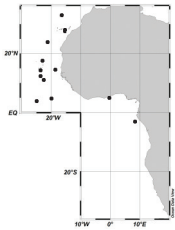
Size: 25.5 cm SL

2a. THO a transverse bar *Maulisia mauli*

Maulisia mauli Parr, 1960

Maul's searsid

Other characters: no information.



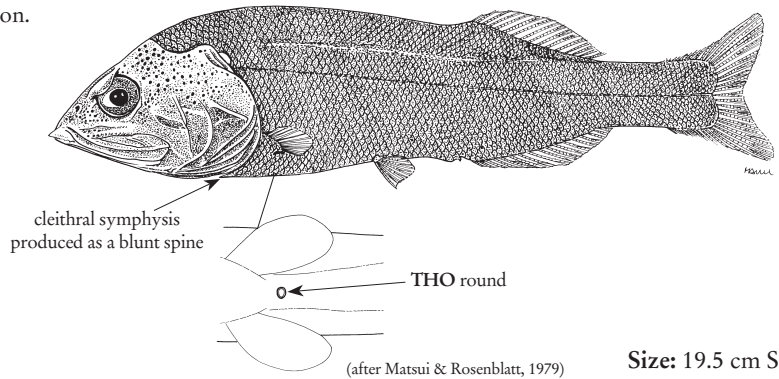
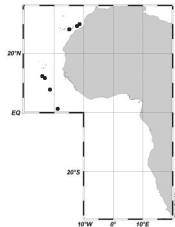
Size: 20.0 cm SL

2b. THO round *Maulisia argipalla*

Maulisia argipalla Matsui & Rosenblatt, 1979

Palegold searsid

Other characters: no information.



Size: 19.5 cm SL

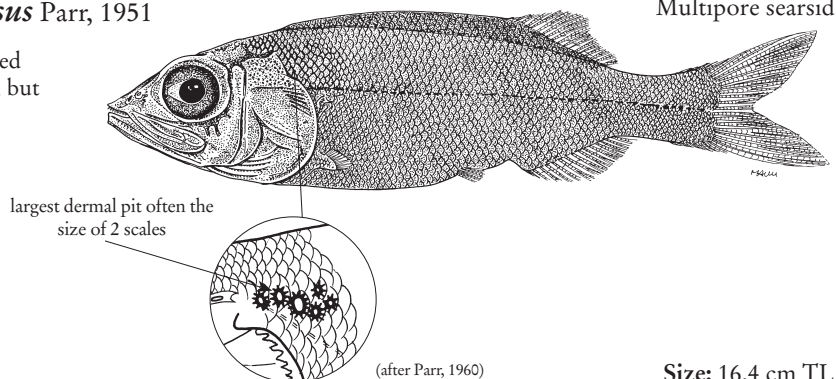
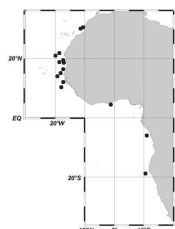
KEY TO THE SPECIES OF *NORMICHTHYS* OCCURRING IN THE AREA

1a. Largest dermal pit in the scalepockets behind supracleithrum, often the size to 2 scales; scales 80-100 along midline; total gillrakers 28-30 on 1st arch *Normichthys operosus*

Normichthys operosus Parr, 1951

Multipore searsid

Remarks: shallowest reported depth of capture 780-785 m, but usually below 1 000 m.

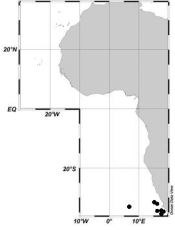


Size: 16.4 cm TL

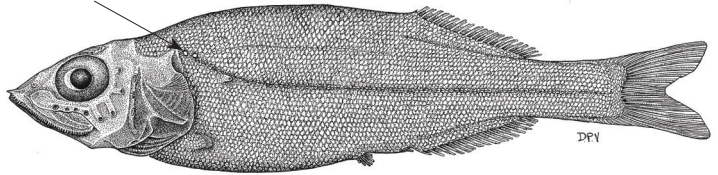
1b. Largest dermal pit about the size of 1 scale; scales 100-125 along midline; total gillrakers 24-28 on 1st arch. *Normichthys yabganorum*

Normichthys yabganorum Lavenberg, 1965

Remarks: circumglobal mostly between 30°S and 50°S.



largest dermal pit about the size of 1 scale



(© SAIAB, CC BY 4.0, not modified)

Size: 16.4 cm TL

STOMIIFORMES

Dragonfishes and relatives

KEY TO THE FAMILIES OF STOMIIFORMES OCCURRING IN THE AREA

- 1a.** True gill rakers present only in larvae (replaced by spine-like teeth or totally absent in juveniles and adults)(Fig. 1a); jaw teeth moderate to large (except small in a few *Astronesthes* species), generally with 1 to several fangs in each jaw; postorbital photophore or light organ present (at least in males)(Fig. 1b)
 **Stomiidae (p. 77)**
- 1b.** True gill rakers present throughout development; jaw teeth small and about the same size; no postorbital photophore or light organ → 2

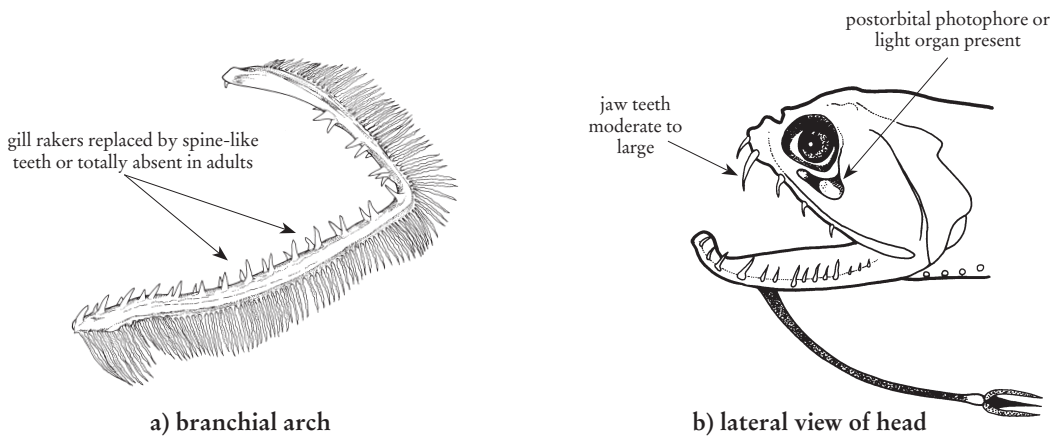


Fig. 1 Stomiidae

- 2a.** Branchiostegal rays 6-10; photophores on branchiostegal membrane (**BR**) 3 or 6 (rarely 7)(Fig. 2a); 2 or more photophores in ventral series posterior to anal-fin origin (**AC**) clumped into compound light organs and surrounded with silvery pigment (Fig. 2b) **Sternoptychidae (p. 68)**
- 2b.** Branchiostegal rays 10-16; photophores on branchiostegal membrane (**BR**) 7-16 (Fig. 3a); photophores in ventral series posterior to anal-fin origin (**AC**) never clumped into compound light organs → 3

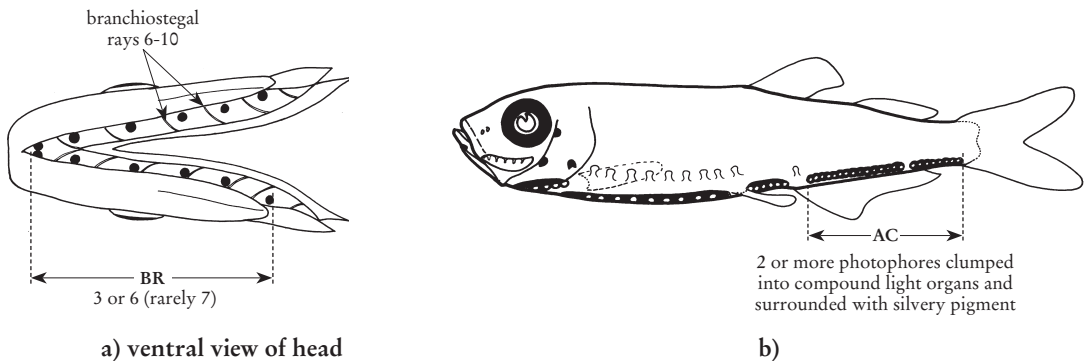


Fig. 2 Sternoptychidae

3a. Photophores present on isthmus (IP)(Fig. 3a); total number of photophores in ventral series (IC) less than 65 (Fig. 3b) Phosichthyidae (p. 63)

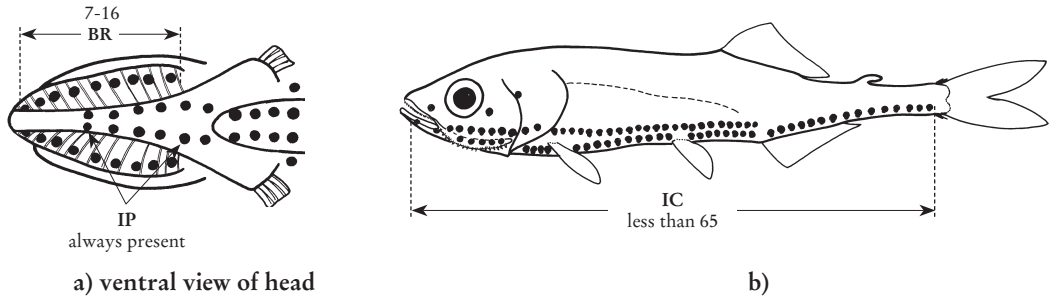


Fig. 3 Phosichthyidae

3b. Photophores generally absent on isthmus (IP), but if present, total number of photophores in ventral series (IC) more than 65 (Figs. 4a & 4b) Gonostomatidae (p. 54)

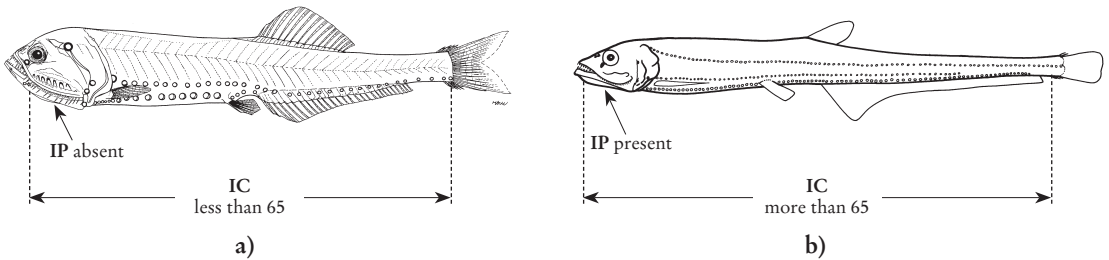
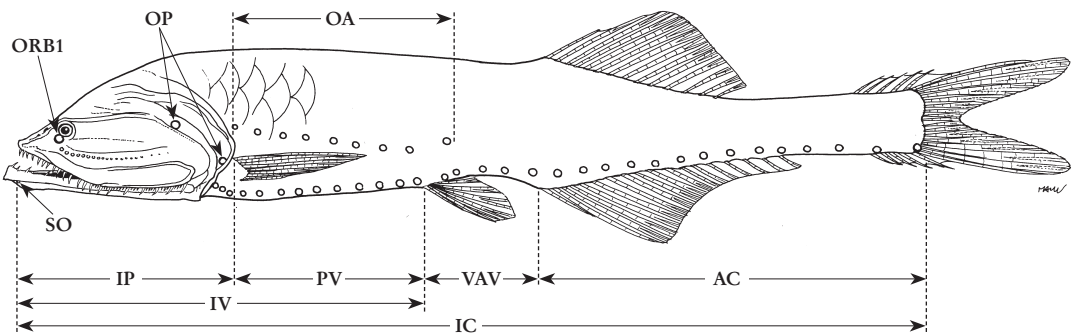


Fig. 4 Gonostomatidae

GONOSTOMATIDAE

Bristlemouths



AC - ventral series posterior to anal-fin origin
 IC - ventral series
 IP - ventral series anterior to pectoral-fin origin
 IV - ventral series anterior to pelvic-fin origin
 OA - lateral series

OP - opercular photophores
 ORB1 - preorbital photophore
 PV - ventral series between origins of pectoral and pelvic fins
 SO - paired photophores near symphysis of lower jaw
 VAV - ventral series between origins of pelvic and anal fins

General distribution and terminology of the luminous organs (photophores)

KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF GONOSTOMATIDAE OCCURRING IN THE AREA

- 1a.** Anal-fin rays 36-69; dorsal-fin origin well in advance of anal-fin origin; posterior insertion of dorsal fin directly above or slightly anterior to anal-fin origin; IP photophores present on isthmus; IV photophores 24-50 (Fig. 1) → 2
- 1b.** Anal-fin rays 16-31; dorsal-fin origin not well in advance of anal-fin origin; IP photophores not present on isthmus; IV photophores 13-17 (Fig. 2) → 4

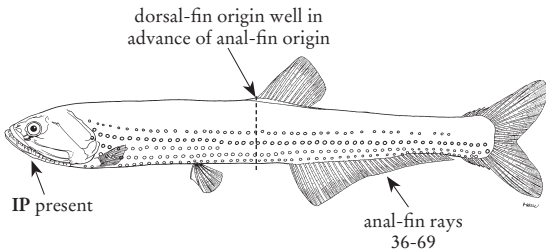


Fig. 1

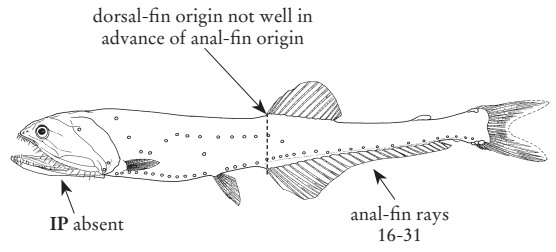
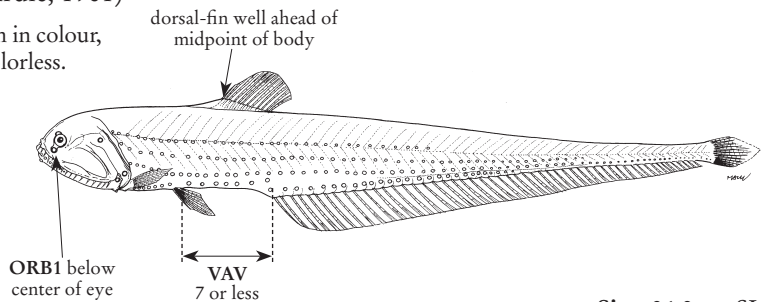
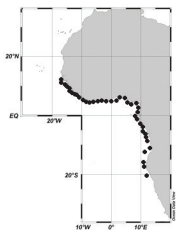


Fig. 2

- 2a.** Dorsal fin well ahead of midpoint of body; VAV photophores 7 or less; ORB1 photophore below center of eye; no photophores on posterior half of lower jaw *Triplophos hemingi*
- 2b.** Dorsal fin at or behind midpoint of body; VAV photophores 12 or more; ORB1 photophore below or slightly ahead of anterior margin of eye; a row of small photophores on posterior half of lower jaw. → 3

Triplophos hemingi (McArdle, 1901)

Other characters: yellowish-brown in colour, black on head and abdomen, fins colorless.

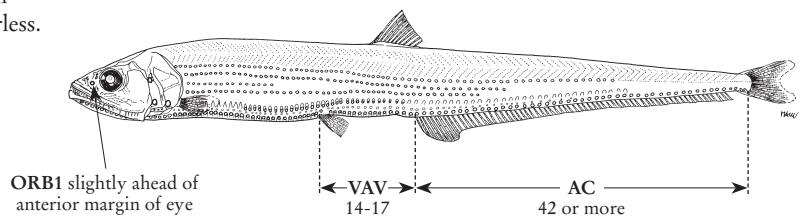
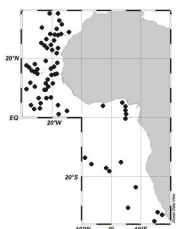


Size: 36.0 cm SL

- 3a.** Anal-fin rays 57 or more; AC photophores 42 or more *Diplophos taenia*

Diplophos taenia Günther, 1873

Other characters: black-brown dorsally, flanks silver; fins colorless.

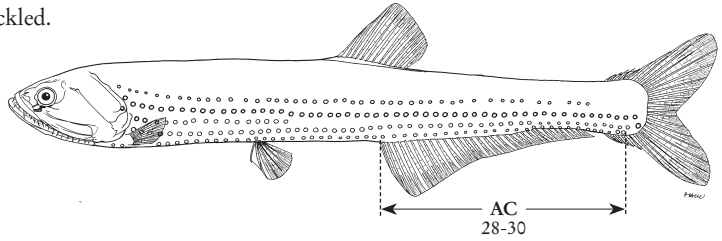
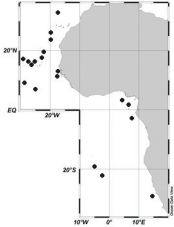


Size: 27.6 cm SL

3b. Anal-fin rays 36-41; AC photophores 28-30 *Manducus maderensis*

Manducus maderensis (Johnson, 1890)

Other characters: dorsum black-brown in colour; flanks silver; fin rays finely speckled.



Size: 27.9 cm SL

4a. Dorsal-fin origin somewhat anterior to anal-fin origin *Margrethia* (p. 61)

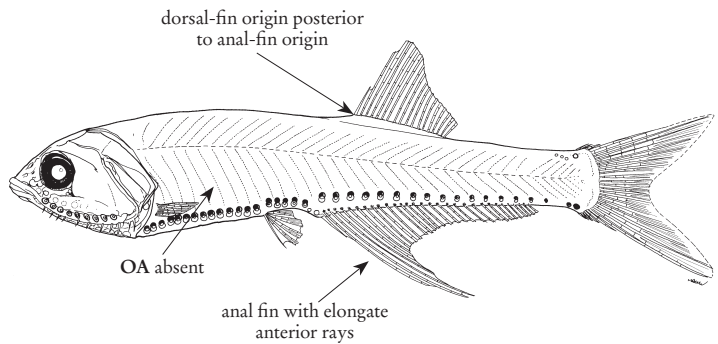
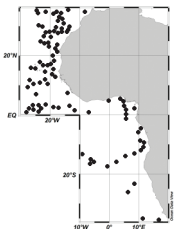
4b. Dorsal-fin origin above or posterior to anal-fin origin → 5

5a. Anal fin with elongate anterior rays; OA photophores absent; pectoral-fin rays 14-15
 *Bonapartia pedaliota*

5b. Anterior dorsal- and anal-fin rays not elongate; OA photophores present (6-16, [Fig. 3a]; except *Cyclothone obscura*, which has no photophores [Fig. 3b]); pectoral-fin rays 7-13 → 6

Bonapartia pedaliota Goode & Bean, 1896

Other characters: operculum and peritoneum silvery; tail translucent ventrally; dorsal and caudal-fin rays pigmented.



Size: 7.2 cm SL

6a. Anus nearer to pelvic-fin bases than anal-fin origin or midway between the two; VAV anterior to anus 1-2 (Fig. 3a) or body photophores absent (Fig. 3b) *Cyclothone* (p. 57)

6b. Anus nearer to anal-fin origin than to pelvic-fin bases; VAV anterior to anus 3 or more → 7

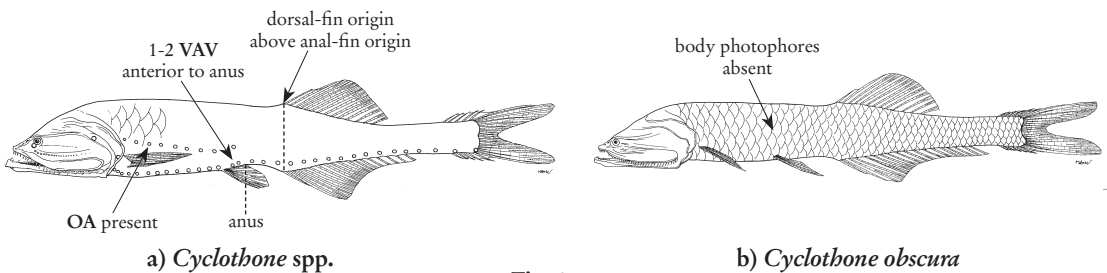


Fig. 3

- 7a. White glandular mass just posterior to SO, and similar masses associated with ORB1 and OA photophores; gill rakers on first arch more than 18. *Sigmops* (p. 62)
- 7b. No glandular masses associated with SO, ORB1, or OA; gill rakers on first arch 18 or less
 *Gonostoma* (p. 61)

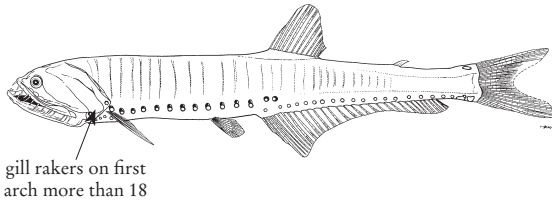


Fig. 4 *Sigmops*

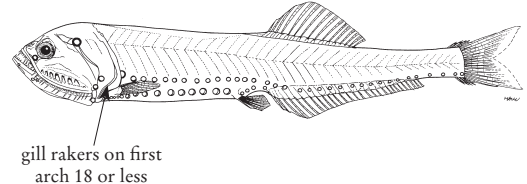


Fig. 5 *Gonostoma*

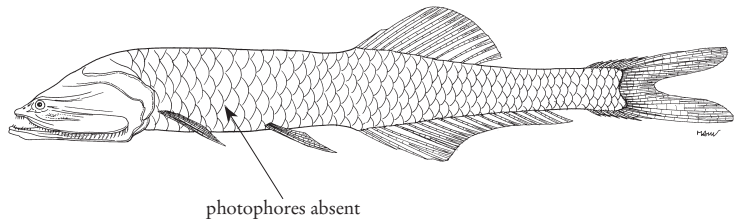
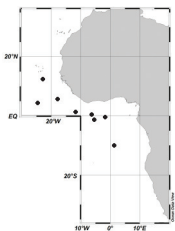
KEY TO THE SPECIES OF *CYCLOTHONE* OCCURRING IN THE AREA

- 1a. Photophores absent. *Cyclothone obscura*
- 1b. Photophores present on head and trunk → 2

Cyclothone obscura Brauer, 1902

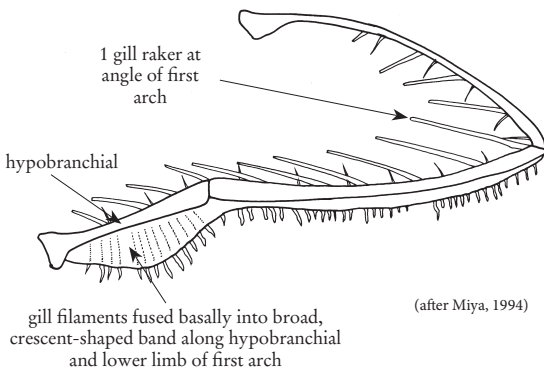
Hidden bristlemouth

Other characters: colour a uniform dark brown.

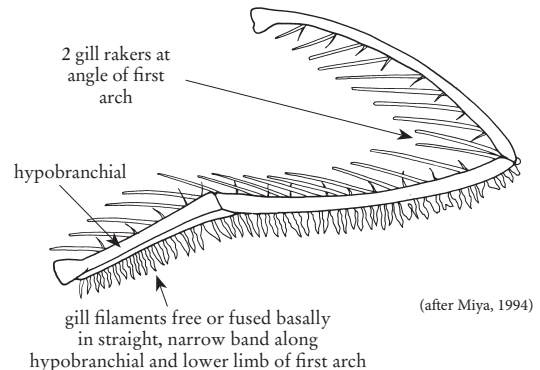


Size: 6.6 cm SL

- 2a. Gill rakers at angle of first arch 1 (Fig. 1a). *Cyclothone alba*
- 2b. Gill rakers at angle of first arch 2 (Fig. 1b) → 3



a)



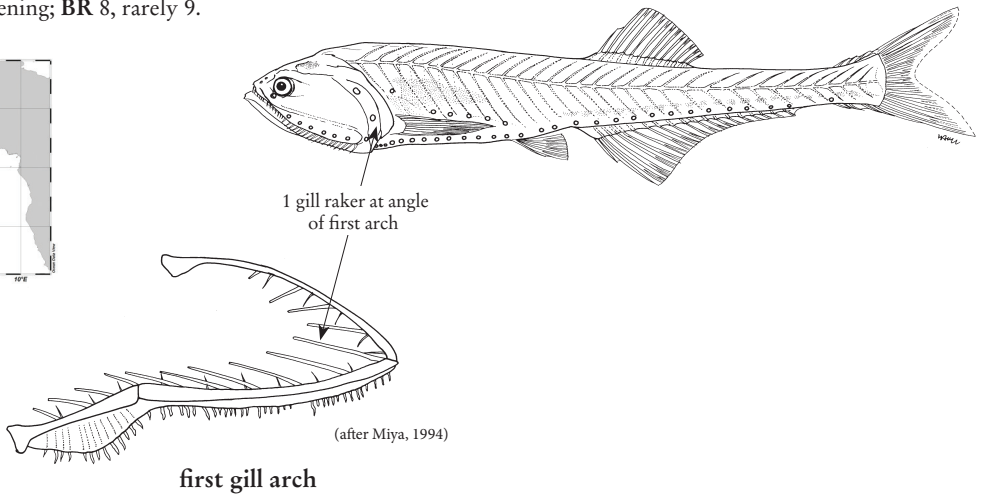
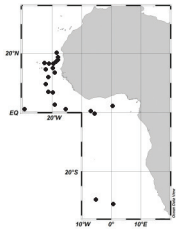
b)

Fig. 1 First gill arch

Cyclothone alba Brauer, 1906

Bristlemouth

Other characters: 3-4 VAV, 1 anterior to genital opening; BR 8, rarely 9.



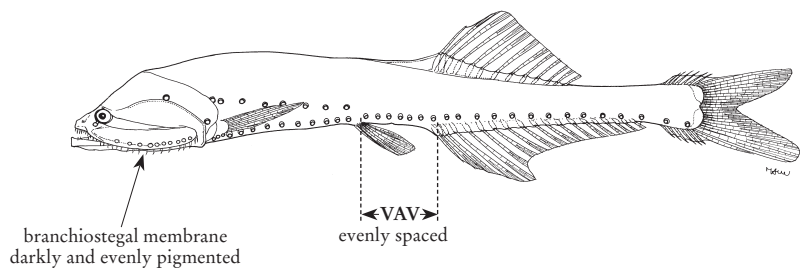
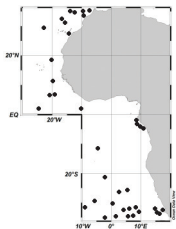
Size: 3.4 cm SL

- 3a. Gill filaments fused basally into broad, crescent-shaped band along hypobranchial and lower limb of first arch (Fig. 1a) → 4
- 3b. Gill filaments free or fused basally in straight, narrow band along hypobranchial and lower limb of first arch (Fig. 1b) → 6
- 4a. VAV evenly spaced; branchiostegal membrane darkly and evenly pigmented. *Cyclothone microdon*
- 4b. First 2 VAV close together, the remainder evenly spaced; pigment on branchiostegal membrane discrete, as streaks along branchiostegal rays → 5

Cyclothone microdon (Günther, 1878)

Veiled anglemouth

Other characters: VAV 5; brown to brown-black in colour; dense stellate pigment over head, body and fins.



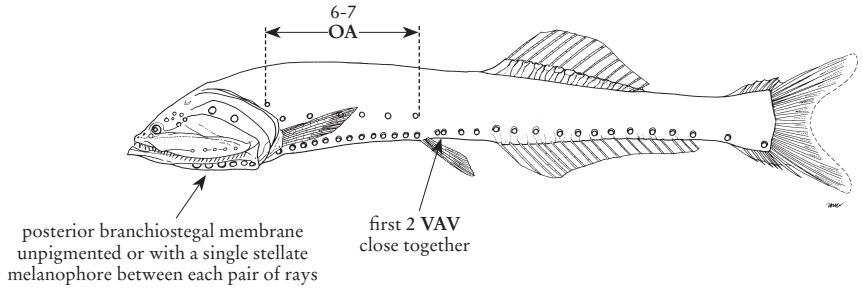
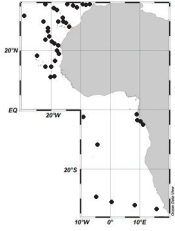
Size: 7.6 cm TL

- 5a. OA 6-7; VAV 4; gill rakers on hypobranchial of first gill arch 3 (rarely 4); posterior branchiostegal membrane unpigmented or with a single stellate melanophore between each pair of rays. *Cyclothone braueri*

Cyclothone braueri Jespersen & Tåning, 1926

Garrick

Other characters: no information.



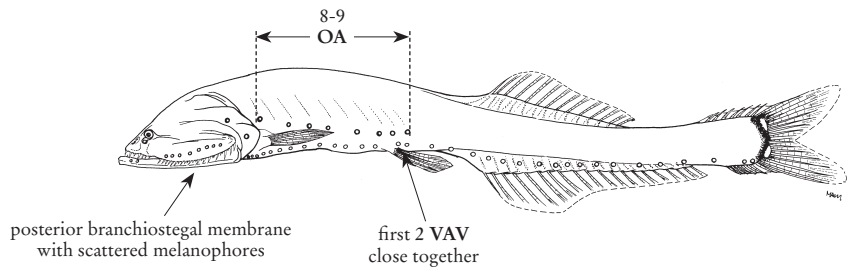
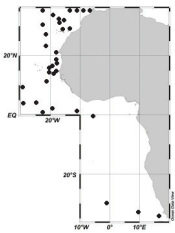
Size: 3.8 cm SL

5b. OA 8-9; VAV 5; gill rakers on hypobranchial of first gill arch 4; posterior branchiostegal membrane with scattered melanophores *Cyclothone pseudopallida*

Cyclothone pseudopallida Mukhacheva, 1964

Slender bristlemouth

Other characters: light to dark brown in colour.



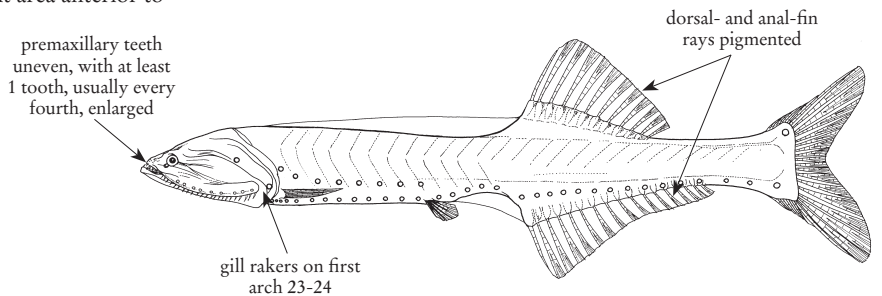
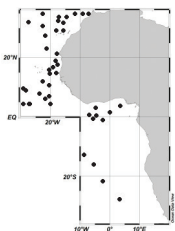
Size: 5.8 cm SL

6a. Premaxillary teeth uneven, with at least 1 tooth, usually every fourth, enlarged; precaudal glands weakly developed → 7
 6b. Premaxillary teeth even, none greatly enlarged; precaudal glands strongly developed. → 8
 7a. Dorsal- and anal-fin rays pigmented; gill rakers on first arch 23-24; internasal area on head pigmented. *Cyclothone pallida*

Cyclothone pallida Brauer, 1902

Tan bristlemouth

Other characters: light to dark brown in colour, with transparent area anterior to anal-fin origin.

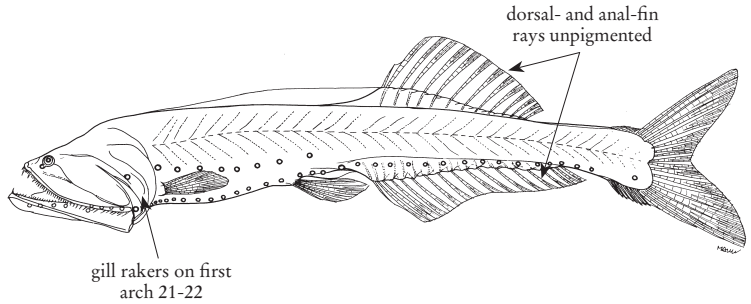
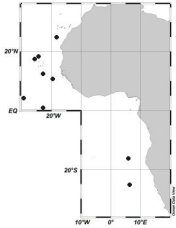


Size: 7.5 cm SL

7b. Dorsal- and anal-fin rays unpigmented; gill rakers on first arch 21-22; internasal area on head unpigmented *Cyclothone parapallida*

Cyclothone parapallida Badcock, 1982

Other characters: no information.

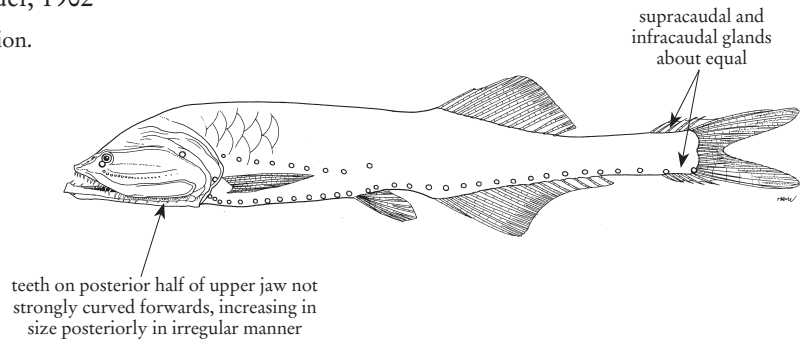
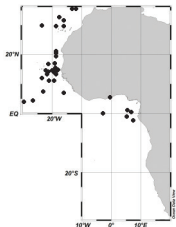


Size: 6.7 cm SL

8a. Teeth on posterior half of upper jaw not strongly curved forwards, increasing in size posteriorly in irregular manner, with long teeth separated by 2-4 smaller teeth; supracaudal and infracaudal glands about equal *Cyclothone livida*

Cyclothone livida Brauer, 1902

Other characters: no information.



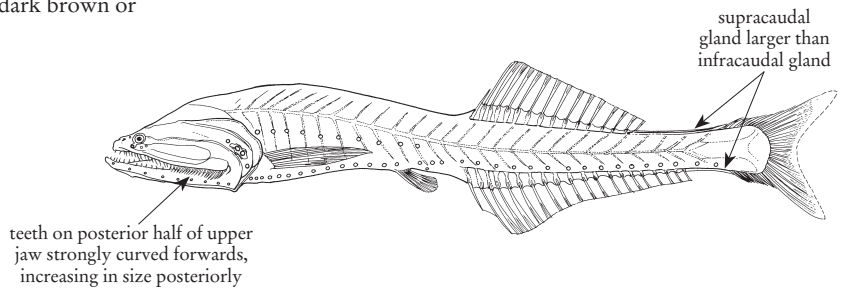
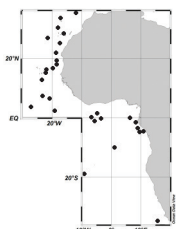
Size: 5.0 cm SL

8b. Teeth on posterior half of upper jaw strongly curved forwards, increasing in size posteriorly; supracaudal gland larger than infracaudal gland *Cyclothone acclinidens*

Cyclothone acclinidens Garman, 1899

Benttooth bristlemouth

Other characters: light to dark brown or grey-brown in colour.



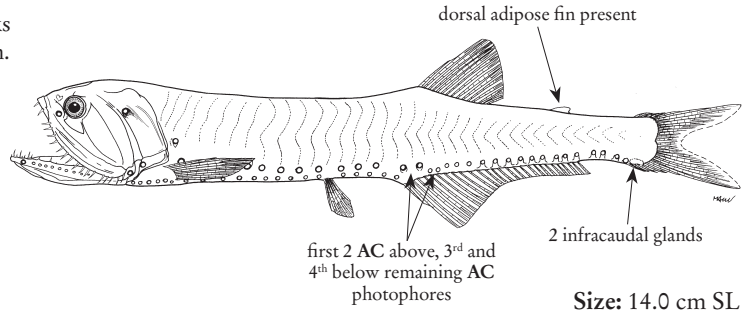
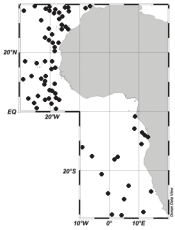
Size: 6.5 cm SL

KEY TO THE SPECIES OF *GONOSTOMA* OCCURRING IN THE AREA

1a. Dorsal adipose fin present; 2 infracaudal glands *Gonostoma denudatum*

Gonostoma denudatum Rafinesque, 1810

Other characters: dark dorsally, flanks silvery; distinctive gular pigment patch.

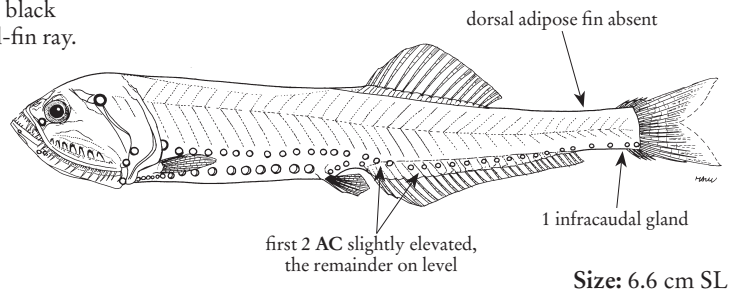
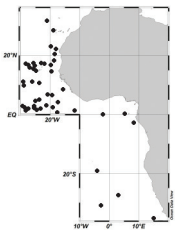


1b. Dorsal adipose fin absent; 1 infracaudal gland *Gonostoma atlanticum*

Gonostoma atlanticum Norman, 1930

Atlantic fangjaw

Other characters: dark dorsally, silvery finish on translucent flanks; fin rays colorless; black pigment at base of each dorsal- and anal-fin ray.



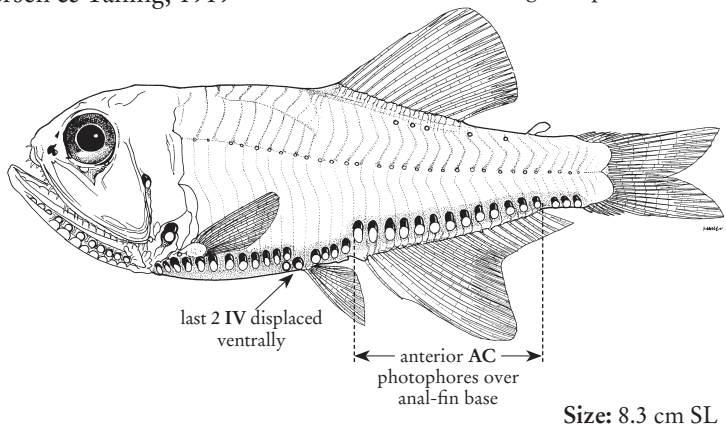
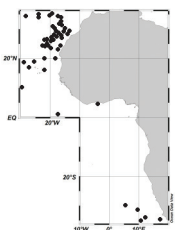
KEY TO THE SPECIES OF *MARGRETHIA* OCCURRING IN THE AREA

1a. All anterior AC photophores over anal-fin base; last 2 IV displaced ventrally . . . *Margrethia obtusirostra*

Margrethia obtusirostra Jespersen & Tåning, 1919

Bighead portholefish

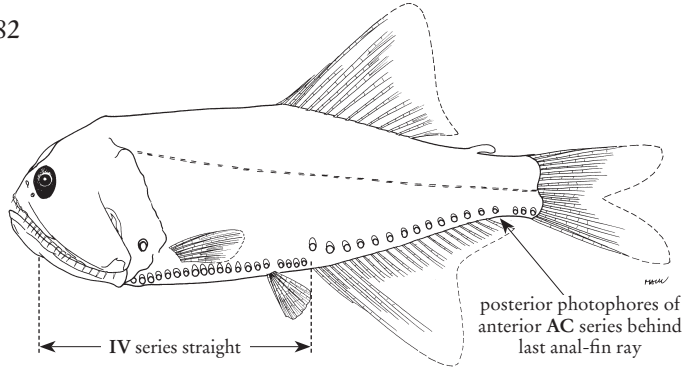
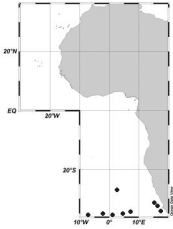
Other characters: yellowish in colour, darker dorsally, opercle silver; caudal-fin base and peduncle dark brown; pectoral and pelvic fins colorless.



1b. Posterior photophores of anterior AC series behind last anal-fin ray; IV series straight
 *Margrethia valentinae*

Margrethia valentinae Parin, 1982

Other characters: no information.



(after Parin, 1982)

Size: 7.2 cm SL

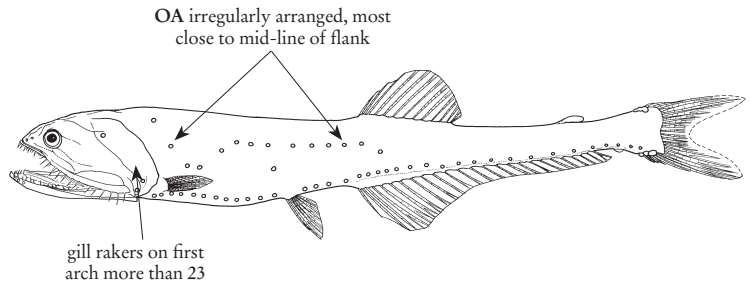
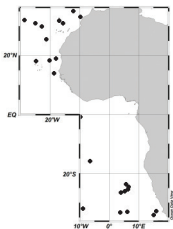
KEY TO THE SPECIES OF *SIGMOPS* OCCURRING IN THE AREA

1a. Gill rakers on first arch more than 23; photophores minute, often obscure; OA irregularly arranged, most close to mid-line of flank.
 *Sigmops bathyphilus*

Sigmops bathyphilus (Vaillant, 1884)

Spark anglemouth

Other characters: black in colour.



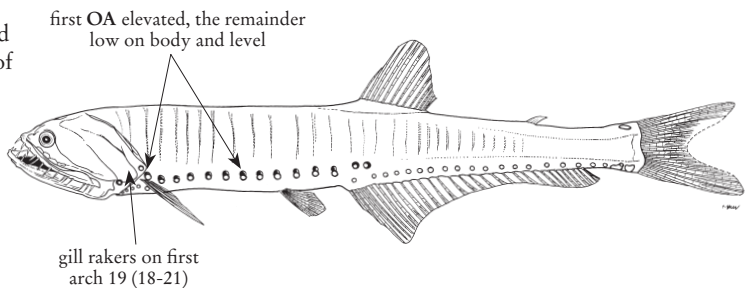
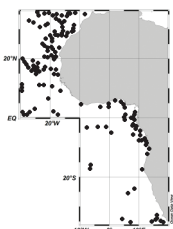
Size: 15.0 cm SL

1b. Gill rakers on first arch 19 (18-21); photophores well-developed; first OA elevated, the remainder low on body and level
 *Sigmops elongatus*

Sigmops elongatus (Günther, 1878)

Elongated bristlemouth fish

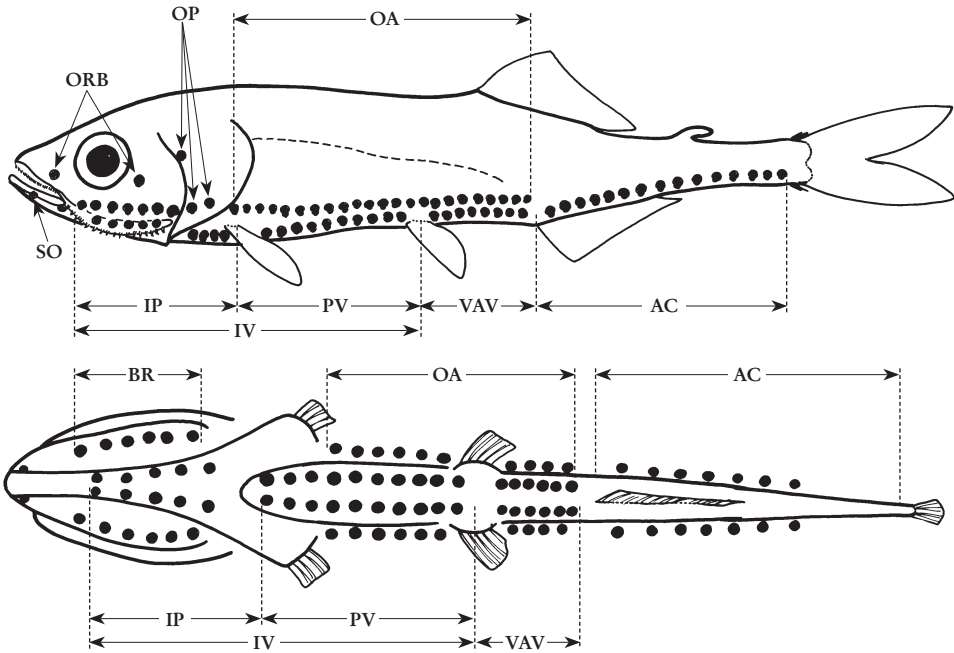
Other characters: black in colour, slightly silvery laterally; fins dusky and with small black spots; distal portion of pectoral and pelvic fins colorless.



Size: 27.5 cm TL

PHOSICHTHYIDAE

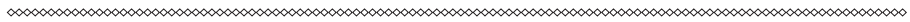
Lightfishes and Lighthouse fishes



AC - ventral series posterior to anal-fin origin
 BR - branchiostegal photophores
 IP - ventral series anterior to pectoral-fin base
 IV - ventral series anterior to pelvic-fin base
 OA - lateral series

OP - opercular photophores
 ORB - pre- and postorbital photophores
 PV - ventral series between bases of pectoral and pelvic fins
 SO - paired photophores near symphysis of lower jaw
 VAV - ventral series between pelvic-fin base and anal-fin origin

General distribution and terminology of the luminous organs (photophores)



KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF PHOSICHTHYIDAE OCCURRING IN THE AREA

- 1a. Two ORB, 1 anterior to eye and 1 mid-ventral or posterior to eye; a single series of premaxillary teeth (Fig. 1) → 2
- 1b. Only 1 ORB anterior to eye (see Fig. *Yarrella blackfordi*, p. 64); two series of premaxillary teeth → 5
- 2a. Anal-fin origin beneath or just behind end of dorsal-fin base; BR 8-9 (Fig. 1) → 3
- 2b. Anal-fin origin well behind end of dorsal-fin base; BR 11-18 (Fig. 2). → 4

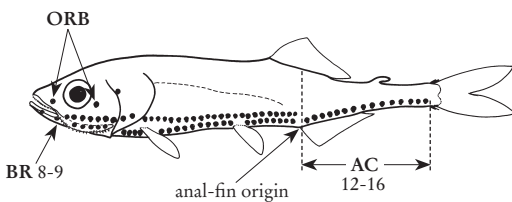


Fig. 1 *Vinciguerria*

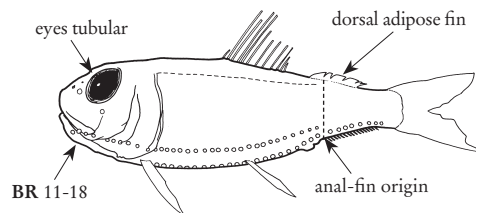


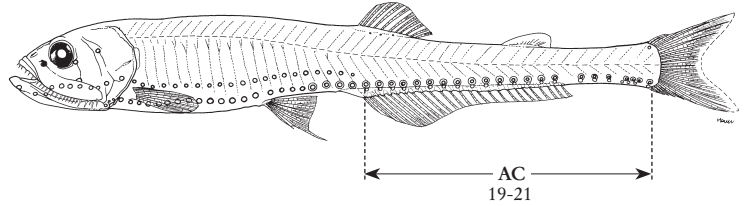
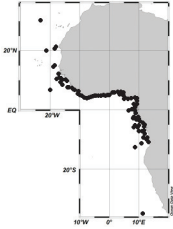
Fig. 2 *Icthyococcus*

3a. Dorsal- and anal-fin bases about equal in length; AC 12-16, 6-7 over anal fin (Fig. 1) . *Vinciguerria* (p. 67)

3b. Anal-fin base more than twice dorsal-fin base length; AC 19-21, 13-15 over anal fin . . *Pollichthys mauli*

Pollichthys mauli (Poll, 1953)

Other characters: dark dorsum, flanks silver.



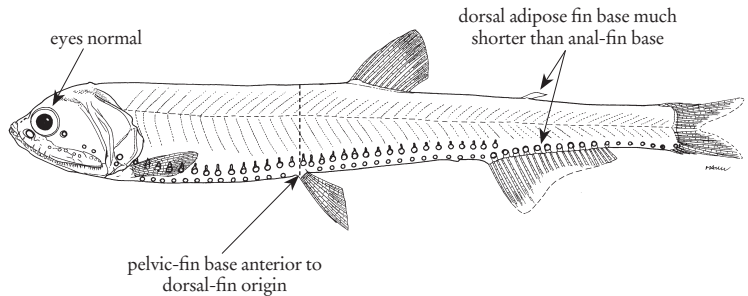
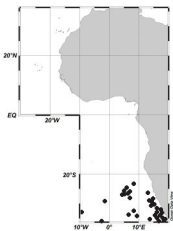
Size: 6.0 cm SL

4a. Pelvic-fin base anterior to dorsal-fin origin; eyes normal; dorsal adipose-fin base much shorter than that of anal fin *Phosichthys argenteus*

4b. Pelvic-fin base behind dorsal-fin origin; eyes tubular; dorsal adipose-fin base about equal to that of anal-fin base (Fig. 2) *Ichthyococcus* (p. 65)

Phosichthys argenteus Hutton, 1872

Other characters: no information.



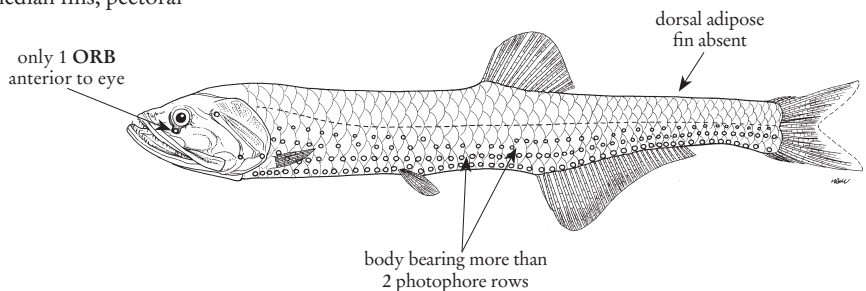
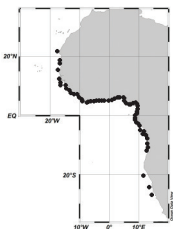
Size: 30.0 cm TL

5a. Body bearing more than 2 photophore rows; dorsal adipose fin absent. *Yarella blackfordi*

5b. Body bearing 2 photophore rows only; dorsal adipose fin present. *Polymetme* (p. 66)

Yarella blackfordi Goode & Bean, 1896

Other characters: black in colour with dusky pigmentation on median fins; pectoral and pelvic fins colorless.



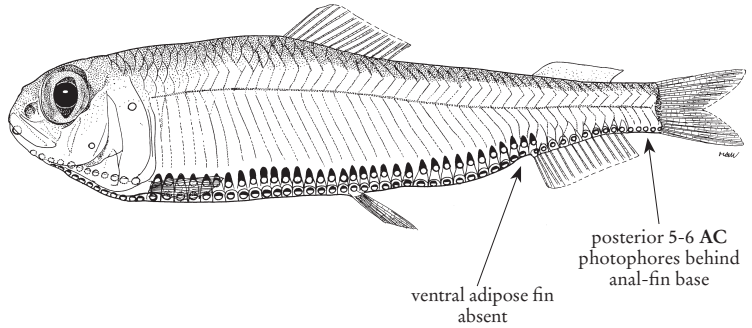
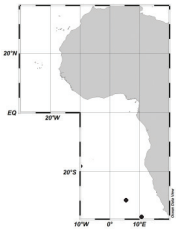
Size: 33.0 cm SL

KEY TO THE SPECIES OF *ICHTHYOCOCCUS* OCCURRING IN THE AREA

- 1a. Ventral adipose fin absent; posterior 5-6 AC photophores behind anal-fin base *Ichthyococcus australis*
- 1b. Ventral adipose fin present; posterior 3-4 AC photophores behind anal-fin base. → 2

Ichthyococcus australis Mukhacheva, 1980

Other characters: brown-yellow in colour, flanks silvery; fin bases and edges of scale pockets black.

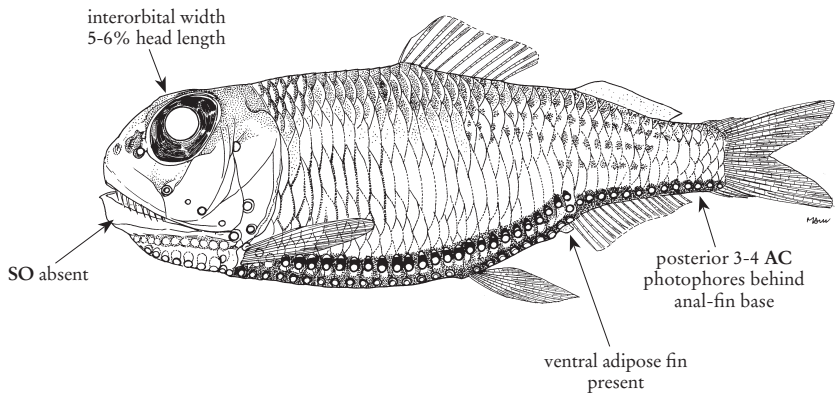
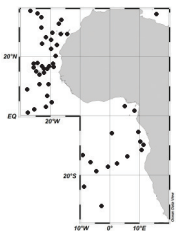


Size: 12.0 cm TL

- 2a. SO photophore absent; interorbital width 5-6% head length. *Ichthyococcus ovatus*

Ichthyococcus ovatus (Cocco, 1838)

Other characters: brown-yellow in colour, flanks silvery; fin bases and edges of scale pockets black.

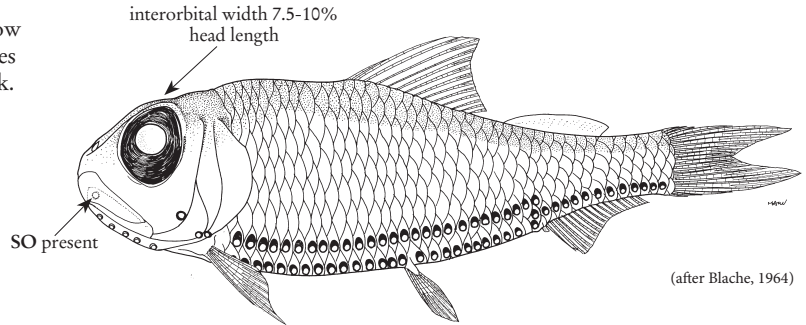
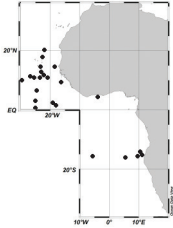


Size: 5.5 cm SL

2b. SO photophore present; interorbital width 7.5-10% head length *Ichthyococcus polli*

Ichthyococcus polli Blache, 1964

Other characters: brown-yellow in colour, flanks silvery; fin bases and edges of scale-pockets black.



(after Blache, 1964)

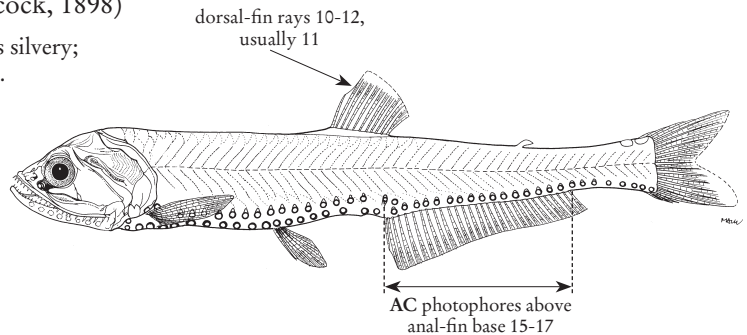
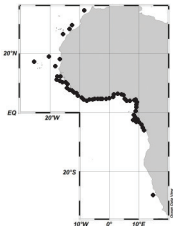
Size: 9.1 cm SL

KEY TO THE SPECIES OF *POLYMETME* OCCURRING IN THE AREA

1a. Dorsal-fin rays 10-12, usually 11; anal-fin rays 27-31, usually 28-30; AC photophores above anal-fin base 15-17. *Polymetme corythaeola*

Polymetme corythaeola (Alcock, 1898)

Other characters: dorsum dark, flanks silvery; black pigment on outer caudal-fin rays.

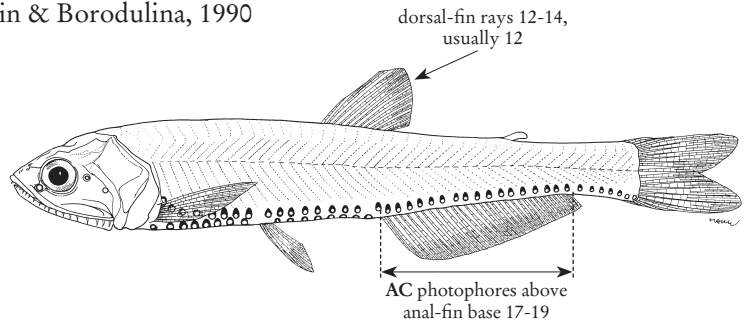
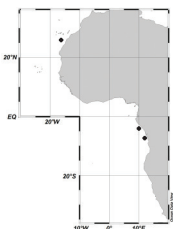


Size: 26.0 cm SL

1b. Dorsal-fin rays 12-14, usually 12; anal-fin rays 30-34, usually 31-32; AC photophores above anal-fin base 17-19. *Polymetme thaeocoryla*

Polymetme thaeocoryla Parin & Borodulina, 1990

Other characters: no information.



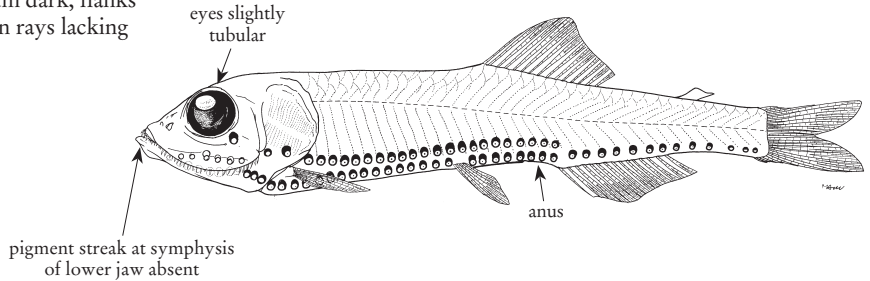
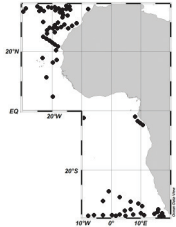
Size: 21.6 cm SL

KEY TO THE SPECIES OF *VINCIGUERRIA* OCCURRING IN THE AREA

- 1a. Anus under 6th-7th VAV; pigment streak at symphysis of lower jaw absent; eyes slightly tubular. *Vinciguerria attenuata*
- 1b. Anus under 8th-9th VAV; pigment streak at symphysis of lower jaw present; eyes normal → 2

Vinciguerria attenuata (Cocco, 1838)

Other characters: dorsum dark, flanks silvery; premaxilla and fin rays lacking pigment streaks.



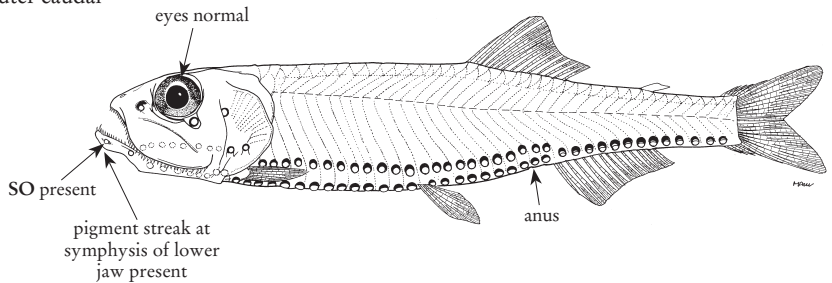
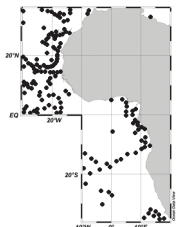
Size: 4.5 cm TL

- 2a. SO present; gill rakers on first arch 21-23 *Vinciguerria nimbaria*

Vinciguerria nimbaria (Jordan & Williams, 1895)

Oceanic lightfish

Other characters: dorsum dark, flanks silvery; upper pectoral and outer caudal fins speckled.



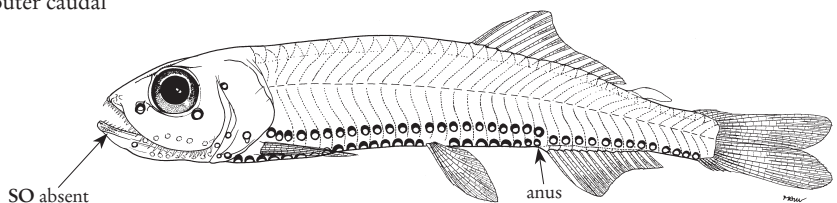
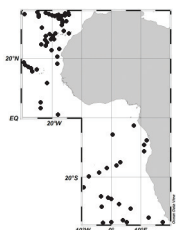
Size: 5.3 cm SL

- 2b. SO absent; gill rakers on first arch 14-16 *Vinciguerria poweriae*

Vinciguerria poweriae (Cocco, 1838)

Power's deep-water bristle-mouth fish

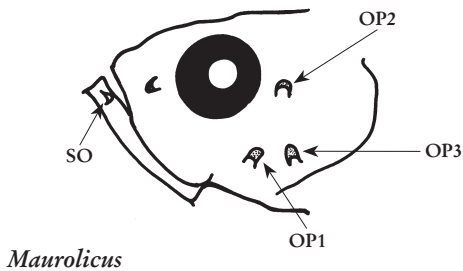
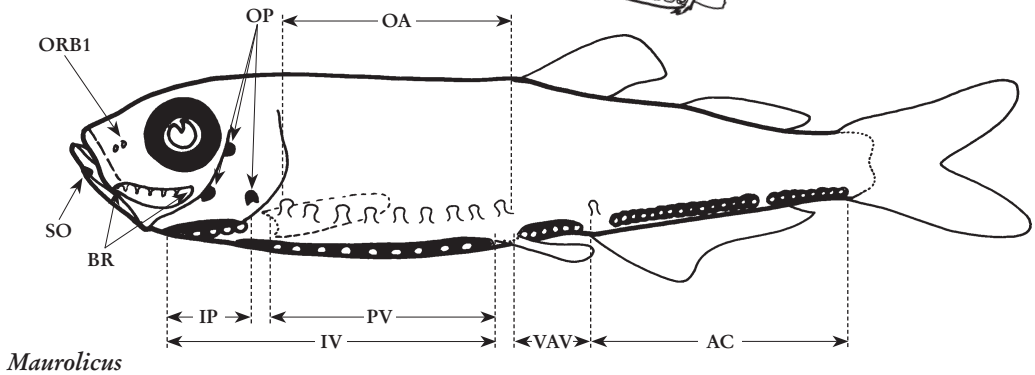
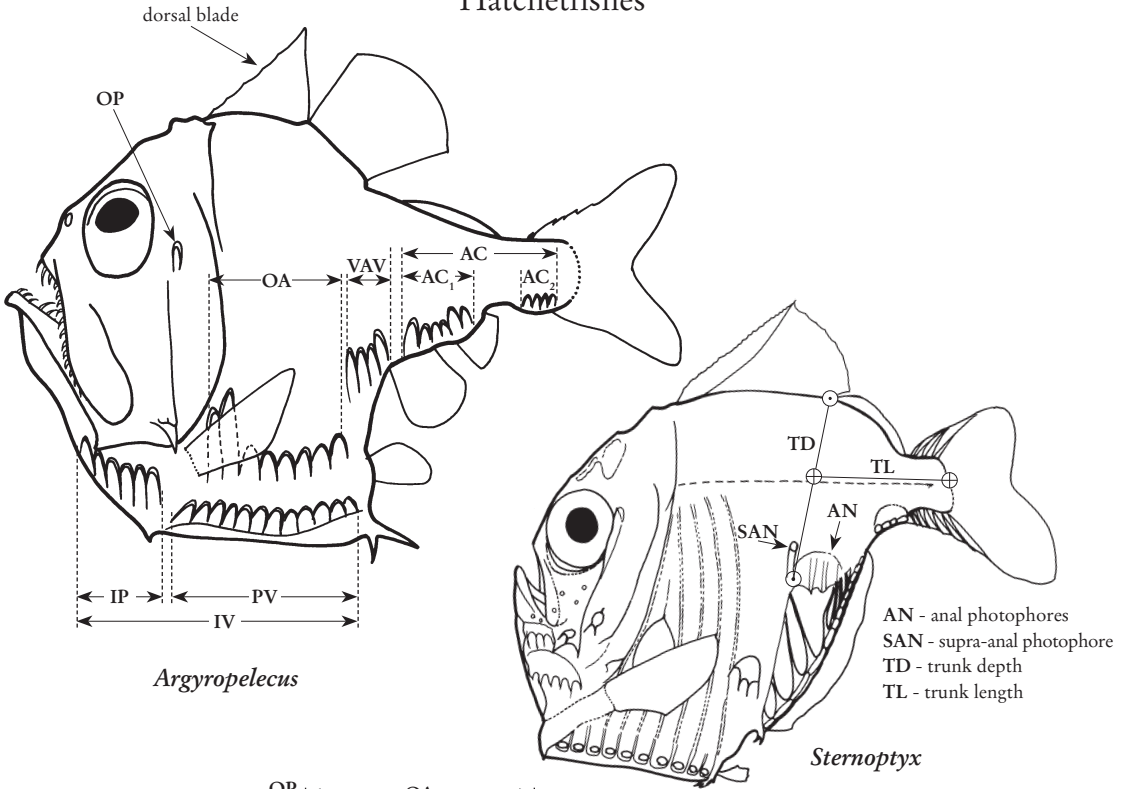
Other characters: dorsum dark, flanks silvery; upper pectoral and outer caudal speckled.



Size: 4.3 cm TL

STERNOPTYCHIDAE

Hatchetfishes



- AC - ventral series posterior to anal-fin origin
- BR - branchiostegal photophores
- IP - ventral series anterior to pectoral-fin base
- IV - ventral series anterior to pelvic-fin base
- OA - lateral series
- OP - opercular photophores
- ORB1 - preorbital photophore
- PV - ventral series between bases of pectoral and pelvic fins
- SO - paired photophores near symphysis of lower jaw
- VAV - ventral series between pelvic-fin base and anal-fin origin

General distribution and terminology of the luminous organs (photophores)

KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF STERNOPTYCHIDAE OCCURRING IN THE AREA

- 1a. Body compressed and deep, greatest depth from 50% to 125% Standard Length; dorsal blade forward of dorsal fin well developed; abdominal keel well developed; postabdominal spines present (Fig. 1) → 2
- 1b. Body elongate, greatest depth 27% or less Standard Length; dorsal blade and postabdominal spines absent (Fig. 3) → 4
- 2a. Eyes tubular, directed dorsally; PV photophores 12 (Fig. 1) *Argyropelecus* (p. 71)
- 2b. Eyes not tubular, directed laterally; PV photophores 10 (Fig. 2) → 3

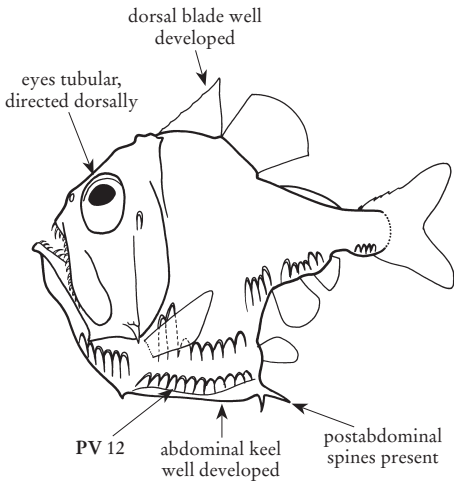


Fig. 1 *Argyropelecus*

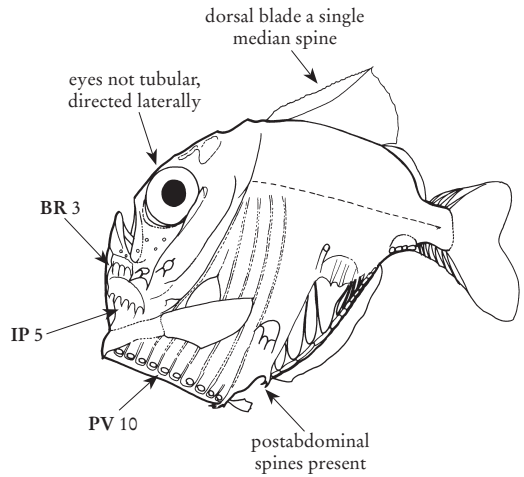
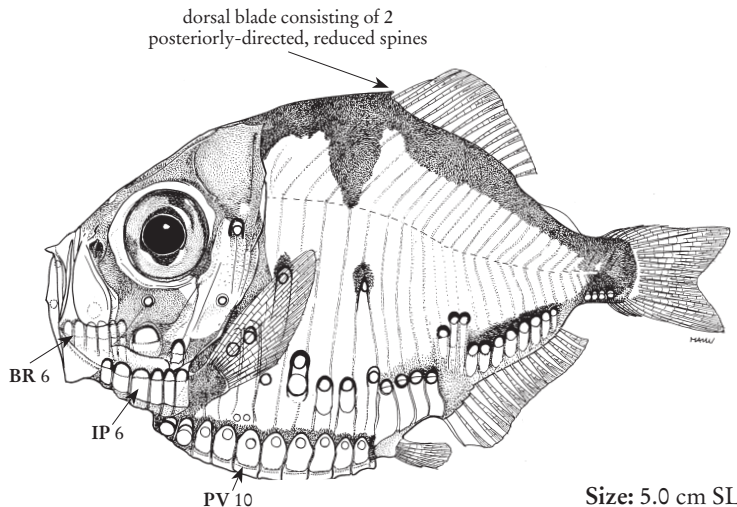
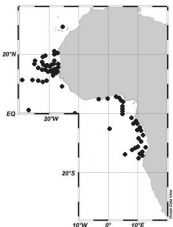


Fig. 2 *Sternoptyx*

- 3a. Dorsal blade consisting of 2 posteriorly-directed, reduced spines; BR photophores 6; IP photophores 6 *Polyipnus polli*
- 3b. Dorsal blade consisting of a single median flattened and prominent spine; BR photophores 3; IP photophores 5 (Fig. 2) *Sternoptyx* (p. 75)

***Polyipnus polli* Schultz, 1961**

Other characters: no information.



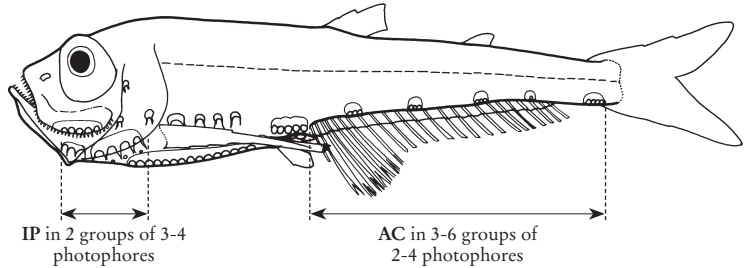
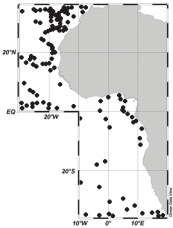
Size: 5.0 cm SL

4a. AC photophores in 3-6 groups, each of 2-4 photophores; IP in 2 groups of 3-4 photophores; gill rakers on first arch 14-16. *Valenciennellus tripunctulatus*

4b. AC with 2-3 groups of 5 or more photophores; IP in a single group of 6 (rarely 7) photophores (Fig. 3); gill rakers on first arch 15-30 → 5

Valenciennellus tripunctulatus (Esmark, 1871)

Other characters: silvery in colour during the day, darker at night.



Size: 3.1 cm SL

5a. Dorsal-fin origin behind mid-body; anal fin not divided by a cluster of AC photophores into 2 distinctly separate parts; SO photophore present (Fig. 3) *Maurolicus* (p. 74)

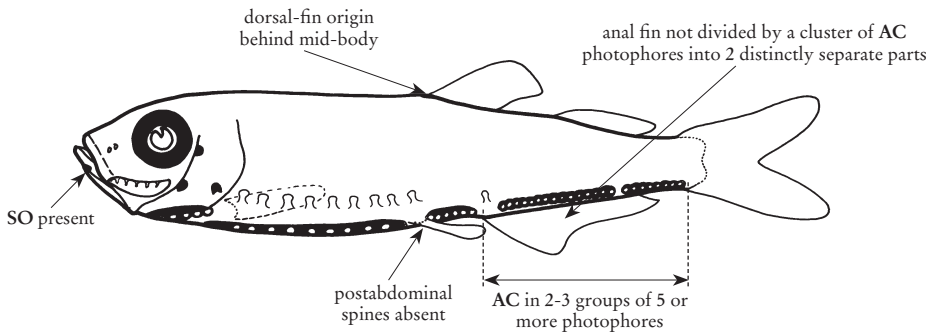
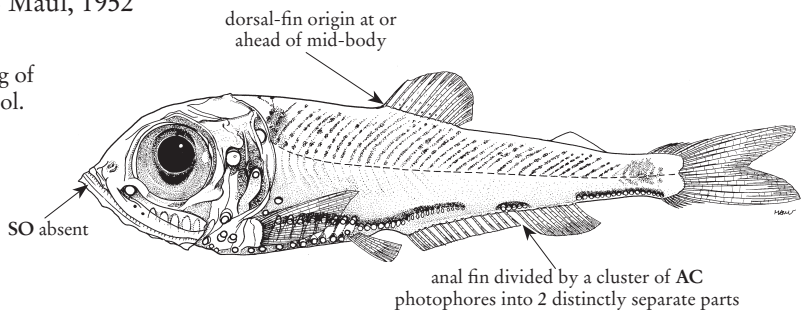
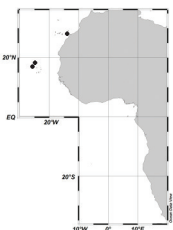


Fig. 3 *Maurolicus*

5b. Dorsal-fin origin at or ahead of mid-body; anal fin divided by a cluster of AC photophores into 2 distinctly separate parts; SO photophore absent *Argyripnus atlanticus*

Argyripnus atlanticus Maul, 1952

Other characters: whitish or yellowish, with thick sprinkling of black chromatophores in alcohol.



Size: 7.7 cm SL

KEY TO THE SPECIES OF *ARGYROPELECUS* OCCURRING IN THE AREA

- 1a. OA, VAV, AC₁, and AC₂ photophores not in a nearly continuous straight line; AC₂ photophores in a single glandular cluster (Fig. 1) → 2
- 1b. OA, VAV, AC₁, and AC₂ photophores in a nearly continuous straight line; AC₂ photophores separated by gaps (Fig. 2) → 3

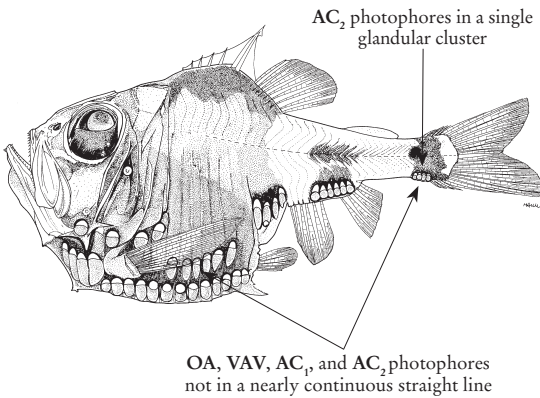


Fig. 1

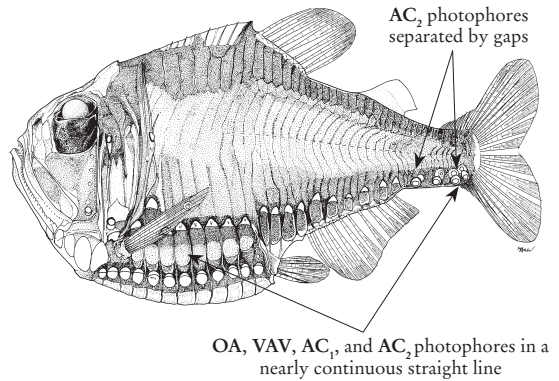


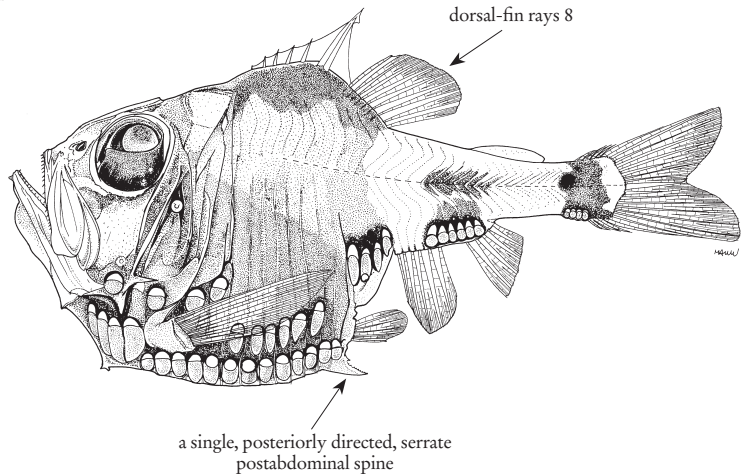
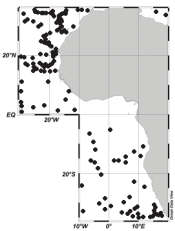
Fig. 2

- 2a. A single, posteriorly directed, serrate postabdominal spine; dorsal-fin rays 8. *Argyropelecus hemigymnus*
- 2b. Two separate postabdominal spines; dorsal-fin rays 9 → 4

Argyropelecus hemigymnus Cocco, 1829

Half-naked hatchetfish

Other characters: body bright silvery; body and trunk with dusky coloration at night.



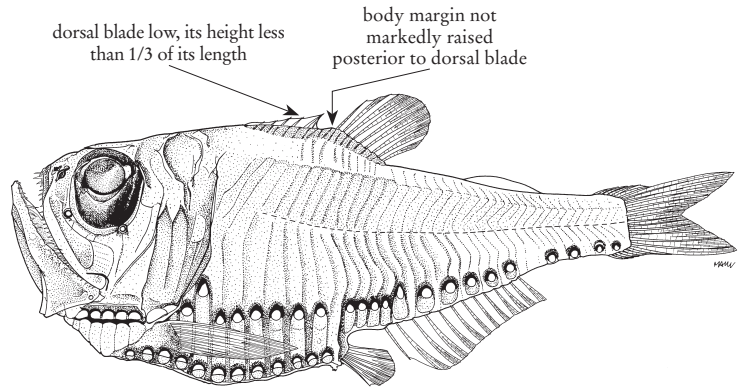
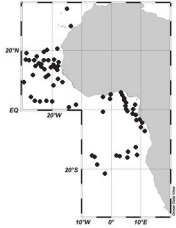
Size: 5.1 cm TL

3a. Dorsal blade low, its height less than 1/3 of its length; body margin not markedly raised posterior to dorsal blade; no laterally-directed spine near posterodorsal margin of eye *Argyropelecus affinis*

Argyropelecus affinis Garman, 1899

Pacific hatchet fish

Other characters: back dark, flanks silvery.



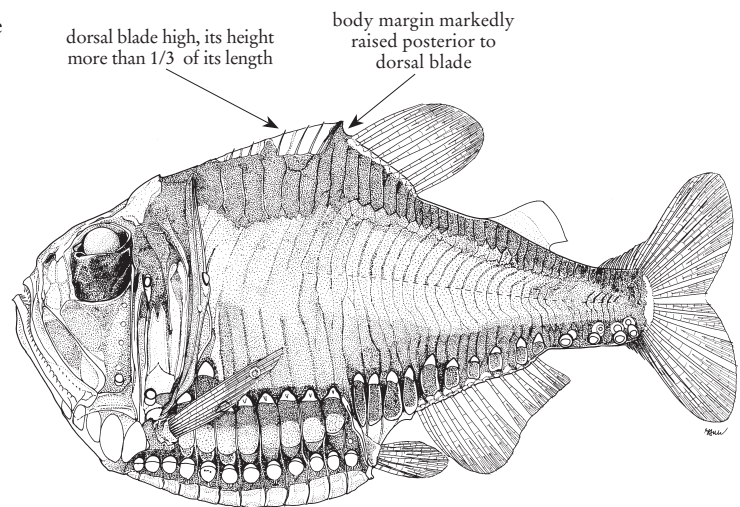
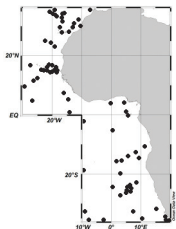
Size: 8.4 cm SL

3b. Dorsal blade high, its height more than 1/3 of its length; body margin markedly raised posterior to dorsal blade; prominent laterally-directed spine near posterodorsal margin of eye . . . *Argyropelecus gigas*

Argyropelecus gigas Norman, 1930

Hatchetfish

Other characters: fleshy elevation between third and fourth dorsal-blade spines.



Size: 12.0 cm SL

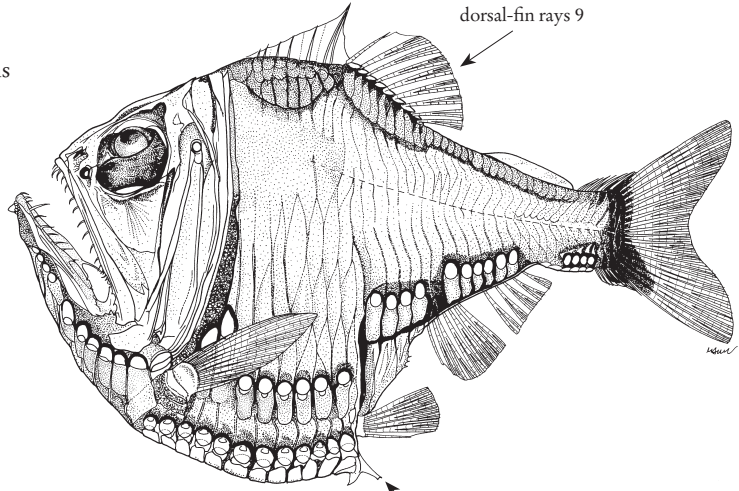
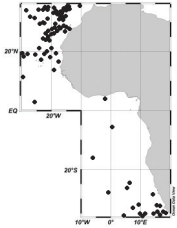
4a. Posterior postabdominal spine directed posteroventrally and markedly larger than the anterior; body depth at end of dorsal fin less than 1.4 times into Standard Length; pair of enlarged canine teeth in lower jaw; subcaudal spines present *Argyropelecus aculeatus*

4b. Both postabdominal spines about equal in length; body depth at end of dorsal fin more than 1.5 times into Standard Length; canines may or may not be present; subcaudal spines may or may not be present . . . → 5

Argyropelecus aculeatus Valenciennes, 1850

Pacific hatchetfish

Other characters: back dark, flanks silvery; dark pigment triangle at base of ventral caudal-fin lobe in specimens larger than 2.0 cm SL.



dorsal-fin rays 9

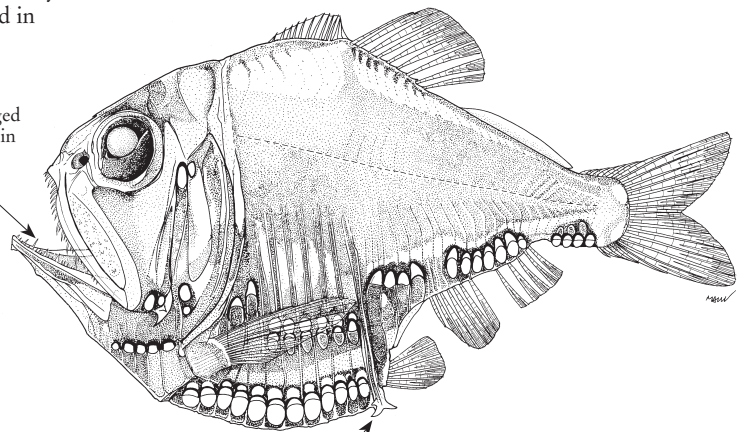
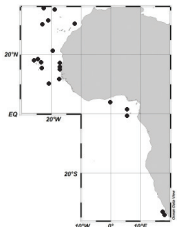
posterior postabdominal spine directed posteroventrally and markedly larger than the anterior

Size: 8.4 cm SL

5a. Pair of enlarged canine teeth in lower jaw; sharply pointed anteriormost postabdominal spine curved markedly and evenly forward; upper preopercular spine short, not extending much beyond the posterior edge of the preopercle *Argyropelecus olfersi*

Argyropelecus olfersi (Cuvier, 1829)

Other characters: back dark, flanks silvery; dorsalmost pectoral-fin ray pigmented in specimens larger than 2.0 cm SL.



pair of enlarged canine teeth in lower jaw

sharply pointed anteriormost postabdominal spine curved markedly and evenly forward

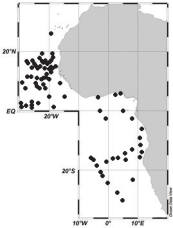
Size: 9.0 cm TL

5b. No pair of enlarged canine teeth in lower jaw; anteriormost postabdominal spine squared or blunt, not curving evenly forward; upper preopercular spine extending well beyond the posterior edge of the preopercle
 *Argyropelecus sladeni*

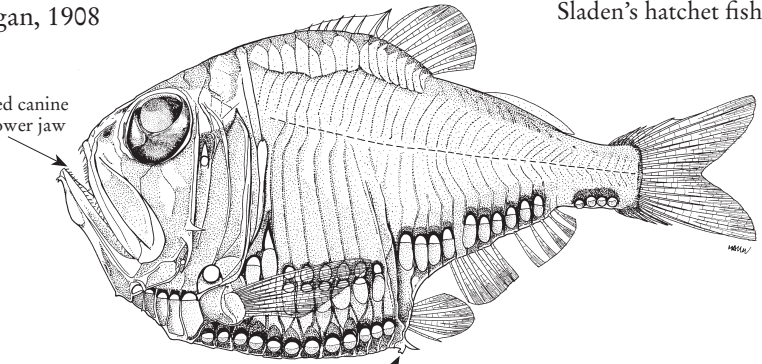
Argyropelecus sladeni Regan, 1908

Sladen's hatchet fish

Other characters: no information.



no enlarged canine teeth in lower jaw



anteriormost postabdominal spine squared or blunt

Size: 7.0 cm TL

KEY TO THE SPECIES OF *MAUROLICUS* OCCURRING IN THE AREA

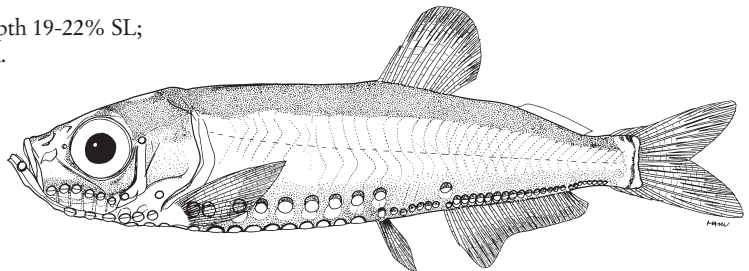
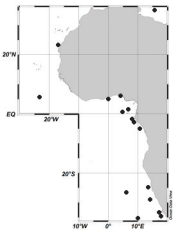
1a. Head length 25-29% Standard Length; eye diameter 8-10% Standard Length . . . *Maurolicus muelleri*

1b. Head length 28.5-34% Standard Length; eye diameter 9.5-11.5% Standard Length → 2

Maurolicus muelleri (Gmelin, 1789)

Silvery lightfish

Other characters: maximum body depth 19-22% SL; body silvery with a greenish-blue back.



Size: 8.0 cm TL

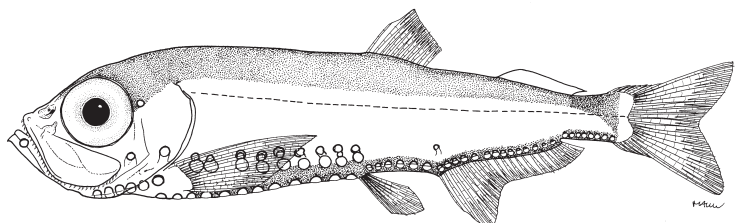
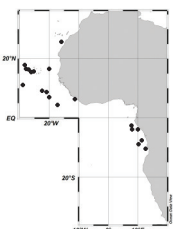
2a. Gill rakers 21-26. *Maurolicus weitzmani*

2b. Gill rakers 25-32 → 3

Maurolicus weitzmani Parin & Kobylansky, 1993

Atlantic pearlside

Other characters: stomach and hind portion of intestine not pigmented.

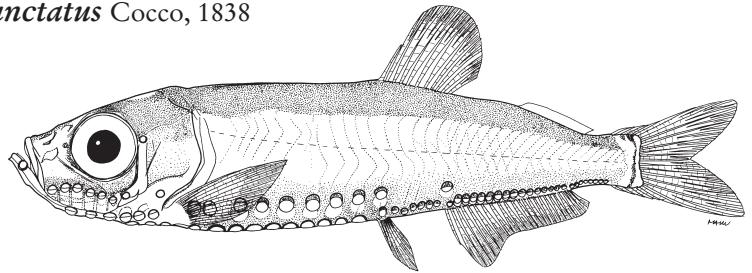
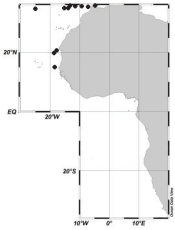


Size: 5.2 cm TL

3a. Posterior part of intestine intensely pigmented. *Maurolicus amethystinopunctatus*

Maurolicus amethystinopunctatus Cocco, 1838

Other characters: no information.

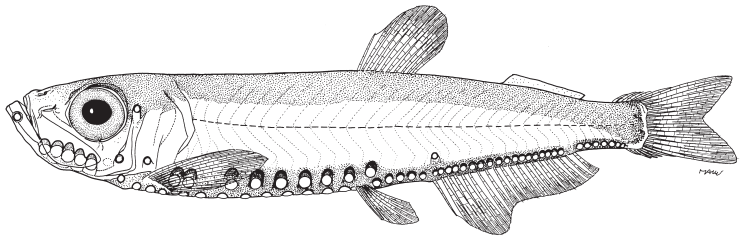
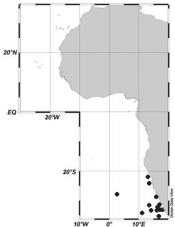


Size: 4.8 cm SL

3b. Posterior part of intestine not pigmented *Maurolicus walvisensis*

Maurolicus walvisensis Parin & Kobylansky, 1993

Other characters: no information.



Size: 4.7 cm SL

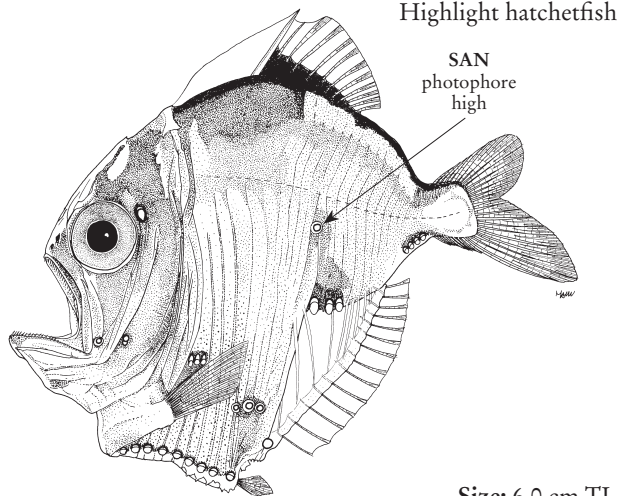
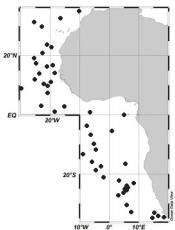
KEY TO THE SPECIES OF *STERNOPTYX* OCCURRING IN THE AREA

1a. SAN photophore high, its height greater than 1/2 distance from ventral body margin to midline (often raised to mid-line); gill-raker tooth plates with prominent spines *Sternoptyx pseudobscura*

1b. SAN photophore low, its height less than 1/2 distance from ventral body margin to midline; gill-raker tooth plates lacking prominent spines → 2

Sternoptyx pseudobscura Baird, 1971

Other characters: triangular transparent membrane above anal fin.



Highlight hatchetfish

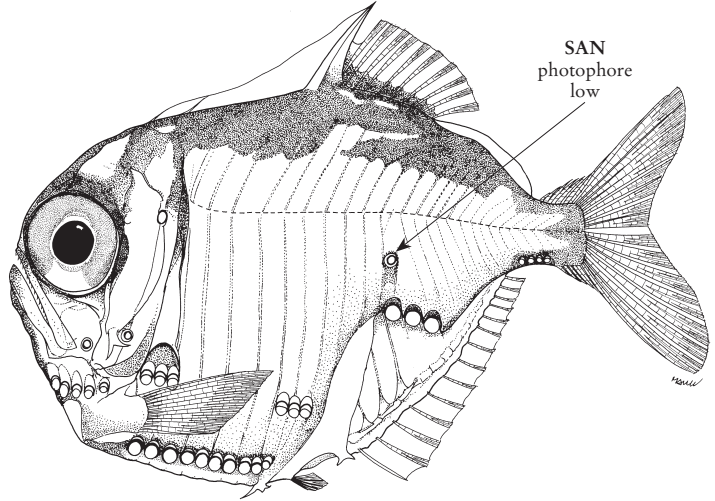
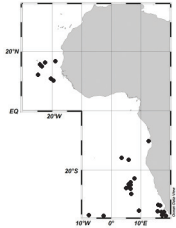
Size: 6.0 cm TL

2a. SAN photophore height 2-3 times in trunk depth; trunk depth about equal to trunk length; dorsal-fin rays usually 11-12; pectoral fin pigmented in juveniles *Sternoptyx pseudodiaphana*

Sternoptyx pseudodiaphana Borodulina, 1977

False oblique hatchetfish

Other characters: adults with pigment streaks on ventral caudal-fin rays.



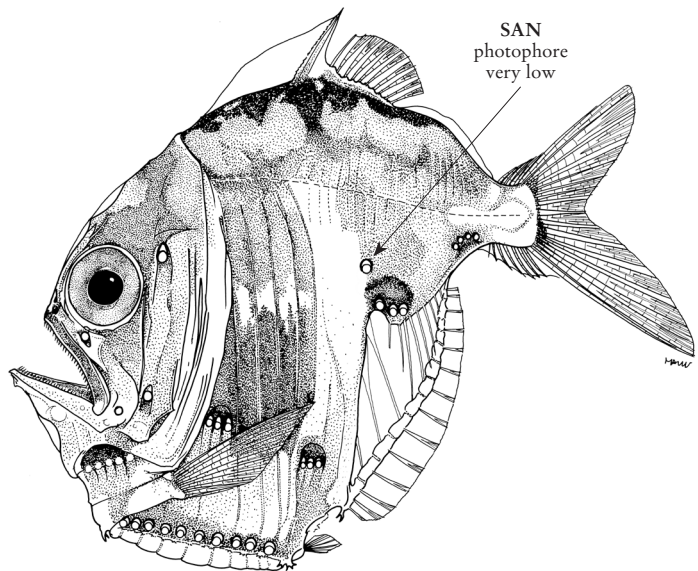
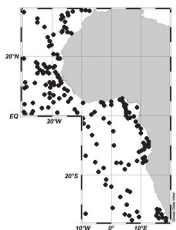
Size: 6.0 cm SL

2b. SAN photophore height 3-4 times in trunk depth; trunk depth conspicuously greater than trunk length; dorsal-fin rays usually 9-11; no pectoral fin pigmentation in juveniles *Sternoptyx diaphana*

Sternoptyx diaphana Hermann, 1781

Diaphanous hatchet fish

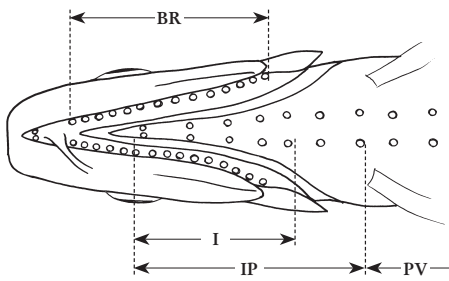
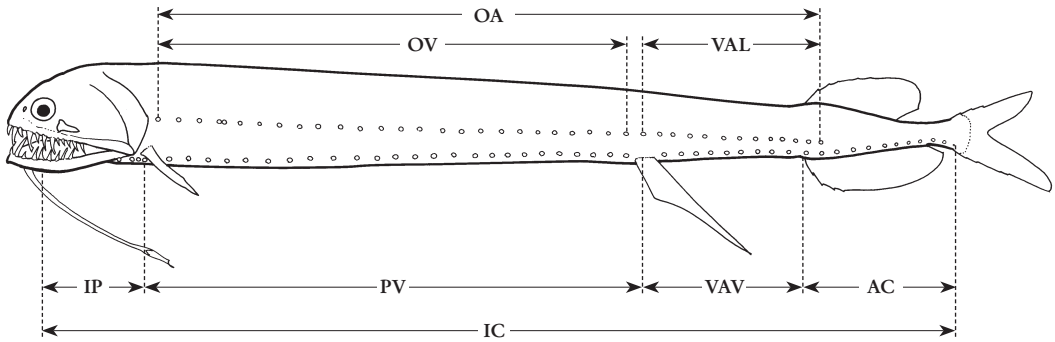
Other characters: no information.



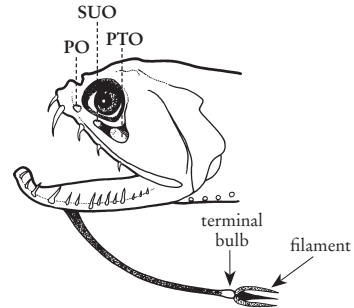
Size: 5.5 cm SL

STOMIIDAE

Dragonfishes



Underside of head (after Nakabo, 2002)



Lateral view of head

- AC - ventral series posterior to anal-fin origin
- BR - branchiostegal series
- I - isthmus photophores
- IC - ventral series from anterior end of isthmus to posterior of caudal peduncle
- IP - ventral series from anterior isthmus to pectoral-fin origin
- OA - lateral series

- OV - lateral series from just behind operculum to just before pelvic-fin base
- PO - pre-orbital photophores
- PTO - post-orbital photophores
- PV - ventral series between bases of pectoral and pelvic fins
- SUO - sub-orbital photophores
- VAL - lateral series posterior to pelvic-fin base
- VAV - ventral series between pelvic-fin base and anal-fin origin

General distribution and terminology of the luminous organs (photophores)

KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF STOMIIDAE OCCURRING IN THE AREA

- 1a. Body with scales or with hexagonal scale pockets (scales often lost during trawling)(Fig. 1). → 2
- 1b. Body without scales or hexagonal scale pockets (Fig. 2) → 3

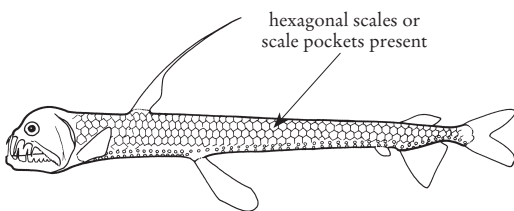


Fig. 1 *Chauliodus*

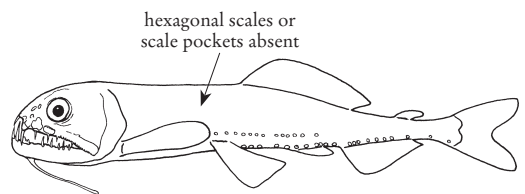


Fig. 2 *Astronesthes*

- 2a. First dorsal fin located near head; anal fin located near caudal fin (Fig. 3) *Chauliodus* (p. 97)
 2b. Dorsal and anal fins located near caudal fin (Fig. 4) *Stomias* (p. 126)

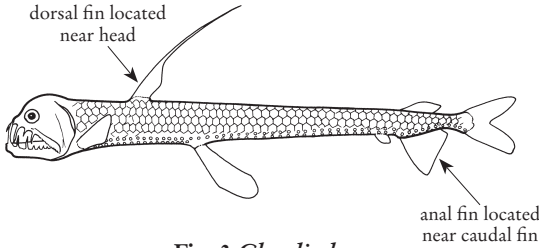


Fig. 3 *Chauliodus*

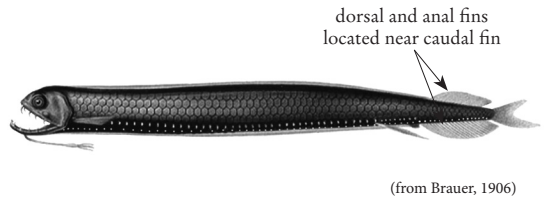


Fig. 4 *Stomias*

- 3a. Dorsal fin distinctly anterior to anal fin; adipose fin present (Fig. 5)(except for *Rhadinesthes decimus* [p. 79]) → 4
 3b. Dorsal and anal fins located near caudal fin; adipose fin absent (Fig. 6)(except for *Chirostomias pliopterus* [p. 80]) → 8

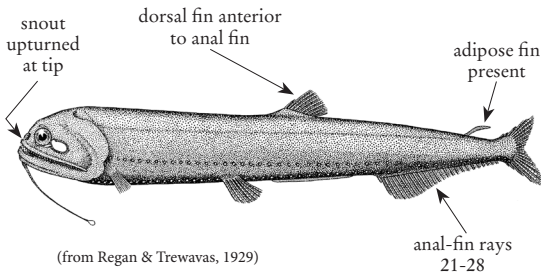


Fig. 5 *Neonesthes*

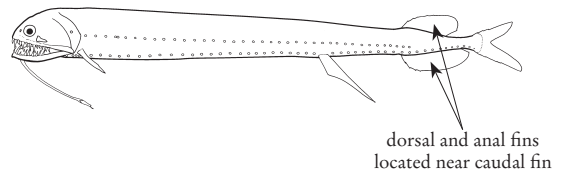


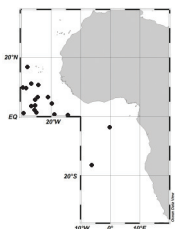
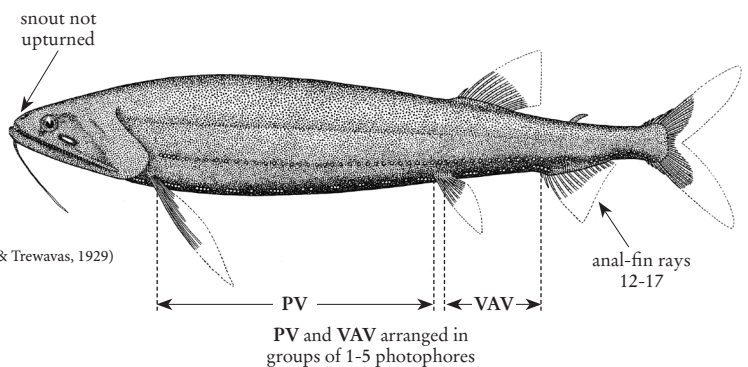
Fig. 6 *Melanostomias*

- 4a. Anal-fin rays 21-28; snout upturned at tip; gill rakers long, numerous, not in groups; lower fleshy lobe of caudal fin distinctly longer than upper (Fig. 5) *Neonesthes* (p. 120)
 4b. Anal-fin rays 20 or fewer; snout not upturned; gill rakers as 1-4 short teeth set in groups far apart. → 5
 5a. PV and VAV arranged in groups of 1-5 photophores; total PV photophores 33 or more.
 *Heterophotus ophistoma*

Heterophotus ophistoma Regan & Trewavas, 1929

Wingfin snaggletooth

Other characters: black in colour; barbel shorter than head length, with a dark stem and a flattened and tapering tip.



Size: 35.6 cm SL

- 5b. PV and VAV in a regular, continuous row; total PV photophores 26 or less (Figs. 7 & 8) → 6
- 6a. Teeth on maxillary comb-like, closely spaced (Fig. 7) *Astronesthes* (p. 86)
- 6b. Teeth on maxillary slender, distinctly separated, not slanting rearward (Fig. 8) → 7

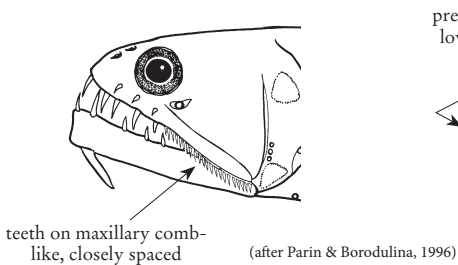


Fig. 7 *Astronesthes*

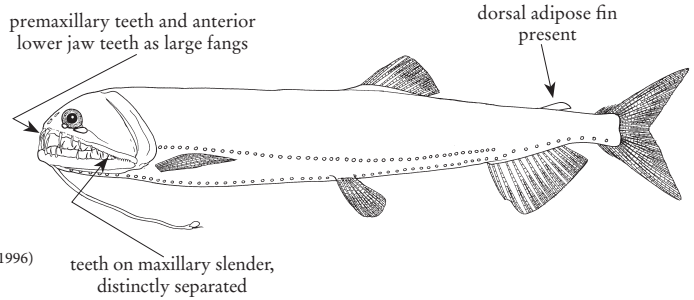


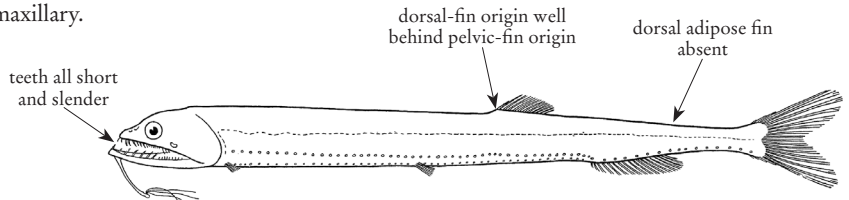
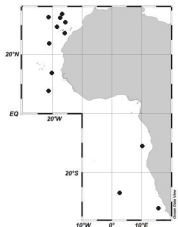
Fig. 8 *Borostomias*

- 7a. Teeth in jaws all short and slender, no large fangs developed; dorsal-fin origin well behind pelvic-fin origin; dorsal adipose fin absent *Rhadinesthes decimus*
- 7b. Premaxillary teeth and anterior lower jaw teeth as large fangs; dorsal-fin origin only slightly behind pelvic-fin origin; dorsal adipose fin present (Fig. 8) *Borostomias* (p. 96)

Rhadinesthes decimus (Zugmayer, 1911)

Slender snaggletooth

Other characters: teeth on upper jaw 10-12 on premaxillary, 14-30 on maxillary.



(from Regan & Trewavas, 1930)

Size: 41.0 cm SL

- 8a. Dorsal-fin base much longer than anal-fin base; dorsal-fin origin anterior to mid-body (Fig. 9) *Idiacanthus* (p. 113)
- 8b. Dorsal and anal-fin bases approximately equal, or anal-fin base longer than dorsal (Fig. 10) → 9
- 9a. Mouth lacks floor, lower jaws not connected by membrane. → 10
- 9b. Mouth with floor, lower jaws connected by membrane → 12

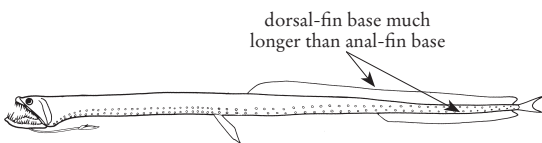


Fig. 9 *Idiacanthus*

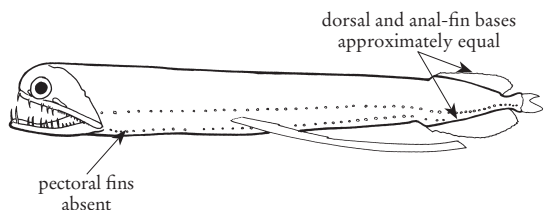


Fig. 10 *Photostomias*

- 10a. Pectoral fins absent (Fig. 10); 1 row of photophores on each side of isthmus . . . *Photostomias* (p. 125)
- 10b. Pectoral fins present; 2 rows of photophores on each side of isthmus → 11
- 11a. Chin barbel absent; snout shorter than eye diameter (Fig. 11). *Malacosteus* (p. 116)
- 11b. Chin barbel present; snout longer than eye diameter (Fig. 12). *Aristostomias* (p. 84)

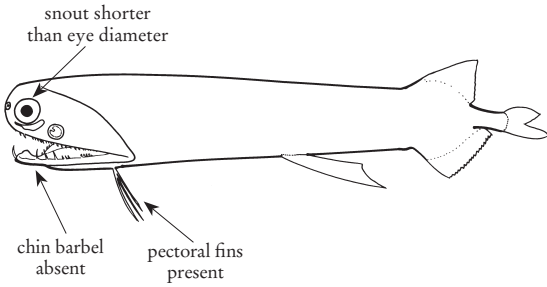


Fig. 11 *Malacosteus*

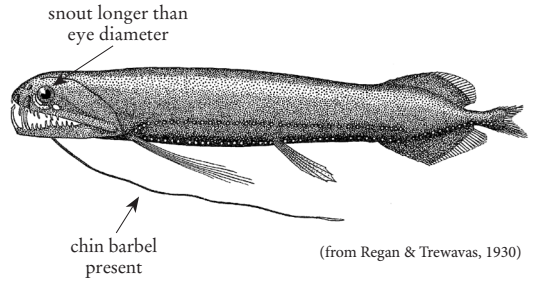
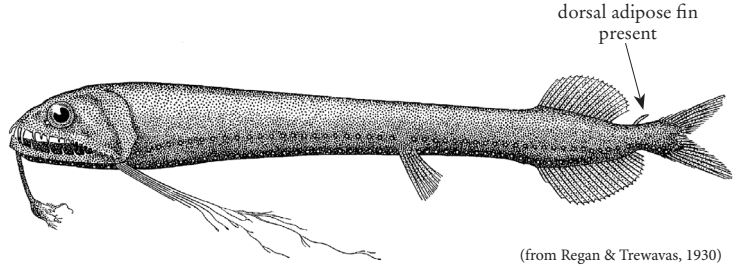
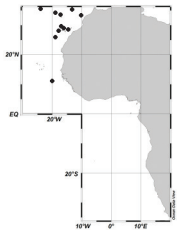


Fig. 12 *Aristostomias*

- 12a. Dorsal adipose-fin present. *Chirostomias pliopterus*
- 12b. Dorsal adipose-fin absent → 13

***Chirostomias pliopterus* Regan & Trewavas, 1930**

Other characters: stem of barbel black or dark brown, basal portion of bulb black, terminal luminous portion and filaments yellowish; body colour black, with greenish or bluish bronze iridescence on anterior parts of sides.



Size: 20.5 cm SL

- 13a. Anal-fin base much longer than dorsal-fin base, its origin anterior to dorsal-fin origin (Fig. 13) . . . → 14
- 13b. Anal-fin base about equal to dorsal-fin base, its origin opposite to dorsal-fin origin (Fig. 14) . . . → 15

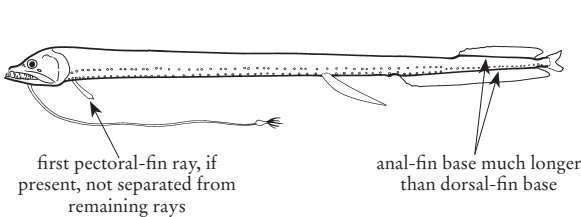


Fig. 13 *Eustomias*

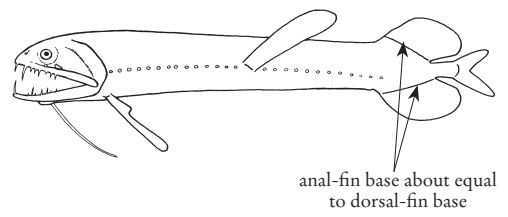


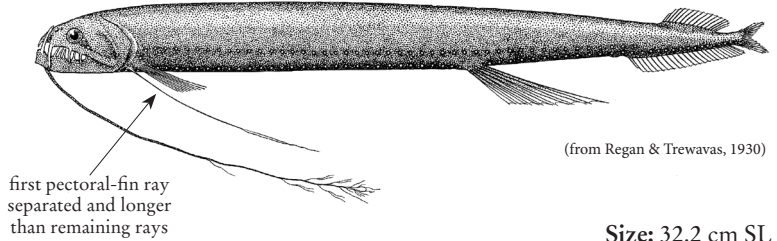
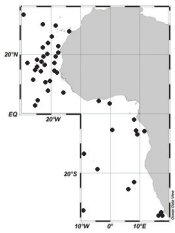
Fig. 14 Other Melanostomiinae

- 14a. First pectoral-fin ray separated and longer than remaining rays; snout blunt and non-protrusible *Flagellostomias boureei*

 14b. First pectoral-fin ray, if present, not separated from remaining rays; snout tapering and protrusible (Fig. 13) *Eustomias* (p. 99)

Flagellostomias boureei (Zugmayer, 1913)

Other characters: stem of barbel spotted with numerous patches of white luminous tissue.

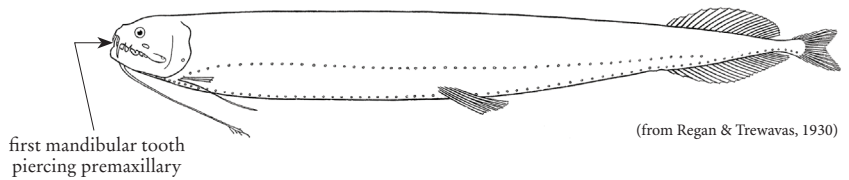
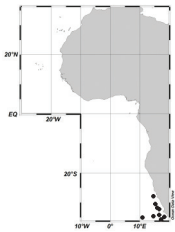


Size: 32.2 cm SL

- 15a. First mandibular tooth piercing premaxillary *Opostomias micripnus*
 15b. First mandibular tooth not piercing premaxillary → 16

Opostomias micripnus (Günther, 1878)

Other characters: no information.



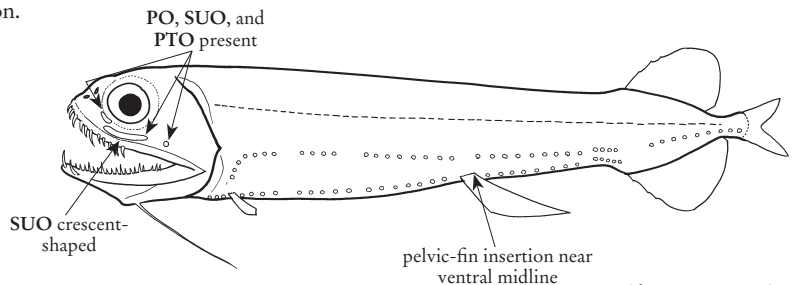
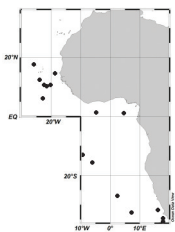
Size: 50.0 cm SL

- 16a. Pelvic-fin insertion near middle of flank *Bathophilus* (p. 93)
 16b. Pelvic-fin insertion near ventral midline → 17
 17a. PO, SUO, and PTO photophores present; SUO organ crescent-shaped (red or orange in fresh specimens) *Pachystomias microdon*
 17b. PO and SUO photophores absent, or PO photophore absent and SUO photophore minute; PTO photophore present, or present in males and absent in females → 18

Pachystomias microdon (Günther, 1878)

Smalltooth dragonfish

Other characters: no information.



Size: 22.1 cm SL

- 18a. Line or loop of luminous tissue on each side of flank (Fig. 15a & 15b) . . . *Grammatostomias* (p. 112)
 18b. No line or loop of luminous tissue on each side of flank → 19

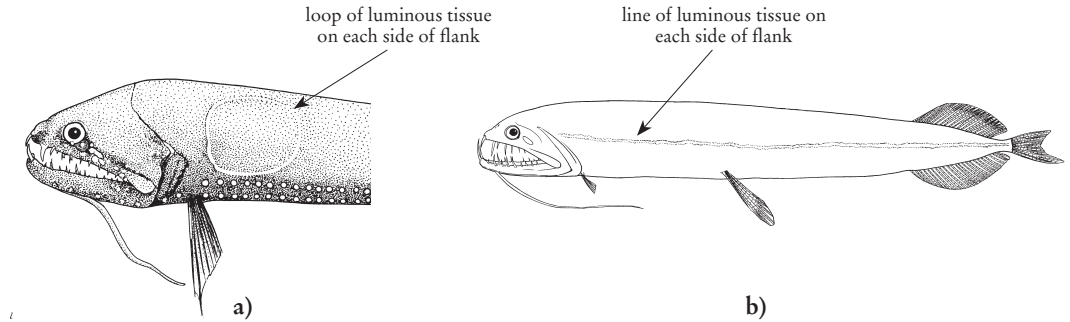


Fig. 15 *Grammatostomias*

- 19a. Lower jaw long, longer than upper, and strongly curved upwards; pectoral-fin rays 0-3 (Fig. 16) *Photonectes* (p. 122)
 19b. Lower jaw length about equal to upper jaw, not projecting beyond upper, and not curved upwards (Fig. 17); pectoral-fin rays 3-12 → 20

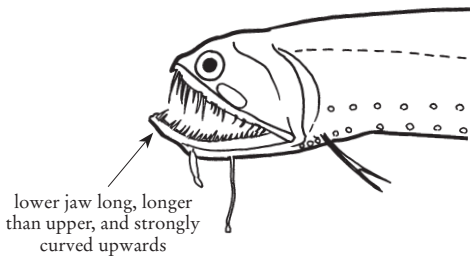


Fig. 16 *Photonectes*

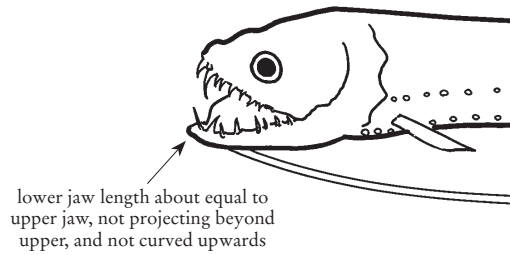


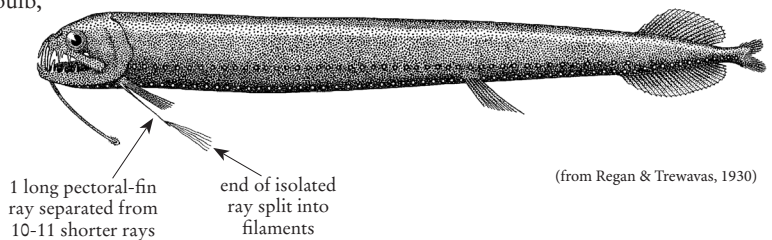
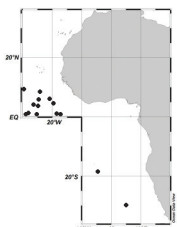
Fig. 17 *Leptostomias*

- 20a. Pectoral fins with 1 long ray separated from shorter rays. → 21
 20b. Pectoral fins with 3-12 rays, with none separated → 22
 21a. A single long pectoral-fin ray separated from 10-11 shorter rays; end of isolated ray split into filaments *Thysanactis dentex*

Thysanactis dentex Regan & Trewavas, 1930

Broomfin dragonfish

Other characters: chin barbel as long as head, pigmented with white spots; tip of barbel white, small spindle-shaped bulb, minute and rounded terminal body.



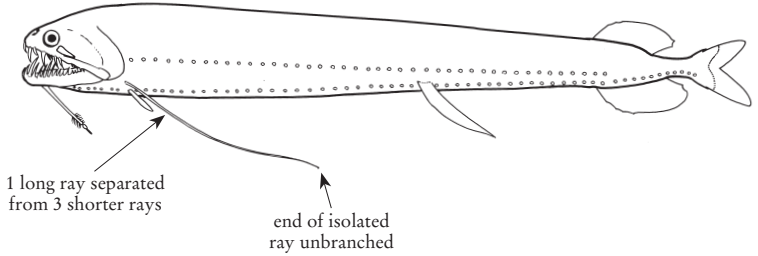
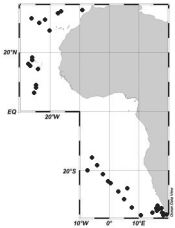
(from Regan & Trewavas, 1930)

Size: 18.0 cm SL

21b. A single long pectoral-fin ray separated from 3 shorter rays; end of isolated ray unbranched *Echiostoma barbatum*

Echiostoma barbatum Lowe, 1843

Other characters: no information.



Size: 36.8 cm SL

22a. Body long and narrow, its depth 10% SL or less; PV photophores 39 or more; pectoral-fin rays 10-12 (Fig. 18) *Leptostomias* (p. 114)

22b. Body depth greater than 10% SL; PV photophores 30 or less; pectoral-fin rays 3-7 → 23

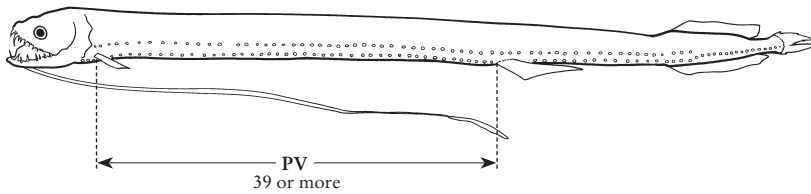


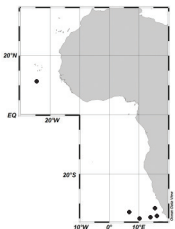
Fig. 18 *Leptostomias*

23a. A large light organ behind eye, above postorbital organ, reaching posterior edge of opercle; all teeth fixed and not depressible *Trigonolampa miriceps*

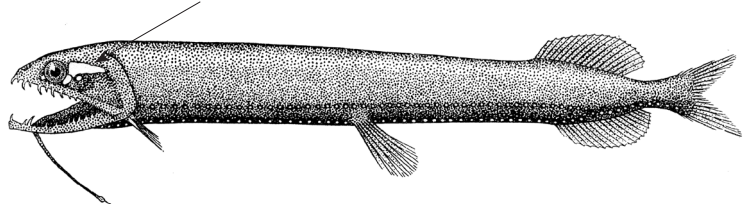
23b. No large light organ behind eye; usually at least 1 depressible tooth in each jaw → 24

Trigonolampa miriceps Regan & Trewavas, 1930

Other characters: minute light organs scattered over skin of body.



a large light organ behind eye, above postorbital organ, reaching posterior edge of operculum



(from Regan & Trewavas, 1930)

Size: 32.0 cm SL

- 24a. Pectoral-fin rays 5-6 (Fig. 19) *Melanostomias* (p. 117)
 24b. Pectoral-fin rays 7 or more (Fig. 20) *Odontostomias* (p. 121)

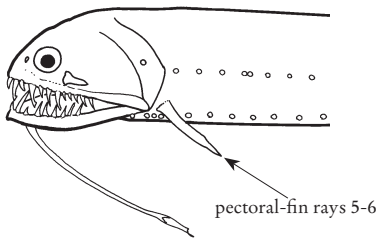


Fig. 19 *Melanostomias*

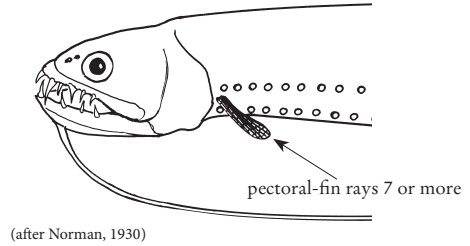


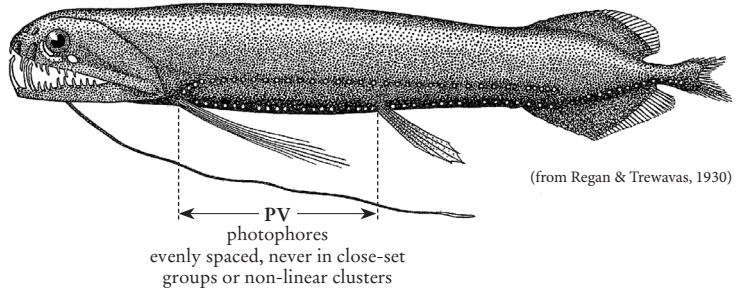
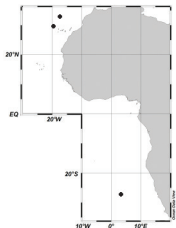
Fig. 20 *Odontostomias*

KEY TO THE SPECIES OF *ARISTOSTOMIAS* OCCURRING IN THE AREA

- 1a. PV photophores evenly spaced, never in close-set groups or non-linear clusters . . . *Aristostomias lunifer*
 1b. PV photophores in close-set groups or non-linear clusters → 2

Aristostomias lunifer Regan & Trewavas, 1930

Other characters: head and body black; pale luminous material forming a prominent, solid or broken crescent extending along the anterior margin of the eye to below SUO.



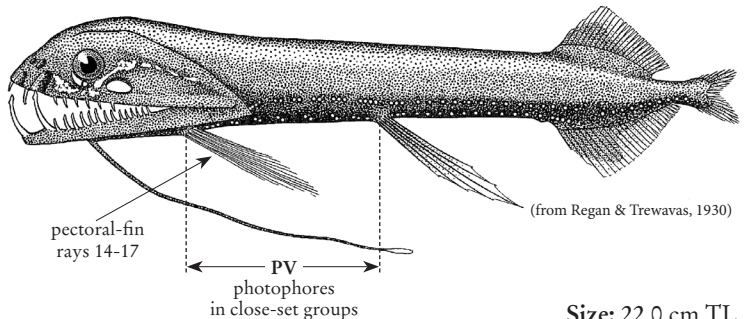
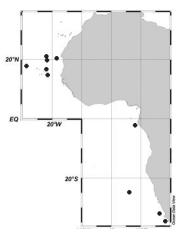
(from Regan & Trewavas, 1930)

Size: 17.0 cm TL

- 2a. Pectoral-fin rays 14-17 *Aristostomias polydactylus*
 2b. Pectoral-fin rays 3-10 → 3

Aristostomias polydactylus Regan & Trewavas, 1930

Other characters: colour black; long, slender barbel bearing cylindrical bulb.



(from Regan & Trewavas, 1930)

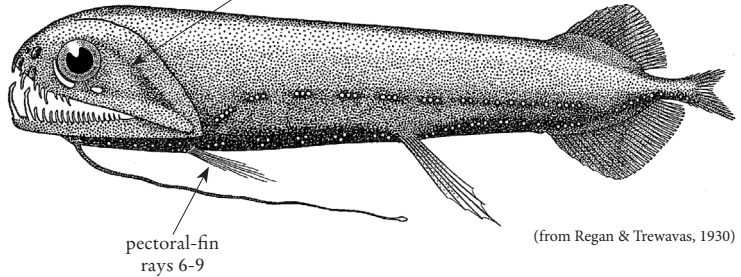
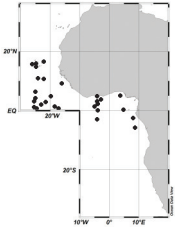
Size: 22.0 cm TL

- 3a. No luminous dots running backwards from eye to PTO *Aristostomias xenostoma*
 3b. A series of luminous dots running backwards from eye to PTO → 4

Aristostomias xenostoma Regan & Trewavas, 1930

Other characters: colour brown to black; barbel bearing a well-defined bulb.

no luminous dots running backwards from eye to postorbital organ



(from Regan & Trewavas, 1930)

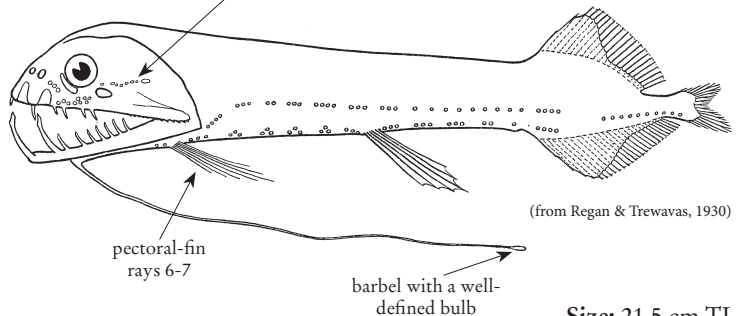
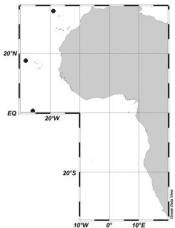
Size: 15.0 cm TL

- 4a. Barbel with a well-defined bulb *Aristostomias tittmanni*

Aristostomias tittmanni Welsh, 1923

Other characters: colour dark brown to black. PV 17-19 in 5 or 6 groups.

series of luminous dots running backwards from eye to postorbital organ



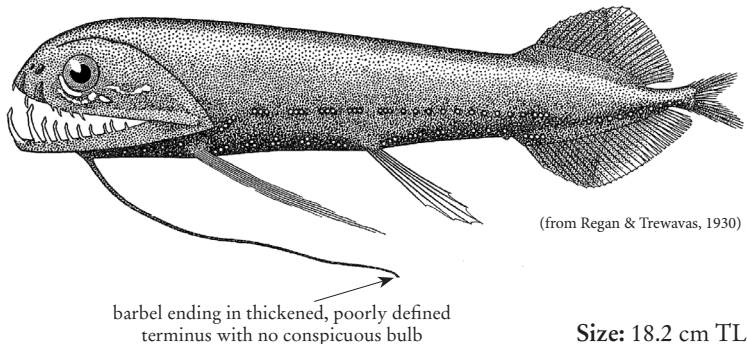
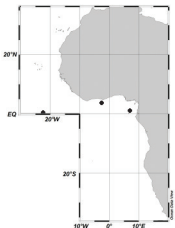
(from Regan & Trewavas, 1930)

Size: 21.5 cm TL

- 4b. Barbel ending in thickened, poorly defined terminus with no conspicuous bulb . *Aristostomias grimaldii*

Aristostomias grimaldii Zugmayer, 1913

Other characters: colour dark brown to black; PV 14-16 in 5 groups.



(from Regan & Trewavas, 1930)

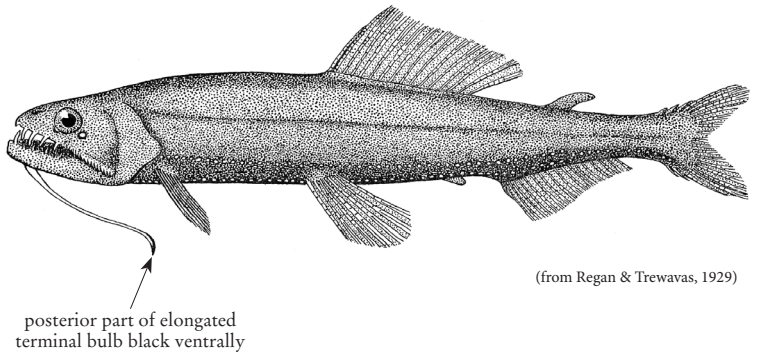
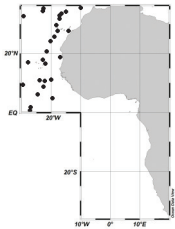
Size: 18.2 cm TL

KEY TO THE SPECIES OF *ASTRONESTHES* OCCURRING IN THE AREA

- 1a. IC photophores more than 56; no dense aggregations of luminous tissue on head and body → 2
- 1b. IC photophores not more than 55 (except for *Astronesthes bouleengeri* – up to 62); dense aggregations of luminous tissue on head and body; usually a spot of luminous tissue on opercle (except for *Astronesthes bouleengeri*, *A. niger*, *A. leucopogon*) → 5
- 2a. Posterior part of elongated terminal bulb of chin barbel black ventrally; 4 premaxillary fangs *Astronesthes gemmifer*
- 2b. Terminal bulb, if present, not pigmented in its posteroventral part → 3

***Astronesthes gemmifer* Goode & Bean, 1896**

Other characters: IC photophores 62-70; body black.



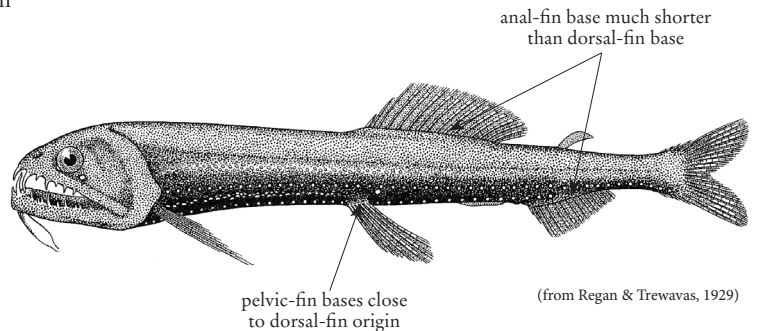
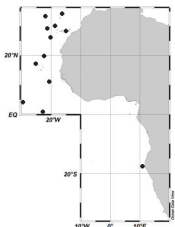
(from Regan & Trewavas, 1929)

Size: 17.0 cm SL

- 3a. Anal-fin base length much shorter than dorsal-fin base length; pelvic-fin bases close to dorsal-fin origin *Astronesthes neopogon*
- 3b. Anal-fin base length approximately equal to dorsal-fin base length; pelvic-fin bases well ahead of dorsal-fin origin. → 3

***Astronesthes neopogon* Regan & Trewavas, 1929**

Other characters: IC photophores 56-59; head and body black; pale spots, when present, not forming large patches.



(from Regan & Trewavas, 1929)

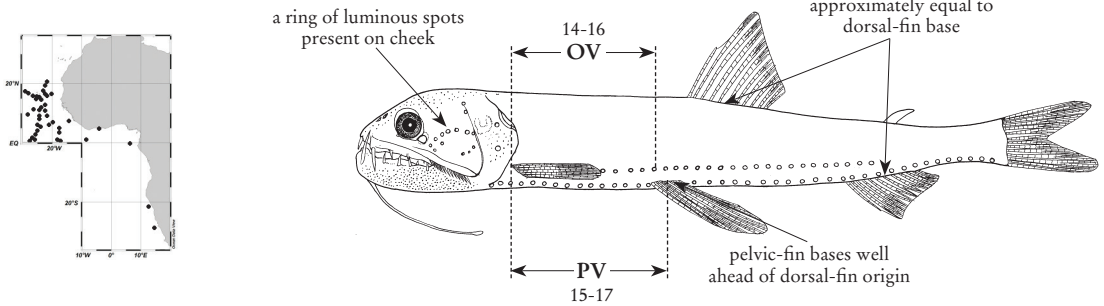
Size: 19.2 cm SL

4a. OV photophores 14-16, PV 15-17; a ring of luminous spots present on cheek *Astronesthes richardsoni*

Astronesthes richardsoni (Poey, 1852)

Richardson's snaggletooth

Other characters: head and body black.

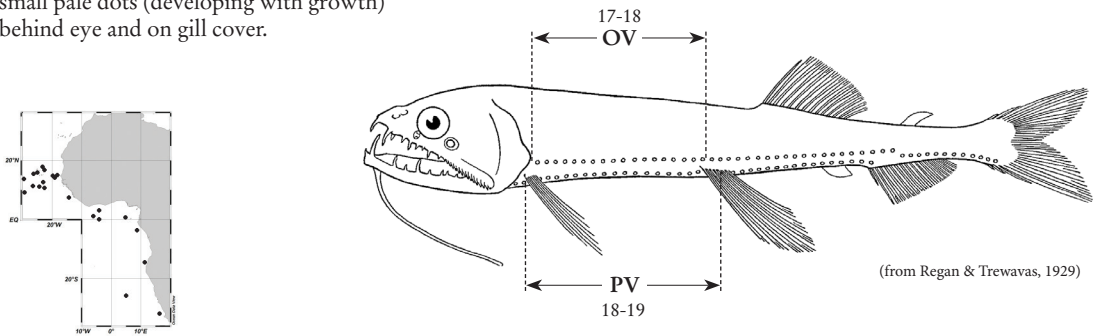


Size: 15.9 cm SL

4b. OV photophores 17-18, PV 18-19; no ring of luminous spots present on cheek *Astronesthes caulophorus*

Astronesthes caulophorus Regan & Trewavas, 1929

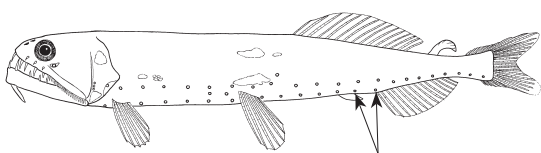
Other characters: body black, head with small pale dots (developing with growth) behind eye and on gill cover.



Size: 26.2 cm SL

5a. Serial photophores widely spaced (inter-photophore distances 8-10 times greater than photophore diameter); IC photophores 29 or less (Fig. 1) → 6

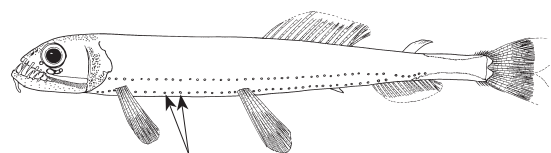
5b. Serial photophores closely situated (inter-photophore distances 2-7 times greater than photophore diameter); IC photophores 44 or more (Fig. 2) → 7



(after Parin & Borodulina, 1996)

Fig. 1

serial photophores widely spaced



(after Parin & Borodulina, 2001)

Fig. 2

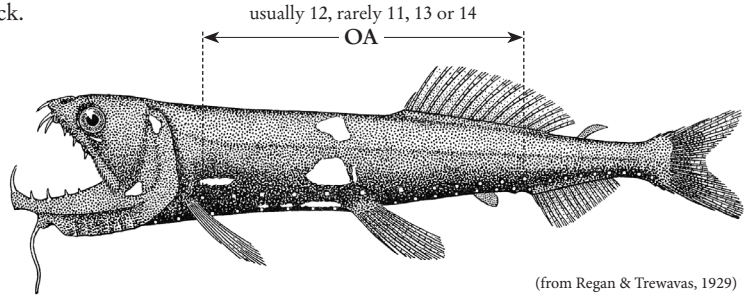
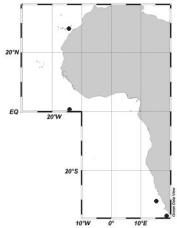
serial photophores closely situated

6a. OA photophores usually 12, rarely 11, 13 or 14; last photophore of VAL series in advance of both anal-fin origin and last photophore of VAV series *Astronesthes indicus*

Astronesthes indicus Brauer, 1902

Black snaggletooth

Other characters: head and body black.



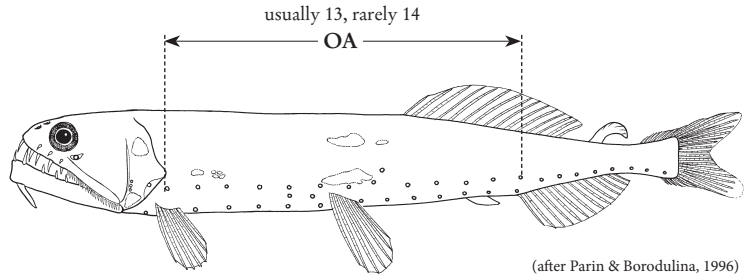
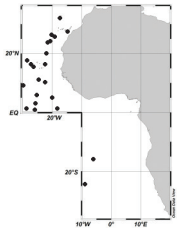
(from Regan & Trewavas, 1929)

Size: 21.0 cm SL

6b. OA photophores usually 13, rarely 14; last photophore of VAL series behind both anal-fin origin and last photophore of VAV series *Astronesthes atlanticus*

Astronesthes atlanticus Parin & Borodulina, 1996

Other characters: head and body black.

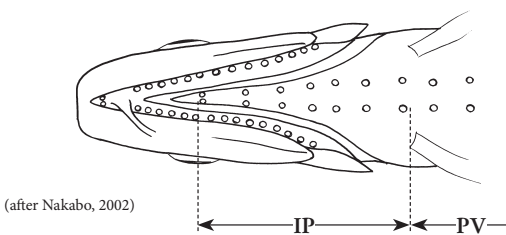


(after Parin & Borodulina, 1996)

Size: 16.3 cm SL

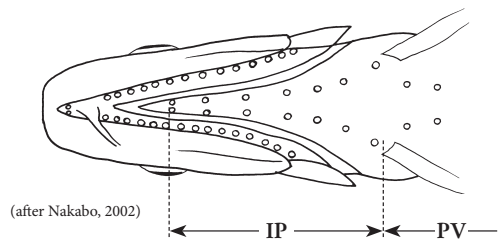
7a. Ventral row of photophores does not form a steep arch between IP and PV series below pectoral-fin base (Fig. 3) → 8

7b. Ventral row of photophores forms a steep arch between IP and PV series below pectoral-fin base (Fig. 4) → 9



(after Nakabo, 2002)

Fig. 3 *A. zharovi*



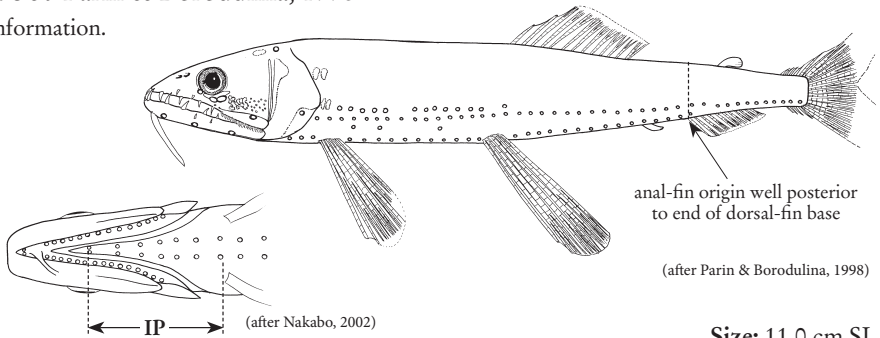
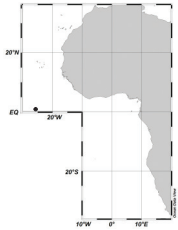
(after Nakabo, 2002)

Fig. 4 *A. boulengeri*

8a. IP photophores 7-8; anal-fin origin well posterior to vertical through end of dorsal-fin base *Astronesthes zharovi*

Astronesthes zharovi Parin & Borodulina, 1998

Other characters: no information.



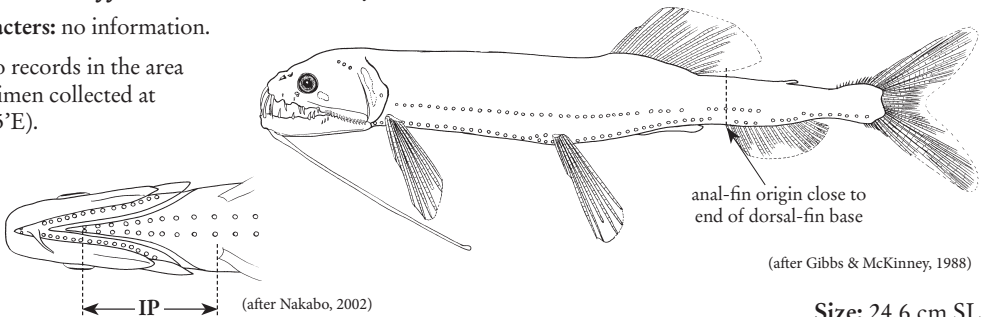
Size: 11.0 cm SL

8b. IP photophores 9-11; anal-fin origin close to end of dorsal-fin base. *Astronesthes krefftii*

Astronesthes krefftii Gibbs & McKinney, 1988

Other characters: no information.

Remarks: no records in the area (closest specimen collected at 38°14'S, 1°15'E).



Size: 24.6 cm SL

9a. Anal-fin origin posterior to vertical through end of dorsal-fin base; dense light glands on dorsal and ventral margins of caudal peduncle → 10

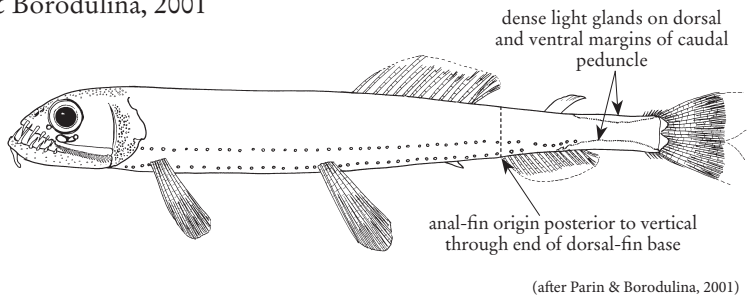
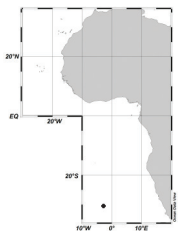
9b. Anal-fin origin anterior to vertical through end of dorsal-fin base; no caudal light glands → 12

10a. No aggregations of luminous tissue on the body, or only small, scattered spots near belly between ventral adipose fin and anal-fin origin. *Astronesthes tanibe*

10b. Numerous aggregations of luminous tissue on the body, situated in longitudinal rows along upper margin, midline, and between rows of photophores → 11

Astronesthes tanibe Parin & Borodulina, 2001

Other characters: no information.



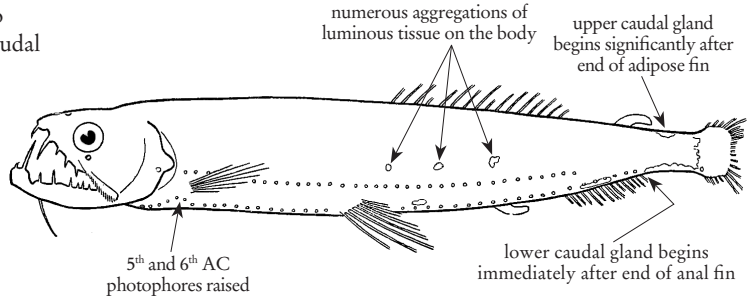
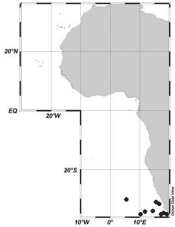
Size: 15.1 cm SL

11a. Upper caudal-fin gland begins significantly behind dorsal adipose fin; lower caudal gland begins immediately after anal-fin end; in AC series, 5th and 6th photophores raised *Astronesthes boulengeri*

Astronesthes boulengeri Gilchrist, 1902

Boulenger's snaggletooth

Other characters: black in colour with pale luminous patches, which develop with growth, on dorsal and ventral caudal peduncle and other parts of body.



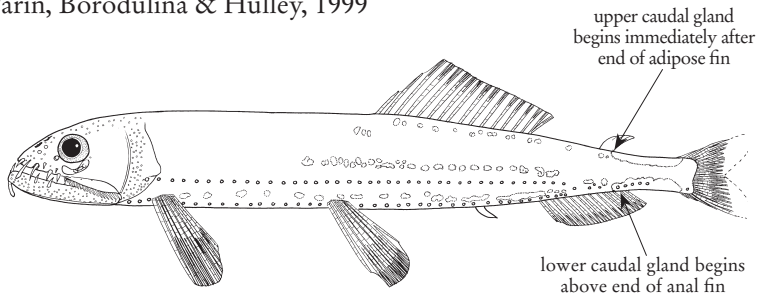
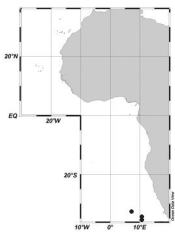
(from Regan & Trewavas, 1929)

Size: 21.2 cm SL

11b. Upper caudal-fin gland begins immediately after dorsal adipose fin; lower caudal gland begins above end of anal fin; in AC series, photophores in a straight row *Astronesthes illuminatus*

Astronesthes illuminatus Parin, Borodulina & Hulley, 1999

Other characters: no information.



(after Parin, Borodulina & Hulley, 1999)

Size: 15.5 cm SL

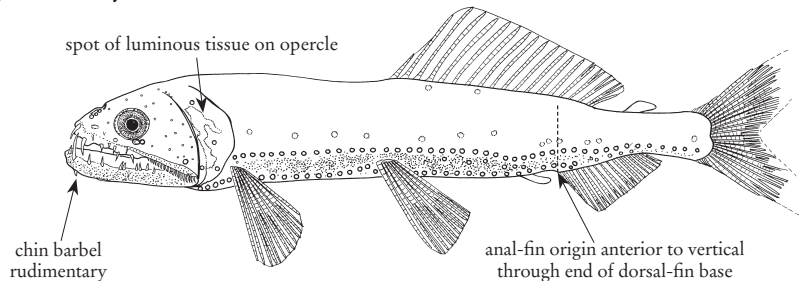
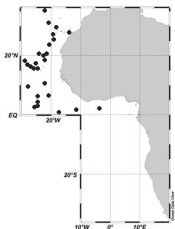
12a. Spot of luminous tissue on opercle; no luminous spots on upper jaw → 13

12b. No spot of luminous tissue on opercle; luminous spots on upper jaw → 14

13a. Chin barbel rudimentary *Astronesthes micropogon*

Astronesthes micropogon Goodyear & Gibbs, 1970

Other characters: body silvery.



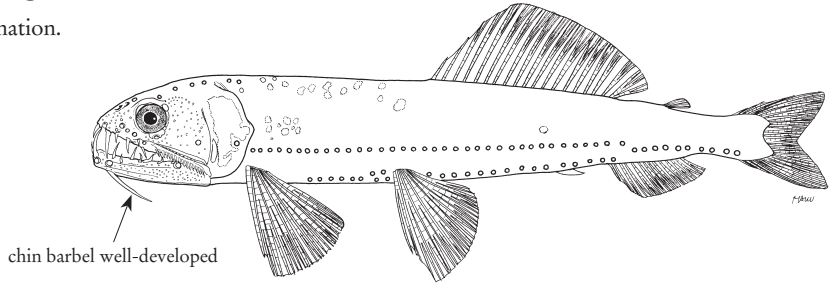
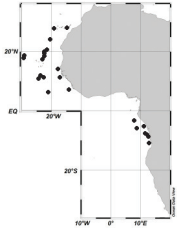
(after Goodyear & Gibbs, 1970)

Size: 8.2 cm SL

13b. Chin barbel well developed, at least 1/3 head length. *Astronesthes macropogon*

Astronesthes macropogon Goodyear & Gibbs, 1970

Other characters: no information.



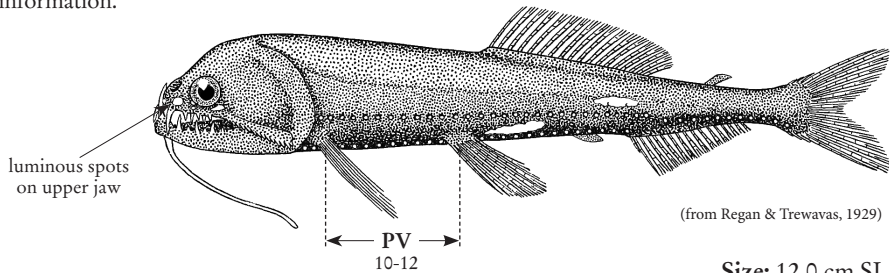
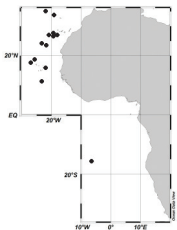
Size: 14.0 cm SL

14a. IC photophores 43-47; PV 10-12 *Astronesthes leucopogon*

14b. IC photophores 50-56; PV 12-15 → 15

Astronesthes leucopogon Regan & Trewavas, 1929

Other characters: no information.



(from Regan & Trewavas, 1929)

Size: 12.0 cm SL

15a. Upper jaw with single spot of luminous tissue anterior to orbit → 16

15b. Upper jaw with single spot of luminous tissue anterior to orbit and 2 smaller spots below anterior portion of orbit → 18

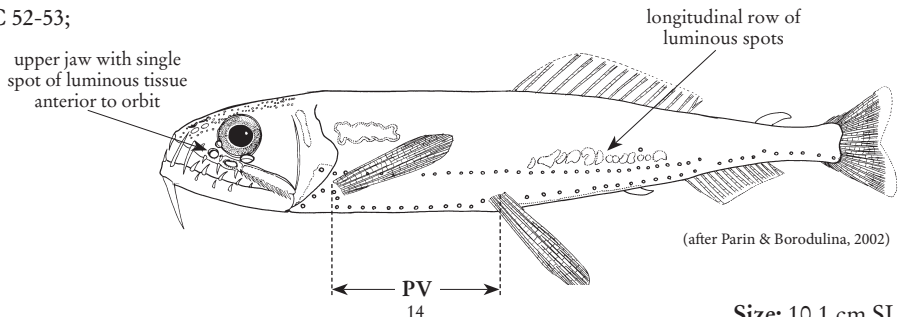
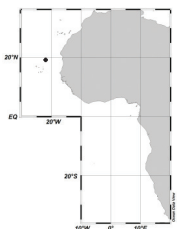
16a. Longitudinal row of luminous spots present between dorsal fin and lateral row of photophores; pelvic-fin bases situated immediately in front of vertical through dorsal-fin origin. *Astronesthes karsteni*

16b. No longitudinal row of luminous spots between dorsal fin and lateral row of photophores; pelvic-fin bases situated far ahead of vertical through dorsal-fin origin. → 17

Astronesthes karsteni Parin & Borodulina, 2002

Other characters: IC 52-53;

OA 32-33.



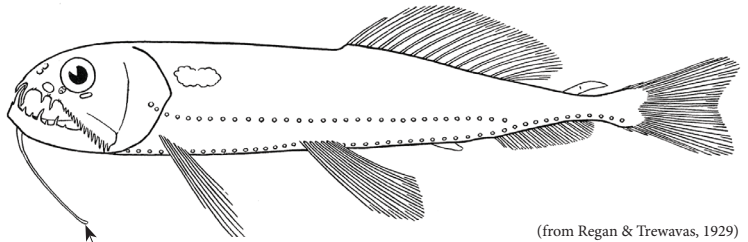
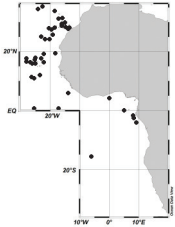
(after Parin & Borodulina, 2002)

Size: 10.1 cm SL

17a. Chin barbel with terminal bulb; body black. *Astronesthes niger*

Astronesthes niger Richardson, 1845

Other characters: IC 52-56;
OA 34-36.



(from Regan & Trewavas, 1929)

chin barbel with terminal bulb

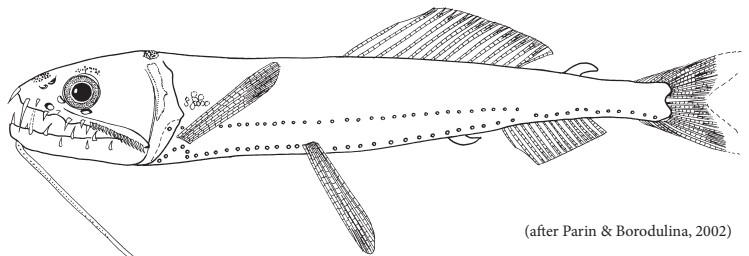
Size: 16.0 cm SL

17b. Chin barbel without terminal bulb; body brown or dark brown with silvery tint . *Astronesthes oligoa*

Astronesthes oligoa Parin & Borodulina, 2002

Other characters: IC 52-54;
OA 31-34.

Remarks: not yet recorded in the area; nearest specimen collected at 21°23'N, 35°11'W.



(after Parin & Borodulina, 2002)

chin barbel without terminal bulb

Size: 5.6 cm SL

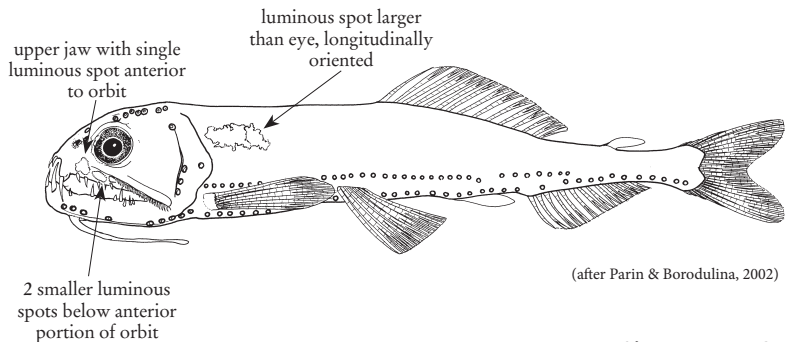
18a. Luminous spot at eye level large (larger than eye), longitudinally oriented. . . *Astronesthes gudrunae*

18b. Luminous spot at eye level small (not exceeding eye diameter), not always longitudinally oriented. → 19

Astronesthes gudrunae Parin & Borodulina, 2002

Other characters: IC 51-53;
OA 32-33.

Remarks: not yet recorded in the area; nearest specimen collected at 22°1'N, 32°8'W.



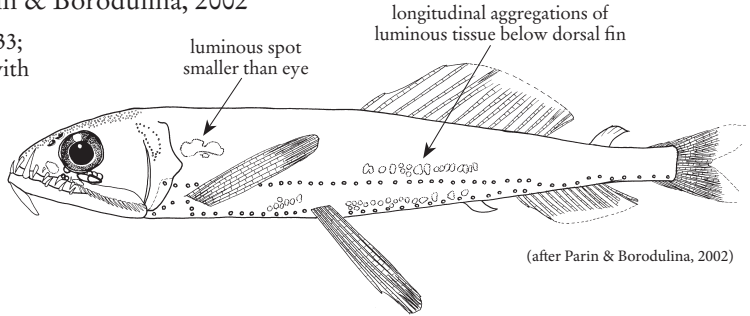
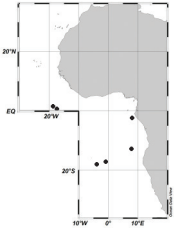
(after Parin & Borodulina, 2002)

Size: 11.1 cm SL

19a. Longitudinal aggregations of luminous tissue below dorsal fin *Astronesthes decoratus*

Astronesthes decoratus Parin & Borodulina, 2002

Other characters: IC 50-52; OA 31-33; background coloration dark brown with silvery tint on sides.



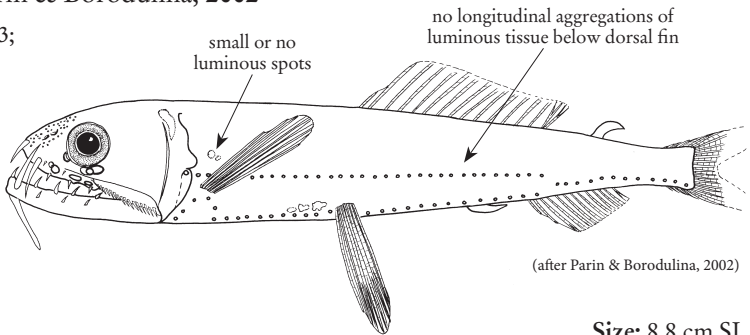
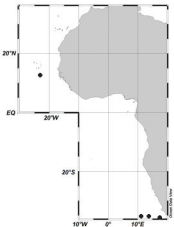
(after Parin & Borodulina, 2002)

Size: 9.7 cm SL

19b. No longitudinal aggregations of luminous tissue below dorsal fin; small or no luminous spots at eye level behind operculum *Astronesthes haplophos*

Astronesthes haplophos Parin & Borodulina, 2002

Other characters: IC 51-53; OA 31-33; background coloration light brown.



(after Parin & Borodulina, 2002)

Size: 8.8 cm SL

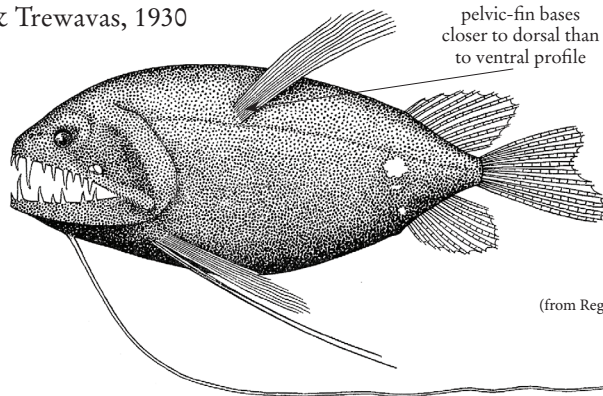
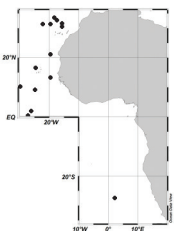
KEY TO THE SPECIES OF *BATHOPHILUS* OCCURRING IN THE AREA

1a. Pelvic-fin bases nearer to dorsal than ventral profile; body depth around 40% SL . . . *Bathophilus brevis*

1b. Pelvic-fin bases equidistant between dorsal and ventral profiles or nearer ventral profile; body depth less than 25% SL → 2

Bathophilus brevis Regan & Trewavas, 1930

Other characters: a luminous patch on middle of side, between dorsal- and anal-fin origins.



(from Regan & Trewavas, 1930)

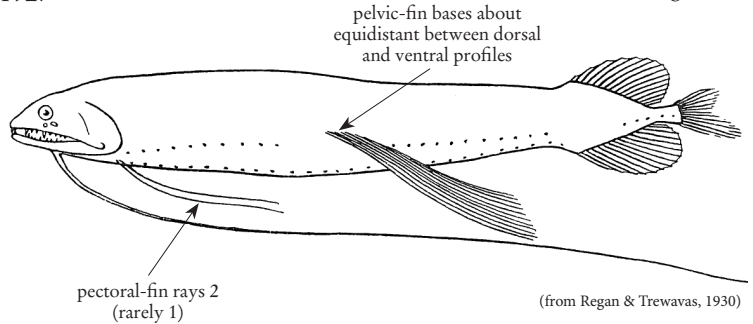
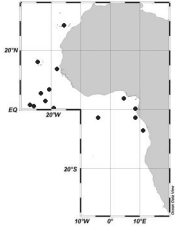
Size: 5.5 cm SL

- 2a. Pectoral-fin rays 2 (rarely 1) *Bathophilus pawneeii*
 2b. Pectoral-fin rays 3 or more → 3

Bathophilus pawneeii Parr, 1927

Pawnee dragonfish

Other characters: generally a small luminous spot behind pelvic fin, and sometimes 1 on shoulder.



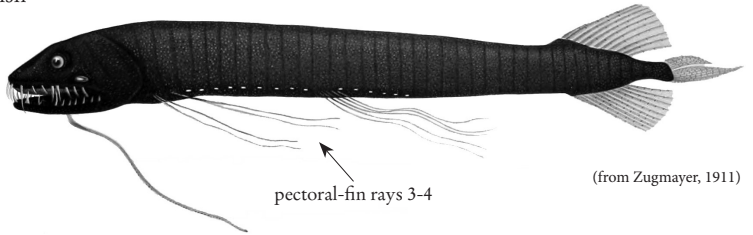
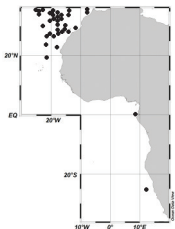
(from Regan & Trewavas, 1930)

Size: 12.2 cm SL

- 3a. Pectoral-fin rays 3-4. *Bathophilus vaillanti*
 3b. Pectoral-fin rays more than 4 → 4

Bathophilus vaillanti (Zugmayer, 1911)

Other characters: black to steely grey, with metallic sheen that may be purplish to greenish or bronzy.



(from Zugmayer, 1911)

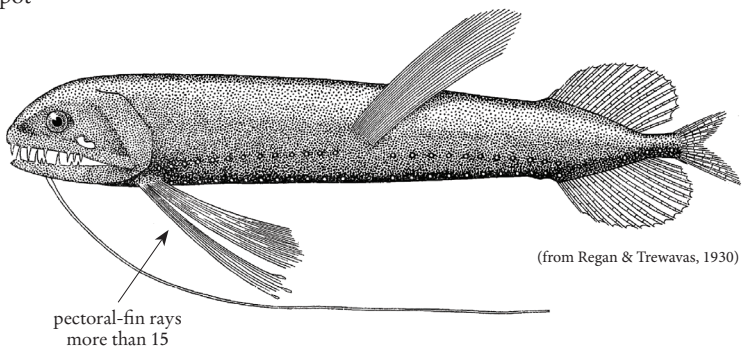
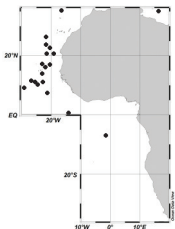
Size: 18.0 cm SL

- 4a. Pectoral-fin rays more than 15 *Bathophilus nigerrimus*
 4b. Pectoral-fin rays less than 15 → 5

Bathophilus nigerrimus Giglioli, 1882

Scaleless dragonfish

Other characters: generally a white spot behind pelvic fin.



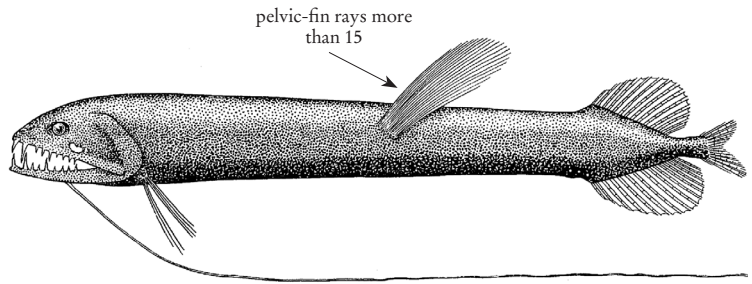
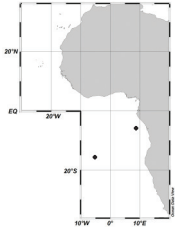
(from Regan & Trewavas, 1930)

Size: 12.2 cm SL

- 5a. Pectoral-fin rays 5-9 (rarely 4) → 6
- 5b. Pectoral-fin rays 10-13 → 8
- 6a. Pelvic-fin rays more than 15 *Bathophilus schizochirus*
- 6b. Pelvic-fin rays 13 or less → 7

Bathophilus schizochirus Regan & Trewavas, 1930

Other characters: dark grey, almost black.



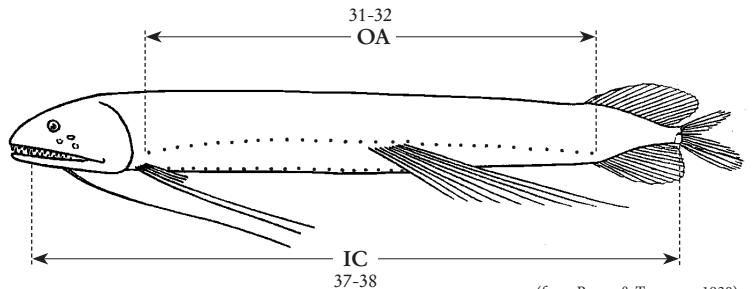
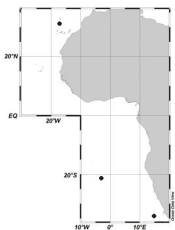
(from Regan & Trewavas, 1930)

Size: 10.3 cm SL

- 7a. IC photophores 37-38; OA 31-32; pectoral-fin rays 4-6 *Bathophilus ater*

Bathophilus ater (Brauer, 1902)

Other characters: pelvic-fin rays 9.



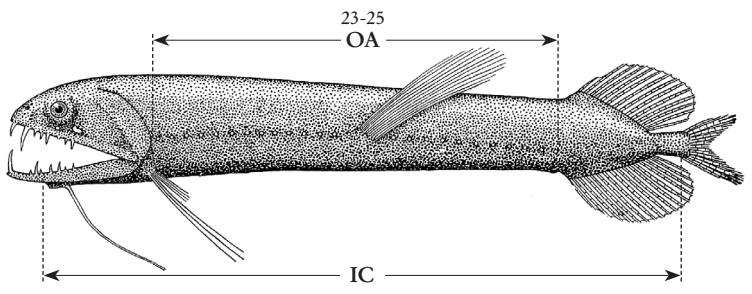
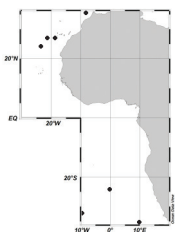
(from Regan & Trewavas, 1930)

Size: 15.0 cm SL

- 7b. IC photophores 30-33; OA 23-25; pectoral-fin rays 6-8 *Bathophilus longipinnis*

Bathophilus longipinnis (Pappenheim, 1914)

Other characters: deep black, fins white and barbel yellowish white.



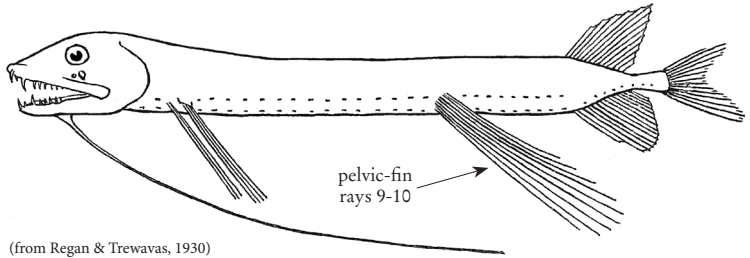
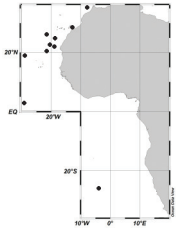
(from Regan & Trewavas, 1930)

Size: 10.9 cm SL

8a. Pelvic-fin rays 9-10; photophore rows straight *Bathophilus digitatus*

Bathophilus digitatus (Welsh, 1923)

Other characters: no information.



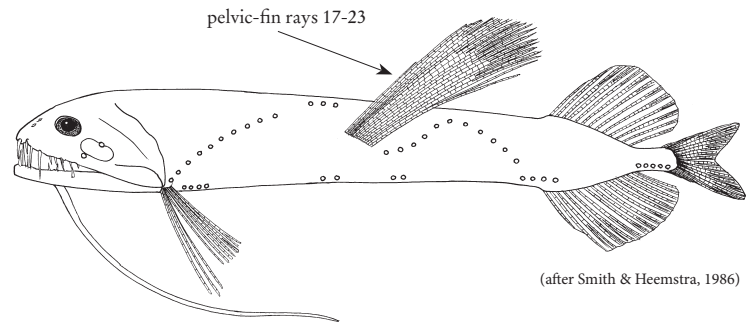
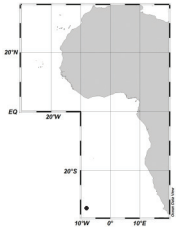
(from Regan & Trewavas, 1930)

Size: 17.0 cm TL

8b. Pelvic-fin rays 17-23; photophore rows irregularly curved and interrupted *Bathophilus irregularis*

Bathophilus irregularis Norman, 1930

Other characters: no information.



(after Smith & Heemstra, 1986)

Size: 12.5 cm SL

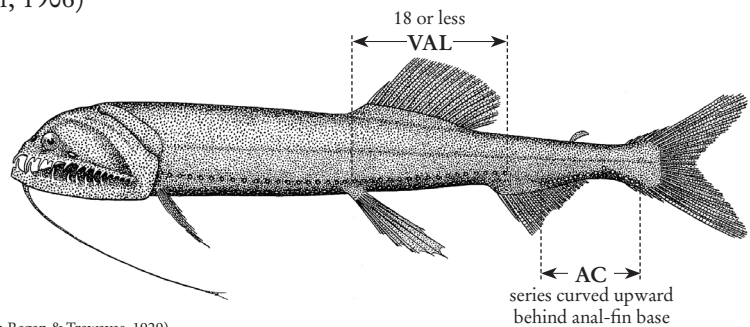
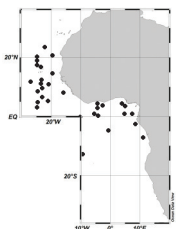
KEY TO THE SPECIES OF *BOROSTOMIAS* OCCURRING IN THE AREA

1a. AC photophores curved upward behind anal-fin base; VAL photophores 18 or less. *Borostomias elucens*

1b. AC photophores straight; VAL photophores 19 or more → 2

Borostomias elucens (Brauer, 1906)

Other characters: no information.



(from Regan & Trewavas, 1929)

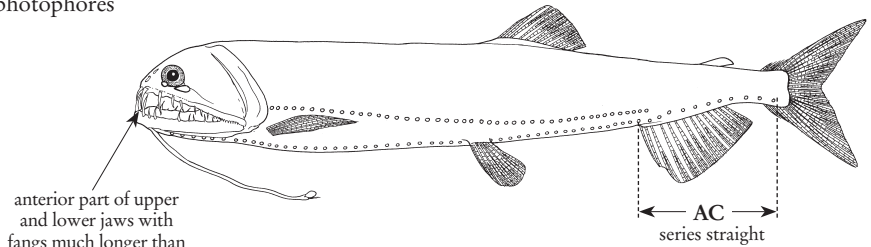
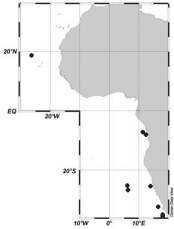
Size: 35.0 cm SL

2a. Anterior part of upper and lower jaws with fangs much longer than other teeth; longer teeth straight; IC photophores 68 or fewer *Borostomias antarcticus*

Borostomias antarcticus (Lönnerberg, 1905)

Snaggletooth

Other characters: OA photophores usually 44 or fewer.



anterior part of upper and lower jaws with fangs much longer than other teeth

series straight

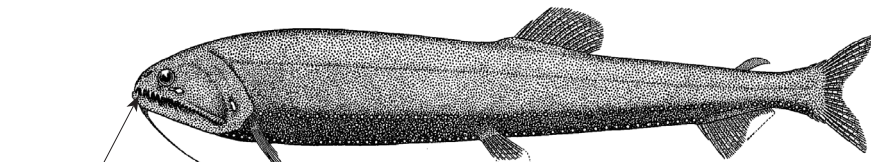
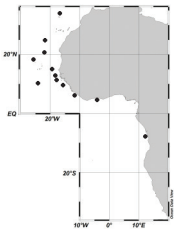
Size: 30.0 cm SL

2b. Anterior part of upper and lower jaws with fangs not much larger than other teeth; longer teeth curved; IC photophores 70 or more *Borostomias mononema*

Borostomias mononema (Regan & Trewavas, 1929)

Sickle snaggletooth

Other characters: OA photophores usually 46 or more.



anterior part of upper and lower jaws with fangs not much longer than other teeth

(from Regan & Trewavas, 1929)

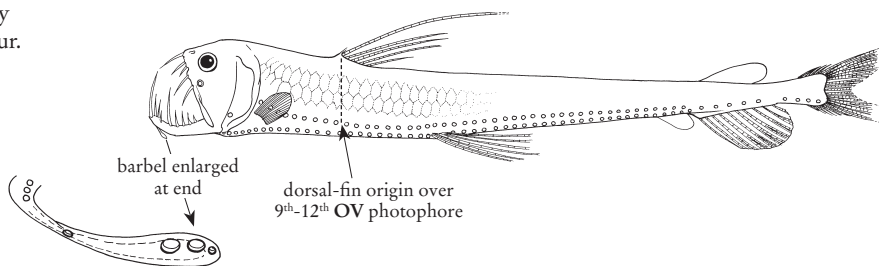
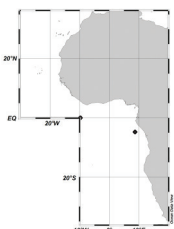
Size: 31.0 cm SL

KEY TO THE SPECIES OF *CHAULIODUS* OCCURRING IN THE AREA

- 1a. Dorsal-fin origin over 9th-12th OV photophore → 2
- 1b. Dorsal-fin origin over 5th-8th OV photophore → 3
- 2a. Barbel enlarged at end *Chauliodus minimus*

Chauliodus minimus Parin & Novikova, 1974

Other characters: body iridescent silver in colour.



barbel enlarged at end

dorsal-fin origin over 9th-12th OV photophore

barbel

(after Smith & Heemstra, 1986)

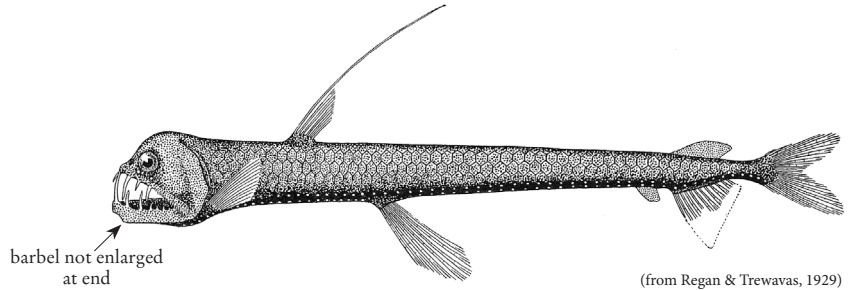
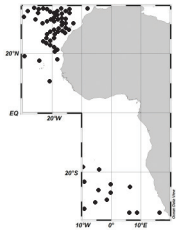
Size: 14.5 cm SL

2b. Barbel not enlarged at end *Chauliodus danae*

Chauliodus danae Regan & Trewavas, 1929

Dana viperfish

Other characters: no information.



(from Regan & Trewavas, 1929)

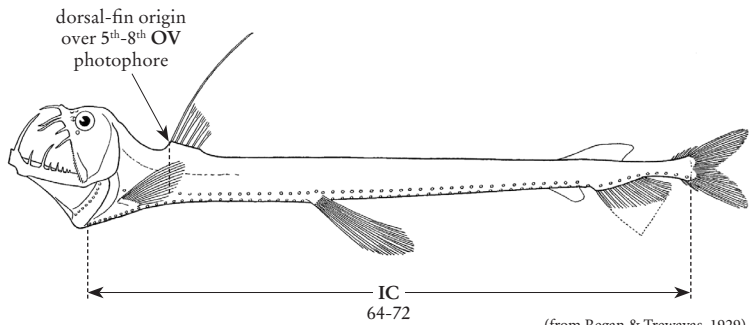
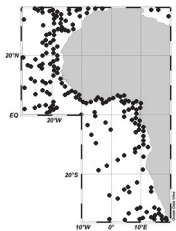
Size: 15.0 cm SL

3a. Total IC photophores 64-72 *Chauliodus sloani*

Chauliodus sloani Bloch & Schneider, 1801

Sloane's viperfish

Other characters: no information.



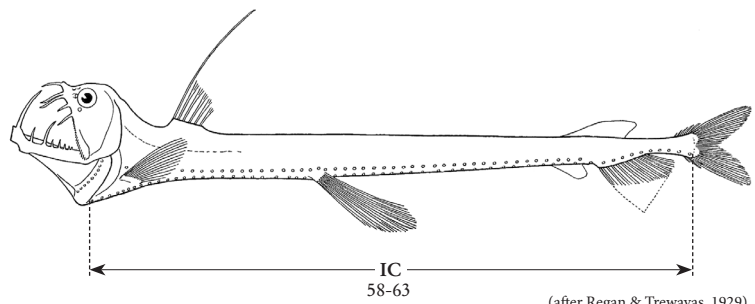
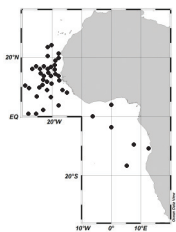
(from Regan & Trewavas, 1929)

Size: 35.0 cm SL

3b. Total IC photophores 58-63 *Chauliodus schmidti*

Chauliodus schmidti Ege, 1948

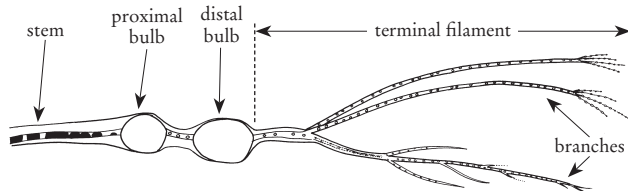
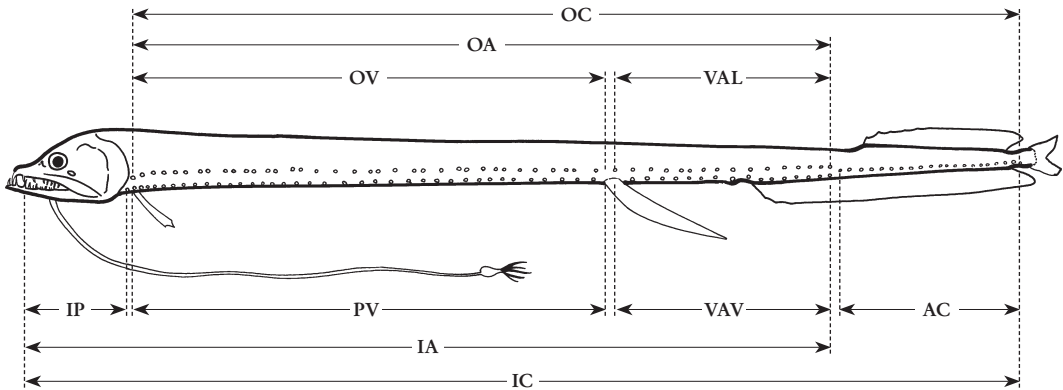
Other characters: no information.



(after Regan & Trewavas, 1929)

Size: 23.0 cm SL

GENUS *EUSTOMIAS*



Terminal portion of barbel

(after Gibbs et al., 1983)

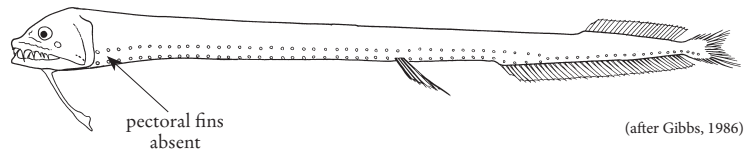
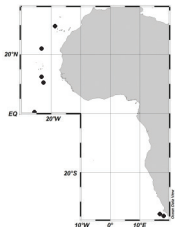
Some morphological characters used for the identification of *Eustomias* species

KEY TO THE SPECIES OF *EUSTOMIAS* OCCURRING IN THE AREA

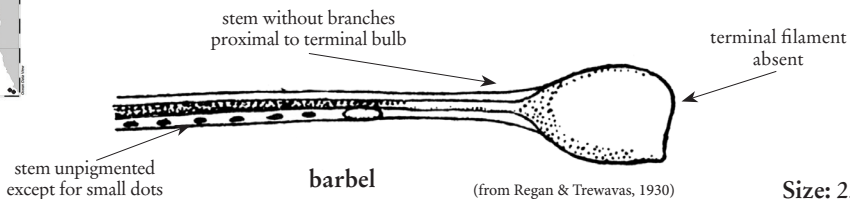
1a. Pectoral fins absent	→ 2
1b. Pectoral fins present.	→ 6
2a. Barbel stem without branches or with only tiny filaments proximal to terminal bulb; stem unpigmented except for small dots; terminal filament absent	<i>Eustomias lipochirus</i>
2b. Barbel stem with branches proximal to terminal bulb; stem pigmented at least up to origin of branches; single terminal filament on bulb.	→ 3

Eustomias lipochirus Regan & Trewavas, 1930

Other characters: no information.



(after Gibbs, 1986)



(from Regan & Trewavas, 1930)

Size: 23.8 cm SL

3a. Barbel branches with large, closely spaced, internal ovoid bodies, their diameters about equal to the branch diameter and spaced 1-3 diameters apart; branch axes lightly pigmented or unpigmented between the ovoids

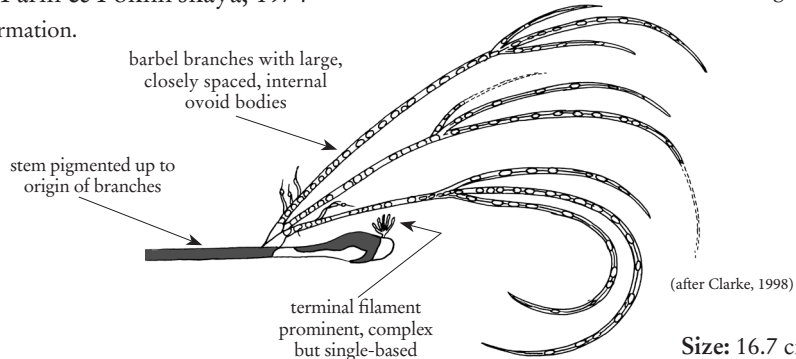
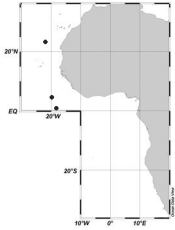
Eustomias achirus

3b. Internal ovoids in the branches either absent or less than 1/2 the diameter of the branches, and widely spaced; axes prominently pigmented or unpigmented between the ovoids → 4

Eustomias achirus Parin & Pokhil'skaya, 1974

Proud dragonfish

Other characters: no information.



(after Clarke, 1998)

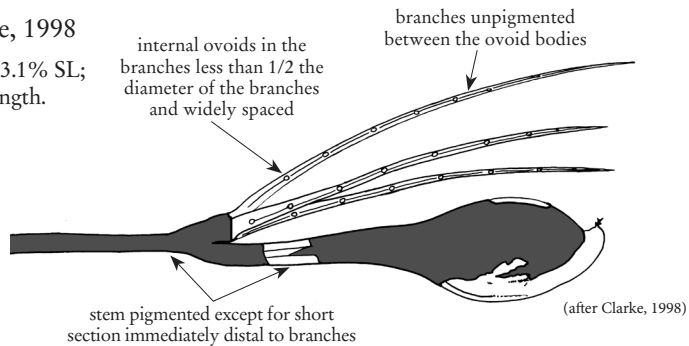
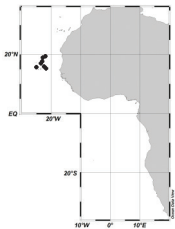
Size: 16.7 cm SL

4a. Branches unpigmented between the ovoid bodies. *Eustomias insularum*

4b. Branches prominently pigmented between the ovoid bodies → 5

Eustomias insularum Clarke, 1998

Other characters: barbel length 11.0-13.1% SL; branches arising at 47-48% of barbel length.



(after Clarke, 1998)

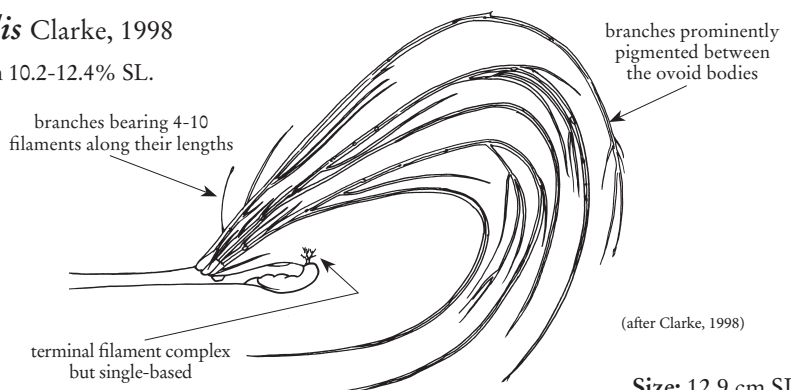
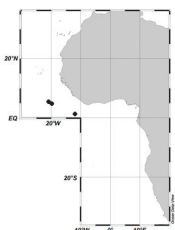
Size: 16.5 cm SL

5a. Branches bearing 4-10 filaments along their lengths; terminal filament single-based but complex

Eustomias aequatorialis

Eustomias aequatorialis Clarke, 1998

Other characters: barbel length 10.2-12.4% SL.



(after Clarke, 1998)

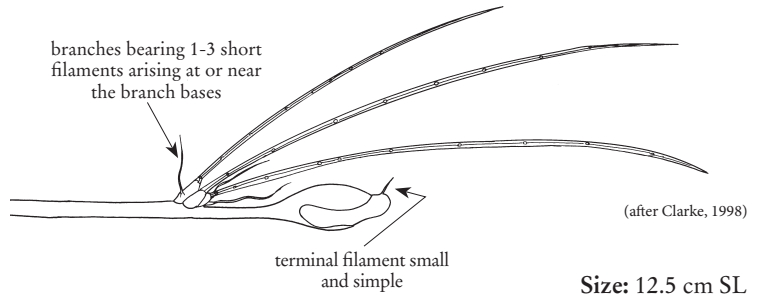
Size: 12.9 cm SL

5b. Branches each bearing 1-3 short, simple filaments arising at or near the branch bases; terminal filament small and simple *Eustomias intermedius*

Eustomias intermedius Clarke, 1998

Other characters: barbel length 8.8-10.0% SL.

Remarks: not yet recorded in the area; nearest specimen collected at 8°2'S, 14°2'W.



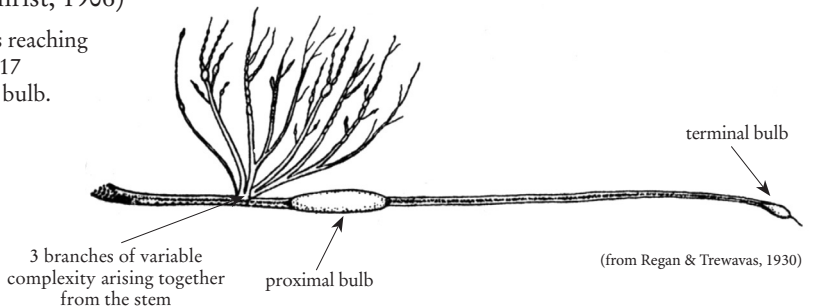
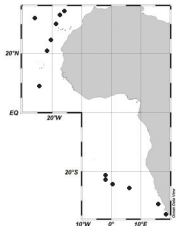
6a. Pectoral-fin rays 2, but 1 is minute (the minute ray sometimes absent) giving the impression of only a single pectoral-fin ray being present; barbel with 3 branches of variable complexity arising together from the stem → 7

6b. Pectoral-fin rays 2 or more, with the second not minute in those species with only 2 rays → 8

7a. Barbel with a single, well-defined proximal bulb on main stem between point of branching and terminal bulb. *Eustomias filifer*

Eustomias filifer (Gilchrist, 1906)

Other characters: no branches reaching terminal bulb; terminal bulb 6-17 diameters away from proximal bulb.

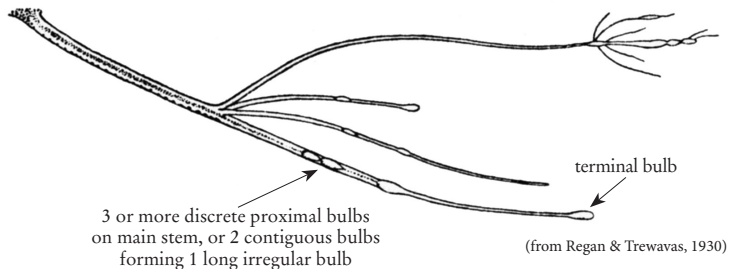
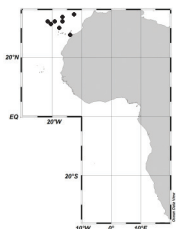


Size: 23.2 cm SL

7b. Barbel with 3 or more discrete proximal bulbs on main stem, or 2 contiguous bulbs forming 1 long irregular bulb, between point of branching and terminal bulb *Eustomias tetranema*

Eustomias tetranema Zugmayer, 1913

Other characters: no information.



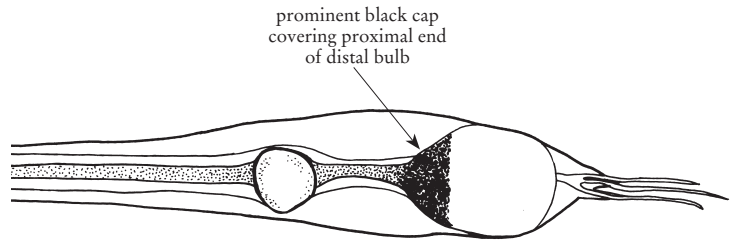
Size: 15.0 cm TL

- 8a. Pectoral-fin rays 2 → 9
- 8b. Pectoral-fin rays more than 2 → 18
- 9a. Pectoral fin-rays long and free, not closely bound by a black membrane; no wide ventral body groove posterior to pectoral-fin base; prominent black cap covering proximal end of distal bulb.
 *Eustomias brevibarbatus*
- 9b. Pectoral fin-rays closely bound by a black membrane; a deep, wide but short ventral body groove present → 10

Eustomias brevibarbatus Parr, 1927

Other characters: distal bulb largest and bearing 2 or more short, terminal filaments that are variously branched or unbranched.

Remarks: not yet recorded in the area; nearest specimens collected at 6°1'S, 27°0'W and 4°7'S, 26°7'W.



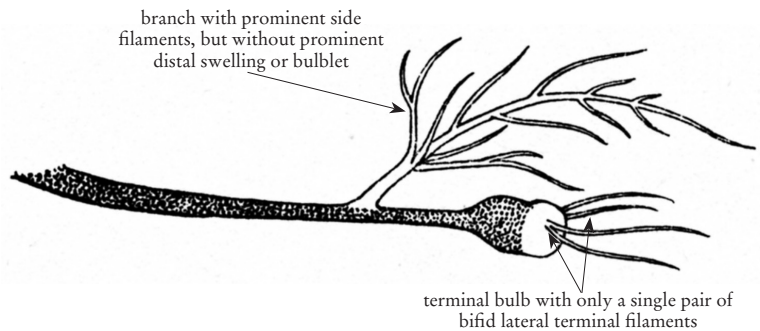
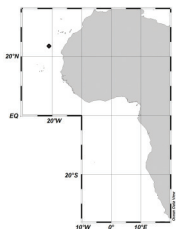
(after Gomon & Gibbs, 1985)

Size: 14.9 cm SL

- 10a. Terminal bulb with only a single pair of lateral terminal filaments → 11
- 10b. Terminal bulb either without filaments or with at least 1 medially based filament (paired lateral filaments may also be present). → 13
- 11a. Branch with prominent side filaments, but without prominent distal swelling or bulblet (some side filaments may bear elongate ovoid bodies) *Eustomias dendriticus*
- 11b. Branch with prominent swelling or bulblet on distal half; side filaments short and simple → 12

Eustomias dendriticus Regan & Trewavas, 1930

Other characters: barbel stem solidly pigmented between origin and terminal bulb.



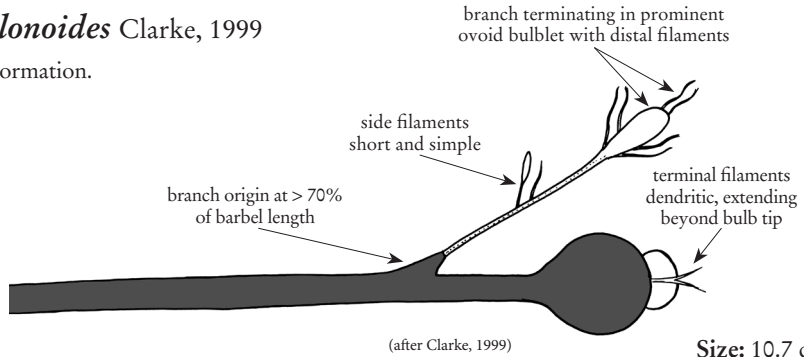
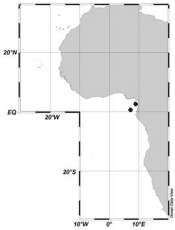
(from Regan & Trewavas, 1930)

Size: 15.0 cm SL

12a. Branch origin at > 70% of barbel length, branch terminating in prominent ovoid bulblet with distal filaments; terminal filaments dendritic, extending beyond bulb tip *Eustomias monoclonoides*

Eustomias monoclonoides Clarke, 1999

Other characters: no information.

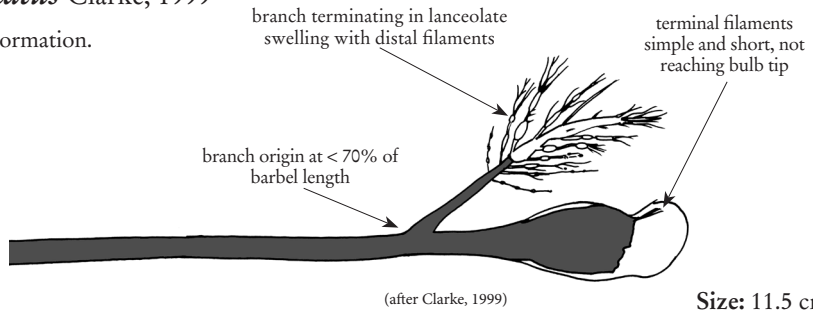
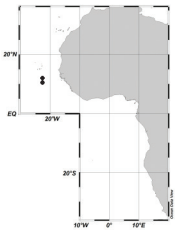


Size: 10.7 cm SL

12b. Branch origin at < 70% of barbel length, branch terminating in lanceolate swelling with distal filaments; terminal filaments simple and short, not reaching bulb tip *Eustomias lanceolatus*

Eustomias lanceolatus Clarke, 1999

Other characters: no information.



Size: 11.5 cm SL

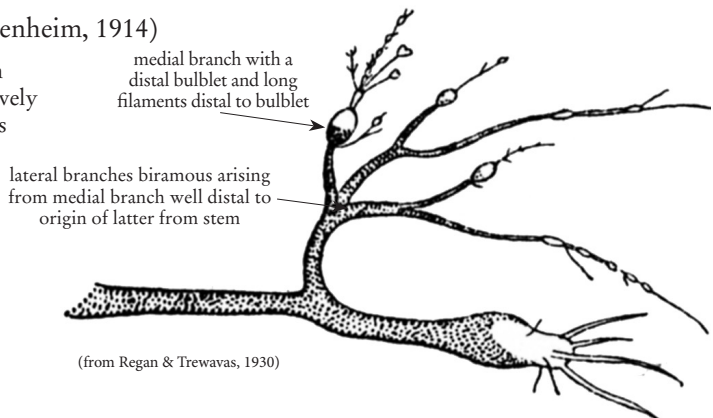
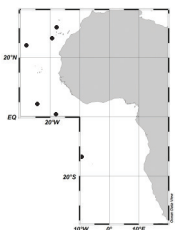
13a. Lateral branches absent or arising from medial branch well distal to origin of latter from barbel stem . → 14

13b. Lateral branches arising from barbel stem together with medial branch or arising from medial branch immediately distal to medial's origin → 15

14a. Lateral branches biramous; medial branch with a distal bulblet greater than branch in diameter and long filaments distal to bulblet. *Eustomias fissibarbis*

Eustomias fissibarbis (Pappenheim, 1914)

Other characters: terminal bulb with both medial and laterally paired, relatively simple terminal filaments, their lengths less than 50% of distal barbel.

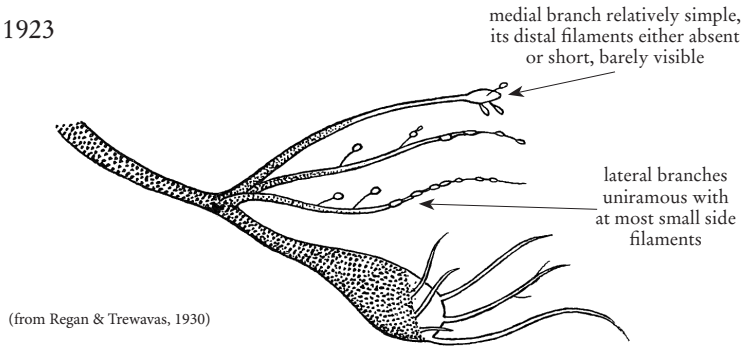
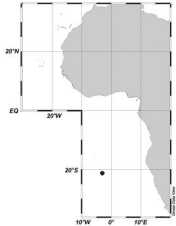


Size: 19.3 cm SL

14b. Lateral branches uniramous with at most small side filaments; medial branch relatively simple, its distal filaments either absent or short, barely visible *Eustomias bigelowi*

Eustomias bigelowi Welsh, 1923

Other characters: no information.



Size: 19.8 cm SL

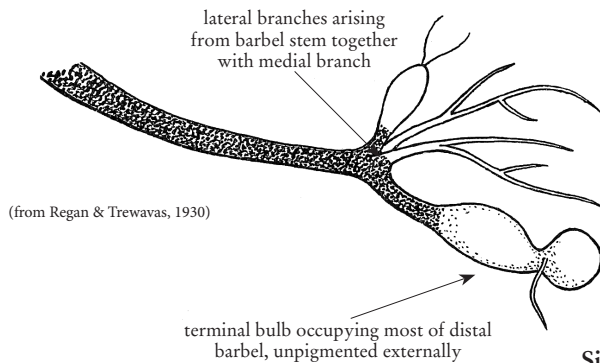
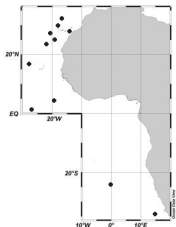
15a. Terminal bulb occupying most of distal barbel, unpigmented externally *Eustomias schmidti*

15b. Terminal bulb length less than 1/2 distal barbel length or, if greater, with pigment on dorsal surface → 16

Eustomias schmidti Regan & Trewavas, 1930

Schmidt's dragonfish

Other characters: no information.



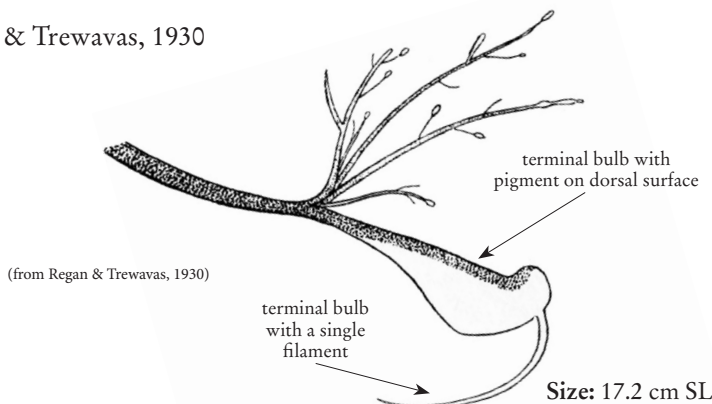
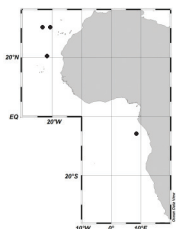
Size: 21.2 cm SL

16a. Five branches arising from stem (2 pairs of lateral branches and 1 medial branch); one pair of lateral branches may actually arise from the other just distal to stem *Eustomias macronema*

16b. Three branches arising from stem (1 pair of lateral branches and 1 medial branch); any bifurcations in lateral branches distinctly distal to origins → 17

Eustomias macronema Regan & Trewavas, 1930

Other characters: no information.



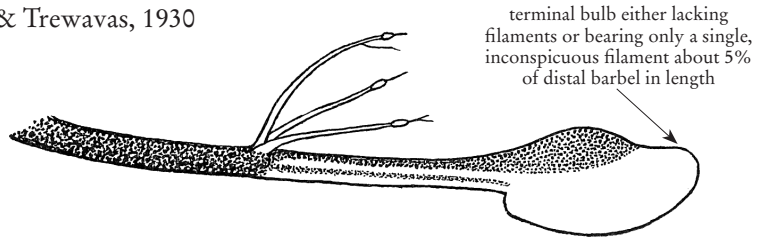
Size: 17.2 cm SL

17a. Terminal bulb either lacking filaments or bearing only a single, inconspicuous filament about 5% of distal barbel in length; no branches reach terminal bulb *Eustomias triramis*

Eustomias triramis Regan & Trewavas, 1930

Other characters: no information.

Remarks: not yet recorded in the area; nearest specimen collected at 21°8'N, 47°2'W.



(from Regan & Trewavas, 1930)

Size: 11.2 cm SL

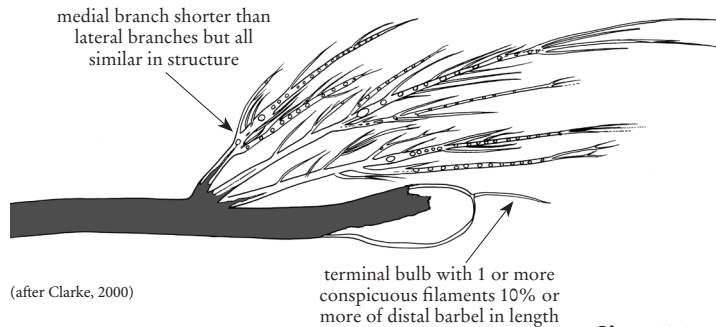
17b. Terminal bulb with 1 or more conspicuous filaments 10% or more of distal barbel in length; stem pigment extending further distally onto dorsal surface of terminal bulb; terminal filament simple to complex, but single-based; medial branch shorter than lateral branches, but all similar in structure. *Eustomias satterleei*

Eustomias satterleei Beebe, 1930

Twinray dragonfish

Other characters: no information.

Remarks: not yet recorded in the area; nearest specimen collected at 24°8'N, 35°7'W.



(after Clarke, 2000)

Size: 14.9 cm SL

18a. Pectoral-fin rays 3 → 19

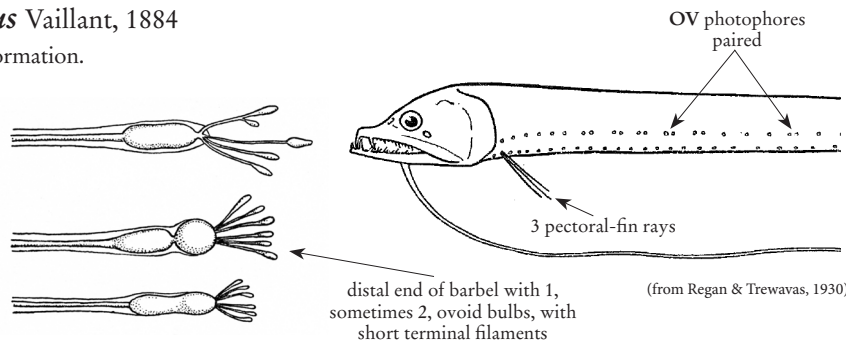
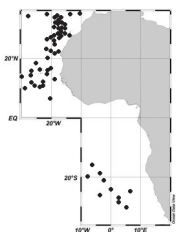
18b. Pectoral-fin rays more than 3 → 31

19a. OV photophores paired (single in all other species); distal end of barbel with 1, sometimes 2, ovoid bulbs, with short terminal filaments *Eustomias obscurus*

19b. OV photophores single; distal end of barbel varied in morphology → 20

Eustomias obscurus Vaillant, 1884

Other characters: no information.



(from Regan & Trewavas, 1930)

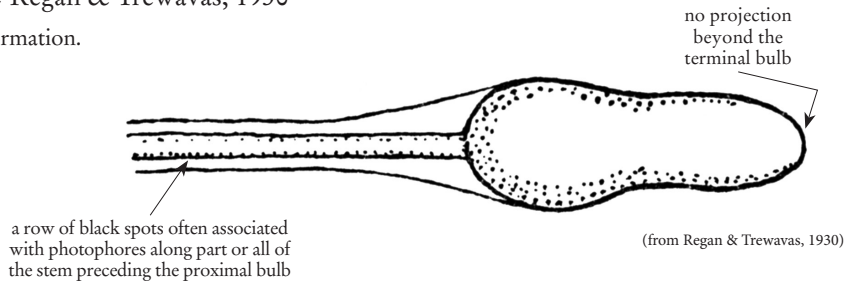
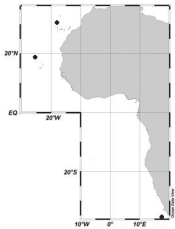
Size: 22.5 cm SL

20a. IC 65-68; OC 59-62; VAV 11-14; VAL 12-15; PV 27-30; OV 26-30; barbel stem with little or no external pigment, but a row of black spots often associated with photophores along part or all of the stem preceding the proximal bulb; barbel with a single distal swelling, often with elaborate appendages; no projection beyond the terminal bulb *Eustomias simplex*

20b. IC 70-78; OC 61-72; VAV 14-19; VAL 12-20; PV 30-35; OV 30-35; barbel stem with little or no external pigment, although stem axis sometimes pigmented internally, and no row of black spots associated with photophores along part or all of the stem preceding the proximal bulb → 21

Eustomias simplex Regan & Trewavas, 1930

Other characters: no information.



(from Regan & Trewavas, 1930)

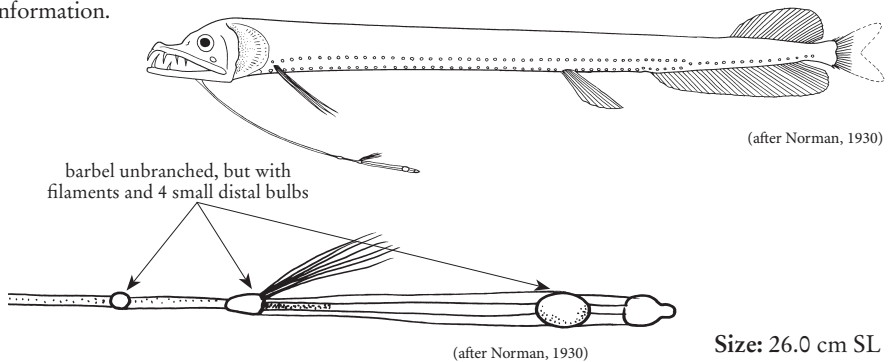
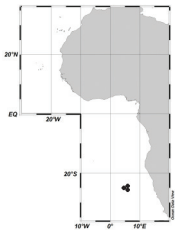
Size: 22.4 cm SL

21a. IC 70-71; OC 61-65; VAV 14-17; VAV over anal-fin base 5-6; AC 14-17; anal-fin rays 32-36; barbel unbranched, but with 4 small distal bulbs, usually with filaments arising from second proximal bulb. *Eustomias trewavasae*

Eustomias trewavasae Norman, 1930

Deepsea dragonfish

Other characters: no information.



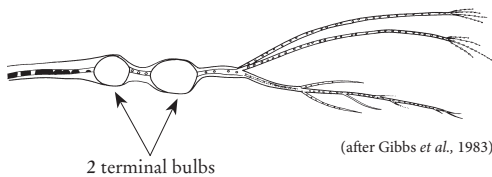
(after Norman, 1930)

Size: 26.0 cm SL

21b. IC 74-78; OC 68-72; VAV 17-20; VAV over anal-fin base 6-8; AC 18-20; anal-fin rays 36-40; barbel not as described in 21a → 22

22a. Two terminal bulbs (Fig. 1). → 23

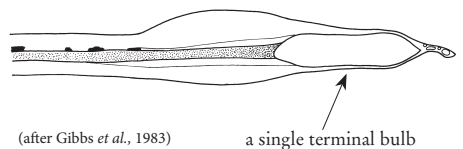
22b. A single terminal bulb (Fig. 2) → 28



2 terminal bulbs

(after Gibbs et al., 1983)

Fig. 1 *E. bimargaritatus*

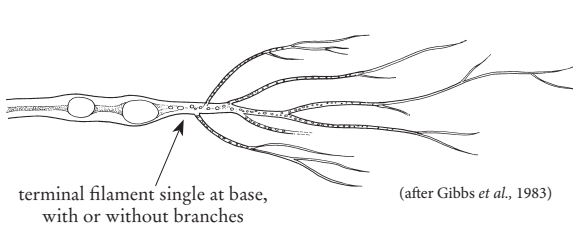


(after Gibbs et al., 1983)

a single terminal bulb

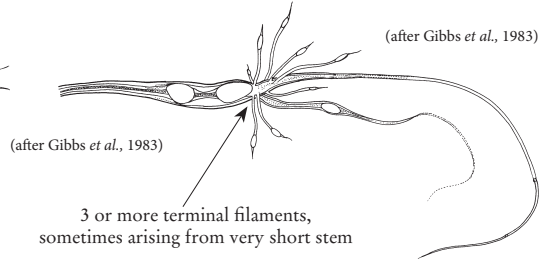
Fig. 2 *E. longibarba*

- 23a. Terminal filament single at base, with or without branches (Fig. 3) → 24
- 23b. Three or more terminal filaments, sometimes arising from very short stem (Fig. 4). → 26
- 24a. First long branches of terminal filament arising close to distal bulb (less than 1.5 distal-bulb lengths) (Fig. 3) → 25



terminal filament single at base, with or without branches (after Gibbs et al., 1983)

Fig. 3 *E. grandibulbus*



3 or more terminal filaments, sometimes arising from very short stem (after Gibbs et al., 1983)

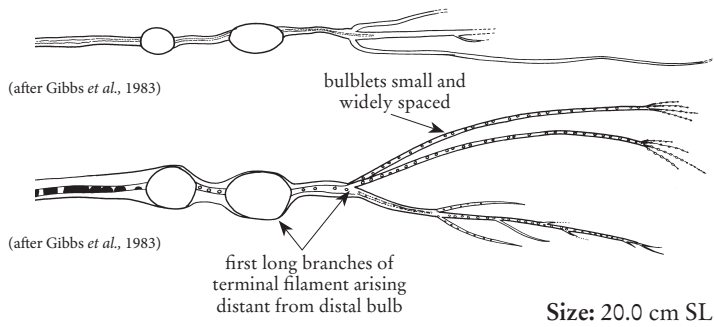
Fig. 4 *E. krefftii*

- 24b. First long branches of terminal filament arising distant from distal bulb (more than 1.5 distal-bulb lengths, up to 11 bulb lengths); bulblets in base of main filament and branches small and widely spaced. *Eustomias bimargaritatus*

***Eustomias bimargaritatus* Regan & Trewavas, 1930**

Other characters: 2 terminal bulbs separated by a short interspace, 0.6-1.7 times length of distal bulb. Barbel length 58-70% SL in specimens larger than 9 cm.

Remarks: not yet recorded in the area; nearest specimen collected at 30°0'N, 33°9'W.

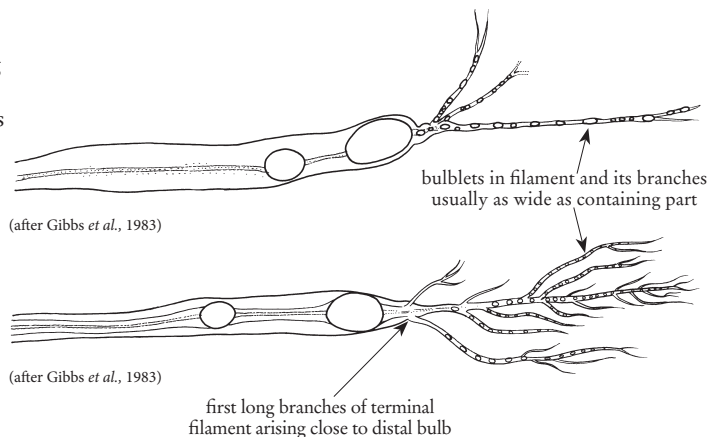
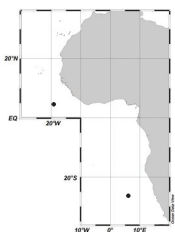


Size: 20.0 cm SL

- 25a. Terminal filament short, 9% SL or less; bulblets in filament and its branches usually as wide as containing part, sometimes wider and causing swellings *Eustomias arborifer*

***Eustomias arborifer* Parr, 1927**

Other characters: barbel length increasing to 70-91% SL in specimens 10.5-15 cm long, apparently decreasing in large females (17.9-25.3 cm) to 46-51% SL.

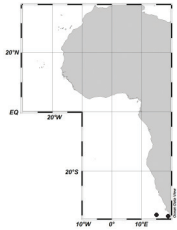


Size: 25.3 cm SL

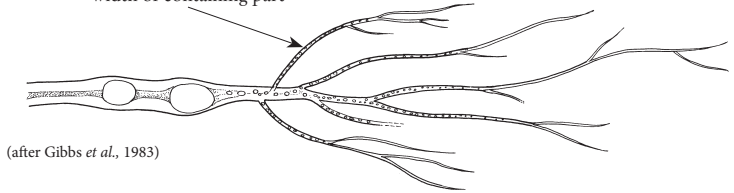
25b. Terminal filament long, 10-23% SL; bulblets in filament and its branches small, much smaller than width of containing part, not causing swellings *Eustomias grandibulbus*

Eustomias grandibulbus Gibbs, Clarke & Gomon, 1983

Other characters: barbel 68% SL.



bulblets in filament and its branches small, much smaller than width of containing part



(after Gibbs *et al.*, 1983)

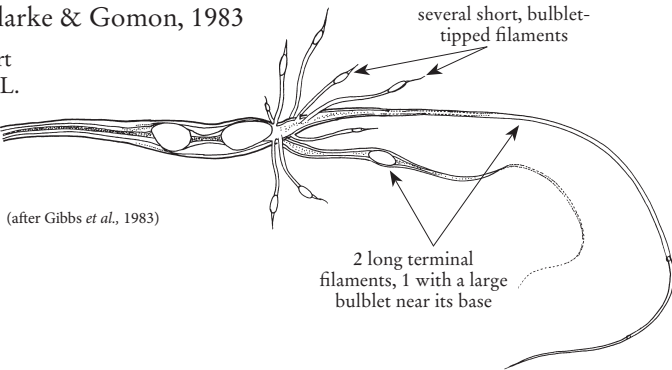
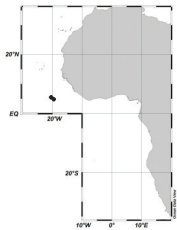
Size: 16.0 cm TL

26a. Two long terminal filaments, 1 with a large bulblet near its base; no other conspicuous bulblets in long filaments; several short, bulblet-tipped filaments *Eustomias krefftii*

26b. Terminal filament short, 10% SL or shorter, from about as long as to 8 times distal-bulb length → 27

Eustomias krefftii Gibbs, Clarke & Gomon, 1983

Other characters: barbel length short 37-44% SL in specimens over 8 cm SL.



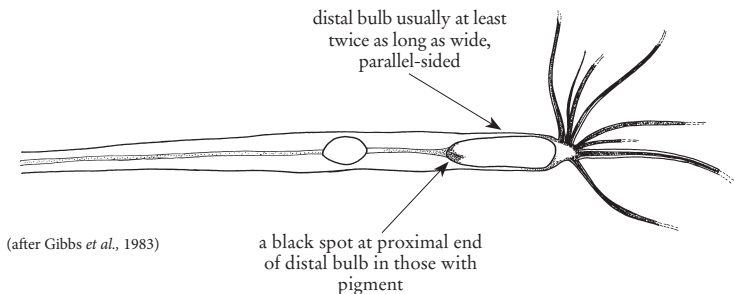
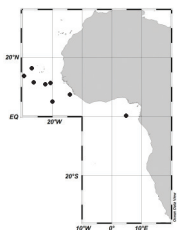
(after Gibbs *et al.*, 1983)

Size: 12.0 cm SL

27a. Distal bulb usually at least twice as long as wide, parallel-sided *Eustomias melanonema*

Eustomias melanonema Regan & Trewavas, 1930

Other characters: barbel length 76-92% SL.



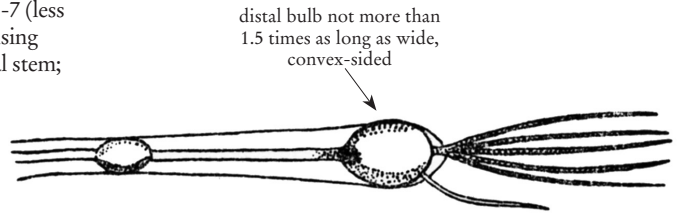
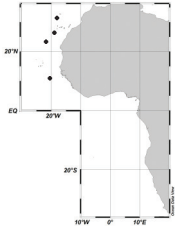
(after Gibbs *et al.*, 1983)

Size: 14.8 cm SL

27b. Distal bulb not more than 1.5 times as long as wide, convex-sided *Eustomias melanostigma*

***Eustomias melanostigma* Regan & Trewavas, 1930**

Other characters: terminal filaments short, 3-7 (less than 10% SL) without prominent bulblets, arising together from distal bulb or from a short distal stem; 1 filament thicker and longer than the rest.



(from Regan & Trewavas, 1930)

Size: 13.6 cm SL

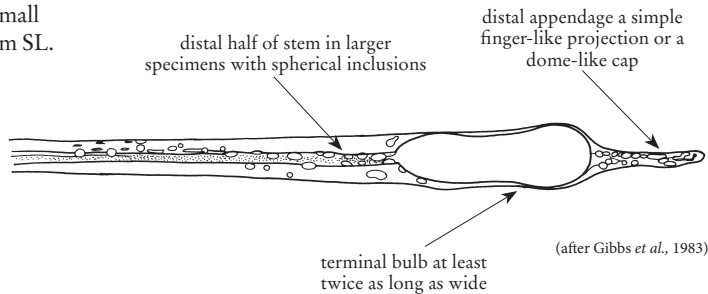
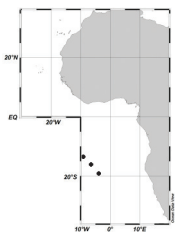
28a. Distal appendage of terminal bulb a simple finger-like projection or a dome-like cap; terminal bulb at least twice as long as wide → 29

28b. Distal appendage or appendages of terminal bulb with slender filaments of varying complexity; terminal bulb not more than 1.5 times longer than wide → 30

29a. Distal half of stem in specimens larger than 90-100 mm SL with spherical inclusions, widely spaced proximally, becoming larger and more crowded distally (inclusions not well developed in smaller specimens) *Eustomias spherulifer*

***Eustomias spherulifer* Gibbs, Clarke & Gomon, 1983**

Other characters: barbel 28-41% SL in small specimens, 60-76% SL in those over 8.5 cm SL.



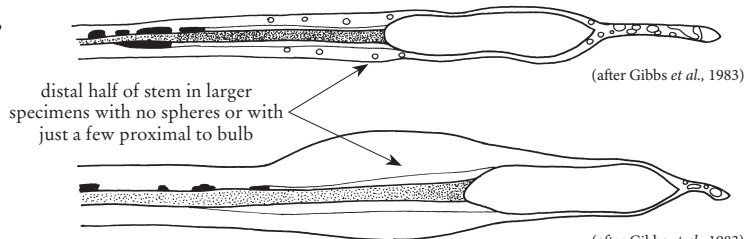
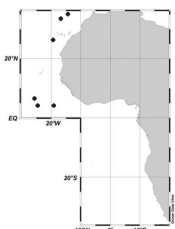
(after Gibbs et al., 1983)

Size: 16.5 cm SL

29b. Distal half of stem in specimens larger than 90-100 mm SL with no spheres or with a few just proximal to bulb *Eustomias longibarba*

***Eustomias longibarba* Parr, 1927**

Other characters: barbel 40-78% SL, mostly more than 30% SL.



(after Gibbs et al., 1983)

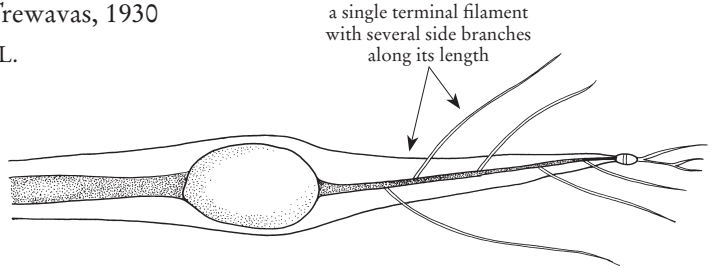
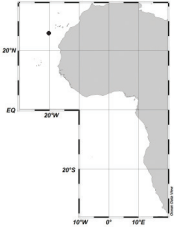
(after Gibbs et al., 1983)

Size: 18.8 cm SL

30a. A single terminal filament with several side branches along its length *Eustomias patulus*

Eustomias patulus Regan & Trewavas, 1930

Other characters: barbel length 56% SL.



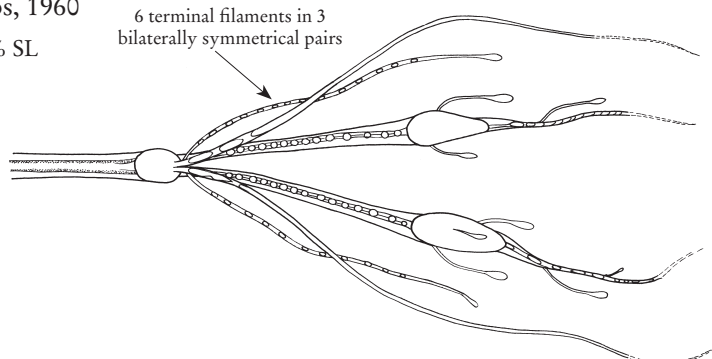
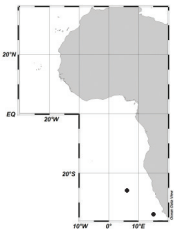
(after Gibbs et al., 1983)

Size: 13.3 cm SL

30b. Six terminal filaments in 3 bilaterally symmetrical pairs, the longest usually 8 or more times bulb length; 2 filaments with a large distal bulblet that may be larger than terminal bulb; distal bulb with 1 side prominently pigmented, pigment forking distally and continuing along axis of 1 pair of terminal filaments *Eustomias bulbornatus*

Eustomias bulbornatus Gibbs, 1960

Other characters: barbel short, 20-35% SL in specimens over 8 cm.



(after Gibbs et al., 1983)

Size: 16.0 cm TL

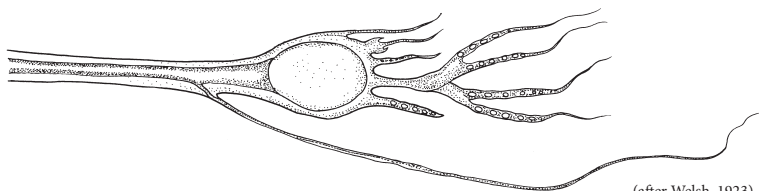
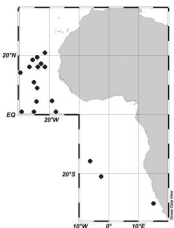
31a. Pectoral-fin rays 4; wide groove on the ventral body margin behind the pectoral fins absent *Eustomias enbarbatus*

31b. More than 4 pectoral-fin rays; wide groove present on the ventral body margin behind the pectoral fins → 32

Eustomias enbarbatus Welsh, 1923

Barbate dragonfish

Other characters: no information.



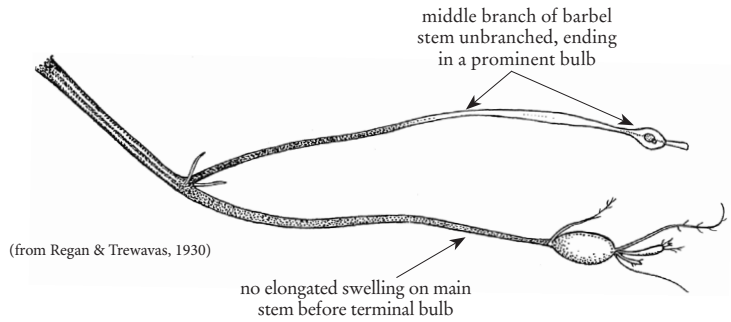
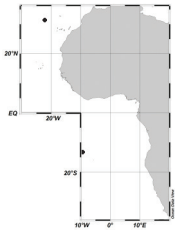
(after Welsh, 1923)

Size: 21.4 cm SL

- 32a. Pectoral-fin rays 6-7 → 33
- 32b. Pectoral-fin rays more than 7 → 34
- 33a. Middle branch of barbel stem unbranched, ending in a prominent bulb; no elongated swelling on main stem before terminal bulb *Eustomias tenisoni*

Eustomias tenisoni Regan & Trewavas, 1930

Other characters: dorsal-fin rays 25;
anal-fin rays 41.

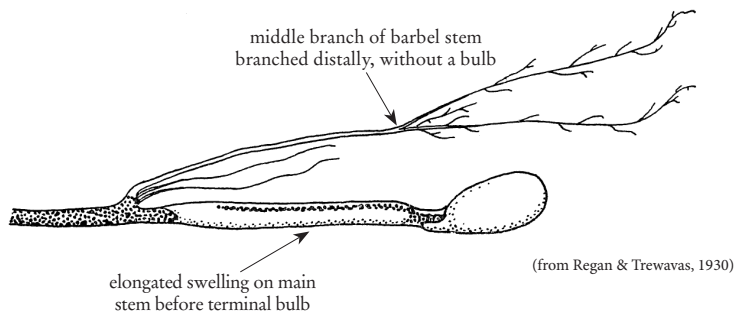
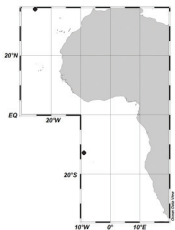


Size: 18.7 cm SL

- 33b. Middle branch of barbel stem branched distally, without a bulb; an elongated swelling on main stem before terminal bulb *Eustomias furcifer*

Eustomias furcifer Regan & Trewavas, 1930

Other characters: dorsal-fin rays 24;
anal-fin rays 45.

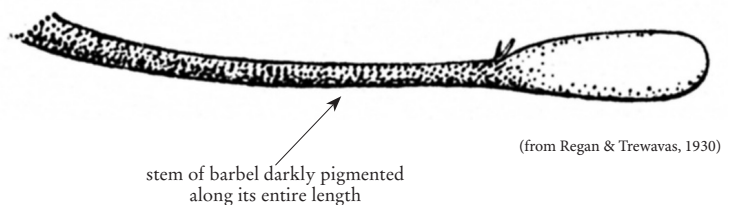
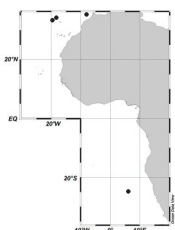


Size: 20.7 cm SL

- 34a. Stem of barbel darkly pigmented along its entire length; pelvic-fin rays 8; a series of round luminous spots on the lower side of the body that resemble large photophores *Eustomias braueri*

Eustomias braueri Zugmayer, 1911

Other characters: barbel 12-17% SL.

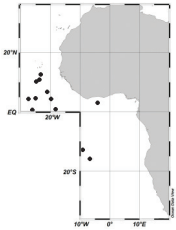


Size: 13.5 cm SL

34b. Stem of barbel lacking pigment except for a series of spots associated with photophores; pelvic-fin rays 7; series of large luminous spots on the lower side of the body difficult to discern to absent . *Eustomias macrurus*

Eustomias macrurus Regan & Trewavas, 1930

Other characters: no information.



stem of barbel lacking pigment except for a series of spots associated with photophores

(from Regan & Trewavas, 1930)

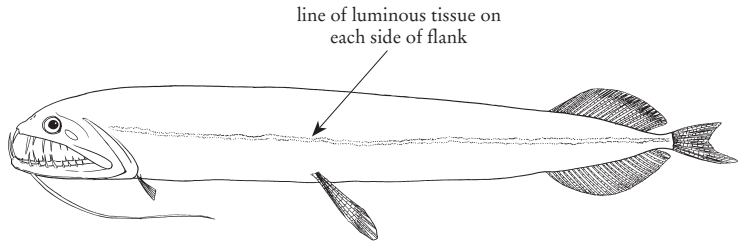
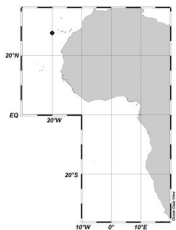
Size: 27.6 cm SL

KEY TO THE SPECIES OF *GRAMMATOSTOMIAS* OCCURRING IN THE AREA

- 1a. Sides with a long line of luminous tissue from operculum to beyond pelvic-fin base; pectoral-fin rays 5. *Grammatostomias dentatus*
- 1b. Sides with a closed loop of luminous tissue; pectoral-fin rays 9-11 → 2

Grammatostomias dentatus Goode & Bean, 1896

Other characters: no information.



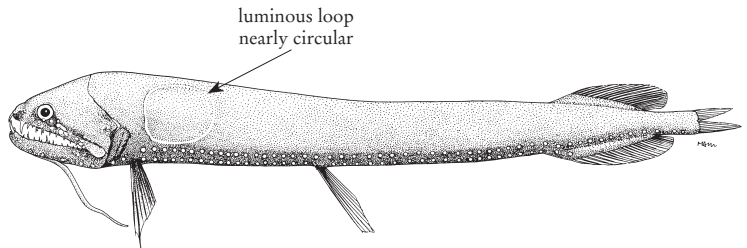
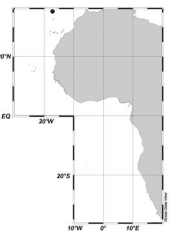
line of luminous tissue on each side of flank

Size: 15.9 cm SL

- 2a. Luminous loop nearly circular, without thickening or zigzags. *Grammatostomias circularis*

Grammatostomias circularis Morrow, 1959

Other characters: no information.



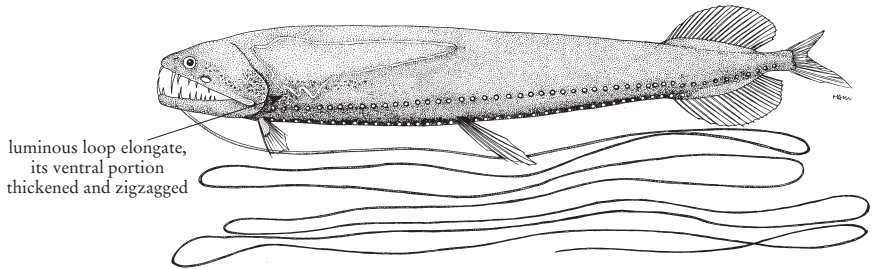
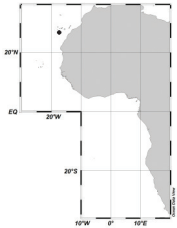
luminous loop nearly circular

Size: 13.6 cm SL

2b. Luminous loop elongated, extending posteriorly to pelvic-fin base, lower anterior portion thickened and zigzagged. *Grammatostomias flagellibarba*

Grammatostomias flagellibarba Holt & Byrne, 1910

Other characters: no information.



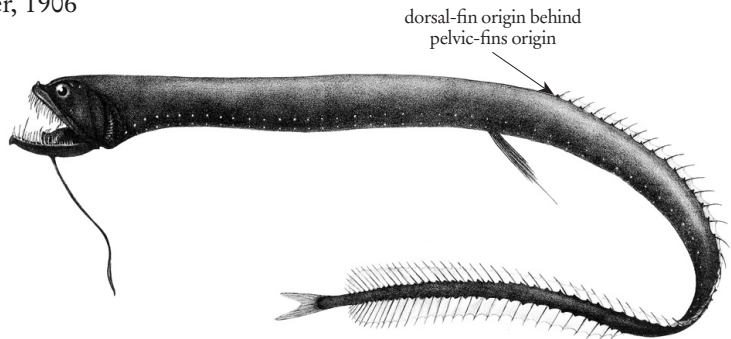
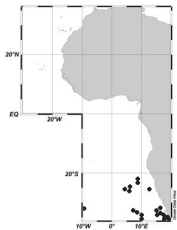
Size: 20.0 cm SL

KEY TO THE SPECIES OF *IDIACANTHUS* OCCURRING IN THE AREA

1a. Dorsal-fin origin behind pelvic-fin origins; VAV photophores 19-23. *Idiacanthus atlanticus*

Idiacanthus atlanticus Brauer, 1906

Other characters: no information.



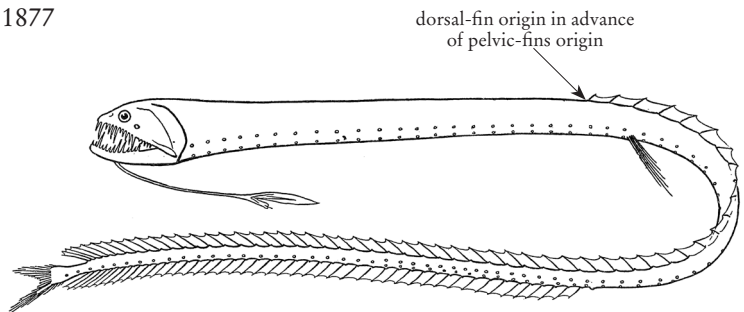
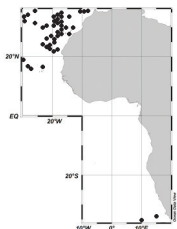
(by G.M. Woodward)

Size: 53.0 cm SL

1b. Dorsal-fin origin in advance of pelvic-fin origins; VAV photophores 14-16. *Idiacanthus fasciola*

Idiacanthus fasciola Peters, 1877

Other characters: no information.



(from Regan & Trewavas, 1930)

Size: 48.9 cm SL

KEY TO THE SPECIES OF *LEPTOSTOMIAS* OCCURRING IN THE AREA

- 1a. Stem of barbel without filaments at its base (Fig. 1) → 2
 1b. Stem of barbel with basal filaments (Fig. 2) → 5

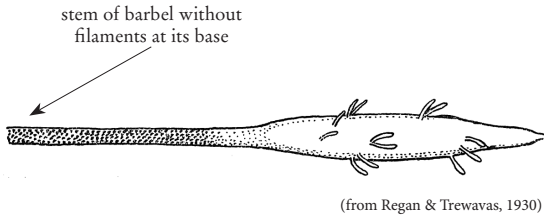


Fig. 1 *L. longibarba*

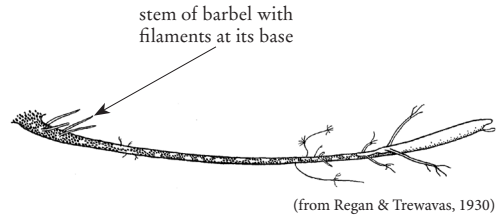
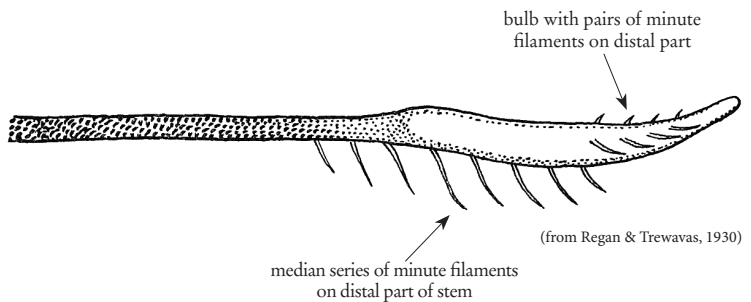
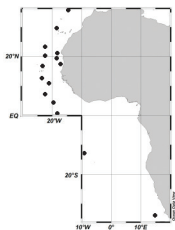


Fig. 2 *L. gladiator*

- 2a. PV photophores 41; barbel with median series of minute filaments on distal part of stem, extending onto proximal part of bulb, the bulb with pairs of minute filaments on distal part . . . *Leptostomias haplocaulus*
 2b. PV photophores 45-48; barbel not as above. → 3

Leptostomias haplocaulus Regan & Trewavas, 1930

Other characters: no information.

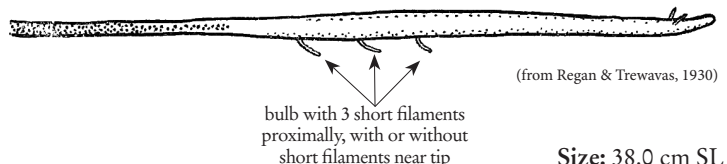
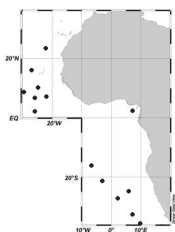


Size: 37.6 cm SL

- 3a. Barbel 25-35% SL; bulb with 3 short filaments proximally, with or without short filaments near tip *Leptostomias gracilis*
 3b. Barbel nearly 75% SL → 4

Leptostomias gracilis Regan & Trewavas, 1930

Other characters: no information.

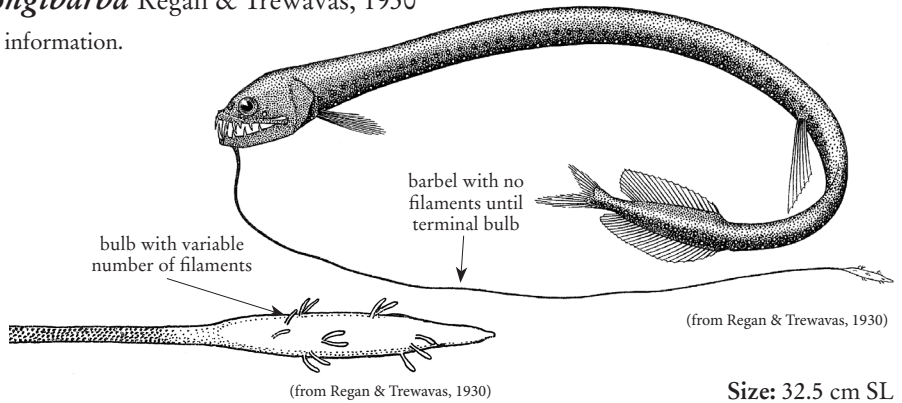
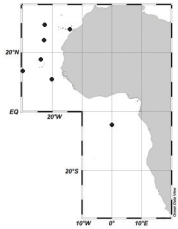


Size: 38.0 cm SL

4a. Barbel with no filaments until terminal bulb, the bulb with variable number of filaments *Leptostomias longibarba*

Leptostomias longibarba Regan & Trewavas, 1930

Other characters: no information.

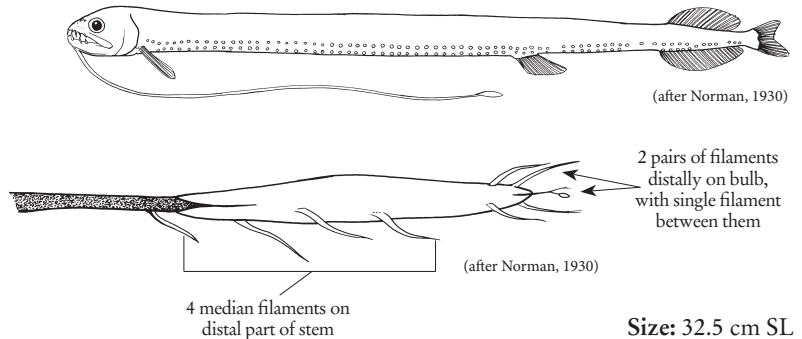
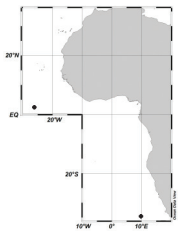


Size: 32.5 cm SL

4b. Barbel with 4 median filaments on distal part of stem, extending onto proximal part of bulb; 2 pairs of filaments distally on bulb, with a single filament between them. *Leptostomias macropogon*

Leptostomias macropogon Norman, 1930

Other characters: no information.

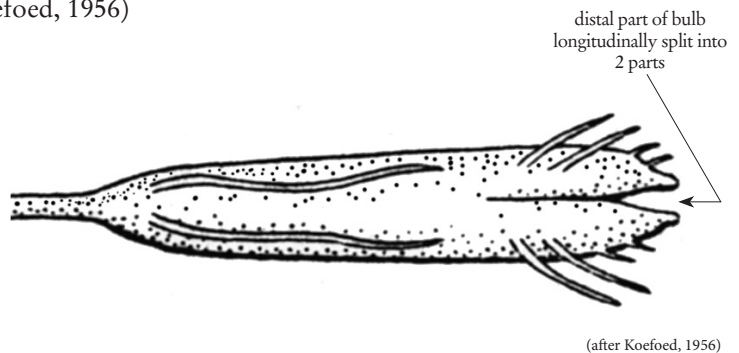
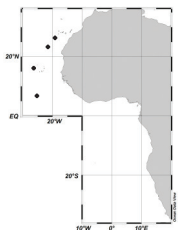


Size: 32.5 cm SL

5a. Distal part of bulb longitudinally split into 2 parts *Leptostomias bilobatus*

Leptostomias bilobatus (Koefoed, 1956)

Other characters: no information.

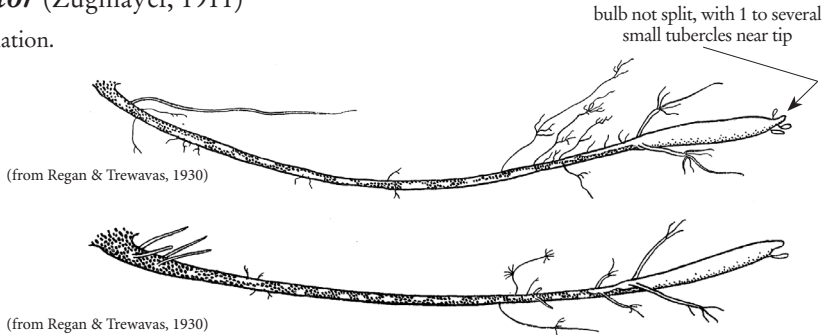
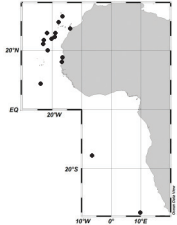


Size: 11.0 cm SL

5b. Bulb not split; distal part of bulb with 1 to several small tubercles near tip . . . *Leptostomias gladiator*

Leptostomias gladiator (Zugmayer, 1911)

Other characters: no information.



Size: 37.3 cm SL

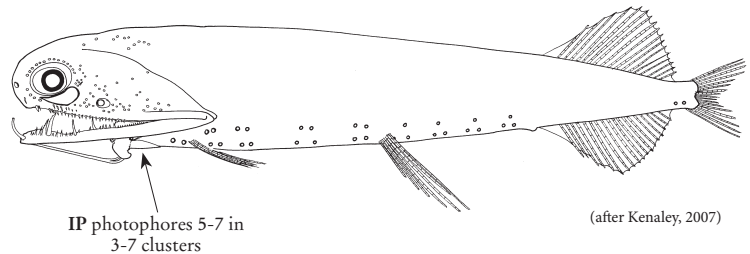
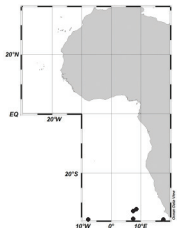
KEY TO THE SPECIES OF *MALACOSTEUS* OCCURRING IN THE AREA

1a. IP photophores 5-7 in 3-7 clusters *Malacosteus australis*

Malacosteus australis Kenaley, 2007

Southern stoplight loosejaw

Other characters: no information.



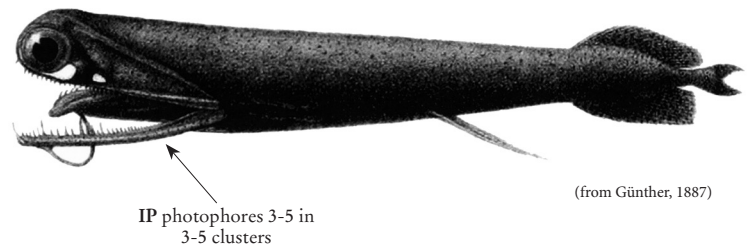
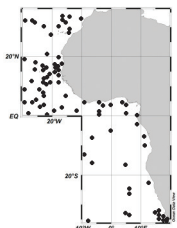
Size: 19.2 cm SL

1b. IP photophores 3-5 in 3-5 clusters *Malacosteus niger*

Malacosteus niger Ayres, 1848

Stoplight loosejaw

Other characters: no information.



Size: 25.6 cm SL

KEY TO THE SPECIES OF *MELANOSTOMIAS* OCCURRING IN THE AREA

- 1a. Barbel ending in 1-2 bulbous swellings without an extended, flattened part (Fig. 1) → 2
 1b. Barbel with its terminal end flattened, variously modified, but not forming a bulb (Fig. 2) → 3

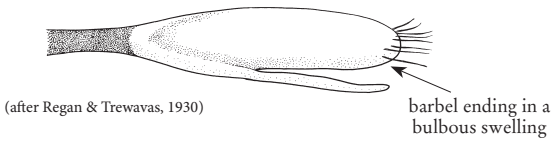


Fig. 1 *M. tentaculatus*

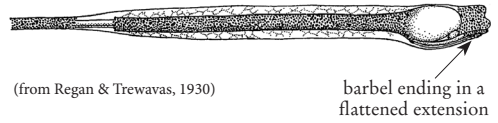
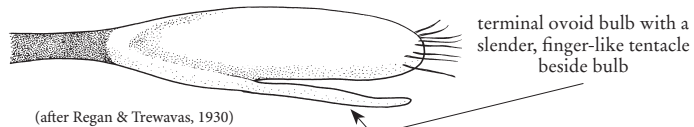
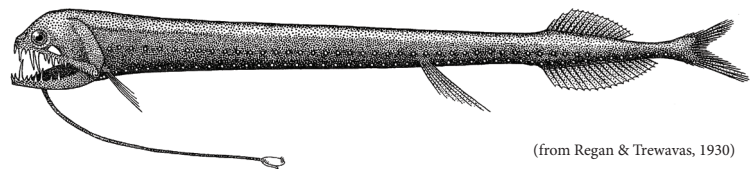
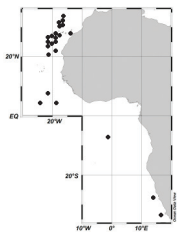


Fig. 2 *M. macrophotus*

- 2a. Barbel with a terminal ovoid bulb with a slender, finger-like tentacle beside bulb
 *Melanostomias tentaculatus*

Melanostomias tentaculatus (Regan & Trewavas, 1930)

Other characters: no information.

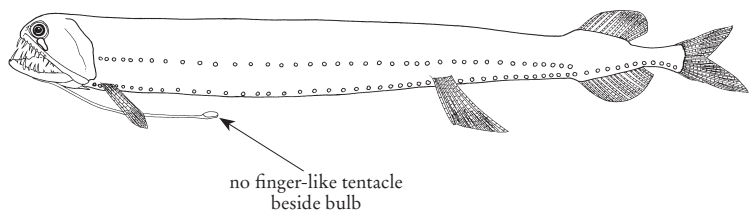
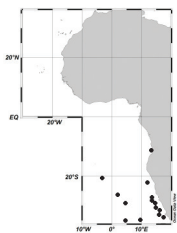


Size: 24.0 cm SL

- 2b. No finger-like tentacle beside bulb *Melanostomias niger*

Melanostomias niger Gilchrist & von Bonde, 1924

Other characters: no information.



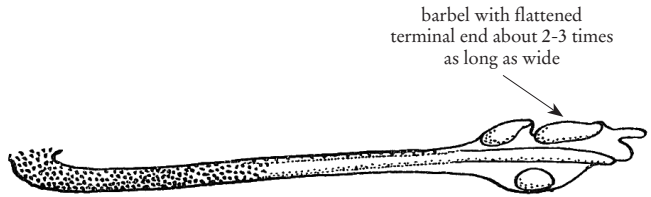
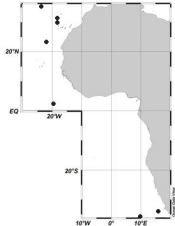
Size: 26.0 cm TL

- 3a. Barbel with flattened terminal end about 2-3 times as long as wide *Melanostomias valdiviae*
 3b. Barbel with flattened terminal end at least 5 times as long as wide → 4

Melanostomias valdiviae Brauer, 1902

Valdivia black dragon fish

Other characters: no information.



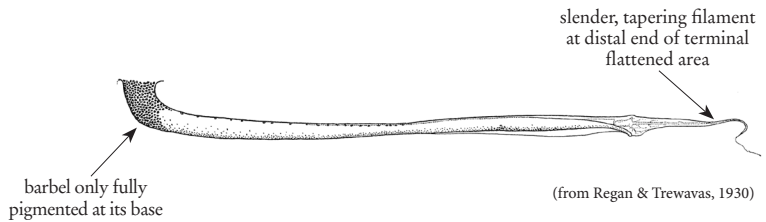
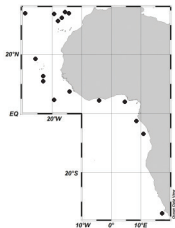
(from Regan & Trewavas, 1930)

Size: 24.1 cm SL

- 4a. Barbel only fully pigmented at its base (may have small black dots in row along stem); slender, tapering filament at distal end of terminal flattened area *Melanostomias melanops*
 4b. Barbel stem fully pigmented; filament present or absent at distal end of terminal flattened area → 5

Melanostomias melanops Brauer, 1902

Other characters: no information.



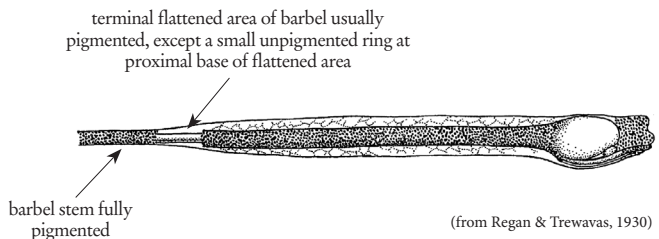
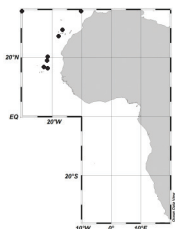
(from Regan & Trewavas, 1930)

Size: 26.0 cm SL

- 5a. Pectoral-fin rays usually 6; terminal flattened area of barbel usually pigmented, except a small unpigmented ring at proximal base of flattened area. *Melanostomias macrophotus*
 5b. Pectoral-fin rays usually 5; terminal flattened area of barbel usually unpigmented (some spots may be present) → 6

Melanostomias macrophotus Regan & Trewavas, 1930

Other characters: no information.



(from Regan & Trewavas, 1930)

Size: 23.0 cm SL

- 6a. Terminal flattened end of barbel with a prominent, tapering extension (Fig. 3) → 7
 6b. Terminal flattened end of barbel rounded, without tapering extension (Fig. 4); no prominent white spots on head → 8

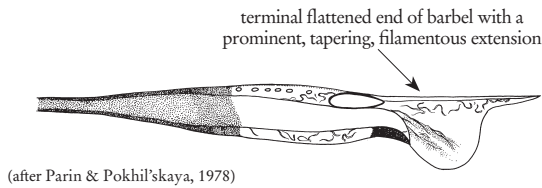


Fig. 3 *M. paucilateratus*

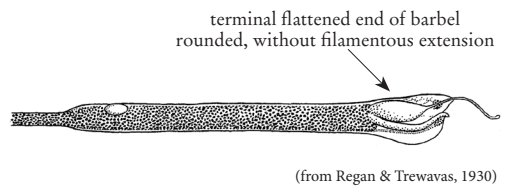


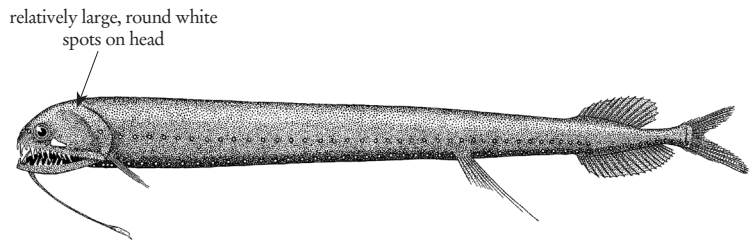
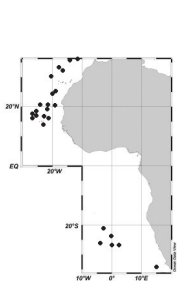
Fig. 4 *M. melanopogon*

- 7a. Terminal end of barbel with masses of opaque material filling much of the membrane on both sides of the axis; relatively large, round white spots on head (1 at tip of snout, 1 on top of head where it joins body, 1 in front of eye, a pair in front of isthmus) *Melanostomias bartonbeani*

Melanostomias bartonbeani Parr, 1927

Scaleless black dragonfish

Other characters: no information.

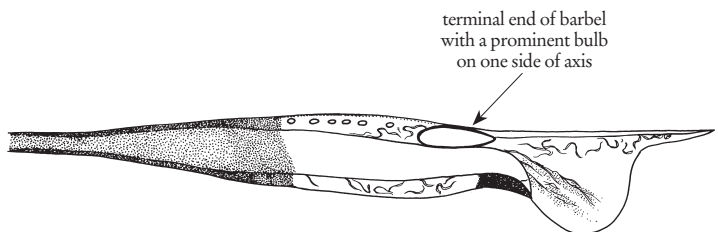
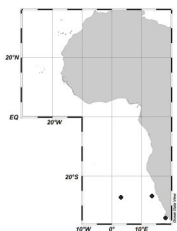


Size: 26.2 cm SL

- 7b. Terminal end of barbel without masses of opaque material along both sides of the axis, but with a prominent bulb on one side of axis; no large white spots on head *Melanostomias paucilateratus*

Melanostomias paucilateratus Parin & Pokhil'skaya, 1978

Other characters: no information.

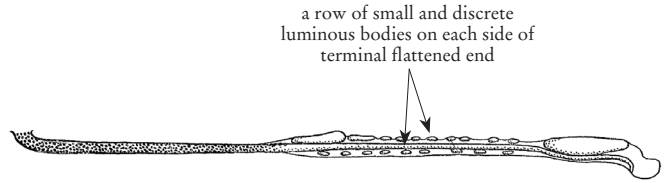
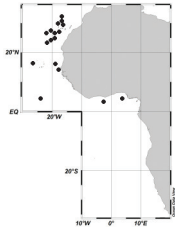


Size: 20.1 cm SL

8a. Axis of terminal flattened end lined on each side with a row of small and discrete luminous bodies *Melanostomias biseriatus*

Melanostomias biseriatus Regan & Trewavas, 1930

Other characters: no information.



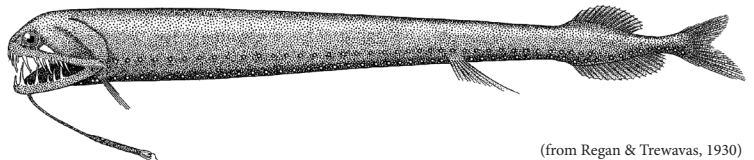
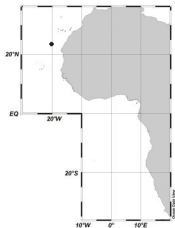
(from Regan & Trewavas, 1930)

Size: 25.0 cm SL

8b. Axis of terminal flattened end not lined with luminous bodies *Melanostomias melanopogon*

Melanostomias melanopogon Regan & Trewavas, 1930

Other characters: no information.



(from Regan & Trewavas, 1930)



(from Regan & Trewavas, 1930)

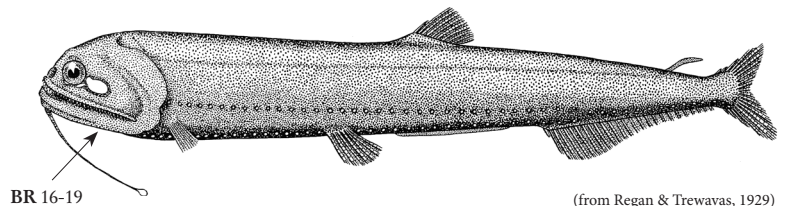
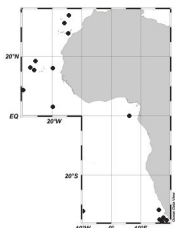
Size: 15.3 cm SL

KEY TO THE SPECIES OF *NEONESTHES* OCCURRING IN THE AREA

1a. Branchiostegal photophores (BR) 16-19 *Neonesthes capensis*

Neonesthes capensis (Gilchrist & von Bonde, 1924)

Other characters: no information.



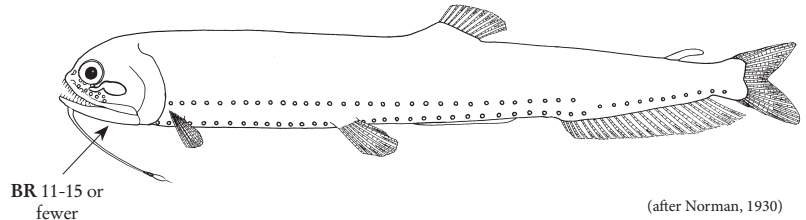
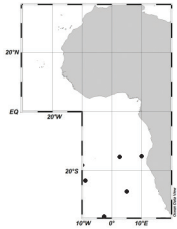
(from Regan & Trewavas, 1929)

Size: 17.0 cm SL

1b. Branchiostegal photophores (BR) 11-15 or fewer *Neonesthes microcephalus*

Neonesthes microcephalus Norman, 1930

Other characters: no information.



(after Norman, 1930)

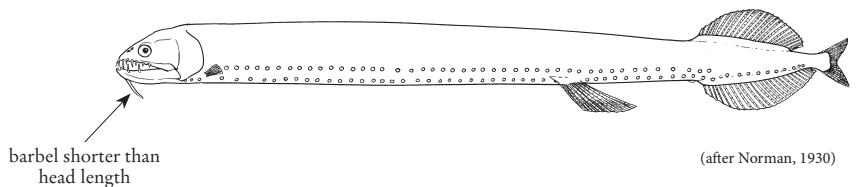
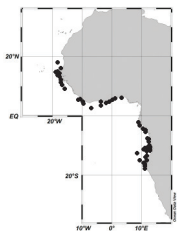
Size: 17.2 cm SL

KEY TO THE SPECIES OF *ODONTOSTOMIAS* OCCURRING IN THE AREA

1a. Barbel shorter than head length *Odontostomias micropogon*

Odontostomias micropogon Norman, 1930

Other characters: no information.



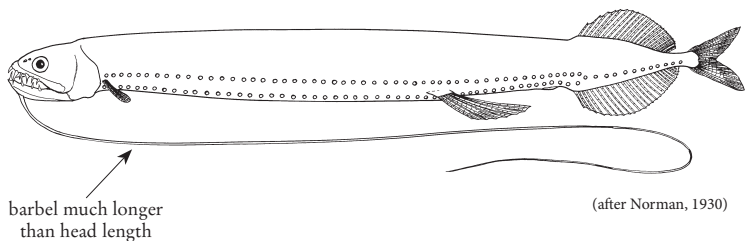
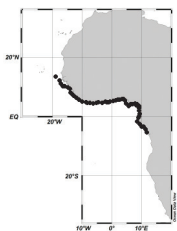
(after Norman, 1930)

Size: 29.5 cm SL

1b. Barbel much longer than head length (greater than body length when unbroken)
 *Odontostomias masticopogon*

Odontostomias masticopogon Norman, 1930

Other characters: no information.



(after Norman, 1930)

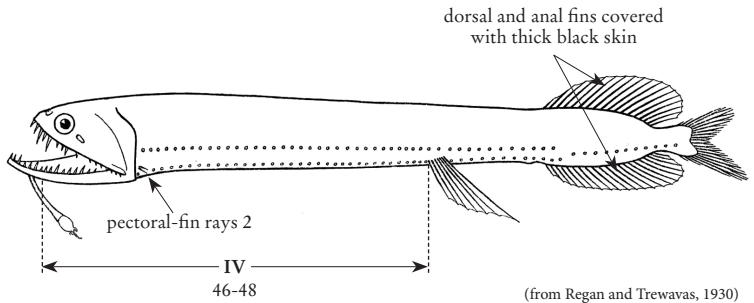
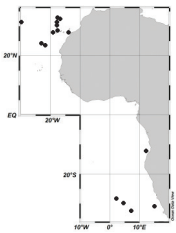
Size: 20.0 cm TL

KEY TO THE SPECIES OF *PHOTONECTES* OCCURRING IN THE AREA

- 1a. Dorsal and anal fins covered with thick black skin, with only tips of fin rays visible in adults; IV (IP + PV) photophores 41-48 → 2
- 1b. Dorsal and anal fins not covered with thick black skin, rays clearly visible; IV (IP + PV) photophores 30-37 → 3
- 2a. Pectoral-fin rays 2 *Photonectes parvimanus*

Photonectes parvimanus Regan & Trewavas, 1930

Other characters: no information.

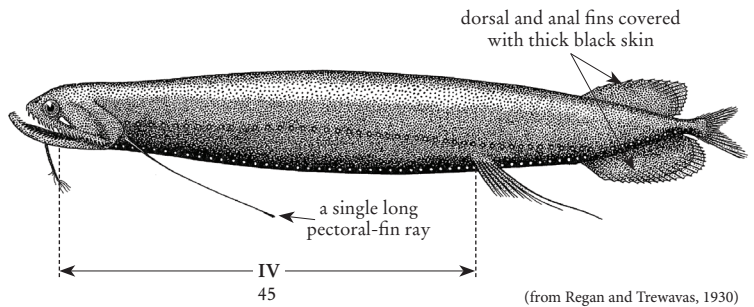
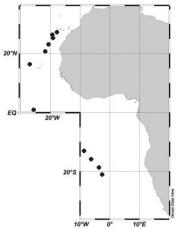


Size: 24.5 cm SL

- 2b. A single long pectoral-fin ray. *Photonectes margarita*

Photonectes margarita (Goode & Bean, 1896)

Other characters: no information.



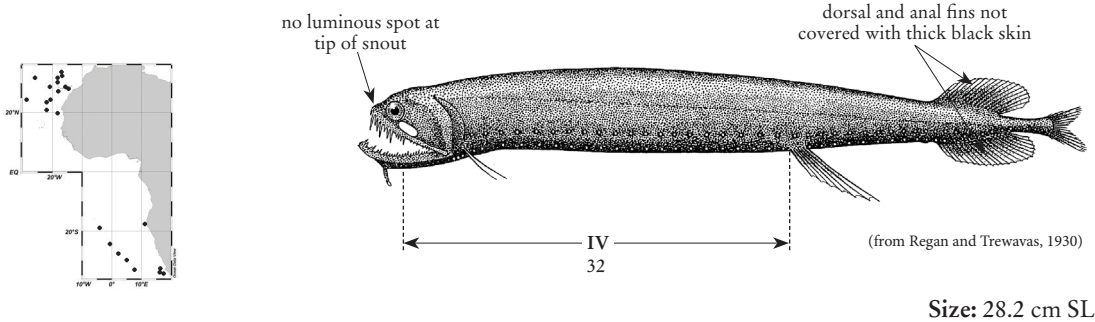
Size: 39.6 cm SL

- 3a. Pectoral fins present, with 2 (sometimes 3) rays → 4
- 3b. Pectoral fins absent → 6

- 4a. No luminous spot at tip of snout *Photonectes braueri*
 4b. Luminous spot at tip of snout present → 5

Photonectes braueri (Zugmayer, 1913)

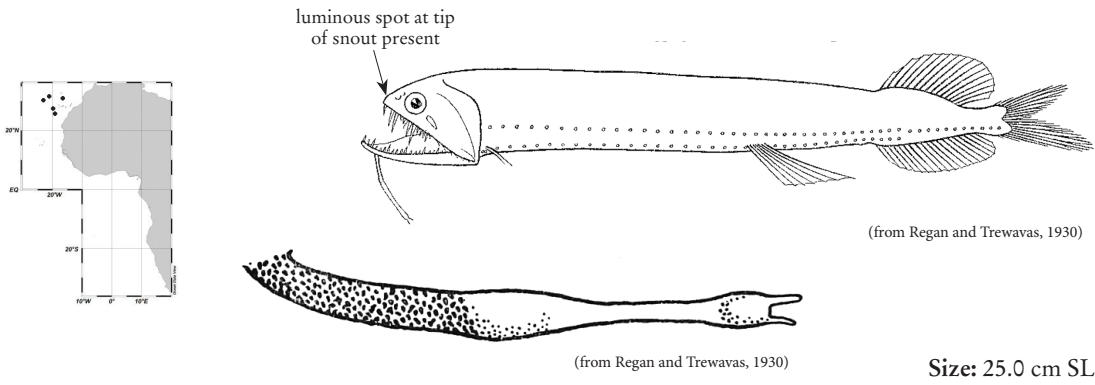
Other characters: no information.



- 5a. Barbel with a slightly swollen bulb bearing a long, translucent appendage that ends in a smaller bulb with a pair of short terminal filaments. *Photonectes dinema*

Photonectes dinema Regan & Trewavas, 1930

Other characters: no information.



- 5b. Barbel with a large white bulb bearing a long, translucent appendage ending in a very small white bulb without appendages. *Photonectes leucospilus*

Photonectes leucospilus Regan & Trewavas, 1930

Other characters: no information.



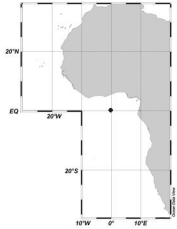
6a. No lateral or mid-ventral band of bluish luminous tissue present; no superficial luminous tissue on ventral surface of lower jaw; no light organs inside of lower jaw *Photonectes phyllopogon*

6b. A lateral or mid-ventral band of bluish luminous tissue present, and/or superficial luminous tissue on ventral surface of lower jaw, and/or light organs inside of lower jaw → 7

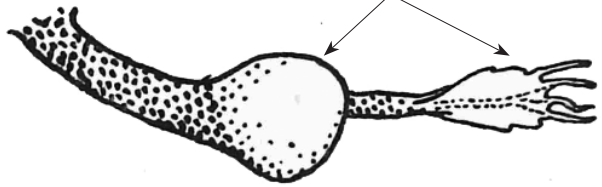
Photonectes phyllopogon Regan & Trewavas, 1930

Other characters: no information.

Remarks: no illustration of the species is available in the literature.



barbel with short black stem and large white bulb bearing an appendage consisting of a pigmented cylindrical stalk and a distal translucent leaf-like expansion with serrated edges and 4 terminal filaments



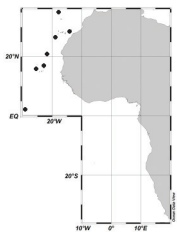
(from Regan and Trewavas, 1930)

Size: 10.0 cm SL

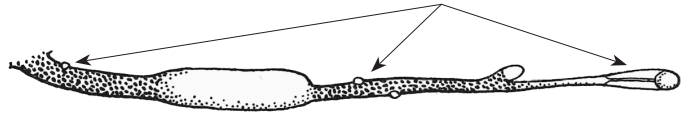
7a. Three pairs of light organs inside lower jaw; blue band present on sides *Photonectes mirabilis*

Photonectes mirabilis Parr, 1927

Other characters: no information.



barbel with short black stem bearing a small posterior luminous bulb, and long tapering terminal part, pigmented proximally, bearing 3 luminous bodies and ending in a flat round translucent expansion with a minute white body at tip



(from Regan and Trewavas, 1930)

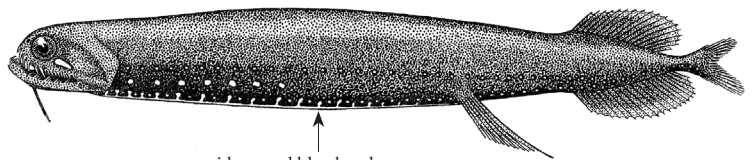
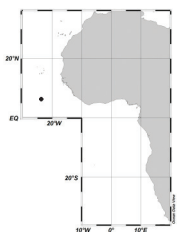
Size: 16.4 cm SL

7b. No light organs inside lower jaw; mid-ventral blue band present *Photonectes caerulescens*

Photonectes caerulescens Regan & Trewavas, 1930

Bulbless dragonfish

Other characters: barbel short, without distinct bulb.



mid-ventral blue band present

(from Regan and Trewavas, 1930)

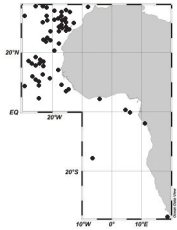
Size: 15.0 cm SL

KEY TO THE SPECIES OF *PHOTOSTOMIAS* OCCURRING IN THE AREA

- 1a. Basibranchial (tongue) with 2 pairs of tooth patches *Photostomias guernei*
 1b. Basibranchial (tongue) with 3 pairs of tooth patches → 2

***Photostomias guernei* Collett, 1889**

Other characters: dorsal-fin rays 23-26;
 anal-fin rays 27-30.



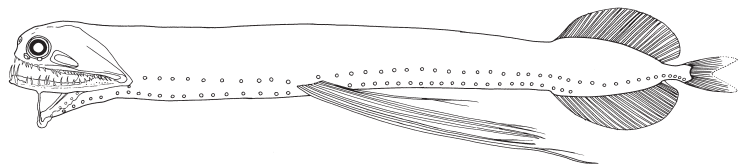
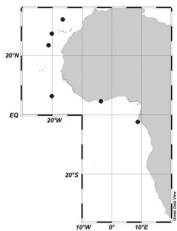
(by Kießling, 1911)

Size: 16.0 cm TL

- 2a. Sum of dorsal- and anal-fin rays 56-63 *Photostomias goodyeari*

***Photostomias goodyeari* Kenaley & Hartel, 2005**

Other characters: no information.

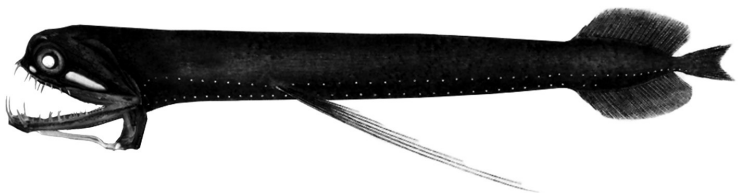
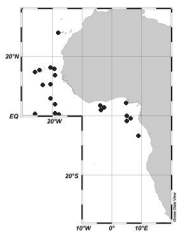


Size: 18.3 cm TL

- 2b. Sum of dorsal- and anal-fin rays 47-55 *Photostomias atrox*

***Photostomias atrox* (Alcock, 1890)**

Other characters: no information.



(after Alcock, 1899)

Size: 15.4 cm SL

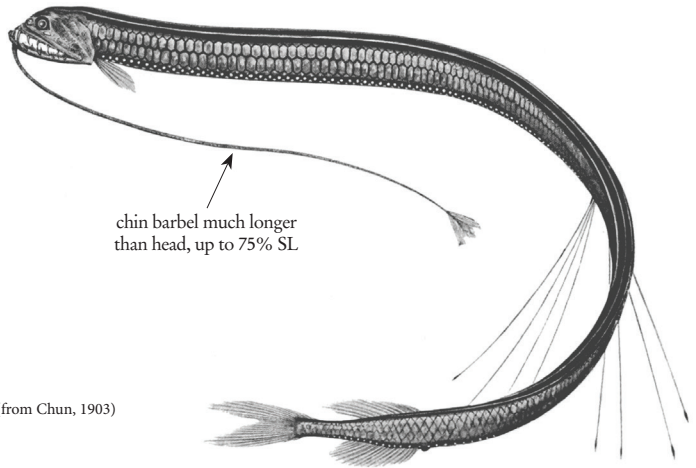
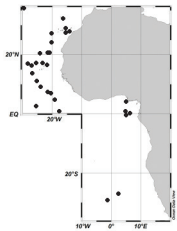
KEY TO THE SPECIES OF *STOMIAS* OCCURRING IN THE AREA

- 1a. More than 170 IC photophores; body length 20-35 times its depth; chin barbel much longer than head length, up to 75% SL. *Stomias longibarbatus*
- 1b. Less than 100 IC photophores; body length 10-20 times its depth; chin barbel shorter or slightly longer than head → 2

***Stomias longibarbatus* (Brauer, 1902)**

Longbarb scaly dragonfish

Other characters: photophores with a bronzy rim; barbel pale, bulb and filaments yellowish.



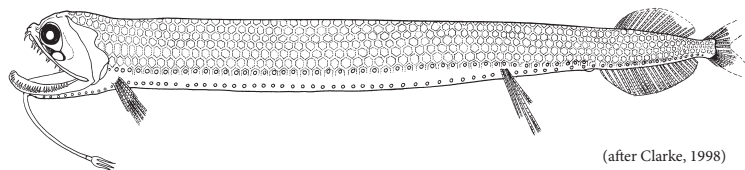
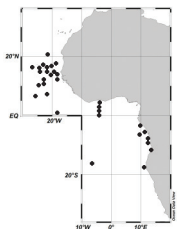
(from Chun, 1903)

Size: 43.0 cm SL

- 2a. A single tooth on the anterior end of each palatine bone *Stomias lampropeltis*
- 2b. Two teeth on the end of each palatine bone → 3

***Stomias lampropeltis* Gibbs, 1969**

Other characters: no information.



(after Clarke, 1998)

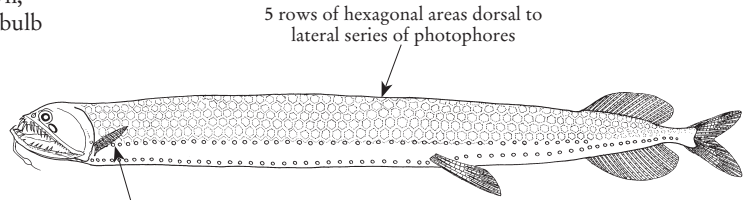
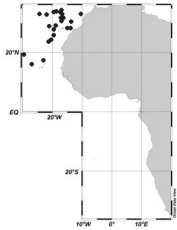
Size: 29.7 cm SL

3a. Rows of hexagonal areas dorsal to lateral series of photophores 5; barbel length (without terminal filaments) 75% head length or less; premaxillary teeth usually 10 or more; pectoral-fin rays 7 or more *Stomias brevibarbatus*

3b. Rows of hexagonal areas dorsal to lateral series of photophores 6; barbel length (without terminal filaments) usually about equal to head length, rarely less than 67% head length; premaxillary teeth 8 or fewer; pectoral-fin rays 6 → 4

Stomias brevibarbatus Ege, 1918

Other characters: black to dark brown, sides iridescent, fins pale; barbel pale, bulb yellowish, filaments pale.



(after Clarke, 1998)

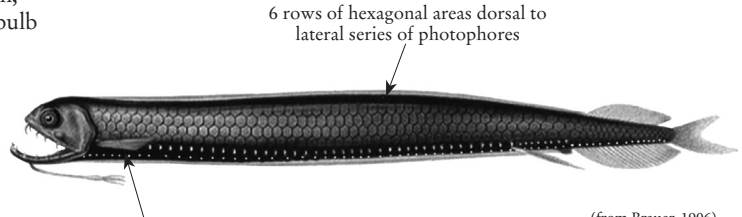
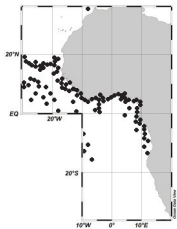
Size: 20.4 cm SL

4a. VAV photophores 5-8 (rarely 9); VAL 4-8 *Stomias affinis*

Stomias affinis Günther, 1887

Günther's boafish

Other characters: black to dark brown, sides iridescent, fins pale; barbel pale, bulb yellowish, filaments pale.



(from Brauer, 1906)

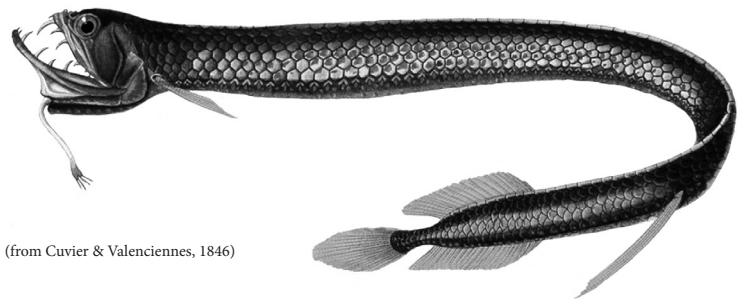
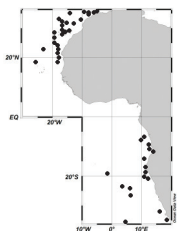
Size: 21.9 cm SL

4b. VAV photophores 10-14 (rarely 9); VAL 10-15 *Stomias boa boa*

Stomias boa boa (Risso, 1810)

Boa dragonfish

Other characters: no information.



(from Cuvier & Valenciennes, 1846)

Size: 32.2 cm SL

AULOPIFORMES

Pearleyes, Sabertooth fishes, Lancet fishes, Hammerjaws, Barracudinas,
Daggertooshs, Telescope fishes, Waryfishes

KEY TO THE FAMILIES OF AULOPIFORMES OCCURRING IN THE AREA

- 1a. Lower lobe of caudal fin prolonged; dorsal adipose fin absent; eyes large, tubular and directed anteriorly (Fig. 1) **Giganturidae (p. 134)**
- 1b. Upper and lower caudal-fin lobes equal; dorsal adipose fin present; eyes various, but not directed forward (Fig. 2) **→ 2**

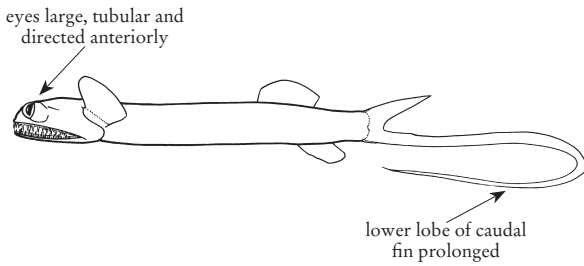


Fig. 1 Giganturidae

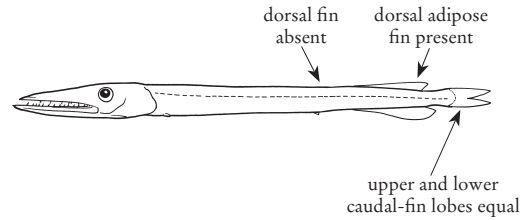


Fig. 2 Anotopteridae

- 2a. Dorsal fin absent (Fig. 2) **Anotopteridae (p. 131)**
- 2b. Dorsal fin present (Figs. 3 & 4) **→ 3**
- 3a. Dorsal fin long, high and sail-like, with 39 or more rays (Fig. 3) **Alepisauridae (p. 130)**
- 3b. Dorsal fin short and low, with 37 or less rays (Figs. 4 & 5-8) **→ 4**



Fig. 3 Alepisauridae

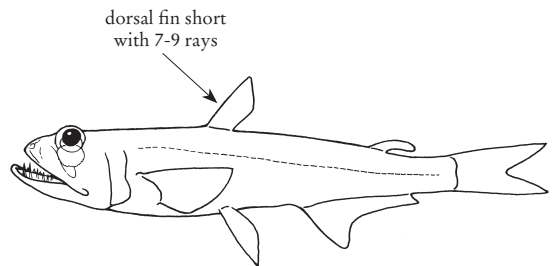


Fig. 4 Scopelarchidae

- 4a. Dorsal-fin origin distinctly in front of midpoint of body; eyes modified in most species (Figs 4 & 5) **→ 5**
- 4b. Dorsal-fin origin at or behind midpoint of body; eyes normal (Figs. 6-8) **→ 6**
- 5a. Dorsal-fin rays 7-9 (Fig. 4) **Scopelarchidae (p. 151)**
- 5b. Dorsal-fin rays 11-13 (Fig. 5) **Evermannellidae (p. 138)**

- 6a. Anal-fin rays 13-14 (Fig. 6) **Omosudidae (p. 138)**
- 6b. Anal-fin rays 16 or more → 7

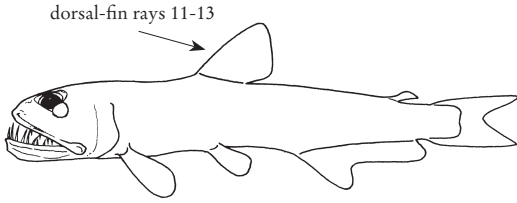


Fig. 5 Evermannellidae

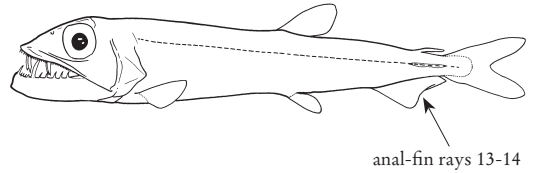


Fig. 6 Omosudidae

- 7a. Dorsal fin behind midpoint of body; upper jaw not reaching middle of eye (Fig. 7) **Paralepididae (p. 139)**
- 7b. Dorsal fin at midpoint of body; upper jaw below middle to rear of eye (Fig. 8) **Notosudidae (p. 135)**

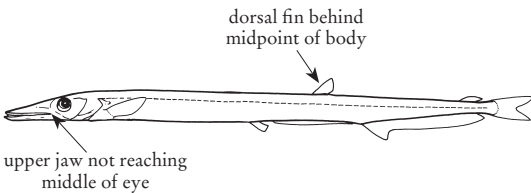


Fig. 7 Paralepididae

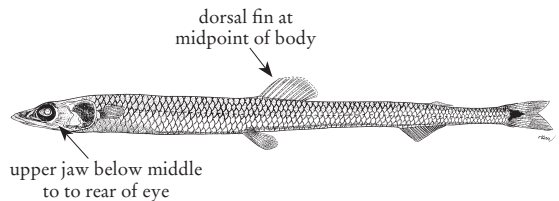


Fig. 8 Notosudidae

ALEPISAUROIDAE

Lancetfishes

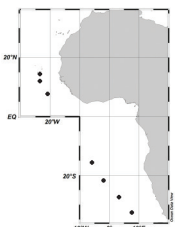
KEY TO THE SPECIES OF ALEPISAUROIDAE OCCURRING IN THE AREA

- 1a. Dorsal-fin origin in front of posterior margin of operculum; dorsal fin without free rays and low in front, forming a curve that is highest near the middle ***Alepisaurus brevirostris***

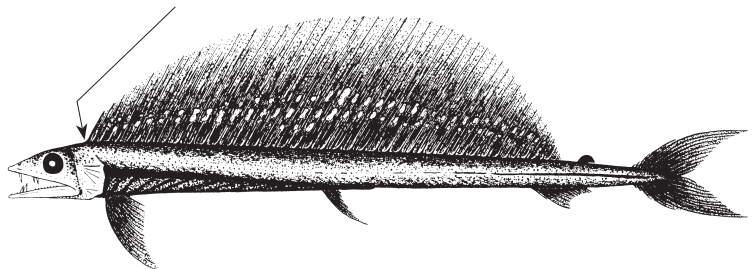
Alepisaurus brevirostris Gibbs, 1960

Short snouted lancetfish

Other characters: for specimens larger than 50.0 cm SL, SL/Head length more than 6.2, Head length/Snout length more than 2.8.



dorsal-fin origin in front of posterior margin of operculum



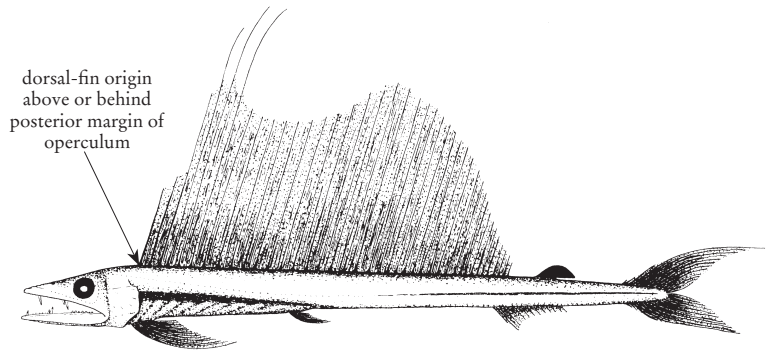
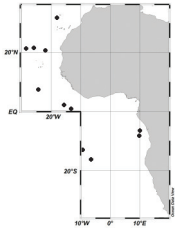
Size: 96.0 cm TL

1b. Dorsal-fin origin above or behind posterior margin of operculum; dorsal fin with several free rays and high in front *Alepisaurus ferox*

Alepisaurus ferox Lowe, 1833

Long snouted lancetfish

Other characters: for specimens larger than 50.0 cm SL, SL/Head length less than 6.2; Head length/Snout length equal to or less than 2.8.



Size: 215.0 cm TL

ANOPTERIDAE

Daggertooshs

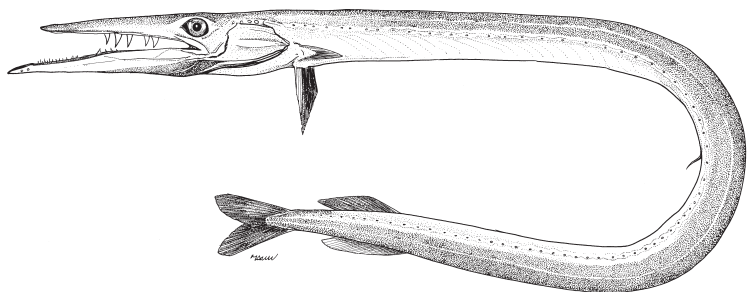
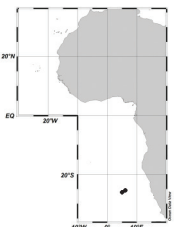
KEY TO THE SPECIES OF ANOPTERIDAE OCCURRING IN THE AREA

1a. Fixed palate teeth 7-17 (in adults usually 11-12); lower jaw teeth 9-30 (in adults usually 15-23); head depth in adult fish 21.3-23.2% of lower jaw length; postadipose distance 4.6-5.9% Standard Length; Vertebrae 81-85 (usually 83-84). Southern circumglobal distribution between 25° and 70°S. *Anotopterus vorax*

Anotopterus vorax (Regan, 1913)

Southern ocean daggertooshs

Other characters: no information.



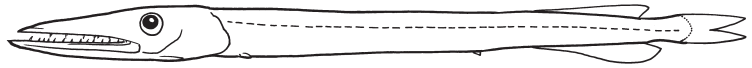
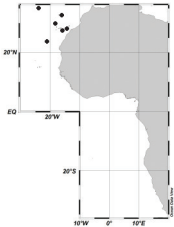
Size: 105.0 cm SL

1b. Fixed palate teeth 4-13 (in adults usually 6-9); lower jaw teeth 6-23 (in adults usually 8-12); head depth in adult fish 23.2-26.8% of lower jaw length; postadipose distance 6-7.4% Standard Length; vertebrae 77-81 (usually 77-80); North Atlantic distribution between 30° and 63°N *Anotopterus pharao*

Anotopterus pharao Zugmayer, 1911

Daggertooth

Other characters: no information.



Size: 96.0 cm SL

EVERMANNELLIDAE

Sabertooth fishes

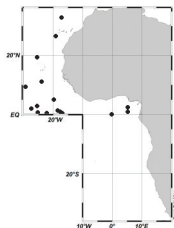
KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF EVERMANNELLIDAE OCCURRING IN THE AREA

- 1a. Eyes normal and lateral in position, not tubular; aperture in adipose eyelid smaller than lens diameter *Odontostomops normalops*
- 1b. Eyes tubular or semi-tubular, directed at least somewhat dorsally; aperture in adipose eyelid larger than lens diameter → 2

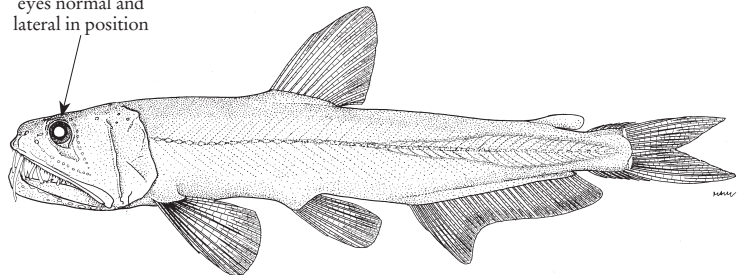
Odontostomops normalops (Parr, 1928)

Undistinguished sabretooth

Other characters: anal-fin rays 30-35.



eyes normal and lateral in position



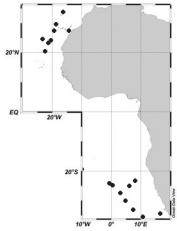
Size: 12.3 cm SL

- 2a. Eyes tubular, directed dorsally and slightly forward; aperture in adipose eyelid greatly exceeds lens diameter; at least some jaw teeth with barbed tips *Evermannella* (p. 133)
- 2b. Eyes semi-tubular, directed dorsolaterally; aperture in adipose eyelid slightly larger than lens diameter; jaw teeth without barbed tips *Coccorella atlantica*

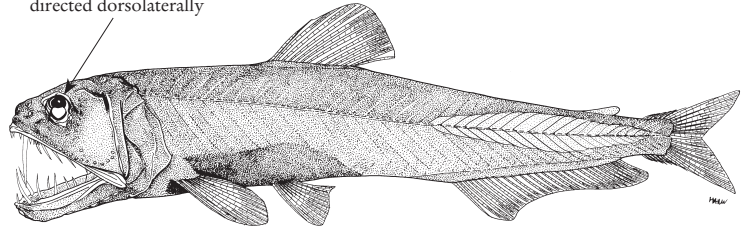
Coccorella atlantica (Parr, 1928)

Atlantic sabretooth

Other characters: anal-fin rays 26-30.



eyes semi-tubular,
directed dorsolaterally



Size: 18.5 cm SL

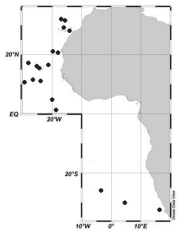
KEY TO THE SPECIES OF *EVERMANNELLA* OCCURRING IN THE AREA

1a. Anal-fin rays 33-37; vertebrae 52-54 *Evermannella balbo*

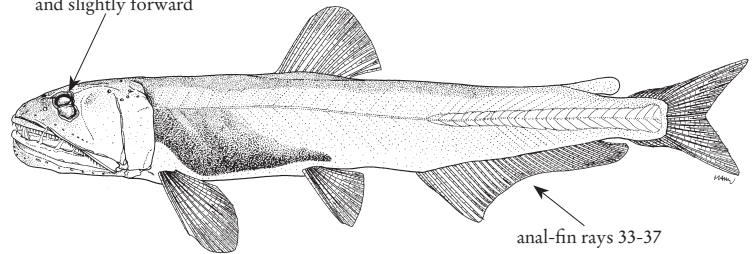
Evermannella balbo (Risso, 1820)

Balbo sabretooth

Other characters: no information.



eyes tubular, directed dorsally
and slightly forward

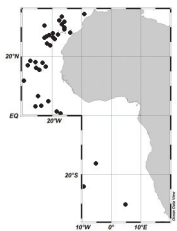


Size: 16.9 cm SL

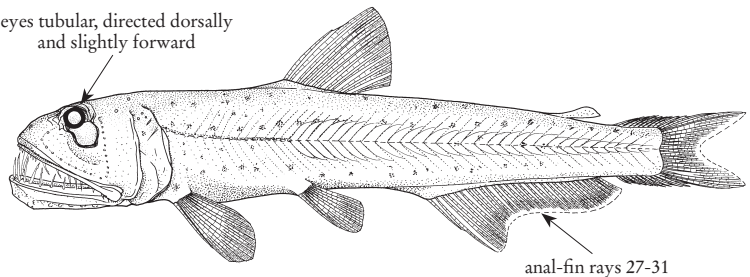
1b. Anal-fin rays 27-31; vertebrae 48-52 *Evermannella melanoderma*

Evermannella melanoderma Parr, 1928

Other characters: no information.



eyes tubular, directed dorsally
and slightly forward



Size: 12.7 cm SL

GIGANTURIDAE

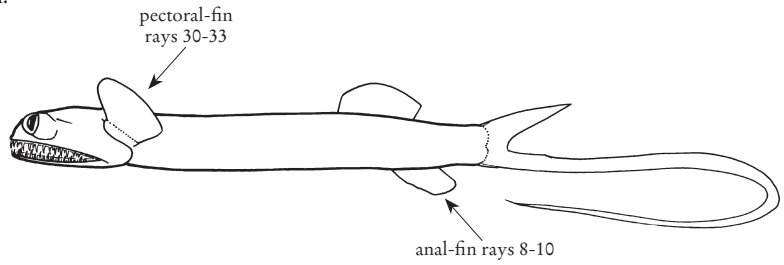
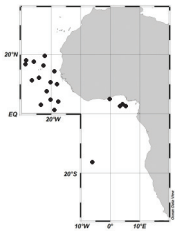
Telescope fishes

KEY TO THE SPECIES OF GIGANTURIDAE OCCURRING IN THE AREA

1a. Pectoral-fin rays 30-33; anal-fin rays 8-10; least depth of caudal peduncle more than 8% Standard Length (in larvae more than 11.5%) *Gigantura chuni*

Gigantura chuni Brauer, 1901

Other characters: no information.

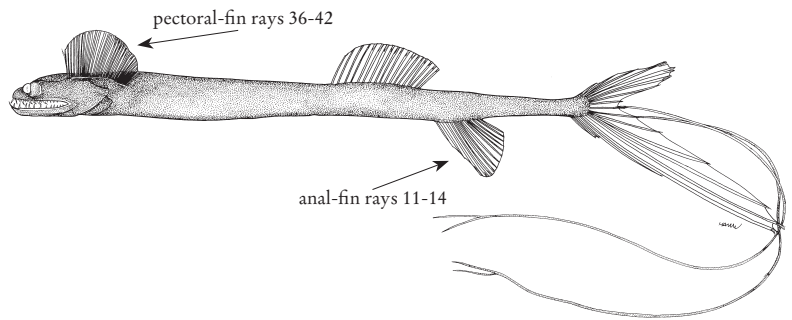
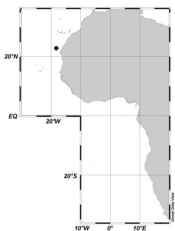


Size: 15.6 cm SL

1b. Pectoral-fin rays 36-42; anal-fin rays 11-14; least depth of caudal peduncle less than 4% Standard Length (in larvae less than 11.5%) *Gigantura indica*

Gigantura indica Brauer, 1901

Other characters: no information.



Size: 20.3 cm SL

NOTOSUDIDAE

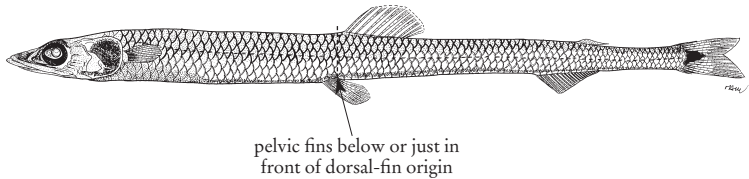
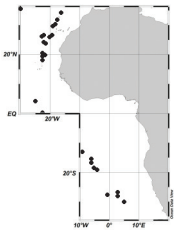
Waryfishes

KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF NOTOSUDIDAE OCCURRING IN THE AREA

- 1a. Pelvic fins below or just in front of dorsal-fin origin; ventral body wall thin and transparent, dark peritoneum clearly visible *Abliesaurus berryi*
- 1b. Pelvic fins distinctly in front of dorsal-fin origin; ventral body wall relatively thick and opaque, dark peritoneum more concealed. → 2

Abliesaurus berryi Bertelsen, Krefft & Marshall, 1976

Other characters: colour after preservation olive-brown, edges of scale pockets blackish; opercle and interior of mouth black.

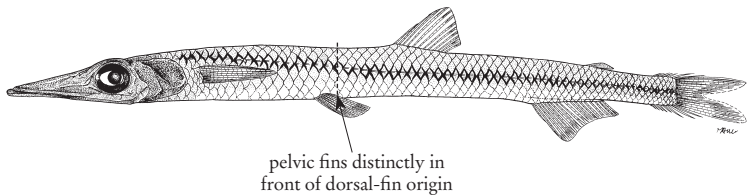
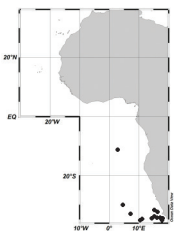


Size: 26.9 cm SL

- 2a. Snout very long, length 10.1-13.2% Standard Length; end of maxilla below anterior half of eye; gill rakers on lower part of first gill arch 26-30 *Luciosudis normani*
- 2b. Snout moderate to short, length 6.5-10.0% Standard Length; end of maxilla below or (in adults) behind posterior half of eye; gill rakers on lower part of first gill arch 14-22 *Scopelosaurus* (p. 136)

Luciosudis normani Fraser-Brunner, 1931

Other characters: adult and semiadults remarkably stiff and rigid compared to all other notosudids; posterior infraorbital bones fused into a large, crescent-shaped bony plate with nearly smooth posterior border.



Size: 20.7 cm SL

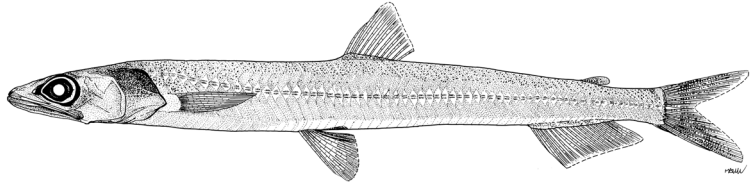
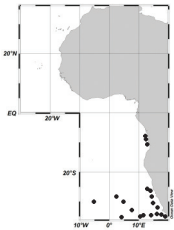
KEY TO THE SPECIES OF *SCOPELOSAURUS* OCCURRING IN THE AREA

Note: All gill raker counts refer to the lower part (cerato- and hypobranchial) of the first gill arch. In addition, there is usually one raker on the upper part (epibranchial) and one in the angle between the upper and the lower part.

- 1a. A distinct black spot surrounding anus *Scopelosaurus meadi*
- 1b. No distinct black spot surrounding anus → 2

Scopelosaurus meadi Bertelsen, Krefft & Marshall, 1976

Other characters: in fresh specimens, scales deciduous transparent, scale pockets not outlined with pigment.

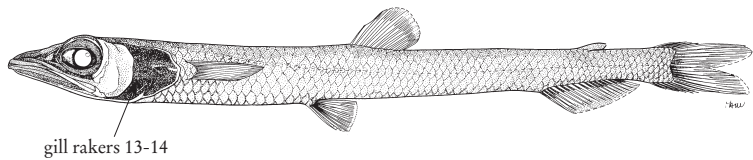
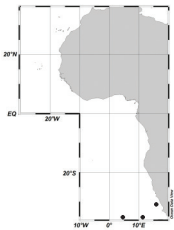


Size: 16.9 cm SL

- 2a. Mandibular pores heavily outlined with black pigment; ventral scales silvery. → 3
- 2b. Mandibular pores not or indistinctly outlined with pigment; ventral scales not silvery.. . . . → 4
- 3a. Gill rakers 13-14; vertebrae 60-62 *Scopelosaurus herwigi*

Scopelosaurus herwigi Bertelsen, Krefft & Marshall, 1976

Other characters: colour after preservation more or less yellowish-brown.

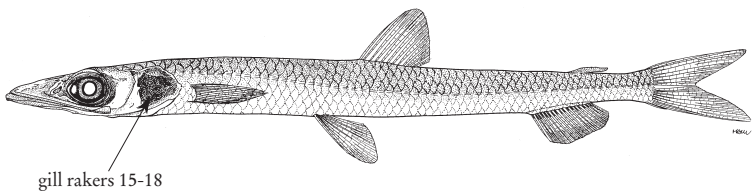
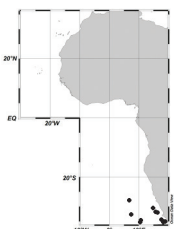


Size: 35.0 cm TL

- 3b. Gill rakers 15-18; vertebrae 57-59 *Scopelosaurus ablstromi*

Scopelosaurus ablstromi Bertelsen, Krefft & Marshall, 1976

Other characters: colour after preservation more or less brownish where skin is intact.

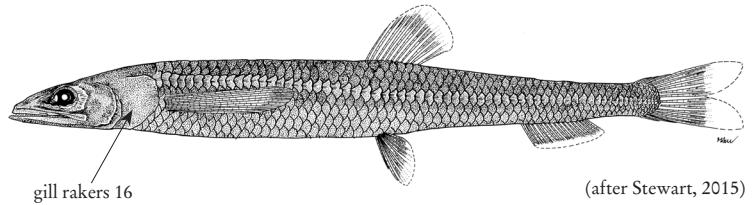
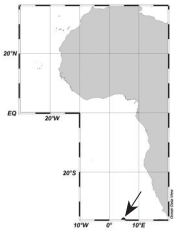


Size: 20.0 cm TL

- 4a. Gill rakers 12-16. → 5
 4b. Gill rakers 17-20 → 7
 5a. Gill rakers 16; pyloric caeca 20-26; vertebrae 61-62 *Scopelosaurus craddocki*

Scopelosaurus craddocki Bertelsen, Krefft & Marshall, 1976

Other characters: colour of preserved specimens dark brown.



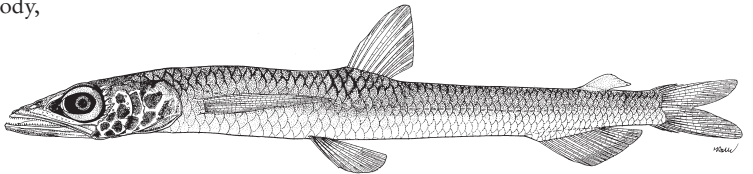
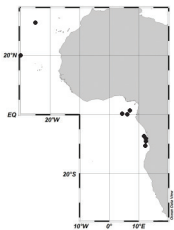
(after Stewart, 2015)

Size: 29.9 cm SL

- 5b. Gill rakers 12-16; pyloric caeca 12-32; vertebrae 53-57 → 6
 6a. Pyloric caeca 12-16; body depth 8.8-9.9% Standard Length (in specimens larger than 10.0 cm SL) *Scopelosaurus smithii*

Scopelosaurus smithii Bean, 1925

Other characters: dark brownish to blackish on head and upper parts of body, somewhat lighter on inferior parts.



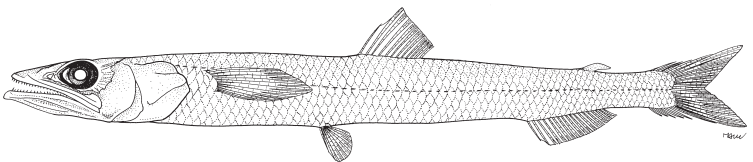
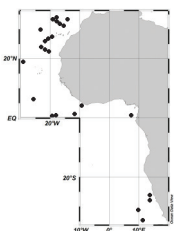
Size: 25.0 cm SL

- 6b. Pyloric caeca 20-32; body depth 11.0-11.9% Standard Length (in specimens larger than 15.0 cm SL) *Scopelosaurus argenteus*

Scopelosaurus argenteus (Maul, 1954)

Waryfish

Other characters: despite its name probably not silver-scaled.



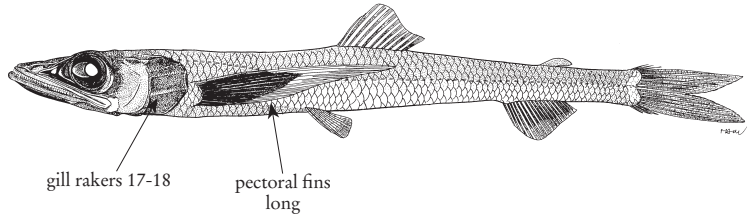
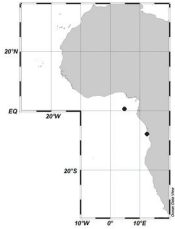
Size: 21.4 cm SL

7a. Pyloric caeca 16-30; gill rakers 17-18; pectoral fins long (18.6-30.6% Standard Length) at any size; vertebrae 58-61 *Scopelosaurus lepidus*

Scopelosaurus lepidus (Kreffft & Maul, 1955)

Blackfin waryfish

Other characters: black patch covering the basal 2/3 of pectoral fins in specimens larger than 12.0 cm SL.

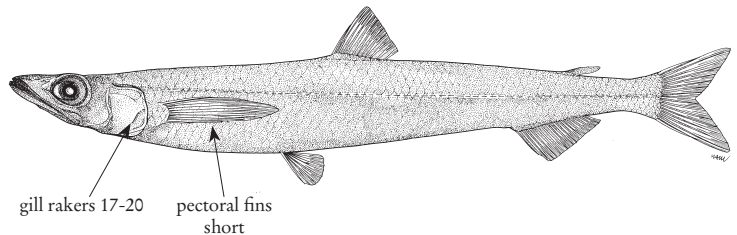
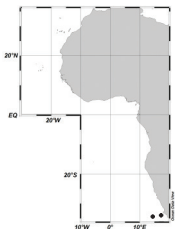


Size: 36.4 cm SL

7b. Pyloric caeca 15-20; gill rakers 17-20; pectoral fins short (12.6-13.9% Standard Length in specimens smaller than 10.0 cm SL) to moderately long (17.4-22.1% SL in specimens larger than 10.0 cm SL); vertebrae 63-67 *Scopelosaurus hamiltoni*

Scopelosaurus hamiltoni (Waite, 1916)

Other characters: no information.



Size: 50.0 cm TL

OMOSUDIDAE

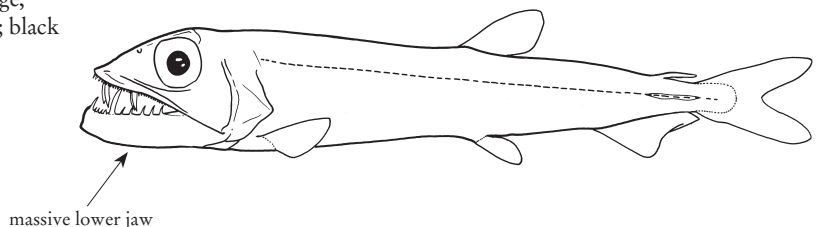
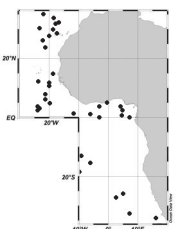
Hammerjaws

Note: a single species in this family.

Omosudis lowii Günther, 1887

Omosudid

Other characters: body strongly compressed; head and eyes large; colour silvery, darker dorsally; black peritoneum visible.



Size: 23.0 cm SL

PARALEPIDIDAE

Barracudinas

KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF PARALEPIDIDAE OCCURRING IN THE AREA

- 1a. Pectoral fins elongate, longest fin ray distinctly longer than anal-fin base (Fig. 1a); large mandibular teeth fixed and with serrate edges (Fig. 1b) *Sudis* (p. 149)
- 1b. Pectoral fins short, longest fin ray shorter than anal-fin base (Fig. 2a); large mandibular teeth fixed or flexible and with smooth edges (Fig. 2b) → 2

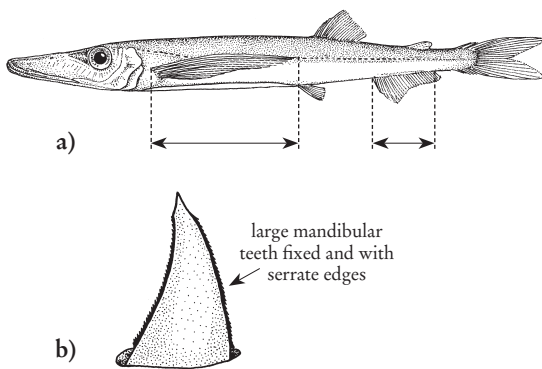


Fig. 1 *Sudis*

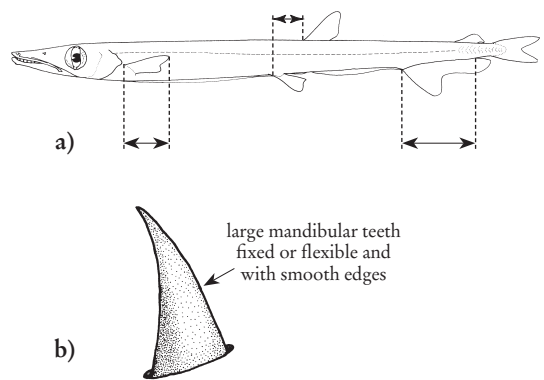
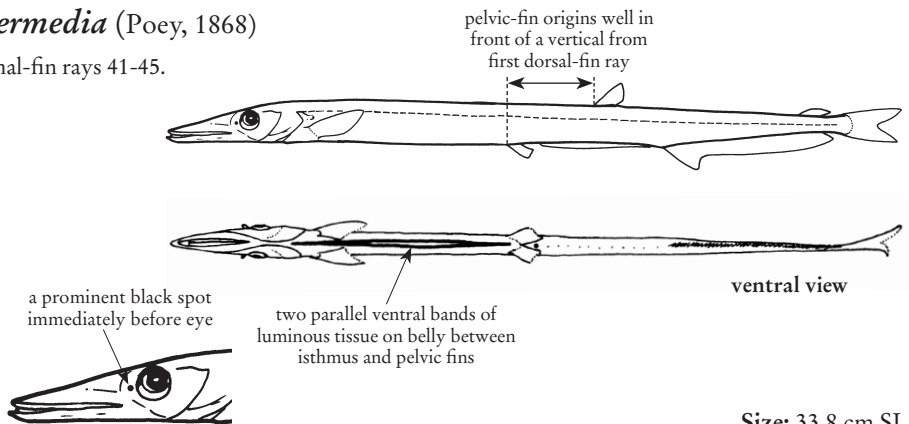
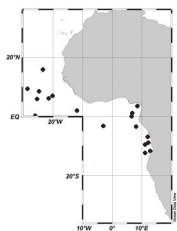


Fig. 2 Other genera

- 2a. Pelvic-fin origins well in front of a vertical from first dorsal-fin ray (by at least one length of dorsal-fin base)(Fig. *Lestrolepis intermedia*) → 3
- 2b. Pelvic-fin origins behind or only slightly in front of a vertical from first dorsal-fin ray (by less than one length of dorsal-fin base)(Fig. 2a) → 7
- 3a. Two parallel ventral bands of luminous tissue on belly between isthmus and pelvic fins; a prominent black spot immediately before eye *Lestrolepis intermedia*
- 3b. No luminous tissue on belly; no black spot before eye. → 4

Lestrolepis intermedia (Poey, 1868)

Other characters: anal-fin rays 41-45.



Size: 33.8 cm SL

- 4a. Dorsal-fin rays 11-14; ventral adipose fin absent; if specimen not completely dark then lateral-line scales marked by black spots (at least on anterior part of trunk)(Fig. 3) *Macroparalepis* (in part)(p. 145)
- 4b. Dorsal-fin rays 8-10; ventral adipose fin between vent and anal fin present (Fig. 4) → 5
- 5a. Anal-fin rays 32 or less (Fig. 4). *Lestidiops* (in part)(p. 142)
- 5b. Anal-fin rays 35 or more → 6

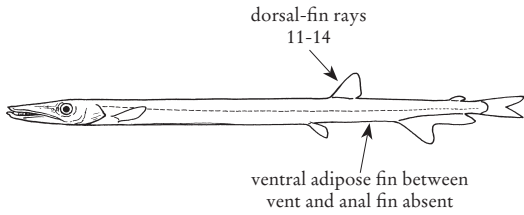


Fig. 3 *Macroparalepis*

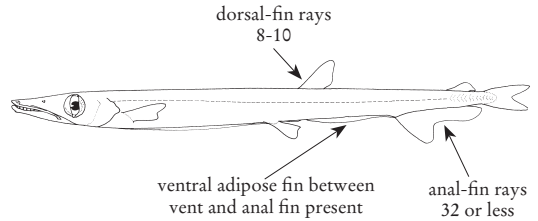
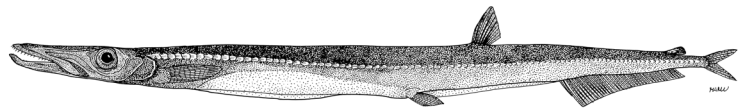
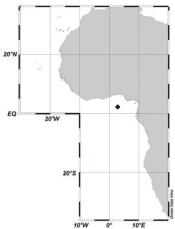


Fig. 4 *Lestidiops*

- 6a. Colour deep black *Dolichosudis fuliginosa*
- 6b. Colour light, some with saddle-like blotches dorsally (Fig. 5) *Stemonosudis* (p. 148)

Dolichosudis fuliginosa Post, 1969

Other characters: hind tip of premaxilla below nostril; anal-fin rays 37-38.



Size: 24.4 cm SL

- 7a. Ventral adipose fin between vent and anal fin present (Fig. 6). → 8
- 7b. Ventral adipose fin between vent and anal fin absent → 10

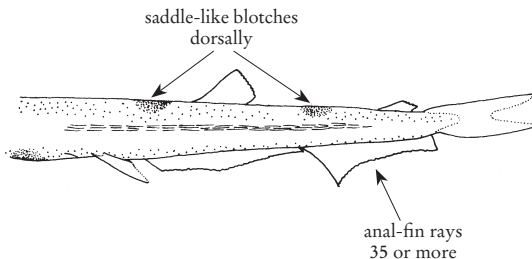


Fig. 5 *Stemonosudis*

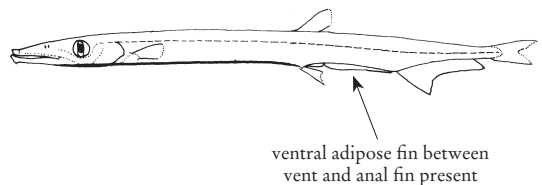


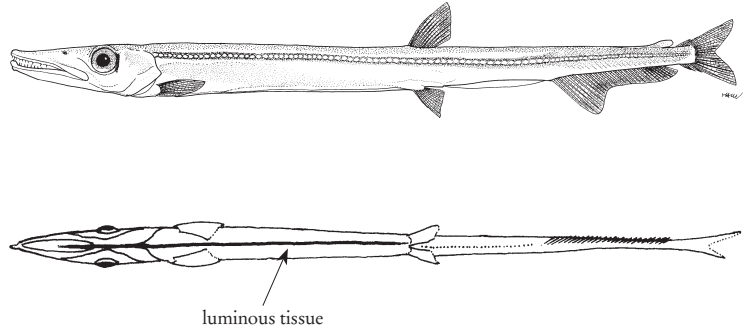
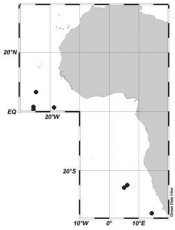
Fig. 6 *Lestidium atlanticum*

- 8a. One band of luminous tissue on ventral midline from isthmus to between pelvic fins (easily visible between opercles) ***Lestidium atlanticum***
- 8b. No luminous tissue on ventral midline → 9

Lestidium atlanticum Borodin, 1928

Atlantic barracudina

Other characters: mostly unpigmented at all sizes.



Size: 25.0 cm TL

- 9a. Pelvic fins heavily pigmented, some species with saddle-like blotches dorsally (Fig. 7) ***Uncisudis*** (p. 150)
- 9b. Pelvic fins slightly pigmented, no saddle-like blotches dorsally (Fig. 8) . . . ***Lestidiops*** (in part)(p. 142)

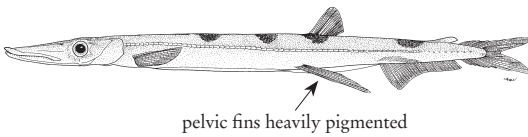


Fig. 7 *Uncisudis*

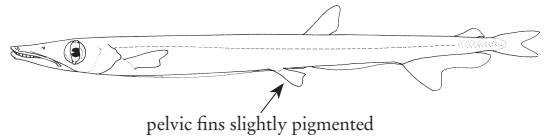
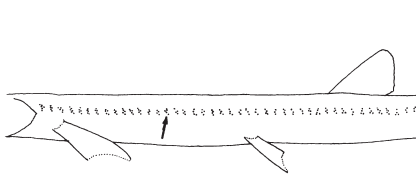
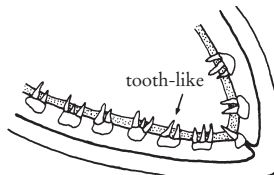


Fig. 8 *Lestidiops*

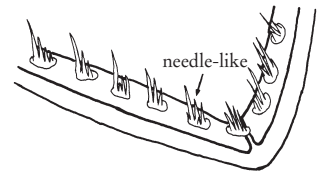
- 10a. Body scaleless, except for lateral-line scales, and entirely black or dark dorsally and light ventrally; in the latter case, lateral-line scales marked by black spots (at least on anterior part of trunk)(Fig. 9a); gill rakers tooth-like on bony bases (Fig. 9b) ***Macroparalepis*** (in part)(p. 145)
- 10b. Body scaled, but scales very delicate and easily shed; gill rakers needle-like on bony bases (Fig. 10) → 11



a)



b) gill arch



gill arch

Fig. 9 *Macroparalepis*

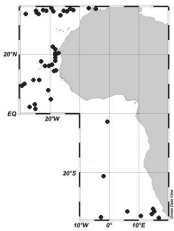
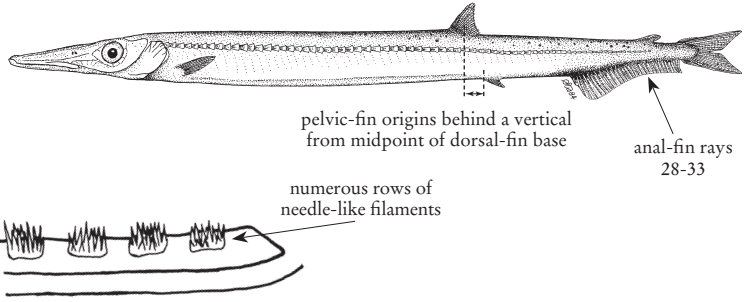
Fig. 10 *Paralepis*

11a. Pelvic-fin origins behind a vertical from midpoint of dorsal-fin base; anal-fin rays 28-33; gill rakers forming numerous rows of short needle-like filaments *Arctozenus risso*

11b. Pelvic-fin origins slightly before or behind a vertical from first dorsal-fin ray; anal-fin rays 21-26; gill rakers on first arch formed by 3-10 slender, flexible needle-like filaments (but may be lost in adults) . → 12

Arctozenus risso (Bonaparte, 1840)

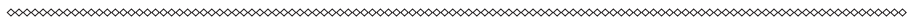
Other characters: specimens grown up in tropical waters have a lower count in vertebrae, anal-fin rays, and lateral-line scales compared to specimens from colder waters.



Size: 30.0 cm SL

12a. Lateral-line scales unpierced by holes; in adults and subadults, 4-6 horizontal rows of scales covering each anterior lateral-line section; 3-4 dark peritoneal sections in young; maximum length more than 45.0 cm Standard Length; gill rakers probably not lost in adults *Magnisudis* (p. 147)

12b. Lateral-line scales pierced by 1-2 longitudinal series of distinct holes; in all growth stages with scales developed, 2 horizontal rows of scales covering each anterior lateral-line section; 6 or more peritoneal sections in young; maximum length less than 30.0 cm Standard Length; gill rakers lost in adults . . . *Paralepis* (p. 147)



KEY TO THE SPECIES OF *LESTIDIOPS* OCCURRING IN THE AREA

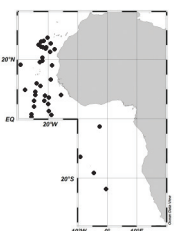
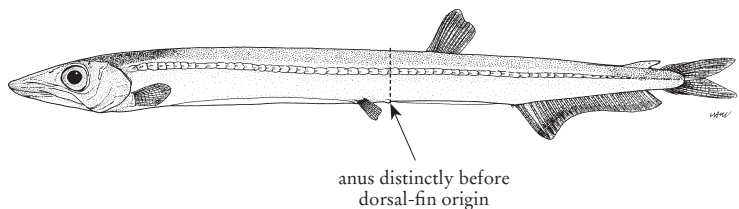
The information available on *Lestidiops* species occurring in the area does not allow for definitive identification to species level. Specimens belonging to this genus should be preserved for further examination, and tissue sampled for genetic analysis.

1a. Anus distinctly before dorsal-fin origin *Lestidiops affinis*

1b. Anus below or behind dorsal-fin origin → 2

Lestidiops affinis (Ege, 1930)

Other characters: vertebrae 75-85.



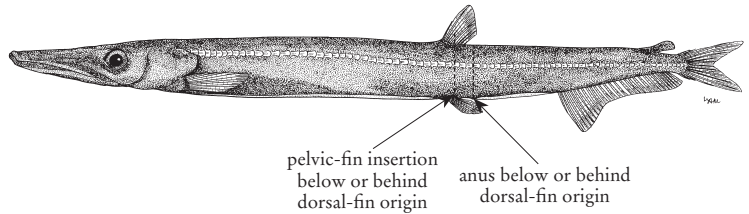
Size: 11.2 cm SL

- 2a. Pelvic-fin insertion below or behind dorsal-fin origin *Lestidiops mirabilis*
 2b. Pelvic-fin insertion in front of dorsal-fin origin → 3

Lestidiops mirabilis (Ege, 1933)

Other characters: adults black and young with prominent vertical color bands; lateral line sections heavily pigmented; vertebrae 81-86.

Remarks: probably circumglobal, but still no records in the eastern Atlantic.

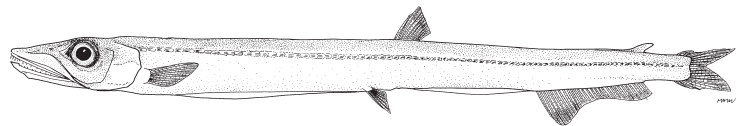
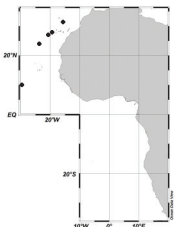


Size: 26.1 cm SL

- 3a. Distance snout to vent 55.7-60.7% Standard Length; preventral length 48.4-54.0% SL → 4
 3b. Distance snout to vent 60.0-63.8% Standard Length; preventral length 53.3-57.2% SL → 5
 4a. Head length 17.3-21.2% Standard Length; snout length 6.5-10.3% SL; preventral length 48.4-52.4% SL; vertebrae 81-85 *Lestidiops pseudosphyraenoides*

Lestidiops pseudosphyraenoides (Ege, 1918)

Other characters: no information.

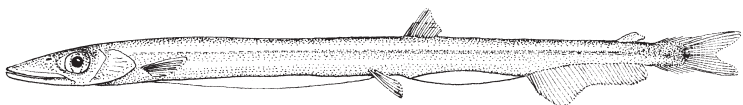
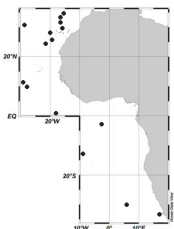


Size: 9.5 cm SL

- 4b. Head length 19.4-22.0% Standard Length; snout length 8.1-10.2% SL; preventral length 51.5-54.0% SL; vertebrae 76-85 *Lestidiops jayakari*

Lestidiops jayakari (Boulenger, 1889)

Other characters: no information.

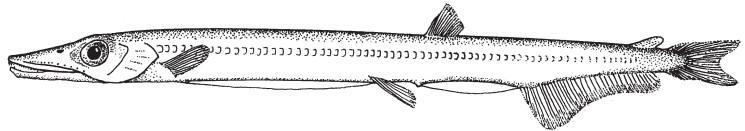
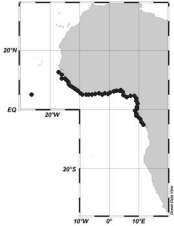


Size: 20.0 cm TL

4c. Head length 17.9-18.7% Standard Length; snout length 7.7-8.7% SL; preventral length 52.0-53.6% SL; vertebrae 88-94. *Lestidiops sphyrenoides*

Lestidiops sphyrenoides (Risso, 1820)

Other characters: no information.

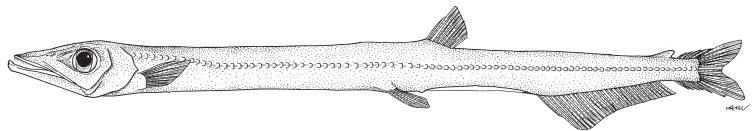
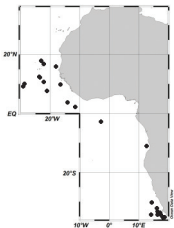


Size: 27.0 cm SL

5a. Head length 15.4-18.1% Standard Length; snout length 6.5-7.6% SL; preventral length 54.9% SL; vertebrae 85-91 *Lestidiops similis*

Lestidiops similis (Ege, 1933)

Other characters: body pale with a greyish dorsal band.

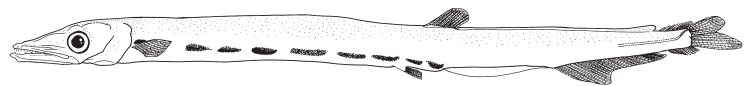
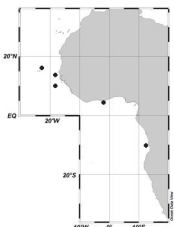


Size: 20.0 cm TL

5b. Head length 18.2-21.2% Standard Length; snout length 8.4-9.5% SL; preventral length 57.0-57.2% SL; vertebrae 82-84 *Lestidiops distans*

Lestidiops distans (Ege, 1933)

Other characters: no information.



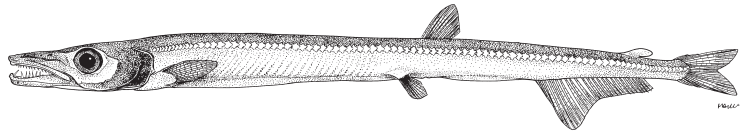
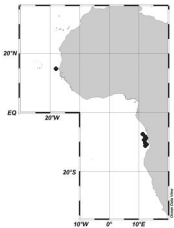
postlarva

Size: 20.9 cm SL

5c. Head length 20.6% Standard Length; snout length 8.7% SL; preventral length 53.3% SL; vertebrae 79-84 *Lestidiops cadenati*

Lestidiops cadenati (Maul, 1962)

Other characters: no information.



Size: 8.3 cm SL

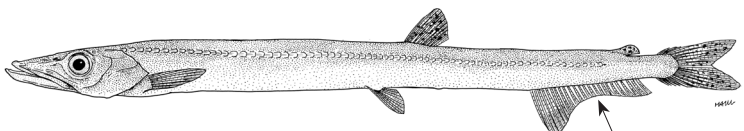
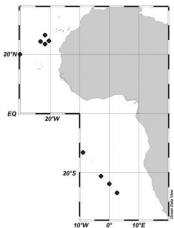
KEY TO THE SPECIES OF *MACROPARALEPIS* OCCURRING IN THE AREA

1a. Anal-fin rays 21-24; lateral-line scales 66-70; vertebrae 80-85 *Macroparalepis brevis*

1b. Anal-fin rays 25-32 (seldom 24 in *M. affinis*); lateral-line scales 79-144; vertebrae 88-110 → 2

Macroparalepis brevis Ege, 1933

Other characters: colour light, getting darker with growth, but never black; position of ventral fins can vary from in front of to below dorsal fin.



anal-fin rays 21-24

Size: 15.0 cm SL

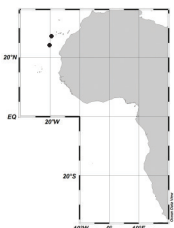
2a. Anal-fin rays 24-28 → 3

2b. Anal-fin rays 29-32 → 4

3a. Maximum body depth less than 6% Standard Length, in probably all length stages . *Macroparalepis nigra*

Macroparalepis nigra (Maul, 1965)

Other characters: colour black, juveniles not known, but probably light.



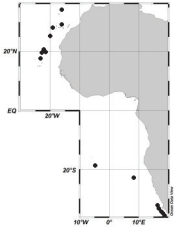
anal-fin rays 25-27

Size: 46.1 cm SL

3b. Maximum body depth more than 6% Standard Length, in specimens larger than 12.0 cm SL
 *Macroparalepis affinis*

Macroparalepis affinis Ege, 1933

Other characters: colour black, young light with dark dorsal band; position of ventral fins can vary from in front of (usually) to below dorsal fin.



anal-fin rays 24-28

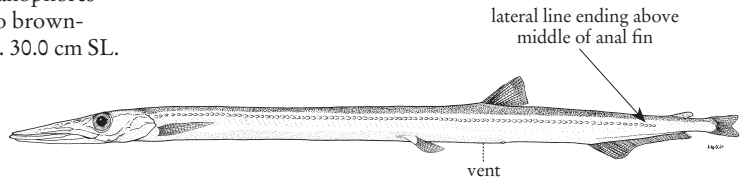
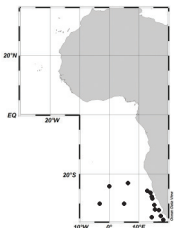
Size: 55.0 cm TL

4a. Lateral line ending above middle of anal fin; lateral-line scales 91-99; vent under or slightly before first dorsal-fin ray; eye diameter more than 2 times in prenasal length
 *Macroparalepis macrogeneion*

Macroparalepis macrogeneion Post, 1973

Longfin barracudina

Other characters: vertebrae 107-110; maximum body depth less than 7% SL; anal-fin rays 29-32; colour light with a broad band of melanophores along back, darkening continuously to brown-black in specimens larger than approx. 30.0 cm SL.



lateral line ending above middle of anal fin

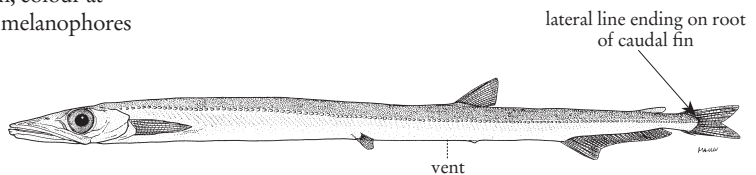
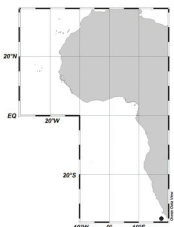
vent

Size: 42.0 cm TL

4b. Lateral line ending on root of caudal fin; lateral-line scales 143-144; vent distinctly in front of first dorsal-fin ray; eye diameter less than 2 times in prenasal length
 *Macroparalepis longilateralis*

Macroparalepis longilateralis Post, 1973

Other characters: only species in the genus with a lateral line not ending above the anal fin; colour at 31.3 cm SL light, with a broad band of melanophores along back; vertebrae 102.



lateral line ending on root of caudal fin

vent

Size: 31.4 cm SL

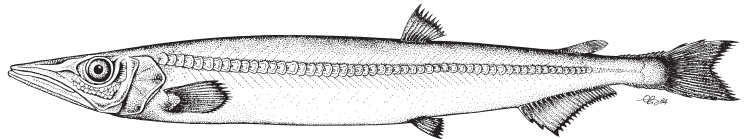
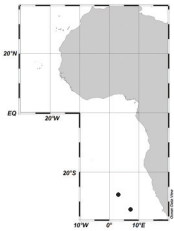
KEY TO THE SPECIES OF *MAGNISUDIS* OCCURRING IN THE AREA

1a. Known to occur only south of 20° S; vertebrae 68-73 *Magnisudis prionosa*

Magnisudis prionosa (Rofen, 1963)

Southern barracudina

Other characters: no information.



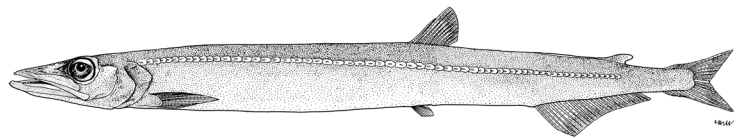
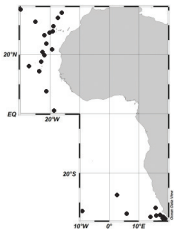
Size: 55.0 cm TL

1b. Found both in the southern and northern sectors of the area; vertebrae 63-67 . . . *Magnisudis atlantica*

Magnisudis atlantica (Krøyer, 1868)

Duckbill barracudina

Remarks: north and south Atlantic specimens show morphometric differences.



Size: 56.0 cm SL

KEY TO THE SPECIES OF *PARALEPIS* OCCURRING IN THE AREA

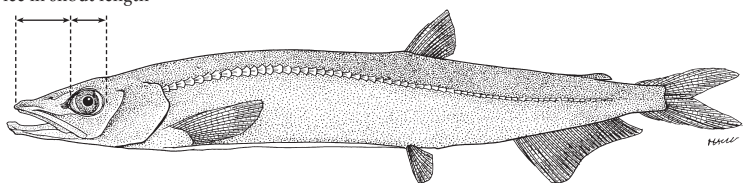
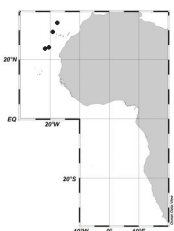
1a. Eye diameter less than twice in snout length (0.9-1.7, normally 1.1-1.3); lateral-line scales 54-58; vertebrae 63-66; scales large, about 8-12 rows between lateral line and ventral midline *Paralepis brevirostris*

1b. Eye diameter more than twice in snout length (1.8-3.2, normally 2.2-2.6); lateral-line scales 58-66; vertebrae 67-77; scales small, about 20 rows between lateral line and ventral midline → 2

Paralepis brevirostris (Parr, 1928)

Remarks: head and eye proportions decrease by allometric growth.

eye diameter less than twice in snout length



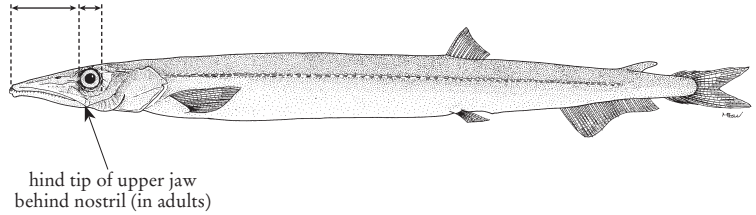
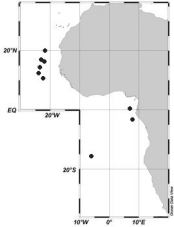
Size: 24.2 cm SL

2a. Hind tip of upper jaw behind nostril (in adults); vertebrae 74-77; gill rakers on first gill arch 19-25; distributed south of 20 °N *Paralepis elongata*

Paralepis elongata (Brauer, 1906)

Remarks: head proportions decrease by allometric growth.

eye diameter more than twice in snout length

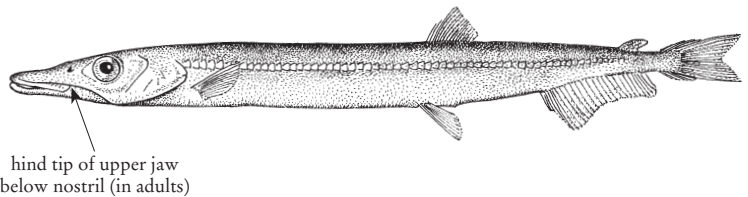
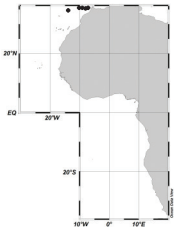


Size: 21.0 cm TL

2b. Hind tip of upper jaw below nostril (in adults); vertebrae 67-74; gill rakers on first gill arch 27-35; distributed north of 28 °N *Paralepis coregonoides*

Paralepis coregonoides Risso, 1820

Remarks: allometric growth of eye diameter and upper jaw.



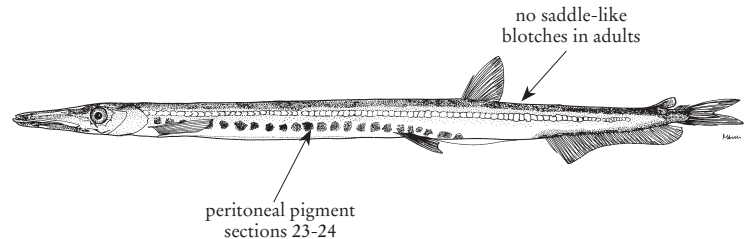
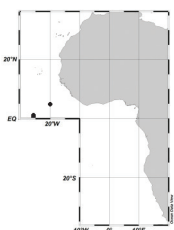
Size: 50.0 cm SL

KEY TO THE SPECIES OF *STEMONOSUDIS* OCCURRING IN THE AREA

- 1a. Peritoneal pigment sections 23-24; saddle-like blotches in adults absent *Stemonosudis siliquiventer*
- 1b. Peritoneal pigment sections 18 or less; saddle-like blotches in adults present → 2

Stemonosudis siliquiventer Post, 1970

Other characters: dorsal band of small melanophores; anal-fin rays 36-38; vertebrae 102-103.

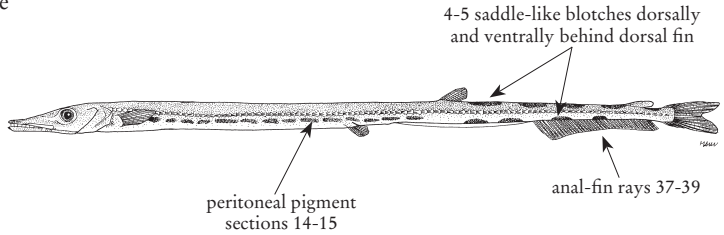
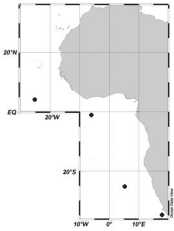


Size: 16.0 cm SL

2a. Peritoneal pigment sections 14-15 (fewer in young); 4-5 saddle-like blotches dorsally and ventrally behind dorsal fin; anal-fin rays 37-39; vertebrae 98-107. *Stemonosudis gracilis*

Stemonosudis gracilis (Ege, 1933)

Other characters: anteriormost ventral saddle-like patch a continuation of the peritoneal pigment sections.

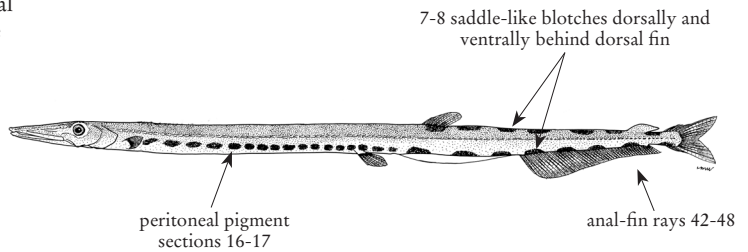
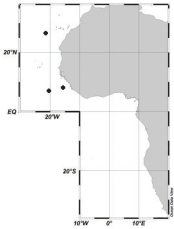


Size: 9.9 cm SL

2b. Peritoneal pigment sections 16-17 (young with 16-18); 7-8 saddle-like blotches dorsally and ventrally behind dorsal fin; anal-fin rays 42-48; vertebrae 111-121 *Stemonosudis intermedia*

Stemonosudis intermedia (Ege, 1933)

Other characters: anteriormost ventral saddle-like patch a continuation of the peritoneal pigment sections.



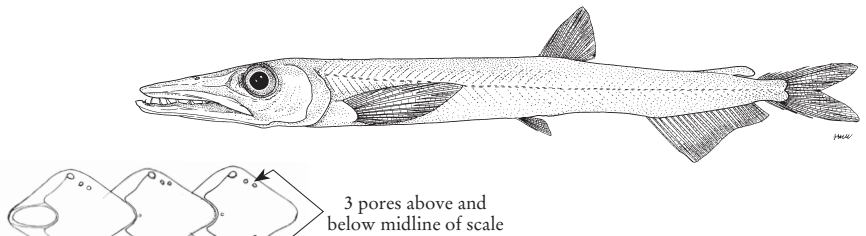
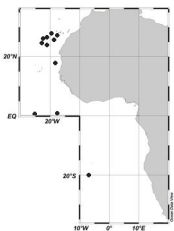
Size: 15.2 cm SL

KEY TO THE SPECIES OF *SUDIS* OCCURRING IN THE AREA

1a. Lateral-line sections pierced by 3 pores above and below midline of scale; distance from tip of snout to pelvic-fin origin 58.1% Standard Length and to anal-fin origin 76.9% SL; vertebrae 53-54 . . . *Sudis atrox*

Sudis atrox Rofen, 1963

Other characters: no information.



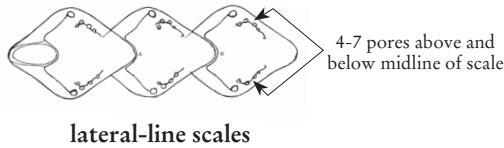
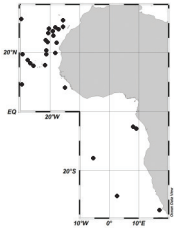
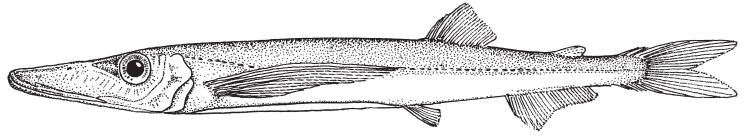
lateral-line scales

Size: 12.5 cm TL

1b. Lateral-line sections pierced by 4-7 pores above and below midline of scale; distance from tip of snout to pelvic-fin origin 62.2-63.8% Standard Length and to anal-fin origin 80.3-82.4% SL; vertebrae 59-60 *Sudis hyalina*

Sudis hyalina Rafinesque, 1810

Other characters: body silvery pink; tip of lower jaw distinctly curved up; large teeth in lower jaw; gill rakers tooth-like, on bony base.



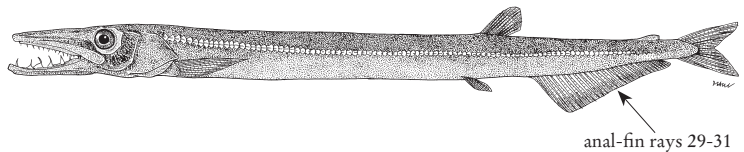
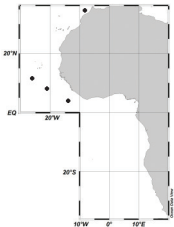
Size: 100.0 cm TL

KEY TO THE SPECIES OF *UNCISUDIS* OCCURRING IN THE AREA

1a. Chromatophores not in distinct blotches; anal-fin rays 29-31 *Uncisudis longirostra*

Uncisudis longirostra Maul, 1956

Other characters: no information.

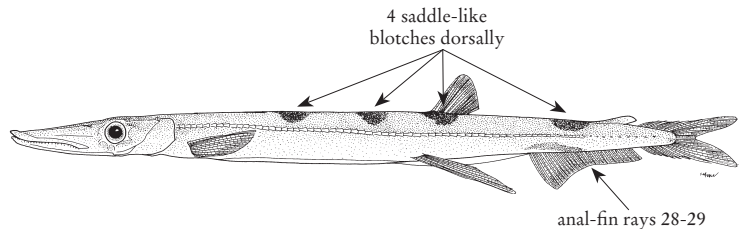
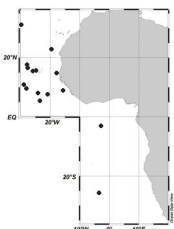


Size: 18.7 cm SL

1b. Four saddle-like blotches dorsally; anal-fin rays 28-29 *Uncisudis quadrimaculata*

Uncisudis quadrimaculata (Post, 1969)

Other characters: no information.



Size: 9.9 cm SL

SCOPELARCHIDAE

Pearleyes

KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF GENERA OF SCOPELARCHIDAE OCCURRING IN THE AREA

1a. Equal or subequal pigment stripes above and below lateral line extending forward from caudal peduncle; pectoral fin longer than pelvic fin; pectoral-fin rays 18-22 (Fig. 1) *Scopelarchus* (p. 153)

1b. No distinct pigment stripes above and below lateral line extending forward from caudal peduncle, or, if present distinctly unequal; pectoral fin shorter than or equal to pelvic fin length; pectoral-fin rays 20-28 . . . → 2

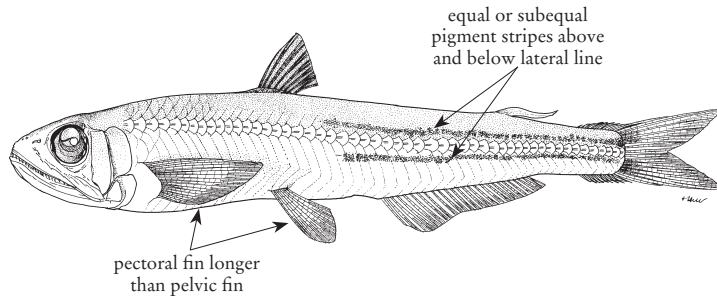


Fig. 1 *Scopelarchus*

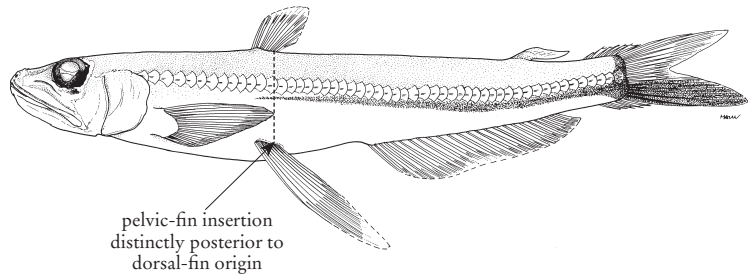
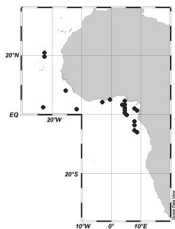
2a. Pelvic-fin insertion distinctly posterior to dorsal-fin origin *Scopelarchoides danae*

2b. Pelvic-fin insertion distinctly anterior to dorsal-fin origin → 3

Scopelarchoides danae Johnson, 1974

Dana pearleye

Other characters: a dark stripe just below lateral line extending to lower caudal-fin lobe.



Size: 12.3 cm SL

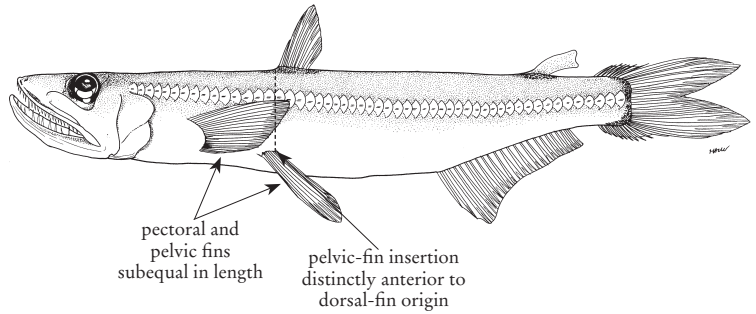
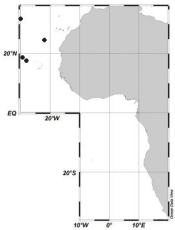
3a. Pectoral and pelvic fins subequal in length; pectoral-fin rays 21-26; lateral-line scales 47-53 *Rosenblattichthys hubbsi*

3b. Pectoral fins shorter than pelvic fins; pectoral-fin rays 25-28; lateral-line scales 54 or more. → 4

Rosenblattichthys hubbsi Johnson, 1974

Hubbs' pearleye

Remarks: known from a single adult specimen taken in a haul between 0-645 m in the equatorial Atlantic and from larval and juvenile specimens taken in hauls in the same area.

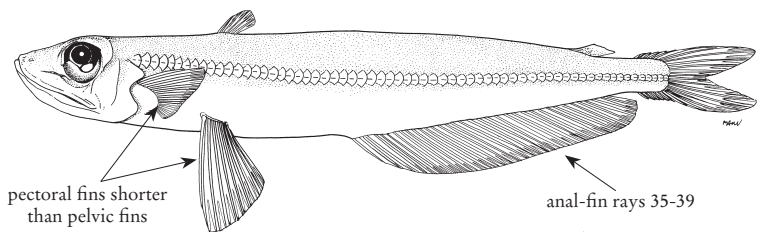
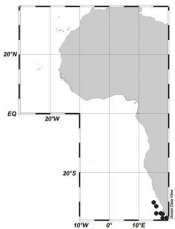


Size: 14.5 cm SL

4a. Anal-fin rays 35-39 *Lagiacusichthys macropinna*

Lagiacusichthys macropinna (Bussing & Bussing, 1966)

Other characters: dorsal-fin rays 5-6; pectoral-fin rays 25-27; lateral-line scales 62-65.



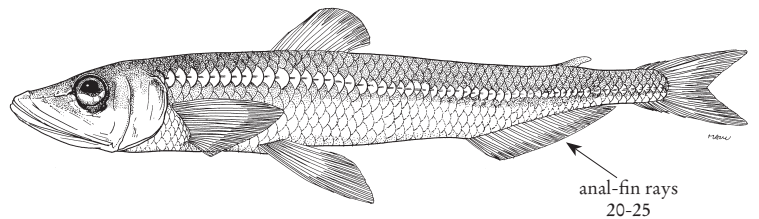
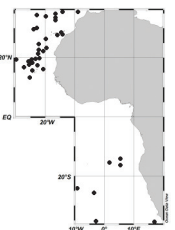
Size: 23.3 cm SL

4b. Anal-fin rays 20-25 *Benthalbella infans*

Benthalbella infans Zugmayer, 1911

Zugmayer's pearleye

Other characters: dorsal-fin rays 9 or rarely 8; pectoral-fin rays 25-28; lateral-line scales 55-59.



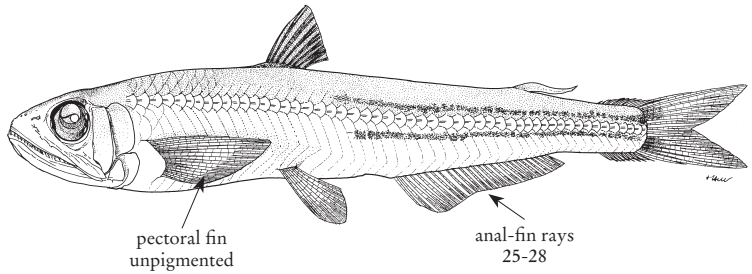
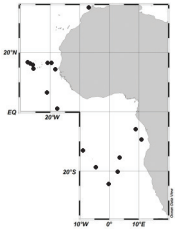
Size: 13.8 cm SL

KEY TO THE SPECIES OF *SCOPELARCHUS* OCCURRING IN THE AREA

- 1a. Pectoral fin unpigmented; anal-fin rays usually 25 or more *Scopelarchus guentheri*
 1b. Pectoral fin pigmented; anal-fin rays usually 25 or less → 2

***Scopelarchus guentheri* Alcock, 1896**

Other characters: pectoral-fin rays 18-19.

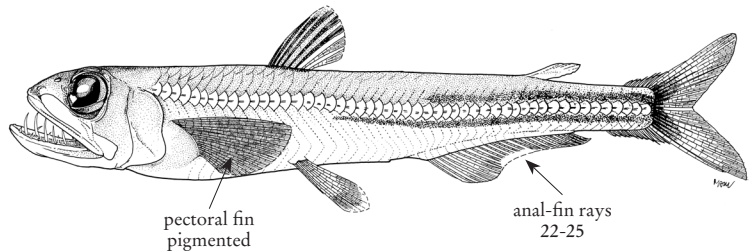
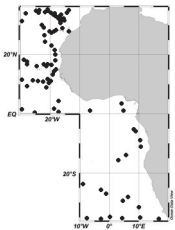


Size: 12.7 cm SL

- 2a. Anal-fin rays 22-25 (rarely 21 or 26); lateral-line scales 46-49 (rarely 45 or 50) *Scopelarchus analis*

***Scopelarchus analis* (Brauer, 1902)**

Other characters: pectoral-fin rays 18-22, usually 19-21.

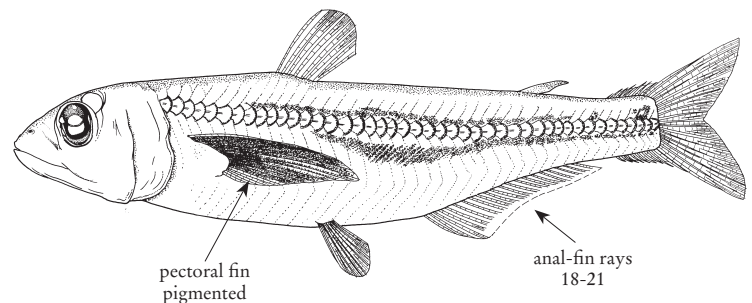
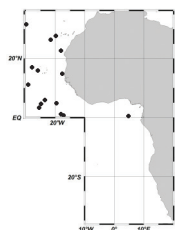


Size: 12.6 cm SL

- 2b. Anal-fin rays 18-21; lateral-line scales 40-44 *Scopelarchus michaelsarsi*

***Scopelarchus michaelsarsi* Koefoed, 1955**

Other characters: pectoral-fin rays 18-21.



Size: 10.2 cm SL

MYCTOPHIFORMES

Blackchins and Lanternfishes

KEY TO THE FAMILIES OF MYCTOPHIFORMES OCCURRING IN THE AREA

1a. Eye diameter equal to, or less than, snout length; anal-fin origin more than 1 eye diameter behind dorsal-fin base; primary photophores (when present) on body in horizontal rows, including anteromedian row anterior to anus, and on tongue margin; no other luminous tissue on fin bases, caudal peduncle or head (Fig. 1) **Neoscopelidae (p. 155)**

1b. Eye diameter greater than snout length; anal-fin origin under, or behind middle of dorsal fin, or less than 1 eye diameter behind dorsal-fin base; primary photophores (when present) arranged in distinct groups on head and body; anteromedian row of photophores anterior to anus absent, and no photophores on tongue margin; luminous tissue of various shapes and sizes on head, scales and caudal peduncle and/or at bases of various fins in most species (Fig. 2) **Myctophidae (p. 157)**

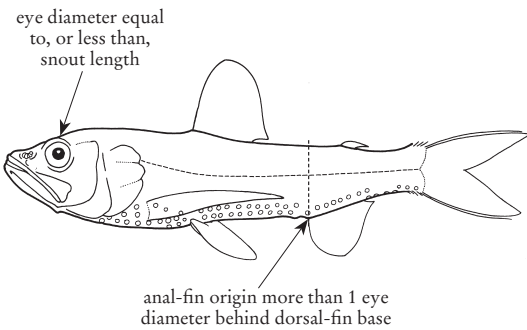


Fig. 1 Neoscopelidae

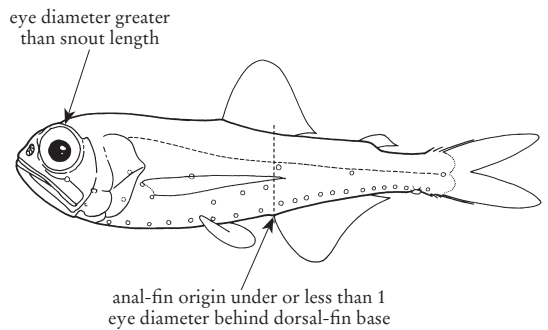
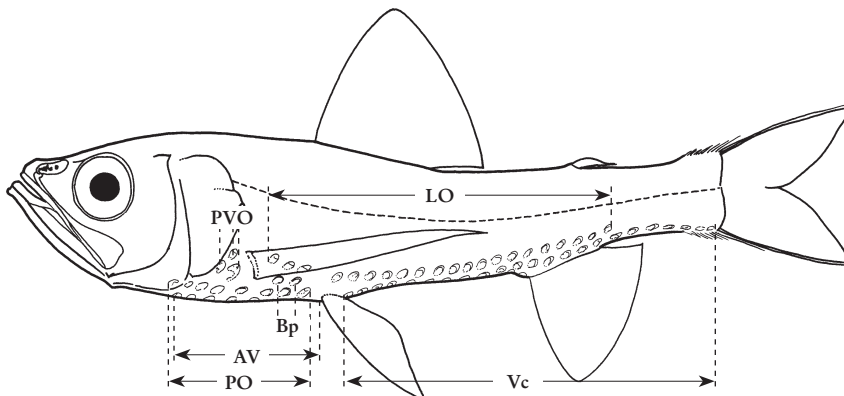


Fig. 2 Myctophidae

NEOSCOPELIDAE

Blackchins



Am - anteromedial (mid-line) AV - anteroventral Bp - basipectoral LO - lateral PO - thoracic PVO - prepectoral Vc - ventrocaudal isthmus to anus - not shown)

General distribution and terminology of the luminous organs (photophores)

KEY TO THE GENERA AND SPECIES OF NEOSCOPELIDAE OCCURRING IN THE AREA

Note: monotypic genus *Solivomer* restricted to the Pacific Ocean.

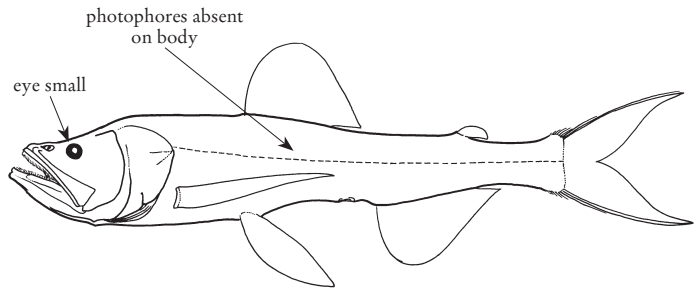
- 1a. Photophores absent on body; eye small, much more than 1 diameter in snout; upper jaw extending at least 1 eye diameter beyond vertical through posterior margin of orbit *Scopelengys tristis*
- 1b. Photophores present on body; eye large, about 1 diameter in snout; upper jaw not reaching, or extending much less than 1 eye diameter beyond, vertical through posterior margin of orbit → 2

Scopelengys tristis Alcock, 1890

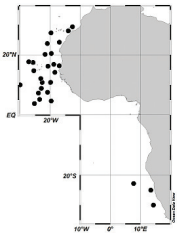
Sombre blackchin

Other characters: blackish, mouth and belly darker; scales deciduous, but bronze-green with black margins when fresh.

Remarks: bathypelagic, oceanic, generally below 350 m.



Size: 20.0 cm SL



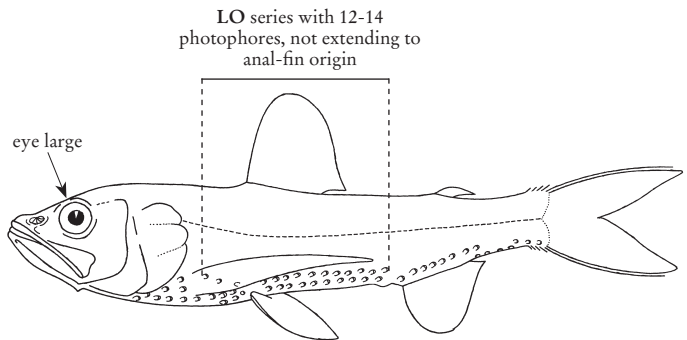
- 2a. Photophore series LO 12-14, not extending to anal-fin origin; total gill rakers usually 11
. *Neoscopelus macrolepidotus*

Neoscopelus macrolepidotus Johnson, 1863

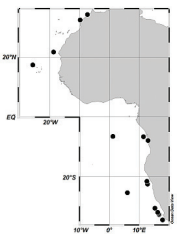
Largescaled blackchin

Other characters: scales silver, deciduous; when fresh body dark-red to brown with silver sheen; fins brick-red.

Remarks: non-migratory, generally below 300 m over slope regions.



Size: 25.0 cm SL



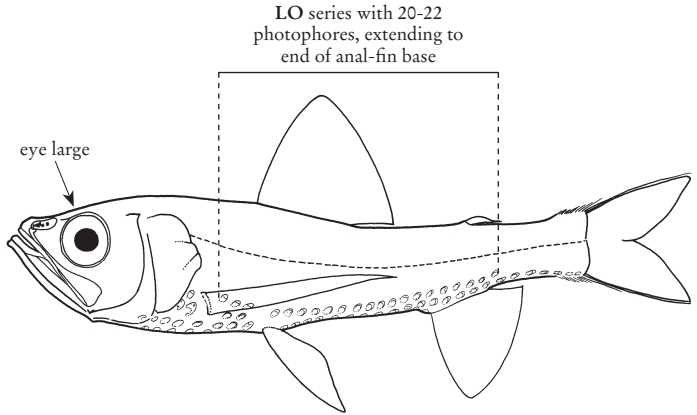
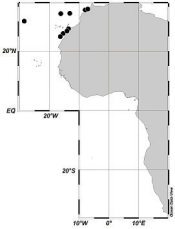
2b. Photophore series LO 20-22, extending to about end of anal-fin base; total gill rakers usually 14. *Neoscopelus n. sp.*

Neoscopelus n. sp.

Smallscaled blackchin

Other characters: scales deciduous; when fresh, body reddish-silver, darker dorsally and ventrally, photophores silver; fins pink.

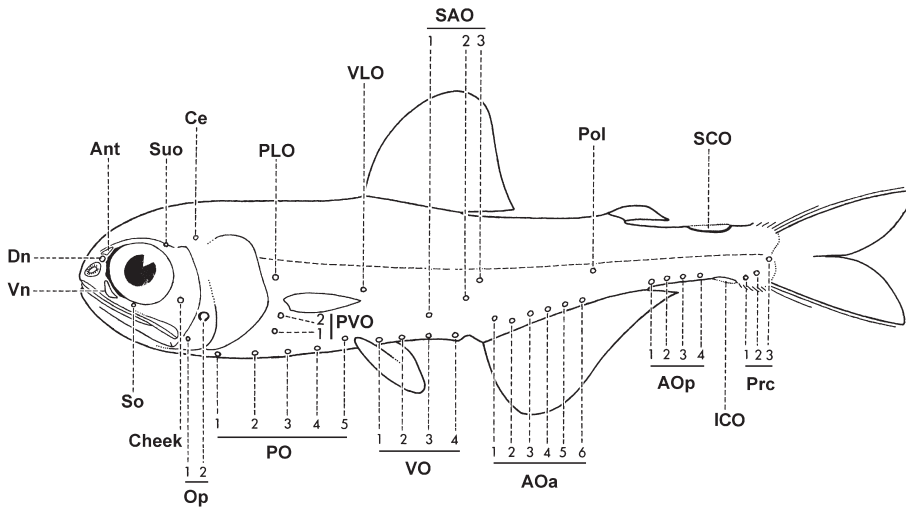
Remarks: non-migratory, generally below 250 m over slope regions.



Size: 30.5 cm SL

MYCTOPHIDAE

Lanternfishes



- | | | | | |
|----------------------|-----------------------------------|----------------------|----------------------------------|--------------------|
| Ant - antorbital | Dn - dorsonasal | PO - thoracic | SAO - supra-anal | VLO - supraventral |
| AOa - anterior anal | ICO - infra-caudal luminous organ | Pol - posterolateral | SCO - supracaudal luminous organ | Vn - ventronasal |
| AOp - posterior anal | Op - opercular | Prc - pre-caudal | So - suborbital | VO - ventral |
| Ce - cervical | PLO - suprapectoral | PVO - subpectoral | Suo - supraorbital | |

General distribution and terminology of the luminous organs (photophores)

KEY TO THE GENERA, SPECIES OF MONOTYPIC GENERA, AND SOLE SPECIES OF MYCTOPHIDAE OCCURRING IN THE AREA

Remarks on key characters: identification based primarily on arrangement of various photophore groups named in figure. Photophores often damaged in nets, but remnants and/or scars usually identifiable with microscope. Gill-raker counts (on 1st gill-arch) include only movable, developed elements, not small anterior knobs on upper and lower gill arch, some of which may be movable. Luminous tissue other than body photophores and head-light organs have usually been termed luminous scales in previous works. As they are not true fish scales, they are termed ‘scale-like plates’ (if well defined as in *SCO*) and ‘scale-like patches’ (without firm, distinct borders), often shortened to plates or patches, in the key below.

- 1a.** Photophores absent; caudal peduncle with well-developed *SCO* and *ICO*, bordered by heavy black pigment (Fig. 1) *Taaningichthys* (in part)(p. 219)
- 1b.** Photophores always present; caudal peduncle with *SCO* and *ICO*, supracaudal and/or infracaudal luminous plates or patches, sometimes coalesced, or without caudal organs and luminous patches (Fig. 2). → 2

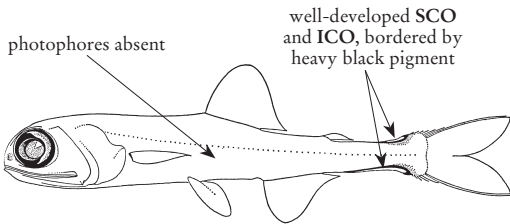


Fig. 1 *Taaningichthys paurolychnus*

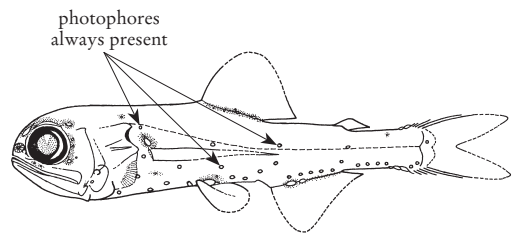


Fig. 2 Other Myctophidae genera

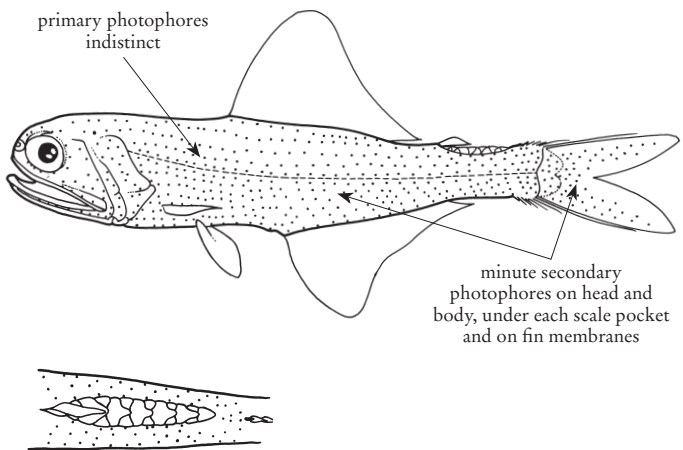
- 2a.** Minute secondary photophores on head and body, under each scale pocket and on fin membranes; primary photophores indistinct. *Scopelopsis multipunctatus*
- 2b.** Secondary photophores absent, or if present, clearly distinguishable from larger primary photophores → 3

Scopelopsis multipunctatus Brauer, 1906

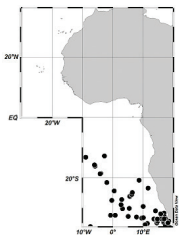
Multispotted lanternfish

Other characters: male *SCO* of about 7 arrow-shaped plates; *ICO* absent in females; fresh specimens uniformly dark, photophores blue.

Remarks: trawled specimens often abraded, but secondary photophores usually visible on caudal-fin rays.



Dorsal view of caudal peduncle



Size: 8.1 cm SL

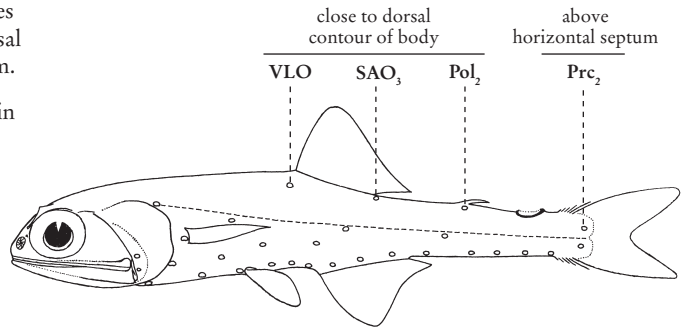
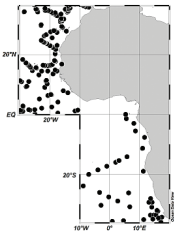
- 3a. VLO, SAO₃ and Pol₂ close to dorsal contour of body; 2 Prc, with Prc₂ well above horizontal septum *Notolychnus valdiviae*
- 3b. VLO, SAO₃ and uppermost Pol below or only slightly above lateral line, well below dorsal contour of body; 2 or more Prc, with Prc₂ never far above lateral line. → 4

Notolychnus valdiviae (Brauer, 1904)

Topside lanternfish

Other characters: single SCO in both males and females; ICO absent in both sexes; dorsal photophores robust, with obvious black rim.

Remarks: common but under-represented in nets with large meshes.



Size: 2.5 cm SL

- 4a. Two Prc, always separate from AO (Fig. 3a) → 5
- 4b. More than 2 Prc, sometimes continuous with AO (Fig. 3b) → 16

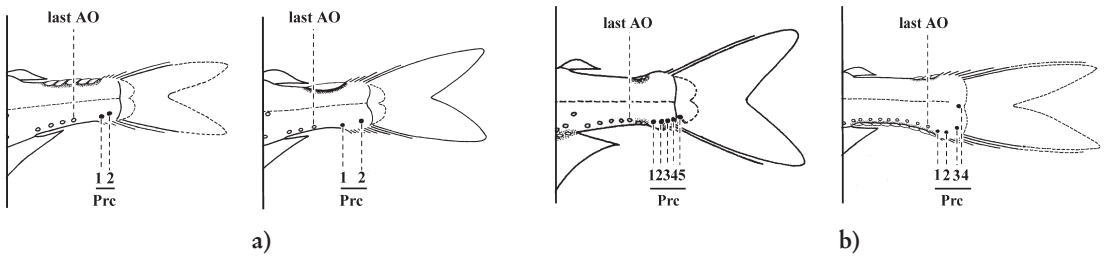


Fig. 3

- 5a. PLO from less than its diameter above to well below level of upper end of pectoral-fin base (Fig. 4a) → 6
- 5b. PLO more than its diameter above level of upper end of pectoral-fin base (Fig. 4b) → 11

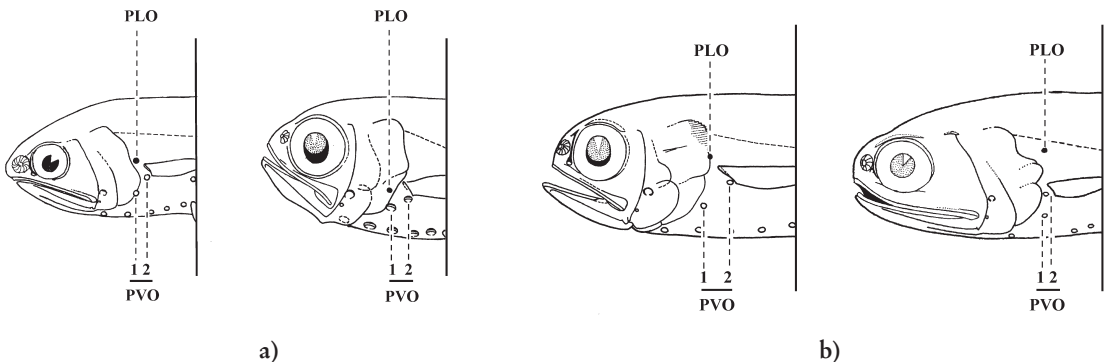


Fig. 4

- 6a. Mouth subterminal; snout conical and more or less protruding; PLO at or slightly above level of upper end of pectoral-fin base; AO series divided into AOa and AOp; Pol present; caudal peduncle markedly slender, its depth at least 2.5 or more times in its length (Fig. 5a) → 7
- 6b. Mouth terminal; snout not protruding; PLO well below level of upper end of pectoral-fin base; AO series continuous; Pol absent; caudal peduncle not markedly slender, its depth less than 2.5 times in its length (Fig. 5b). → 9

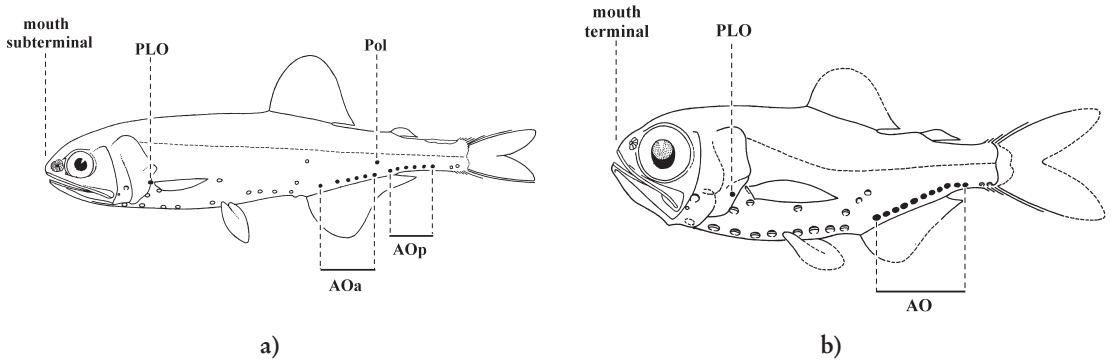


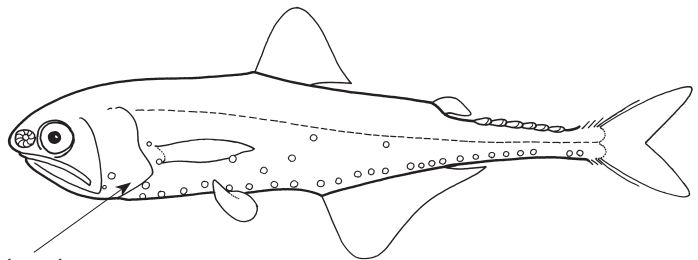
Fig. 5

- 7a. Gill rakers absent, reduced to spiny knobs *Centrobranchus nigroocellatus*
- 7b. Gill rakers present → 8

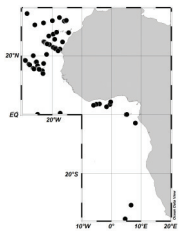
Centrobranchus nigroocellatus (Günther, 1873)

Roundnose lanternfish

Other characters: lateral line very poorly developed, perforated mid-line scales absent; male SCO of 4-7 well-defined, overlapping plates, and ICO absent; female ICO of 3-6 non-overlapping patches, and SCO absent; body firm, usually scaled, body sides blue-silver, darkening dorsally.



gill rakers absent, reduced to spiny knobs



Size: 5.0 cm SL

- 8a. Anal-fin origin under middle of dorsal-fin base; none or only 1 AOp above anal-fin base; caudal-peduncle depth about 2.5 times in its length (Fig. 6a) *Loweina* (p. 206)
- 8b. Anal-fin origin on or slightly in advance of vertical through last dorsal-fin ray base; 5-7 AOp above anal-fin base; caudal-peduncle depth 3.5 or more in its length (Fig. 6b). *Gonichthys* (p. 188)

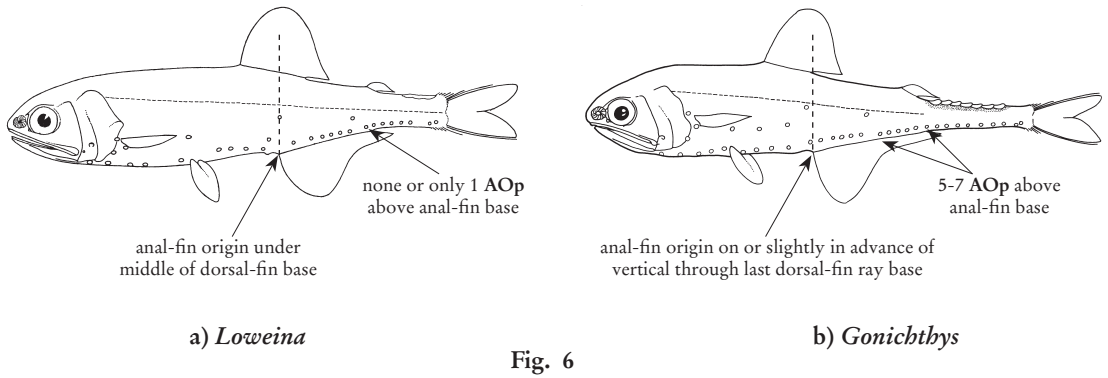


Fig. 6

9a. PLO in front of and slightly higher than PVO₁; PLO, PVO₁ and PVO₂ on somewhat angulate line (Fig. 7)
 *Protomyctophum* (p. 213)

9b. PLO almost directly above PVO₁; PLO, PVO₁ and PVO₂ forming a triangle (Fig. 8); interorbital width greater than expanded posterior end of maxilla; eyes normal. → 10

10a. VO series level, or VO₂ only slightly raised, touching line through centres of VO₁ and VO₃ (Fig. 8); posterodorsal margin of operculum broadly rounded, without serrations
 *Electrona* (p. 187)

10b. VO₂ noticeably elevated above line through centres of VO₁ and VO₃; posterodorsal margin of operculum sharply rounded and serrate.
 *Metelectrona ventralis*

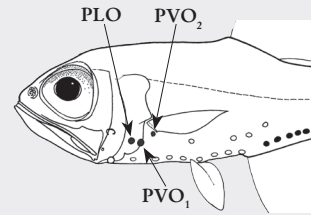


Fig. 7 *Protomyctophum*

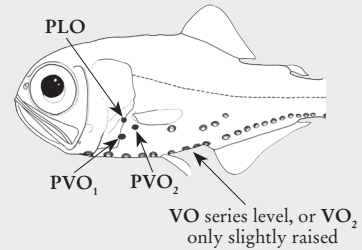


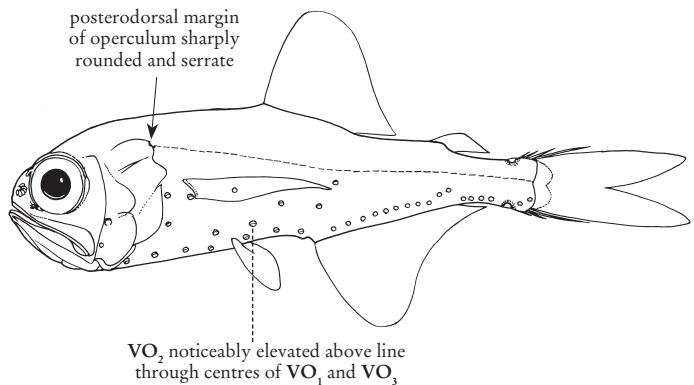
Fig. 8 *Electrona*

Metelectrona ventralis (Becker, 1963)

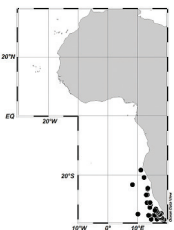
Flaccid lanternfish

Other characters: no So under eye; SCO and ICO in both males and females; colour uniform grey; photophores blue.

Remarks: body soft in fresh specimens, easily damaged.



Size: 10.7 cm SL



- 11a. VO_2 elevated; PVO series horizontal, with PVO_1 not more than its diameter below level of PVO_2 (Fig. 9a) → 12
- 11b. VO series level; PVO series on an inclined line, with PVO_1 more than its diameter below level of PVO_2 (Fig. 9b) → 13

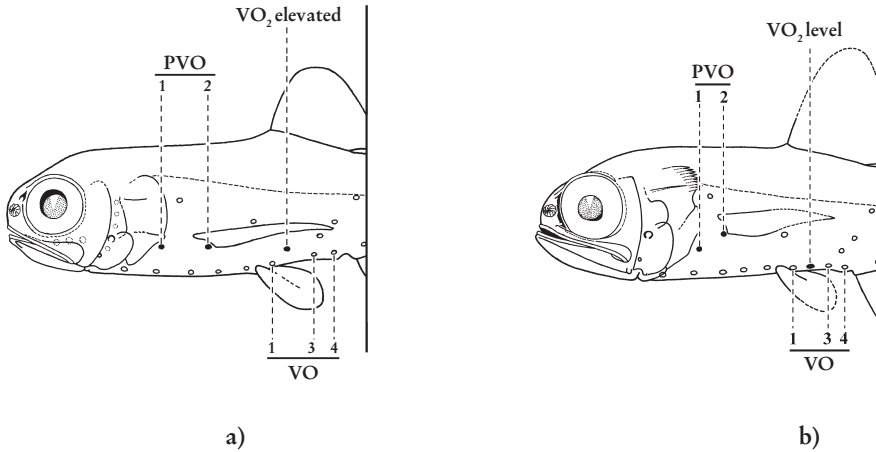


Fig. 9

- 12a. Prc series horizontal, or with Prc_2 only very slightly raised, more than 2 times its diameter below lateral line; outer, posterior teeth in both jaws broad-based and hooked (Fig. 10) *Diogenichthys* (p. 186)
- 12b. Prc_2 much higher than Prc_1 , at or less than its diameter below lateral line; outer posterior teeth in both jaws small and conical (Fig. 11) *Bentbosema* (p. 169)

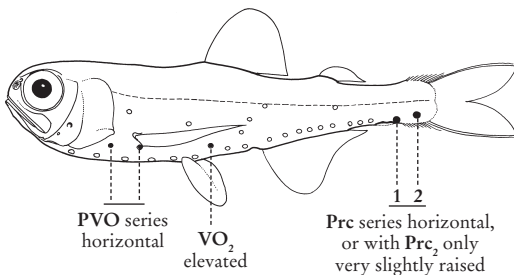


Fig. 10 *Diogenichthys*

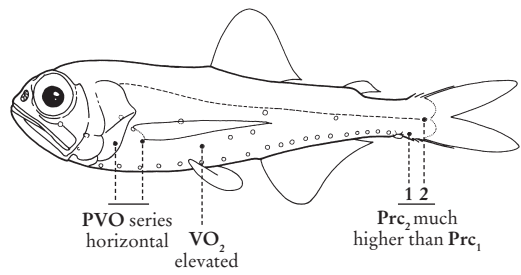


Fig. 11 *Bentbosema*

- 13a. Two Pol (Fig. 12) *Hygophum* (p. 190)
- 13b. One Pol (Figs. 13 & 14) → 14
- 14a. SAO series strongly angulate, with SAO_1 in advance of (seldom directly over) VO_3 (Fig. 13) *Symbolophorus* (p. 215)
- 14b. SAO series in straight or slightly angulate line, with SAO_1 behind vertical through VO_3 (Fig. 14) → 15

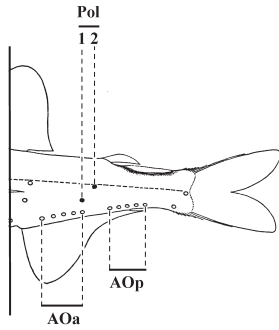


Fig. 12 *Hygophum*

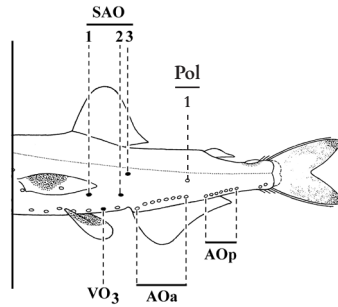


Fig. 13 *Symbolophorus*

15a. Prc_2 more than 2 photophore diameters below lateral line; Prc_1 - Prc_2 interspace about 2 or more in AOp - Prc_1 interspace; PLO more than 3 photophore diameters below lateral line (Fig. 14)

Myctophum/Dasyscopelus (p. 207)

15b. Prc_2 1 photophore diameter below lateral line or less; Prc_1 - Prc_2 interspace about equal to AOp - Prc_1 interspace; PLO 2 photophore diameters or less below lateral line; posterodorsal margin of opercle strongly serrate in specimens larger than 25 mm, weakly serrate in juveniles.

Ctenoscopelus phengodes

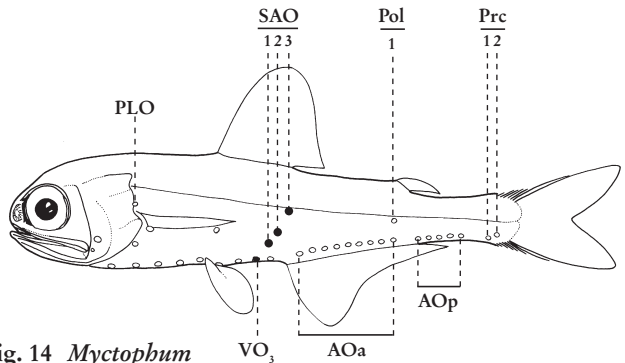
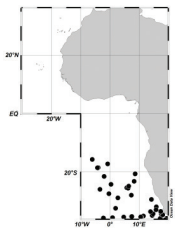
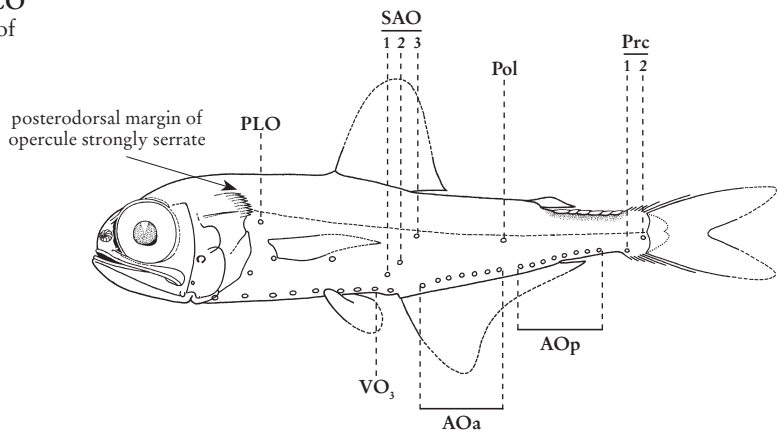


Fig. 14 *Myctophum*

Ctenoscopelus phengodes (Lütken, 1892)

Bright lanternfish

Other characters: scales cycloid; male SCO of 6-8 overlapping plates, ICO absent; female SCO absent, ICO of 2-4 irregular patches.



Size: 9.3 cm SL

- 16a. PO₁, PVO₁ and PVO₂ in straight ascending line; VO₁, VO₂ and VO₃ in straight ascending line (Fig. 15) → 17
- 16b. PO₁, PVO₁ and PVO₂ not in straight ascending line; VO₁, VO₂ and VO₃ not in straight ascending line → 18
- 17a. Dn and Vn present on head; SCO and ICO absent in both sexes; scale-like luminous patch usually near PLO (Fig. 16a) *Diaphus* (p. 173)
- 17b. Dn present on head, Vn absent; SCO (males) and ICO (female) well developed; no scale-like luminous patch near PLO (Fig. 16b) *Lobianchia* (p. 205)

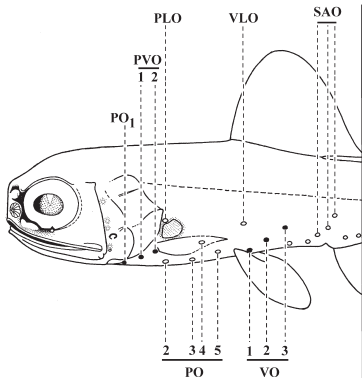
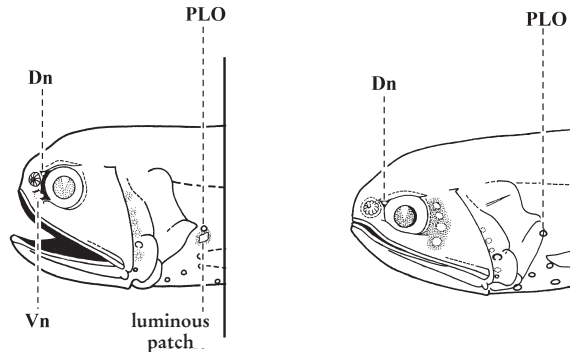


Fig. 15 *Diaphus*



a) *Diaphus*

b) *Lobianchia*

Fig. 16

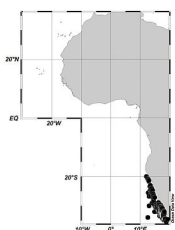
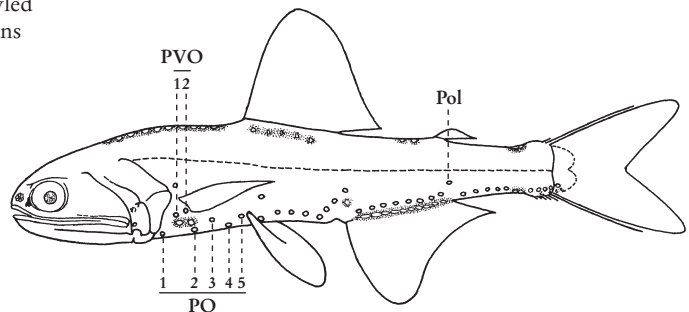
- 18a. PVO sub-horizontal, with PVO₁ well in front of PVO₂, and almost at level of PVO₂; PO₃ and PO₅ elevated; 1 Pol (Note: *Gymnoscopelus braueri* with PO₃ and PO₅ elevated, but with PVO series vertical; 2 Pol vertical). *Lampanyctodes hectoris*
- 18b. PVO sub-vertical, with PVO₁ in front of, on or behind vertical through PVO₂, well below level of PVO₂; PO series approximately level, or PO₄ or PO₅ elevated → 19

Lampanyctodes hectoris (Günther, 1876)

Hector's lanternfish

Other characters: usually 5 Prc, continuous; body scales silver, but often abraded in trawled specimens; photophores and luminous organs yellow; SCO and ICO in both sexes.

Remarks: infestation by parasitic copepods prevalent; on occasion fished commercially in South Africa.



Size: 7.0 cm SL

- 19a. SCO and ICO large, singular and usually bordered by heavy black pigment (not in small and medium specimens of *Lampadena anomala*)(Fig. 17a) → 20
 19b. SCO and/or ICO absent, or SCO and/or ICO consisting of a series of overlapping plates or scale-like patches, sometimes coalesced, and not bordered by heavy black pigment (Fig. 17b) → 21

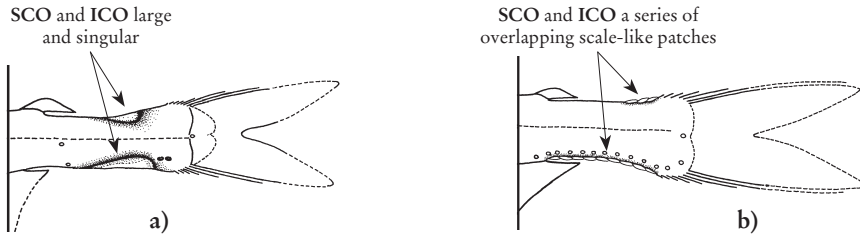


Fig. 17

- 20a. Dorsal-fin origin behind vertical through outer pelvic-fin base; large crescent of whitish tissue on rear half of iris; 1 SAO (Fig. 18) *Taaningichthys* (p. 219)

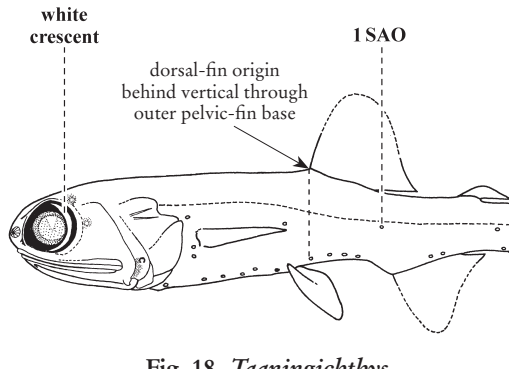


Fig. 18 *Taaningichthys*

- 20b. Dorsal-fin origin on or somewhat in advance of vertical through outer pelvic-fin base; no large crescent of whitish tissue on rear half of iris (*Lampadena chavesi* with whitish crescent on dorsal half of iris); 3 SAO (Fig. 20b) *Lampadena* (p. 193)

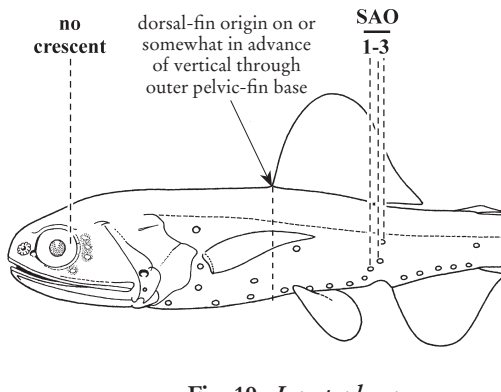


Fig. 19 *Lampadena*

- 21a. Dn absent (Fig. 20a) → 22
 21b. Dn present (Fig. 20b) → 26



Fig. 20

- 22a. PO₄ not elevated; scale-like patches of luminous tissue between pelvic-fin bases or mid-ventrally between pelvic-fin bases and anus (Fig. 21a) *Ceratoscopelus* (p. 172)
 22b. PO₄ highly elevated; no scale-like patches of luminous tissues between pelvic-fin bases and anus (Fig. 21b). → 23

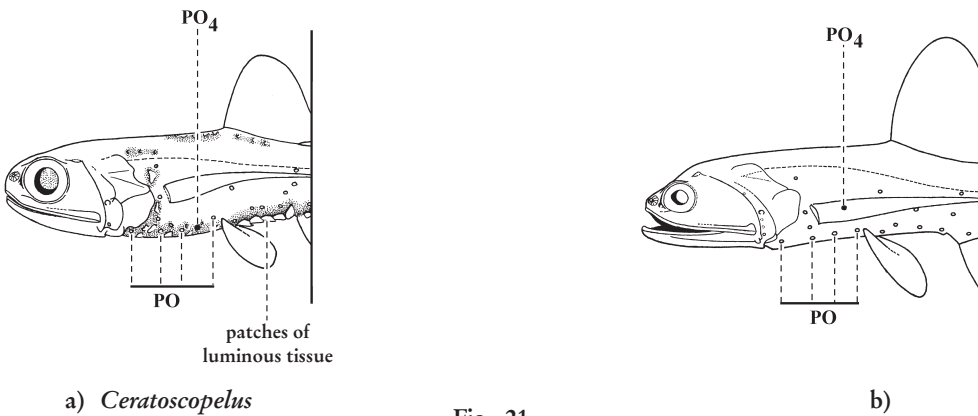


Fig. 21

- 23a. Patches of luminous tissue over dorsal- and anal-fin bases and on other portions of body (Fig. 22a) → 24
 23b. Luminous tissue (other than photophores) restricted to dorsal and ventral surface of caudal peduncle and sometimes at adipose-fin base (Fig. 22b). → 25

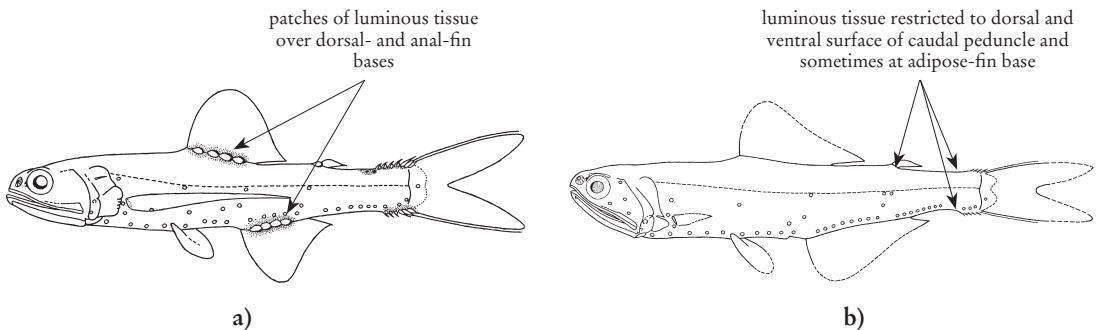


Fig. 22

24a. Three Prc (2 + 1 format); crescent of whitish tissue on posterior half of iris; posterodorsal margin of opercle sharply pointed and rear margin markedly concave (Fig. 23a) *Bolinichthys* (p. 170)

24b. Four Prc; no crescent of whitish tissue on posterior half of iris; posterodorsal margin of opercle broadly rounded, rear margin only slightly concave (Fig. 23b) *Lepidophanes* (p. 204)

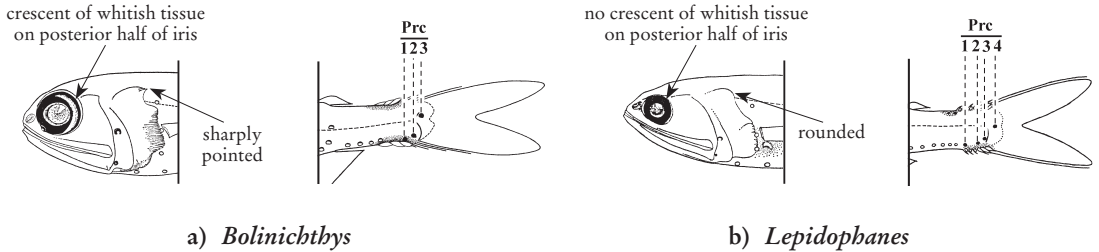


Fig. 23

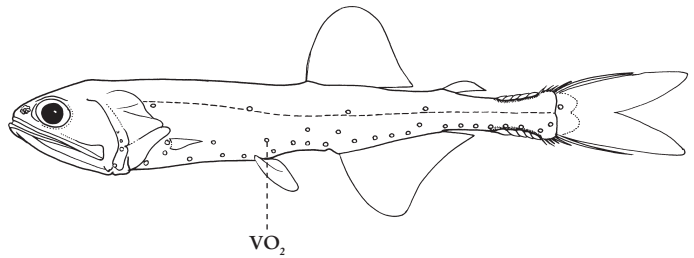
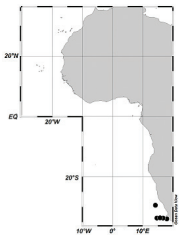
25a. Four (rarely 5) VO, level or with VO₂ elevated; most posterior Prc below or less than 1 photophore diameter above lateral line *Lampanyctus* (p. 196)

25b. Five VO, with VO₂ or with VO₂ and VO₃ elevated; most posterior Prc at least 1 photophore diameter above lateral line. *Triphoturus nigrescens*

Triphoturus nigrescens (Brauer, 1904)

Vagabond lanternfish

Other characters: no information.



Size: 4.0 cm SL

26a. VO₂ elevated; 12-14 anal-fin rays *Hintonia candens*

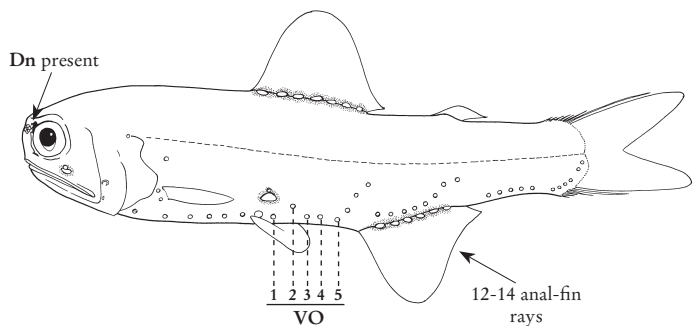
26b. VO series level or only slightly arched; more than 17 anal-fin rays → 27

Hintonia candens Fraser-Brunner, 1949

Midas lanternfish

Other characters: 3-4 + 2 Prc; fresh specimens dark brown, with a large golden patch below cheek photophore; luminous patch on each body scale in best specimens.

Remarks: not yet recorded in the area; generally south of about 39°S; nearest record at 38.5°S, 3.3°W.



Size: 13.0 cm SL

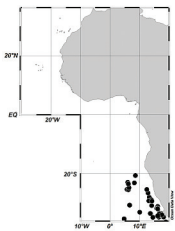
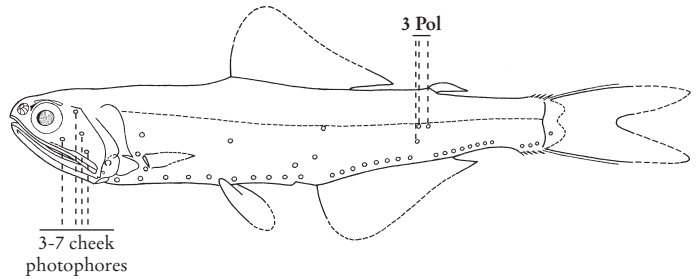
- 27a. Secondary photophores present on head and body; 3-7 primary cheek photophores; 3 Pol, forming right angle *Lampichthys procerus*
- 27b. No secondary photophores on head and body; no cheek photophores; 2 or 3 Pol, in either horizontal line or sub-vertical line with last AOa (Figs. 24a & 24b) → 28

Lampichthys procerus (Brauer, 1904)

Blackhead lanternfish

Other characters: mature males with wide **Suo** surrounded by much black tissue, females with narrow **Suo** with grey borders if undamaged.

Remarks: trawled specimens always abraded, so as to somewhat resemble *Taaningichthys bathyphilus* (black heads with pale bodies), but the two species may be identified by the cheek photophores in *L. procerus* and the structure of the **SCO** and **ICO** in *T. bathyphilus*.



Size: 10.0 cm SL

- 28a. AOa₁ photophore abruptly elevated; 2 Pol, in sub-vertical line with last AOa; 4 or more Prc *Gymnoscopelus* (p. 189)
- 28b. AOa₁ photophore not elevated; 2 or 3 Pol in horizontal line; 3 Prc, with Prc₂-Prc₃ interspace greater than Prc₁-Prc₂ interspace *Notoscopelus* (p. 211)

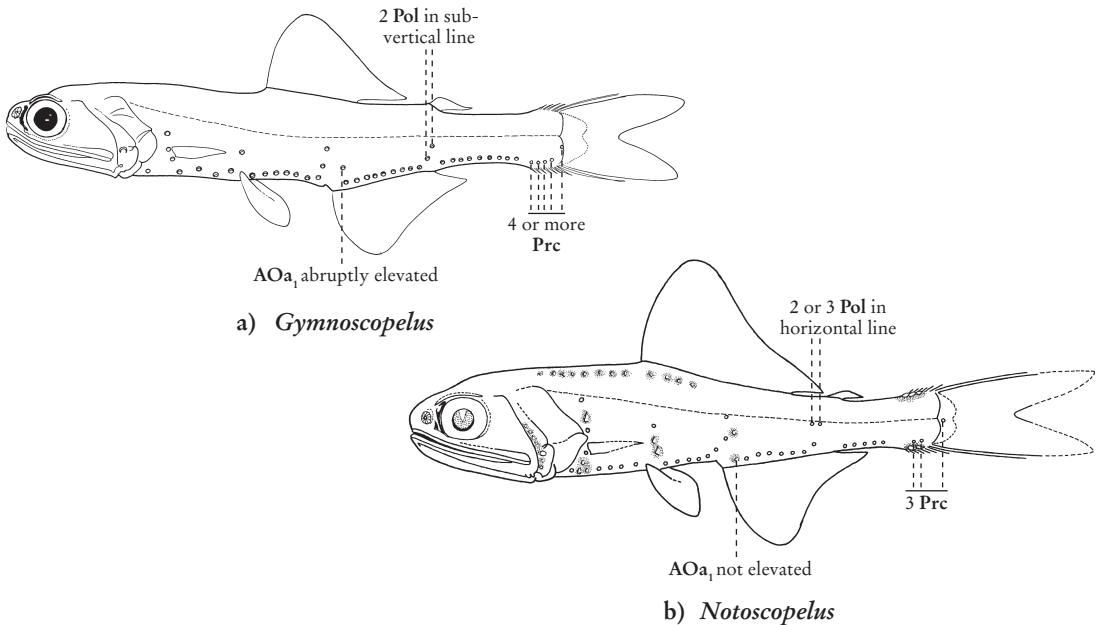


Fig. 24

KEY TO THE SPECIES OF *BENTHOSEMA* OCCURRING IN THE AREA

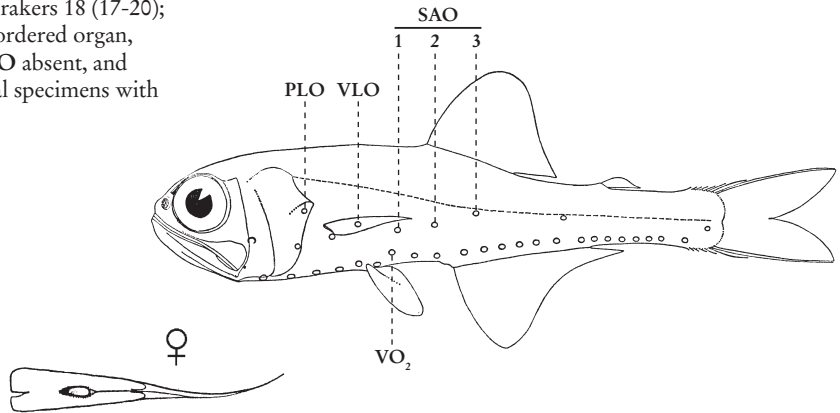
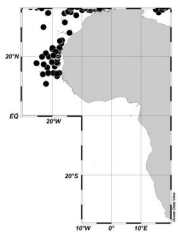
1a. SAO weakly angulate, forming an even arc, with SAO₁ slightly behind vertical through VO₂; VO₂ raised, about midway between VO₁ and VO₃; VLO below line PLO-SAO₁ *Benthoosema glaciale*

1b. SAO angulate, with SAO₁ on or slightly behind vertical through VO₃; VO₂ elevated and anteriorly displaced to above VO₁; VLO above line PLO-SAO₁ → 2

Benthoosema glaciale (Reinhardt, 1837)

Glacier lanternfish

Other characters: total gill rakers 18 (17-20); male SCO a single, black-bordered organ, and ICO absent; female SCO absent, and ICO of 2 patches; occasional specimens with both SCO and ICO.



Ventral view of caudal region

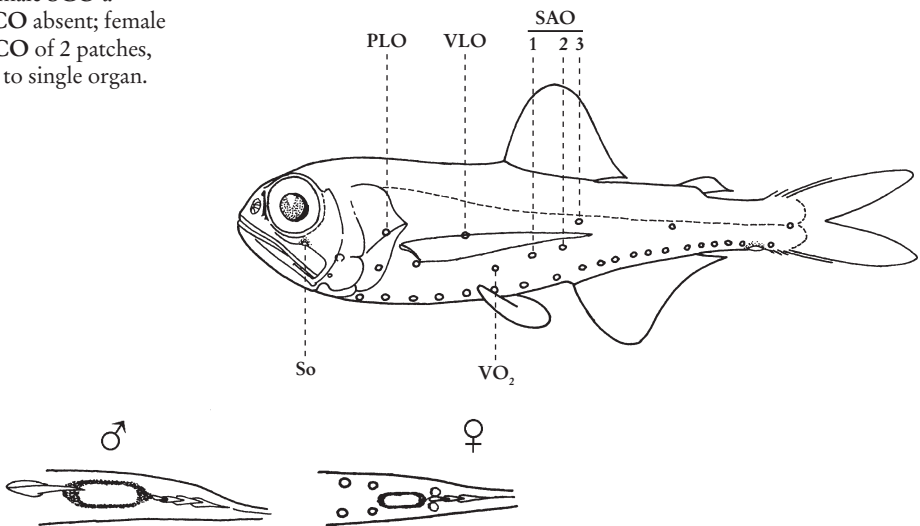
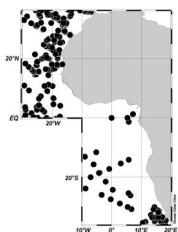
Size: 10.3 cm SL

2a. So present; gill rakers 3 + 1 + 10 (9, rarely 11), total 14 (13, rarely 15); PLO nearer to upper pectoral-fin base than to lateral line *Benthoosema suborbitale*

Benthoosema suborbitale (Gilbert, 1913)

Dimple lanternfish

Other characters: male SCO a single organ, and ICO absent; female SCO absent, and ICO of 2 patches, coalescing with age to single organ.



Dorsal view of caudal region

Ventral view of caudal region

Size: 3.9 cm SL

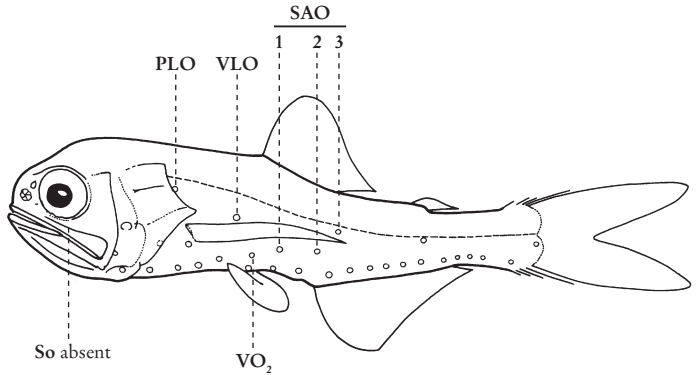
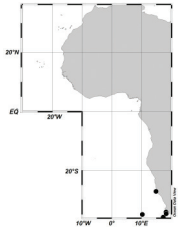
2b. So absent; gill rakers 6-7 (rarely 5) + 1 + 14-16 (rarely 13), total 21-24 (rarely 19); PLO much closer to lateral line than to upper pectoral-fin base *Bentbosema fibulatum*

Bentbosema fibulatum (Gilbert & Cramer, 1897)

Spinycheek lanternfish

Other characters: male SCO of 4 oval-shaped plates, and ICO of 2 irregular patches; female SCO a small single patch, and ICO a very small patch.

Remarks: body photophores yellow.



Size: 9.0 cm SL

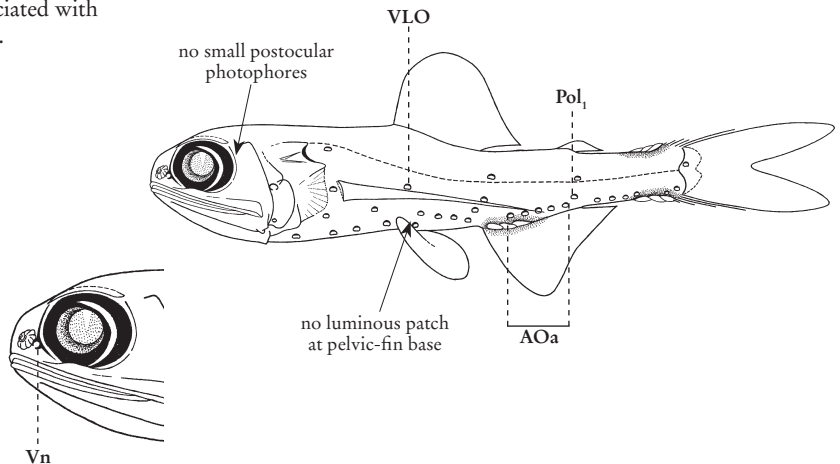
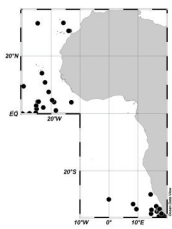
KEY TO THE SPECIES OF *BOLINICHTHYS* OCCURRING IN THE AREA

- 1a. VLO 3-5 photophore diameters below lateral line; luminous patch at pelvic-fin base absent; small postocular photophores absent → 2
- 1b. VLO at or less than 1 photophore diameter below lateral line; luminous patch at pelvic-fin base present; small, postocular photophores present → 3
- 2a. Gill rakers 6 (7) + 1 + 13 (12-14), total 20 (19-22); Pol₁ well above line through last 2 AOa photophores; Vn below anterior margin of orbit *Bolinichthys supralateralis*

Bolinichthys supralateralis (Parr, 1928)

Stubby lanternfish

Other characters: irregular, supraorbital luminous patches, each associated with minute, circular photophore.



Size: 11.7 cm SL

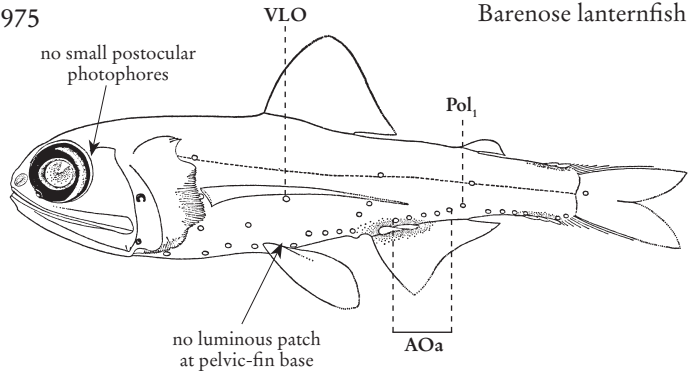
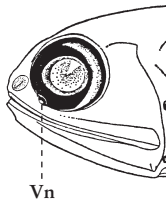
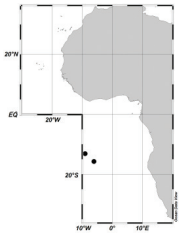
2b. Gill rakers 5 (6) + 1 + 11 (10-12), total 17 (16-18); Pol_1 on or touching line through last 2 AOa photophores; Vn below anterior margin of pupil *Bolinichthys distofax*

Bolinichthys distofax Johnson, 1975

Barenose lanternfish

Other characters: no information.

Remarks: South Atlantic gyral-eye species, just penetrating the area, south of the equator.



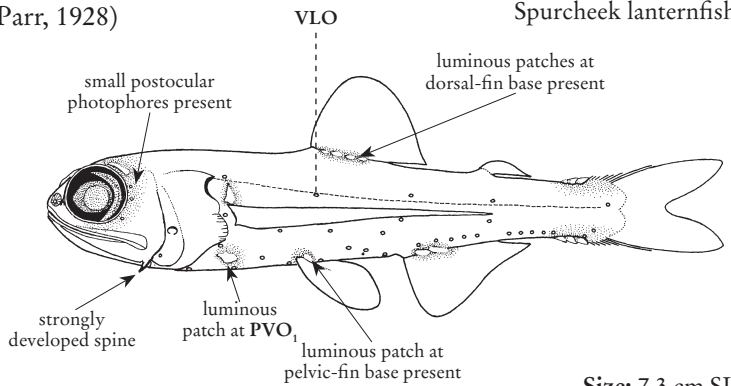
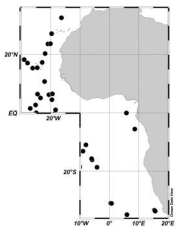
Size: 9.0 cm SL

3a. Preopercle with strongly developed, anteriorly recurved spine at posteroventral margin; luminous patch at PVO_1 present; luminous patches at dorsal-fin base present *Bolinichthys photothorax*

Bolinichthys photothorax (Parr, 1928)

Spurcheek lanternfish

Other characters: no information.



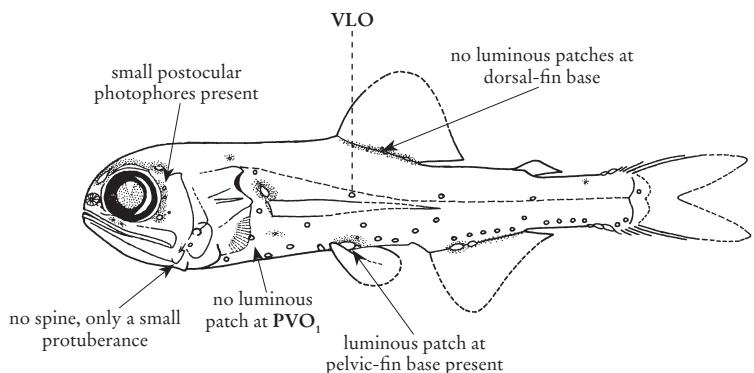
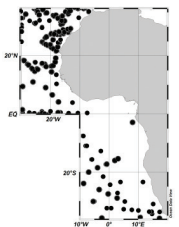
Size: 7.3 cm SL

3b. Preopercle with only a small protuberance at posteroventral margin; luminous patch at PVO_1 absent; luminous patches at dorsal-fin base absent *Bolinichthys indicus*

Bolinichthys indicus (Nafpaktitis & Nafpaktitis, 1969)

Smoothcheek lanternfish

Other characters: no information.



Size: 4.5 cm SL

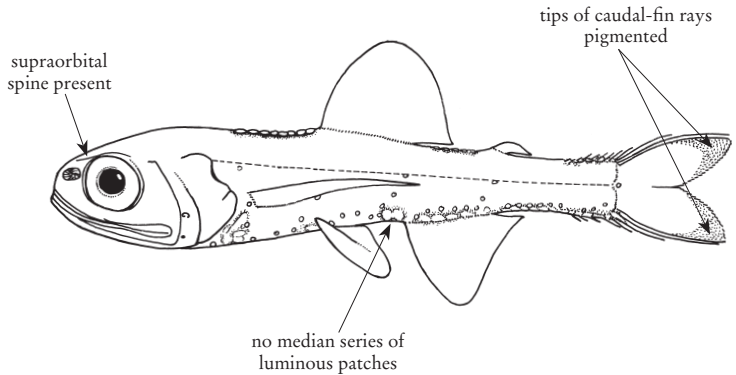
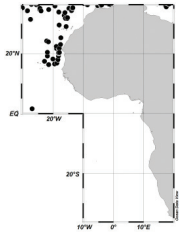
KEY TO THE SPECIES OF *CERATOSCOPELUS* OCCURRING IN THE AREA

1a. Supraorbital spine present; no median series of luminous patches between inner pelvic-fin bases and anus; total gill rakers 19 (18-21, rarely 17 or 22); tips of caudal-fin rays pigmented
 *Ceratoscopelus maderensis*

Ceratoscopelus maderensis (Lowe, 1839)

Madeiran lanternfish

Other characters: no information.



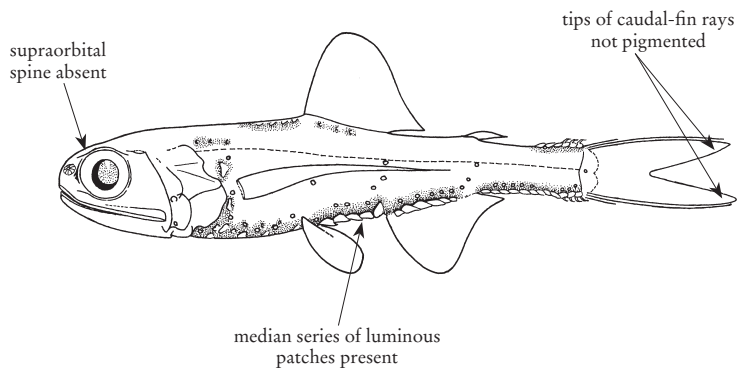
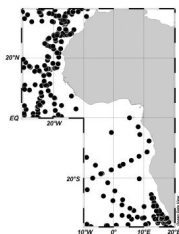
Size: 8.1 cm SL

1b. Supraorbital spine absent; a median series of luminous patches between inner pelvic-fin bases and anus present; total gill rakers 14 (13-15, rarely 16); tips of caudal-fin rays not pigmented
 *Ceratoscopelus warmingii*

Ceratoscopelus warmingii (Lütken, 1892)

Warming's lanternfish

Other characters: no information.



Size: 8.1 cm SL

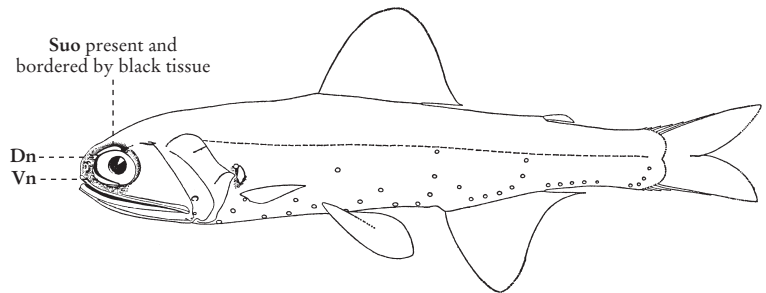
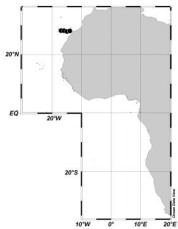
KEY TO THE SPECIES OF *DIAPHUS* (SUBGENERA *DIAPHUS* AND *AETHOPRORA*) OCCURRING IN THE AREA

- 1a. Supraorbital luminous organ (**Suo**) present, bordered by black tissue and extending posteriorly to about centre of lens or beyond *Diaphus* (*A.*) *adenomus*
- 1b. Supraorbital luminous organ (**Suo**) absent → 2

Diaphus (*A.*) *adenomus* Gilbert, 1905

Firebrow lanternfish

Other characters: no information.



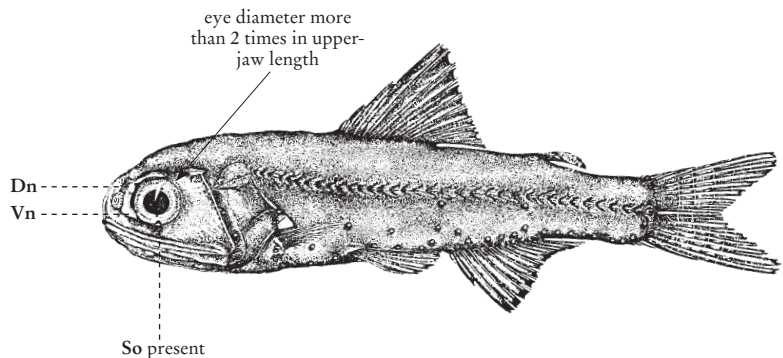
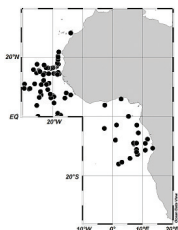
Size: 20.7 cm SL

- 2a. **So** present, completely separated from **Vn**, or connected to **Vn** by a strand of dark tissue (**Note:** otolith and **So** in *D. vanboeffeni* anatomically different to subgenus *Diaphus*) → 3
- 2b. **So** absent → 13
- 3a. **Dn** very small, inconspicuous, directed laterally, shallowly embedded, and almost completely fused with much larger and upwardly spreading **Vn**; eye diameter more than 2 times in upper-jaw length; upper jaw extending about 1 eye diameter behind vertical through posterior border of orbit . *Diaphus* (*A.*) *vanboeffeni*

Diaphus (*A.*) *vanboeffeni* (Brauer, 1906)

VanHöffen's lanternfish

Other characters: no information.



Size: 4.2 cm SL

3b. Dn well defined, round, equal in size to or somewhat smaller than nasal rosette, directed forward, and set in deep, cup-shaped recess above nasal rosette; eye diameter 2 or less times in upper-jaw length; upper jaw extending about 1/2 eye diameter behind vertical through posterior margin of orbit (Fig. 1a) → 4

4a. So behind vertical through posterior margin of pupil; Vn very long, longer than horizontal diameter of pupil, occupying anteroventral and most of ventral orbital margin; luminous patch at PLO absent (Fig. 1b) . . . → 5

4b. So slightly to markedly in advance of vertical through posterior margin of pupil; Vn elongate, but shorter than horizontal diameter of pupil, or small, rounded and about equal in size to So; luminous patch at PLO present (sometimes poorly defined or rubbed off)(Fig. 1c) → 6

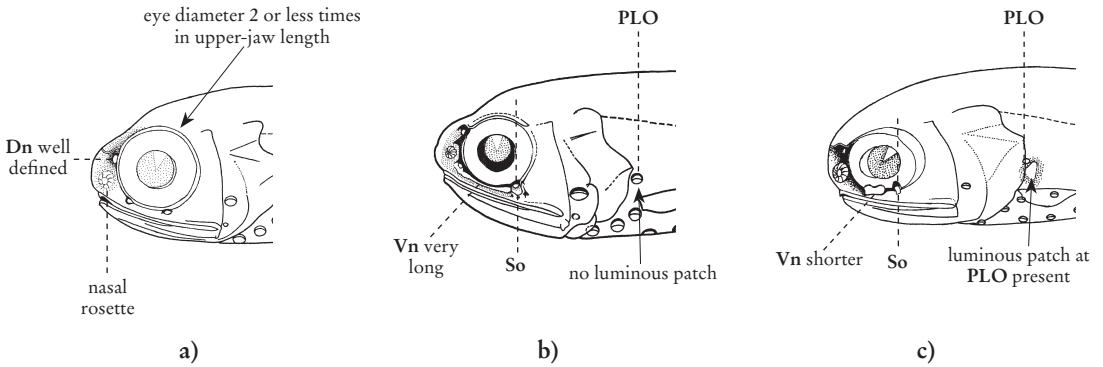


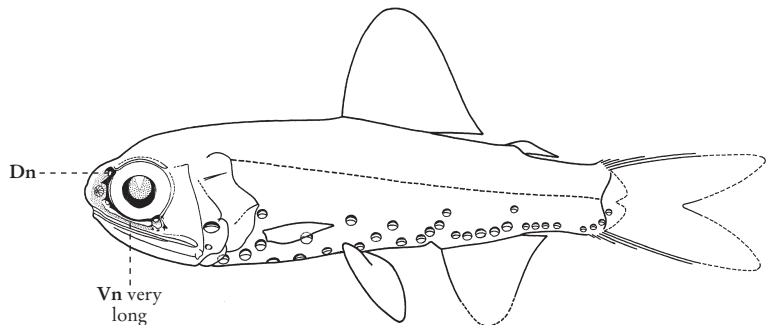
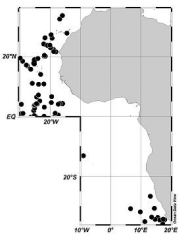
Fig. 1

5a. Head depth less than 4 times in Standard Length; eye diameter and depth of caudal peduncle less than 8 times in Standard Length *Diaphus (D.) brachycephalus*

Diaphus (D.) brachycephalus Tåning, 1928

Shorthead lanternfish

Other characters: PLO patch absent.



Size: 6.0 cm SL

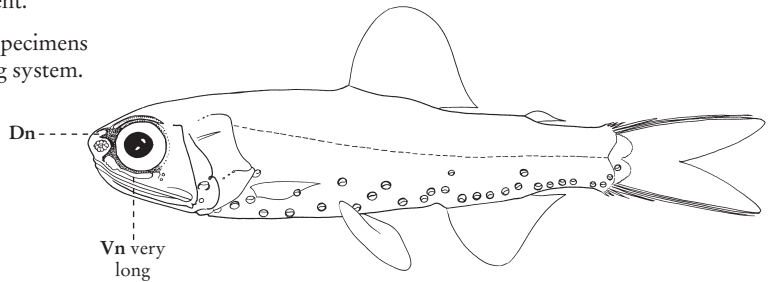
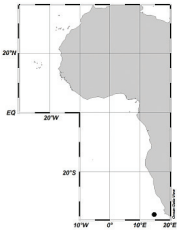
5b. Head depth more than 4 times in Standard Length; eye diameter and depth of caudal peduncle 8 or more times in Standard Length *Diaphus (D.) richardsoni*

Diaphus (D.) richardsoni Tåning, 1932

Richardson's lanternfish

Other characters: PLO patch absent.

Remarks: known from two small specimens (26 and 28 mm SL) in Agulhas Ring system.



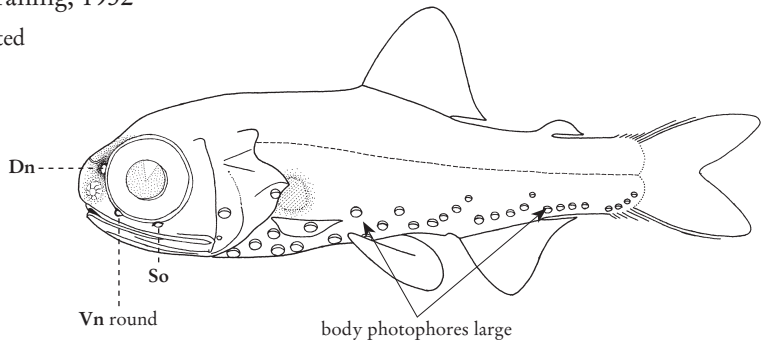
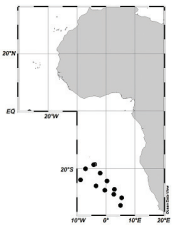
Size: 6.0 cm SL

6a. Vn round, its size equal to or slightly smaller than So; distance between Vn and So 3 or 4 times So diameter; body photophores large, those of AO series about 1/2 photophore diameter apart *Diaphus (D.) anderseni*

Diaphus (D.) anderseni Tåning, 1932

Andersen's lanternfish

Other characters: PLO patch striated anteroventrally.



Size: 3.2 cm SL

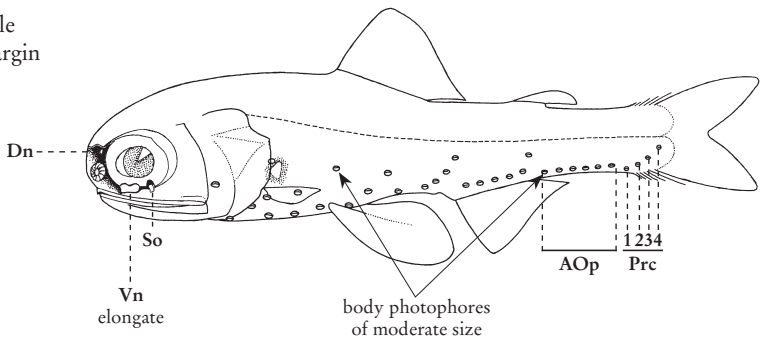
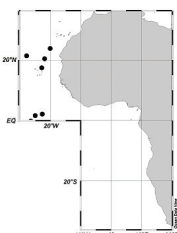
6b. Vn horizontally elongate, its size more than 2 times So; distance between Vn and So less than 3 times So diameter; body photophores of moderate size, those of AO series more than 1/2 photophore diameter apart → 7

7a. AOp more-or-less continuous with Prc, distance between Prc₁ and Prc₃ longer than AOp-Prc₁ interspace; caudal-peduncle length longer than dorsal-fin base *Diaphus (D.) subtilis*

Diaphus (D.) subtilis Nafpaktitis, 1968

Flabby lanternfish

Other characters: body flabby; scale pockets large and loose; anterior margin of gill rakers fleshy.



Size: 8.5 cm SL

- 7b. AOp well separated from Prc, distance between Prc₁ and Prc₃ equal to or usually shorter than AOp-Prc₁ interspace; caudal-peduncle length equal to or slightly shorter than dorsal-fin base (Fig. 2a) → 8
- 8a. AOa₁ elevated or raised, with straight line through centres of AOa₂ and AOa₁ passing above centre of SAO₂ (Fig. 2a) → 9
- 8b. AOa₁ level or only slightly raised, with straight line through centres of AOa₂ and AOa₁ passing below ventral margin of SAO₂ (Fig. 2b) → 10

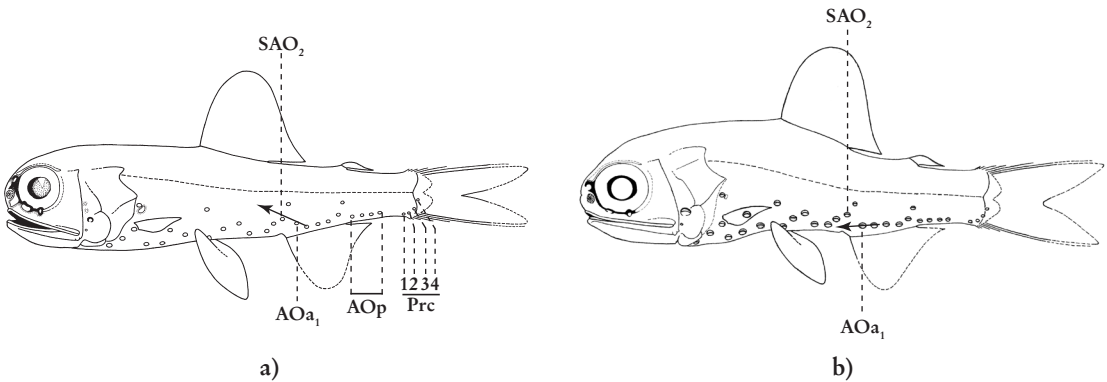


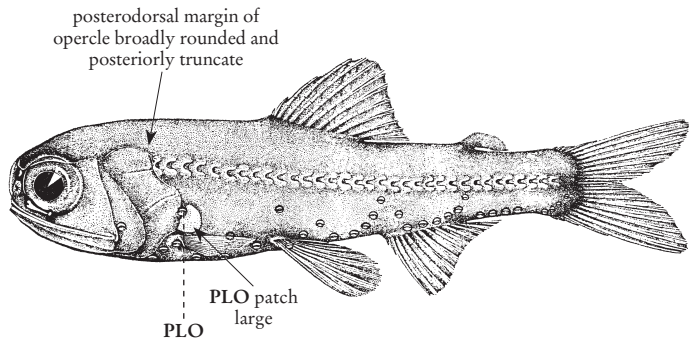
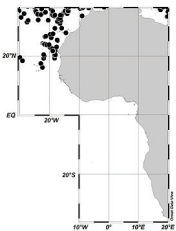
Fig. 2

- 9a. Gill rakers 7-8 + 1 + 14-15 (rarely 13 or 16), total 22-24 (rarely 21 or 25); PLO patch large, its maximum length more than 2 times PLO diameter; posterodorsal margin of opercle broadly rounded and posteriorly truncate *Diaphus (D.) rafinesquii*

Diaphus (D.) rafinesquii (Cocco, 1838)

Rafinesque's lanternfish

Other characters: Vn sexually dimorphic, larger in males than in females.



Size: 9.0 cm SL

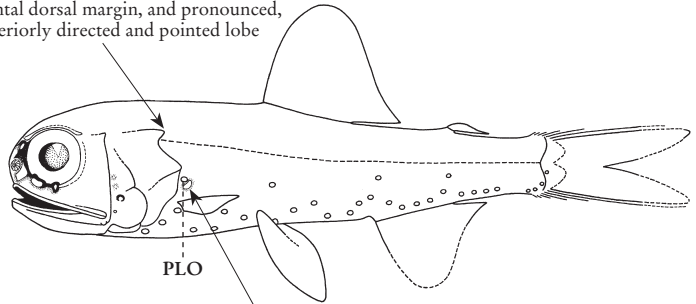
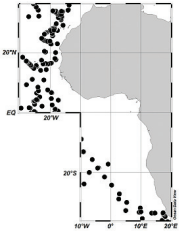
- 9b. Gill rakers 5 (rarely 4 or 6) + 1 + 11-12 (rarely 13), total 17-18 (16, rarely 19); PLO patch small, its maximum length about equal to PLO diameter; opercle with straight or nearly straight horizontal dorsal margin, and pronounced, posteriorly directed and pointed lobe, due to concavity in posterodorsal opercular margin *Diaphus (D.) mollis*

Diaphus (D.) mollis Tåning, 1928

Soft lanternfish

Other characters: gill rakers on lower 1st arch broad-based and leaf-like; **Vn** sexually dimorphic, larger in males than in females.

opercle with straight or nearly straight horizontal dorsal margin, and pronounced, posteriorly directed and pointed lobe



Size: 6.6 cm SL

10a. Length of **Vn** less than or equal to **Vn-So** interspace; posterodorsal margin of opercle with prominent, posteriorly directed, pointed lobe, due to concavity in posterior opercular margin . . . *Diaphus (D.) parri*

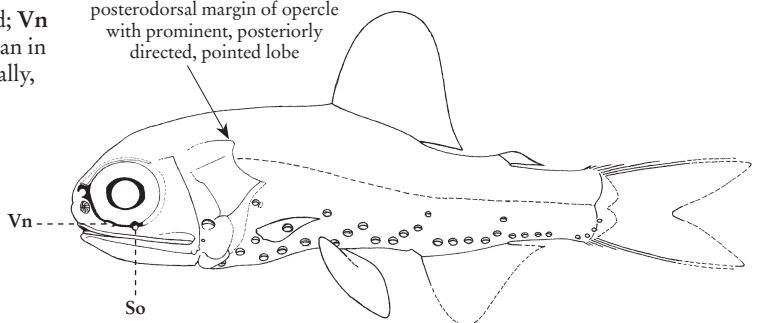
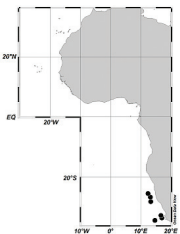
10b. Length of **Vn** greater than **Vn-So** interspace; posterodorsal margin of opercle rounded to broadly rounded and posteriorly truncate, sometimes with slight anterodorsally directed concavity → 11

Diaphus (D.) parri Tåning, 1932

Parr's lanternfish

Other characters: short, deep-bodied; **Vn** sexually dimorphic, larger in males than in females; **PLO** patch striated horizontally, and varying in size with growth.

posterodorsal margin of opercle with prominent, posteriorly directed, pointed lobe



Size: 6.5 cm SL

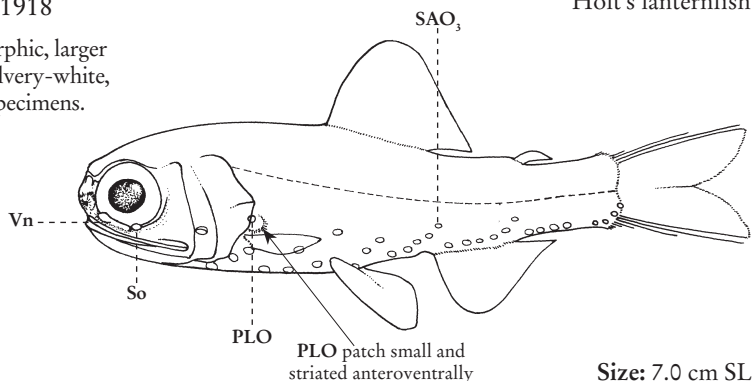
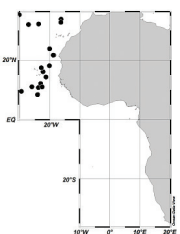
11a. **SAO₃** about equidistant from lateral line and anal-fin base; **PLO** patch small, its length about twice diameter of **PLO**; caudal-peduncle depth 8 or less times in Standard Length *Diaphus (D.) holti*

11b. **SAO₃** much nearer lateral line than anal-fin base; **PLO** patch large, about 3-6 times diameter of **PLO**; caudal-peduncle depth more than 8 times in Standard Length → 12

Diaphus (D.) holti Tåning, 1918

Holt's lanternfish

Other characters: **Vn** sexually dimorphic, larger in males than in females; **Vn** and **So** silvery-white, and body photophores blue in fresh specimens.



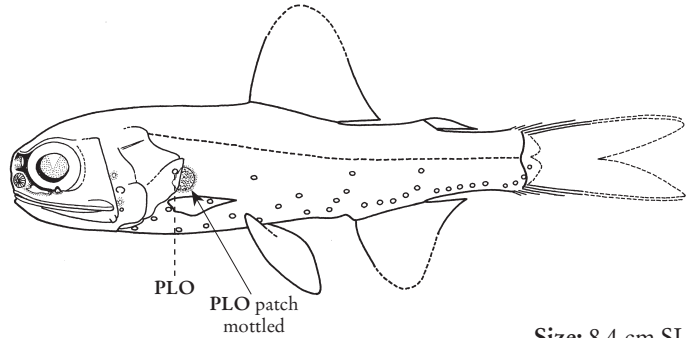
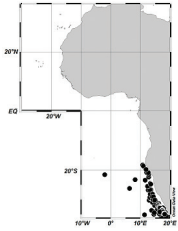
Size: 7.0 cm SL

12a. Gill rakers 7-8 (9) + 1 + 15-16 (14-17, rarely 18), total 24-25 (22-26, rarely 27 or 28); PLO patch mottled; fresh specimens metallic green *Diaphus (D.) hudsoni*

Diaphus (D.) hudsoni Zurbrigg & Scott, 1976

Hudson's lanternfish

Other characters: Vn sexually dimorphic, larger in males than in females.



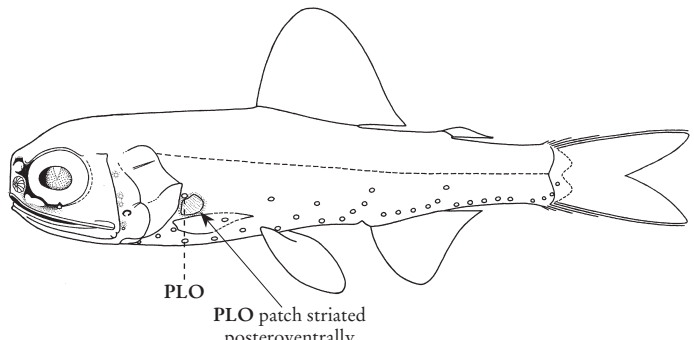
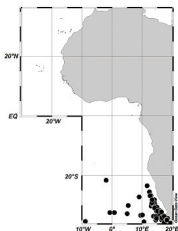
Size: 8.4 cm SL

12b. Gill rakers 5 (rarely 4 or 6) + 1 + 11 (12, rarely 10 or 13), total 17 (18, rarely 16, 19 or 20); PLO patch striated posteroventrally; fresh specimens metallic blue *Diaphus (D.) meadi*

Diaphus (D.) meadi Nafpaktitis, 1978

Mead's lanternfish

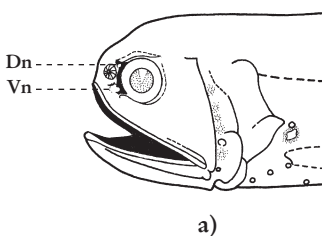
Other characters: Vn sexually dimorphic, larger in males than in females.



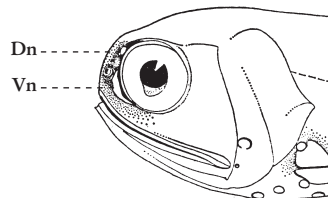
Size: 5.4 cm SL

13a. Dn small, shallowly embedded and directed laterally; Vn equally small, completely separated from Dn and located at ventral margin of orbit, or somewhat larger and located at anteroventral margin of orbit and connected with Dn by a narrow streak of luminous tissue between eye and nasal apparatus (Fig. 3a) → 14

13b. Dn ranging in size from smaller than body photophore to much larger than nasal rosette, in more-or-less deep recess and directed forward; Vn may be (a) restricted to ventral margin of orbit, (b) restricted to anteroventral margin of orbit, (c) extending dorsally to reach Dn, or (d) spread over most of entire area of snout (Fig. 3b) → 18



a)



b)

Fig. 3

14a. Vn small, about half size of general body photophore, completely separated from Dn, and located at ventral orbital margin on or slightly in advance of vertical through anterior margin of pupil; SAO noticeably angulate; AOa₁ not elevated *Diaphus (A.) dumerilii*

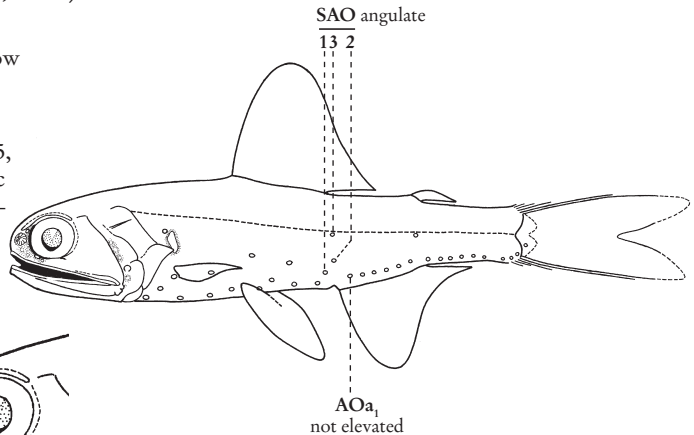
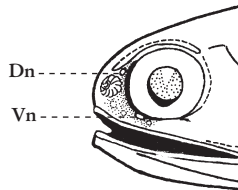
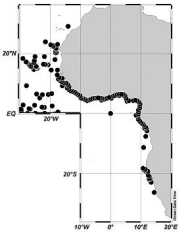
14b. Vn somewhat larger than Dn and connected with it by a thin streak of luminous tissue extending between eye and nasal apparatus; SAO not or only slightly angulate; AOa₁ abruptly elevated → 15

Diaphus (A.) dumerilii (Bleeker, 1856)

Dumeril's lanternfish

Other characters: Dn sexually dimorphic, larger in males than in females, golden-yellow in fresh specimens.

Remarks: two populations in the area, oceanic [GR 6 (rarely 5 or 7) + 1 + 14 (13-15, total 21 (20-22, rarely 23))] and pseudo-oceanic [GR 8 (7-9) + 1 + 16 (17, rarely 15), total 25-26 (rarely 23 or 27)].



Size: 8.7 cm SL

15a. Total gill rakers 15 or less; SAO₃ and Pol 1-1.5 photophore diameters below lateral line

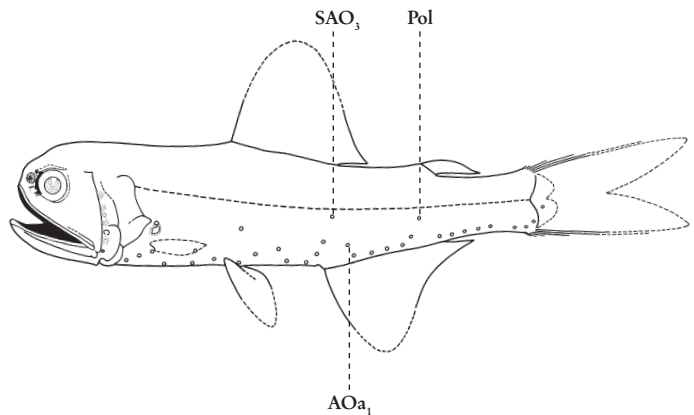
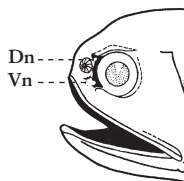
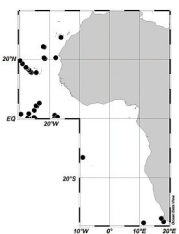
Diaphus (A.) problematicus

15b. Total gill rakers 16 or more; SAO₃ and Pol in contact with lateral line → 16

Diaphus (A.) problematicus Parr, 1928

Problematic lanternfish

Other characters: no information.



Size: 10.5 cm SL

16a. PLO nearer to lateral line than to upper pectoral-fin base *Diaphus (A.) garmani*

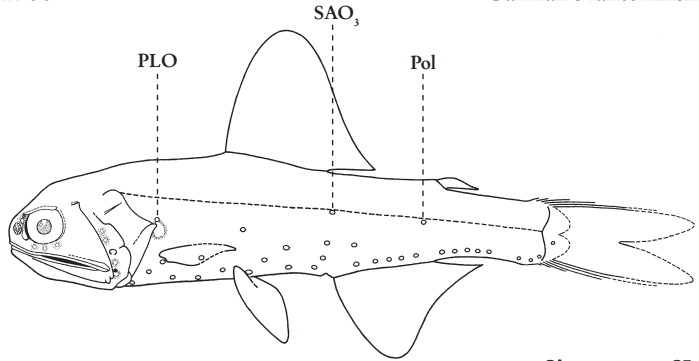
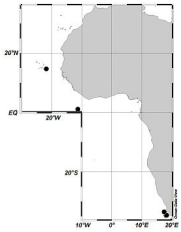
16b. PLO nearer to upper pectoral-fin base than to lateral line, rarely midway between lateral line and upper pectoral-fin base → 17

Diaphus (A.) garmani Gilbert, 1906

Garman's lanternfish

Other characters: no information.

Remarks: unconfirmed records off Canary Islands and Senegal.



Size: 6.0 cm SL

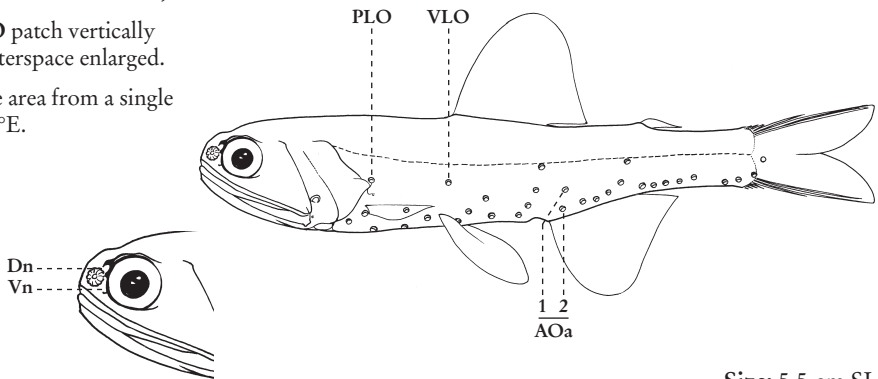
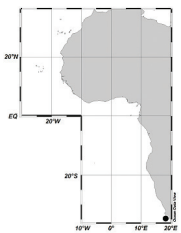
17a. Distance between VLO and outer pelvic-fin base 1.5-2 times larger than distance between VLO and lateral line; AOa₁ directly on, or usually behind vertical through AOa₂; Vn about equal in size to Dn, slightly larger than Dn in adult males; dorsal-fin origin behind vertical through outer pelvic-fin base *Diaphus (A.) signatus*

Diaphus (A.) signatus Gilbert, 1908

Arrowmark lanternfish

Other characters: PLO patch vertically striated; AOa₂-AOa₃ interspace enlarged.

Remarks: known in the area from a single record at 34.72°S, 18.30°E.



Size: 5.5 cm SL

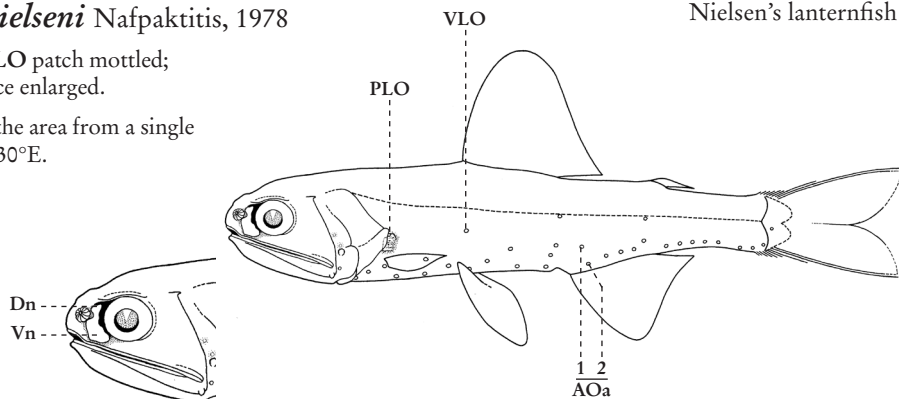
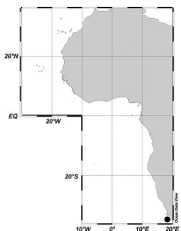
17b. VLO midway between outer pelvic-fin base and lateral line, or slightly higher; AOa₁ directly on, or slightly in advance of vertical through AOa₂; Vn larger than Dn, especially in adult males; dorsal-fin origin on or slightly in advance of vertical through outer pelvic-fin base *Diaphus (A.) nielseni*

Diaphus (A.) nielseni Nafpaktitis, 1978

Nielsen's lanternfish

Other characters: PLO patch mottled; AOa₂-AOa₃ interspace enlarged.

Remarks: known in the area from a single record at 34.72°S, 18.30°E.



Size: 4.0 cm SL

- 18a.** Vn widely separated from Dn, not extending dorsally beyond upper margin of nasal apparatus, confined to ventral or anteroventral aspect of orbit, but some connected to Dn by a strand of dark tissue along anterior margin of orbit (Fig. 4a) → 19
- 18b.** Vn extending dorsally between anterior margin of orbit and nasal apparatus, in contact or confluent with Dn (Fig. 4b) → 23

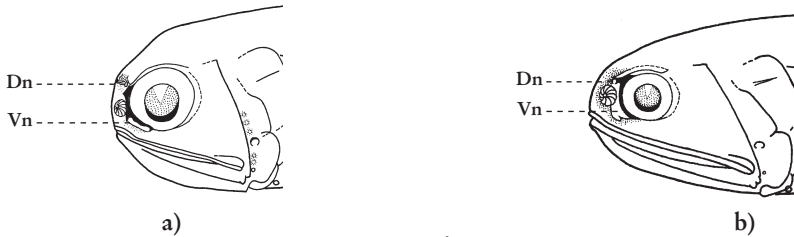


Fig. 4

- 19a.** SAO₁ above level of VO₅; upper jaw extending less than 1 eye diameter behind vertical through posterior margin of orbit (Fig. 5a) → 20
- 19b.** SAO₁ on same level with VO₅; upper jaw extending more than 1 eye diameter behind vertical through posterior margin of orbit (Fig. 5b) → 21

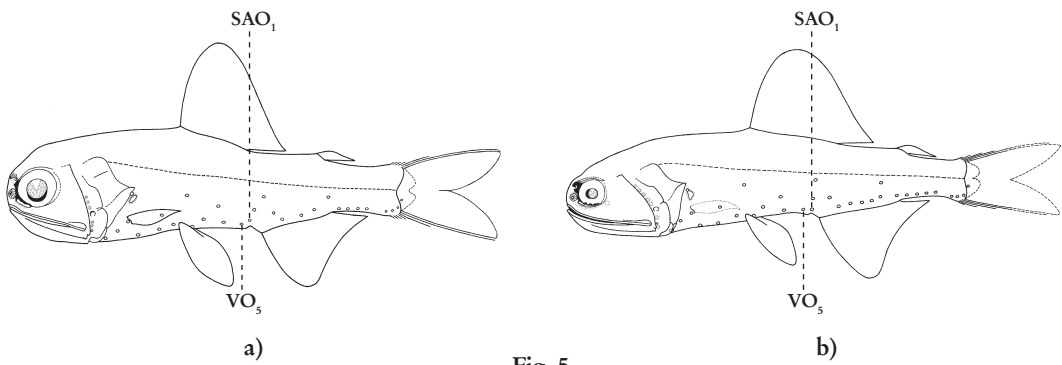


Fig. 5

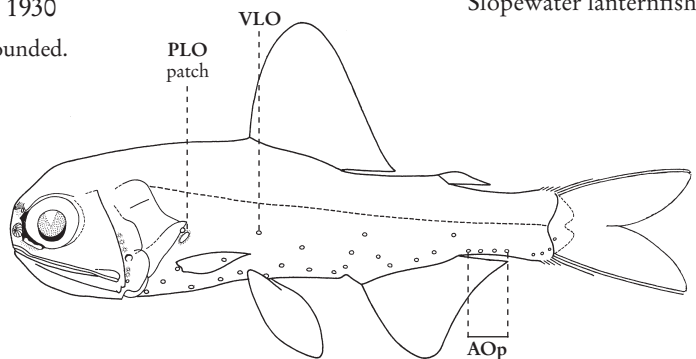
- 20a.** Body photophores of moderate size, those of AOp series separated by spaces larger than 1/2 AOp photophore diameter; VLO midway between lateral line and pelvic-fin base, or somewhat higher; gill rakers 6-7 (8) + 1 + 13-14 (12), total 20-22 (19-23). *Diaphus (A.) taaningi*

Diaphus (A.) taaningi Norman, 1930

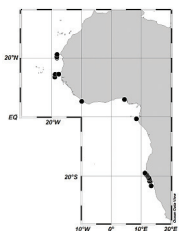
Sloperwater lanternfish

Other characters: PLO patch small and rounded.

Remarks: pseudo-oceanic species over slope regions; Atlantic Ocean endemic.



Size: 7.0 cm SL



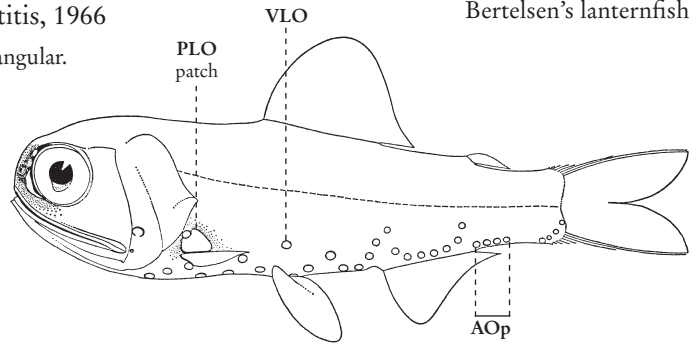
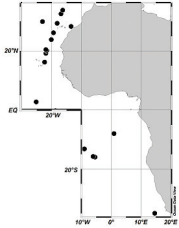
20b. Body photophores large, those of **AOp** series separated by spaces equal to 1/2 **AOp** photophore diameter, or less, relatively smaller in specimens > 80 mm; **VLO** nearer to pelvic-fin base than to lateral line; gill rakers 5 (rarely 6) + 1 + 12 (rarely 11 or 13), total 18 (19, rarely 17) *Diaphus (A.) bertelseni*

Diaphus (A.) bertelseni Nafpaktitis, 1966

Bertelsen's lanternfish

Other characters: **PLO** patch large and triangular.

Remarks: uncommon species.



Size: 10.0 cm SL

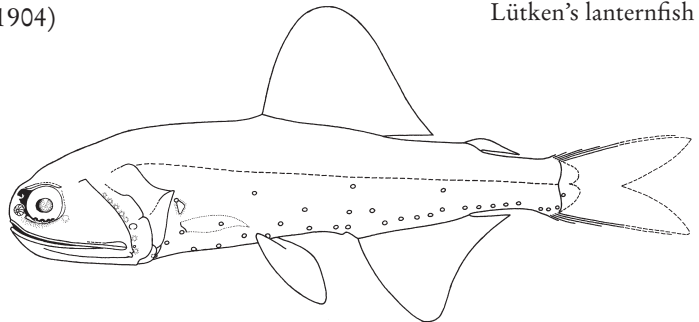
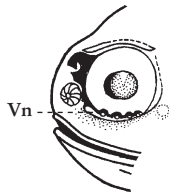
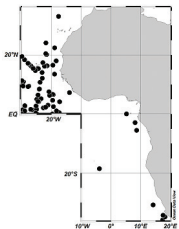
21a. **Vn** very long, extending along most of ventral border of eye, its dorsal margin with small, round bud-like projections *Diaphus (A.) luetkeni*

21b. **Vn** round or oval, located on ventral margin of eye about under centre of pupil, or extending from this region as a posterior wedge, without budlike projections, but with tiny luminous spots in black pigment on orbital margin between **Vn** and nasal rosette. → 22

Diaphus (A.) luetkeni (Brauer, 1904)

Lütken's lanternfish

Other characters: no information.



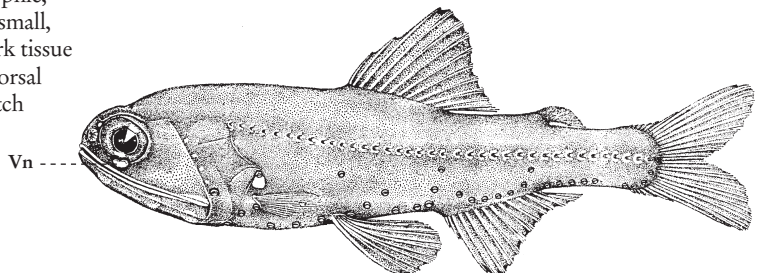
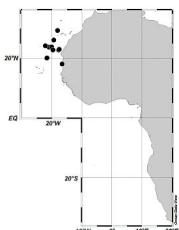
Size: 6.0 cm SL

22a. Gill rakers 8 (9) + 1 + 15 (16), total 24 (25-26) *Diaphus (A.) termophilus*

Diaphus (A.) termophilus Tåning, 1928

Warmwater lanternfish

Other characters: **Vn** sexually dimorphic, larger in males than in females; 2 or 3 small, round luminous organs in band of dark tissue between **Vn** and **Dn**; depression in dorsal profile above eye noticeable; **PLO** patch striated posteroventrally.



Size: 11.7 cm SL

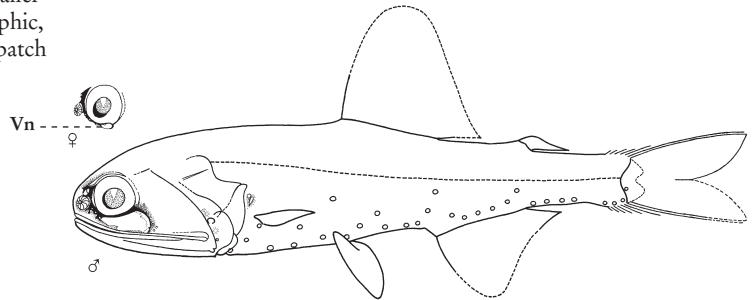
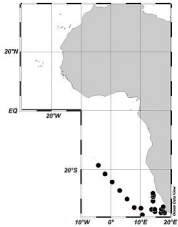
22b. Gill rakers 5 (4) + 1 + 10 (11), total 16 (15-17) *Diaphus (A.) diadematus*

Diaphus (A.) diadematus Tåning, 1932

Crown lanternfish

Other characters: Dn equal to or smaller than nasal rosette; Vn sexually dimorphic, larger in males than in females; PLO patch minute.

Remarks: mature females occur in the South East Atlantic sector.



Size: 4.2 cm SL

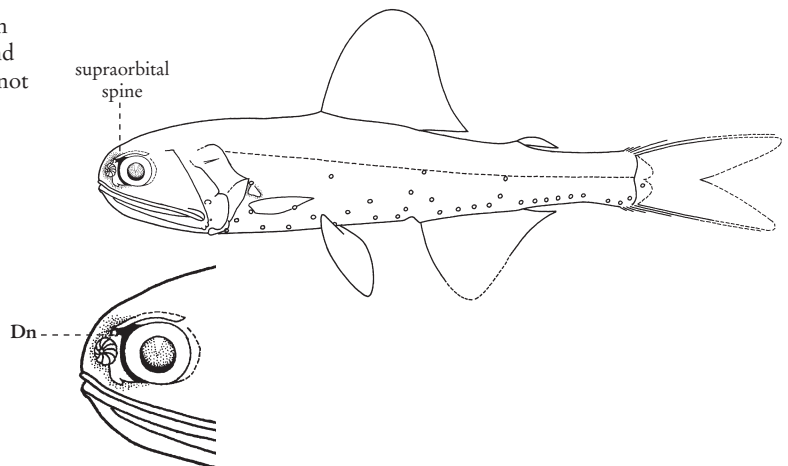
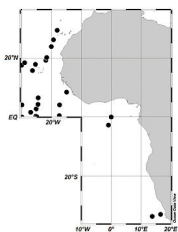
23a. Dn round, smaller than nasal rosette, set in deep, pigment-lined recess above nasal apparatus; anterior end of supraorbital ridge produced into forwardly directed strong spine (often broken) . . . *Diaphus (A.) splendidus*

23b. Dn equal in size or larger than nasal rosette, round or rectangular, often reaching median ethmoid crest; anterior end of supraorbital ridge not produced into spine-like process → 24

Diaphus (A.) splendidus (Brauer, 1904)

Horned lanternfish

Other characters: Vn sexually dimorphic, larger in males than in females; PLO patch triangular and mottled; AOa₂-AOa₃ interspace not enlarged.



Size: 9.0 cm SL

24a. Head length about equal to head depth, or less than 1.1 times as long as deep. → 25

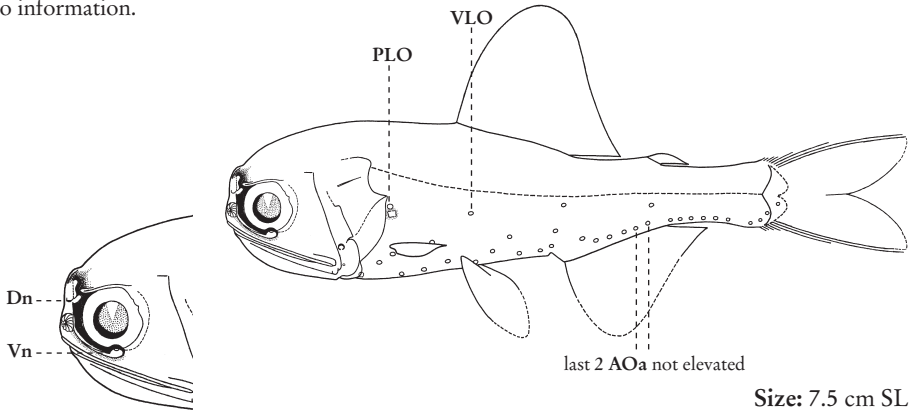
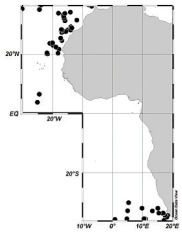
24b. Head more than 1.2 times as long as deep → 26

25a. Vn extending along ventral margin of orbit to or somewhat behind vertical through centre of pupil, and somewhat expanded posteriorly; PLO nearer lateral line than pectoral-fin base; VLO nearer lateral line than pelvic-fin base; last 2 AOa photophores not elevated or raised. *Diaphus (A.) metopoclampus*

Diaphus (A.) metopoclampus (Cocco, 1829)

Bluntnose lanternfish

Other characters: no information.

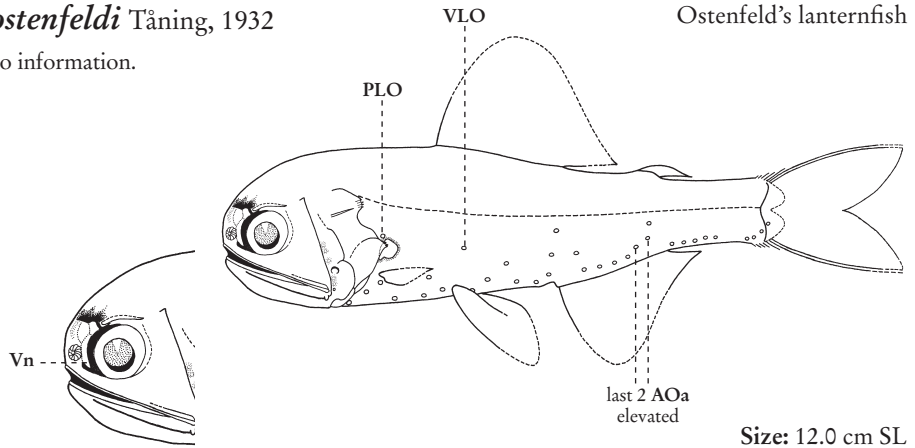
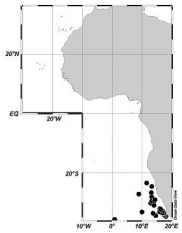


25b. Vn extending only to anterior margin of pupil; PLO about midway between lateral line and pectoral-fin base; VLO about midway between lateral line and pelvic-fin base; last 2 AOa photophores elevated
 *Diaphus (A.) ostenfeldi*

Diaphus (A.) ostenfeldi Tåning, 1932

Ostenfeld's lanternfish

Other characters: no information.

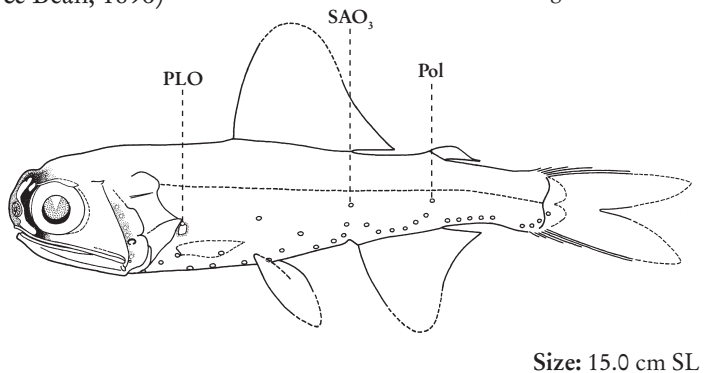
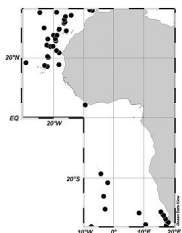


26a. SAO₃ and Pol more than 3 photophore diameters below lateral line *Diaphus (A.) effulgens*
 26b. SAO₃ and Pol in contact with, or 1 photophore diameter or less below lateral line → 27

Diaphus (A.) effulgens (Goode & Bean, 1896)

Headlight lanternfish

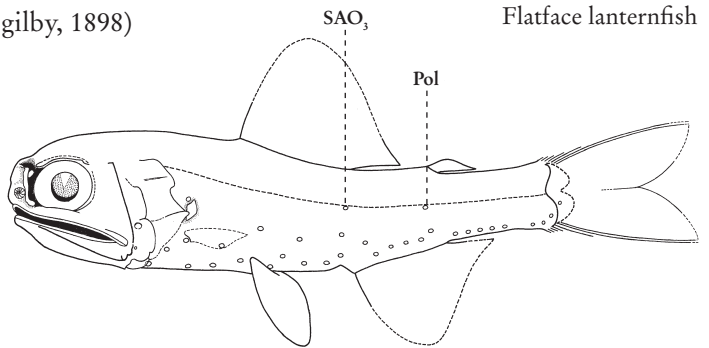
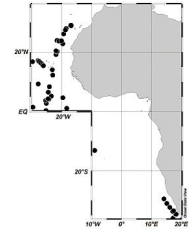
Other characters: PLO nearer upper pectoral-fin base than to lateral line; SAO₁ almost level with VO₅,



27a. Total gill rakers 26 or more (very rarely 25) *Diaphus (A.) perspicillatus*

Diaphus (A.) perspicillatus (Ogilby, 1898)

Other characters: abrupt concavity on posterodorsal margin of opercle.



Flatface lanternfish

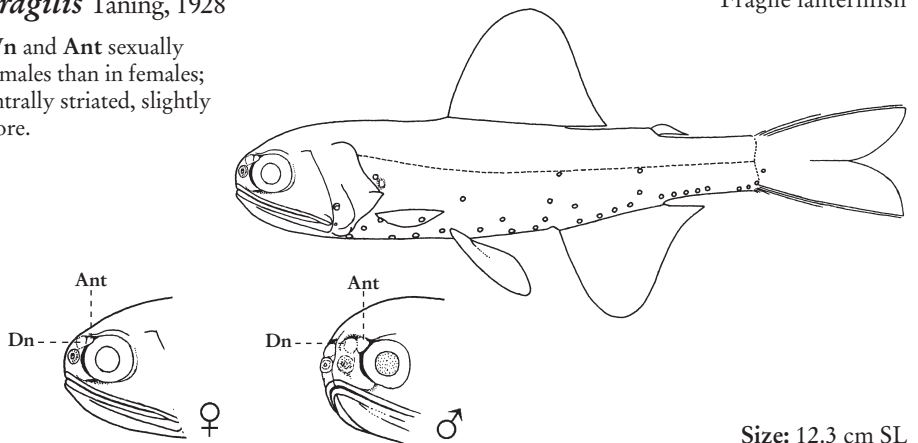
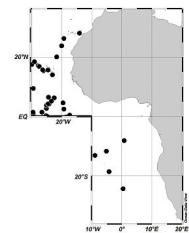
Size: 7.1 cm SL

27b. Total gill rakers 20 or less (rarely 21). → 28

28a. Dn about size of nasal rosette, extending dorsally to about level of dorsal margin of orbit; body photophores normal; inner series of teeth on dentary large and sharp; Ant present . . . *Diaphus (A.) fragilis*

Diaphus (A.) fragilis Tåning, 1928

Other characters: Vn and Ant sexually dimorphic, larger in males than in females; PLO patch dorsoventrally striated, slightly larger than photophore.



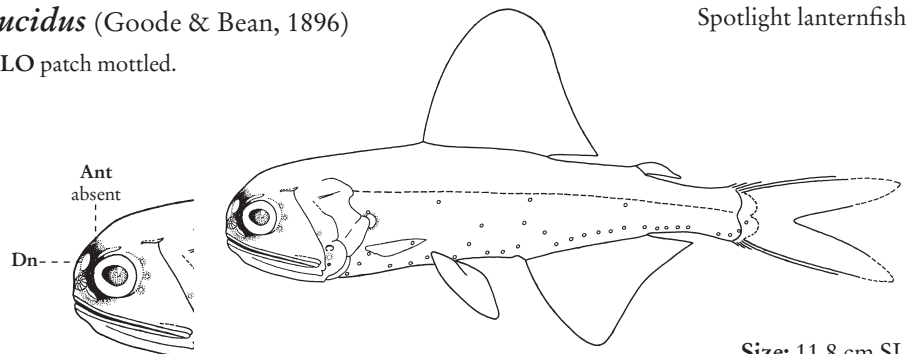
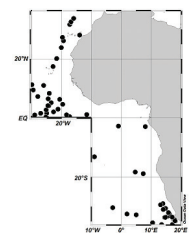
Fragile lanternfish

Size: 12.3 cm SL

28b. Dn very large, about 1/2 eye diameter, extending dorsally well above level of dorsal margin of orbit and in adults reaching median ethmoid crest; body photophores noticeably small; dentary with inner series of densely set, small teeth; Ant absent *Diaphus (A.) lucidus*

Diaphus (A.) lucidus (Goode & Bean, 1896)

Other characters: PLO patch mottled.



Spotlight lanternfish

Size: 11.8 cm SL

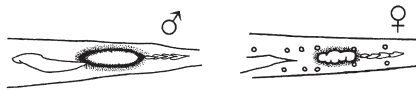
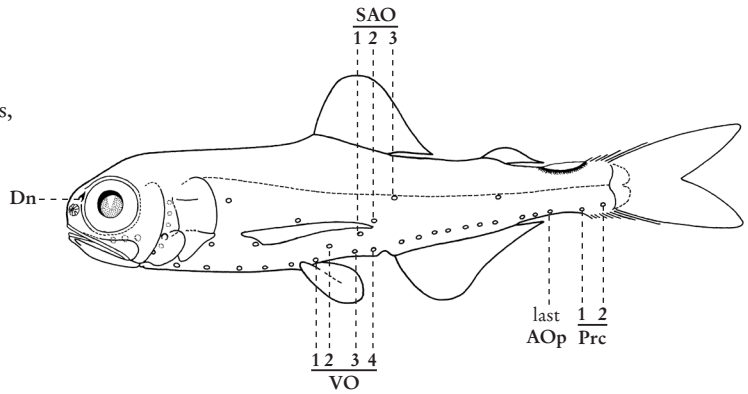
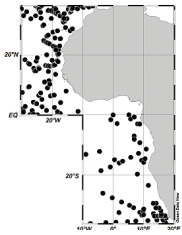
KEY TO THE SPECIES OF *DIOGENICHTHYS* OCCURRING IN THE AREA

1a. Prc₁-Prc₂ interspace subequal to or longer than AOp-Prc₁ interspace; SAO₁ above VO₃-VO₄ interspace; gill rakers 2 (rarely 3) + 1 + 9-11 (rarely 12), total 12-14 (rarely 15); Dn poorly developed in matures males
 *Diogenichthys atlanticus*

Diogenichthys atlanticus (Tåning, 1928)

Atlantic lanternfish

Other characters: Dn sexually dimorphic, better developed in males than females; male SCO single, extending about 50-75% of distance adipose-base to procurrent caudal rays, and ICO absent; female SCO absent, and ICO of 2-4 coalesced patches.



Dorsal view of caudal region

Ventral view of caudal region

Size: 2.7 cm SL

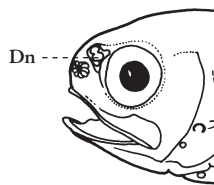
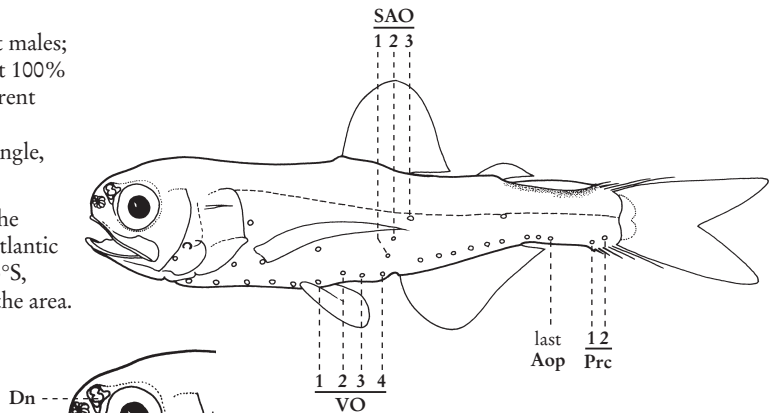
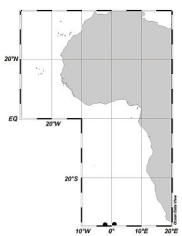
1b. Prc₁-Prc₂ interspace 1/2 or less than 1/2 length of AOp-Prc₁ interspace; SAO₁ on vertical through VO₄ or slightly behind VO₄; gill rakers 2 + 1 + 8-9, total 11-12; Dn well developed in mature males
 *Diogenichthys panurgus*

Diogenichthys panurgus Bolin, 1946

Rascal lanternfish

Other characters: Dn sexually dimorphic, well developed in adult males; male SCO single, extending almost 100% of distance adipose-base to procurrent caudal rays, and with ICO absent; female SCO absent, and ICO of single, irregularly-shaped patch.

Remarks: not yet recorded from the area; 3 records in the South East Atlantic (35.4°S, 0.9°E; 35.5°S, 2.2°W; 37.75°S, 18.00°E) just outside the limits of the area.



Size: 2.3 cm SL

KEY TO THE SPECIES OF *ELECTRONA* OCCURRING IN THE AREA

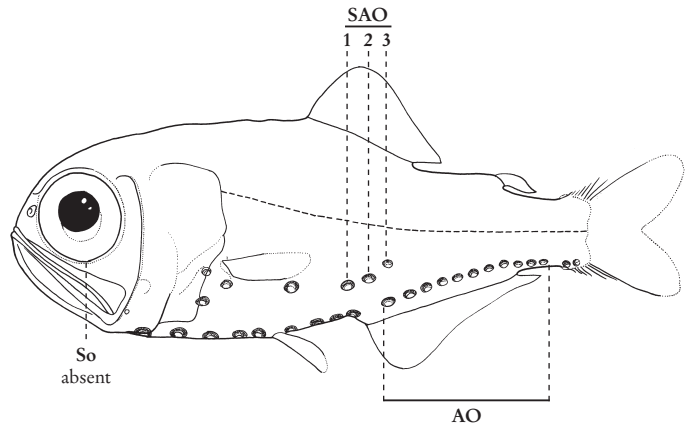
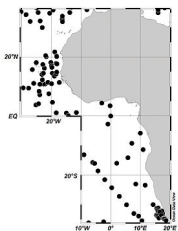
1a. Body depth greater than or equal to 1/3 Standard Length; So photophore absent; SAO series slightly curved; total AO 10-13. *Electrona risso*

Electrona risso (Cocco, 1829)

Risso's lanternfish

Other characters: males with SCO only, or ICO only, or both; females typically with SCO and ICO, sometimes double, or with single SCO or ICO.

Remarks: photophores in fresh specimens blue.



Size: 8.2 cm SL

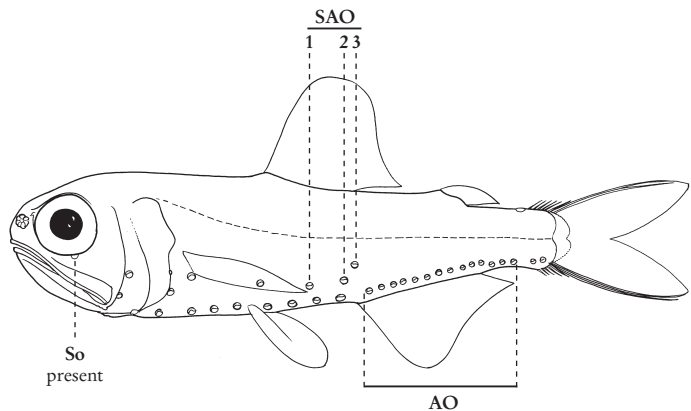
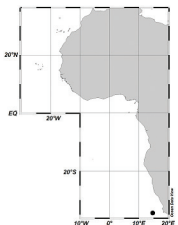
1b. Body depth less than 1/3 Standard Length; So photophore on or slightly behind vertical through middle of orbit; SAO series angulate; total AO 13-19. *Electrona carlsbergi*

Electrona carlsbergi (Tåning, 1932)

Carlsberg's lanternfish

Other characters: both males and females with SCO and ICO.

Remarks: known in the area from a single record at 34.43°S, 14.72°E.



Size: 11.2 cm SL

KEY TO THE SPECIES OF *GONICHTHYS* OCCURRING IN THE AREA

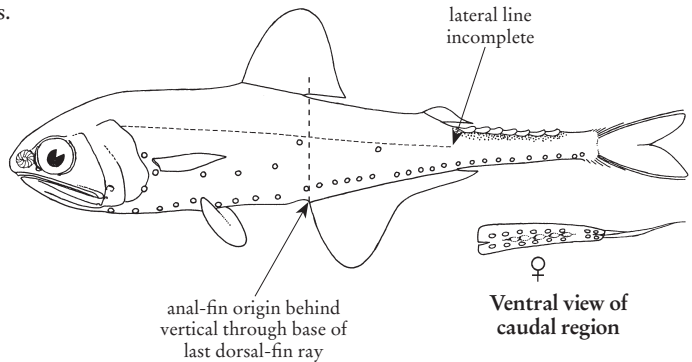
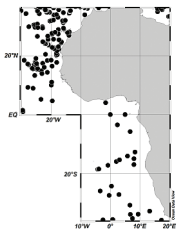
1a. Lateral line incomplete, with last perforated scale below area of adipose-fin origin; anal-fin origin behind vertical through base of last dorsal-fin ray *Gonichthys cocco*

Gonichthys cocco (Cocco, 1829)

Cocco's lanternfish

Other characters: male SCO of 6-8 overlapping scale-like plates, and ICO absent; female SCO absent; and ICO of 3-6 patches.

Remarks: scales usually present.



Size: 6.0 cm SL

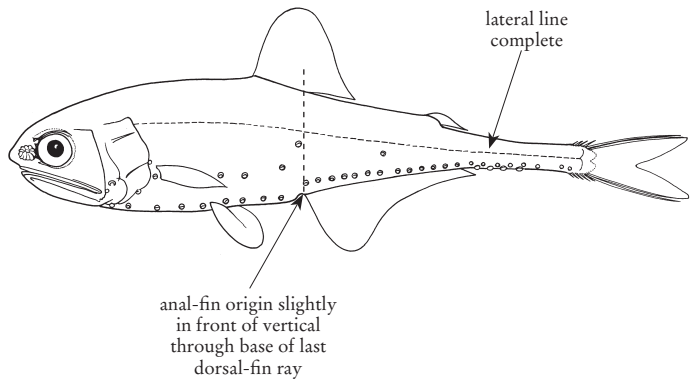
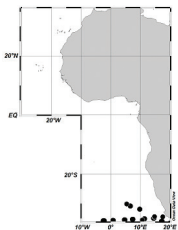
1b. Lateral line complete, all scales perforated; anal-fin origin slightly in front of vertical through base of last dorsal-fin ray *Gonichthys barnesi*

Gonichthys barnesi Whitley, 1943

Barnes' lanternfish

Other characters: male SCO of 6-9 overlapping scale-like plates, and ICO absent; female SCO absent; and ICO of 4-5 patches.

Remarks: scales usually present.



Size: 5.0 cm SL

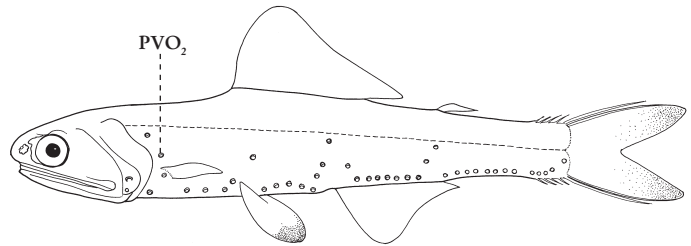
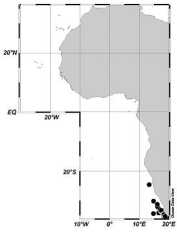
KEY TO THE SPECIES OF *GYMNOSCOPELUS* (SUBGENERA *GYMNOSCOPELUS* AND *NASOLYCHNUS*) OCCURRING IN THE AREA

- 1a. PVO₂ noticeably above level of upper pectoral-fin base; total gill rakers more than 30 *Gymnoscopelus (N.) piabilis*
- 1b. PVO₁ and PVO₂ below level of upper pectoral-fin base; total gill rakers less than 25 → 2

Gymnoscopelus (N.) piabilis (Whitley, 1931)

Southern blacktip lanternfish

Remarks: pelvic-fin tips pigmented.



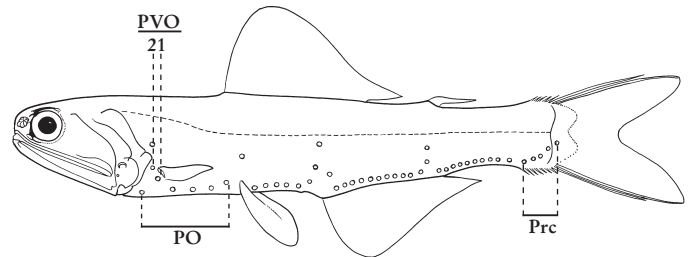
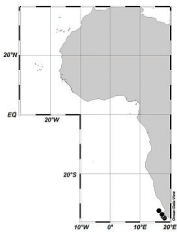
Size: 14.6 cm SL

- 2a. PO₁-PO₄ level, PO₅ raised or elevated; 5 or 6 Prc, the last never widely separated from rest of series; 19-22 dorsal-fin rays; dorsal-fin origin anterior to vertical through outer pelvic-fin base . *Gymnoscopelus (G.) bolini*

Gymnoscopelus (G.) bolini Andriashev, 1962

Grand lanternfish

Remarks: known from 6 records in the area, all in depths greater than 780 m.



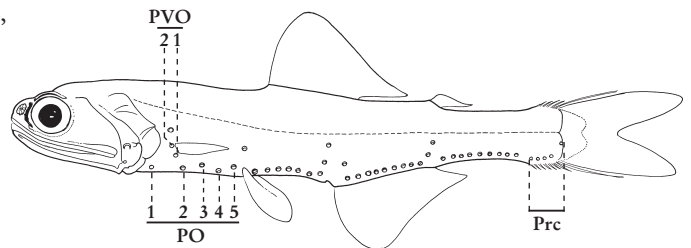
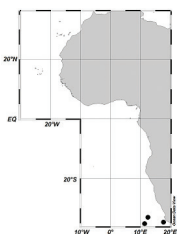
Size: 28.0 cm SL

- 2b. PO₃ elevated above rest of series, PO₅ raised or elevated; 4 (3, rarely 5) +1 Prc, the last widely separated from rest of series; 14-17 dorsal-fin rays; dorsal-fin origin slightly posterior to vertical through outer pelvic-fin base. *Gymnoscopelus (G.) braueri*

Gymnoscopelus (G.) braueri (Lönnerberg, 1905)

Brauer's lanternfish

Remarks: known from 3 records in the area or just outside limits (33.90°S, 12.52°E; 34.65°S, 17.72°E; 35.17°S; 11.40°E).



Size: 13.2 cm SL

KEY TO THE SPECIES OF *HYGOPHUM* OCCURRING IN THE AREA

1a. PO₅ elevated above level of rest of series, well above level of outer pelvic-fin base; AOa series arched, with AOa₂ well above level of AOa₁ *Hygophum hanseni*

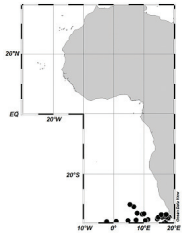
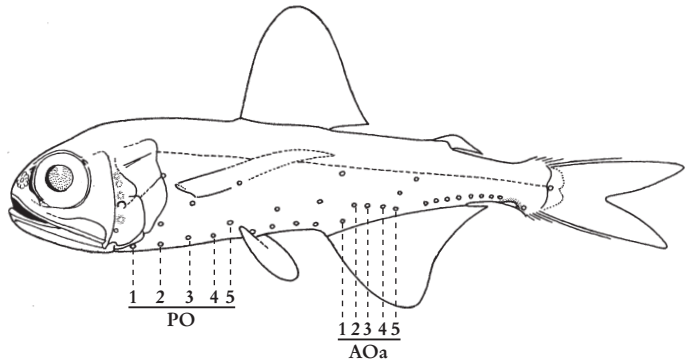
1b. PO₅ level with rest of series, or slightly raised, but never above level of outer pelvic-fin base; AOa series level → 2

Hygophum hanseni (Tåning, 1932)

Hansen's lanternfish

Other characters: male SCO single, and ICO absent; female SCO absent, and ICO of 1-2 patches, sometimes coalesced.

Remarks: convergence species occurring only in the southern sector of the area.



Size: 6.7 cm SL

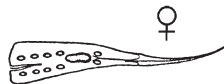
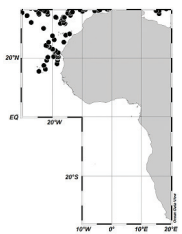
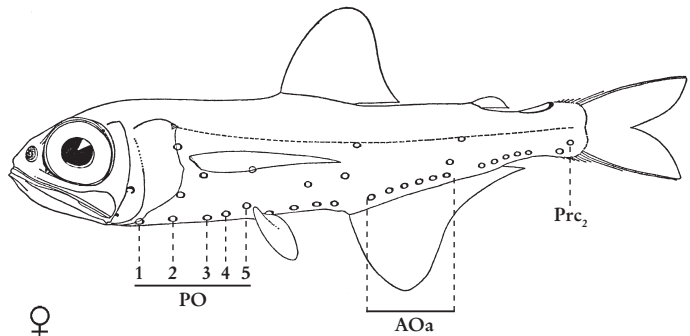
2a. Prc₂ midway between lateral line and ventral contour of body *Hygophum benoiti*

2b. Prc₂ at lateral line or less than 1 photophore diameter below lateral line → 3

Hygophum benoiti (Tåning, 1932)

Benoit's lanternfish

Other characters: male SCO single, black-rimmed, and ICO absent; female SCO absent, and ICO of 2-3 patches, sometimes coalesced.



Ventral view of caudal region

Size: 5.5 cm SL

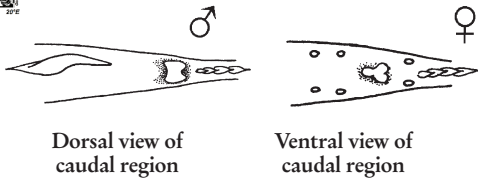
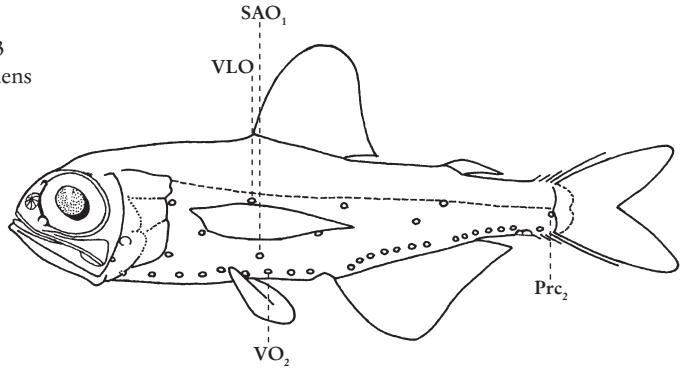
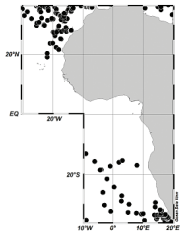
3a. VLO at lateral line; SAO₁ in front of or above VO₂ *Hygophum bygomii*

3b. VLO about midway between lateral line and outer pelvic-fin base; SAO₁ behind VO₂ → 4

Hygophum hygomii (Lütken, 1892)

Hygom's lanternfish

Other characters: male SCO single, ICO absent; female SCO absent, and ICO of 1-3 irregular-shaped patches; occasional specimens with both.



Size: 6.8 cm SL

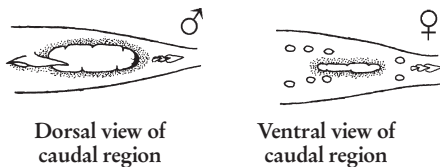
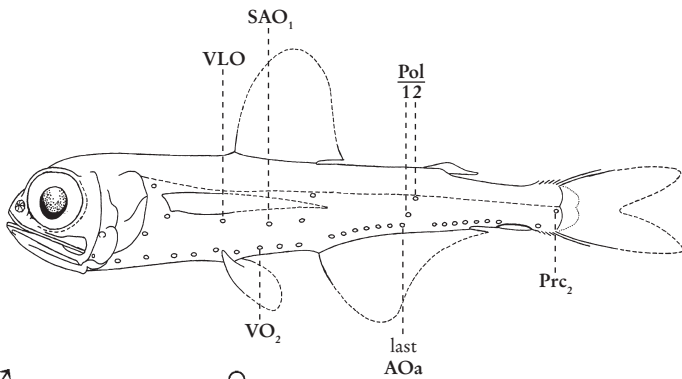
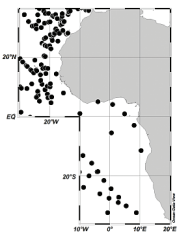
4a. Twenty-two to 24 (very rarely 21 or 25) anal-fin rays; caudal-peduncle length distinctly longer than dorsal-fin base; Pol_1 equidistant between last AOa and Pol_2 *Hygophum reinhardtii*

4b. Eighteen to 20 (very rarely 21) anal-fin rays; caudal-peduncle length subequal to dorsal-fin base; Pol_1 often over last AOa and noticeably closer to last AOa than Pol_2 → 5

Hygophum reinhardtii (Lütken, 1892)

Reinhardt's lanternfish

Other characters: male SCO single, ICO absent; female SCO absent, and ICO of 3-4 coalesced patches, sometimes separate.



Size: 6.1 cm SL

5a. Pol_1 behind vertical through centre of last AOa; line through Pol_2 to Pol_1 passing through centre, or anterior margin of last AOa *Hygophum proximum*

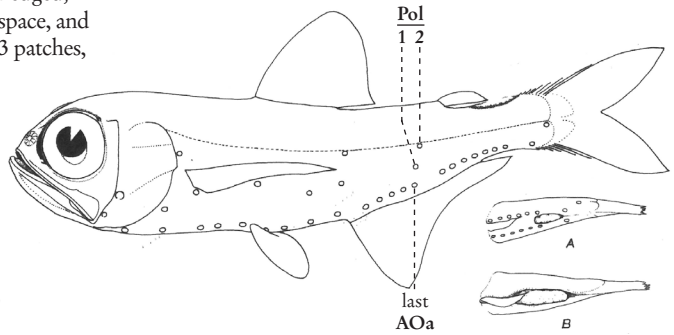
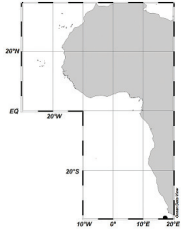
5b. Pol_1 on, or in front of vertical through centre of last AOa; line through Pol_2 to Pol_1 passing through middle of AO series → 6

Hygophum proximum Becker, 1965

Firefly lanternfish

Other characters: male SCO large, single, black-edged, extending about 3/4 or more of the supracaudal space, and ICO absent; female SCO absent, and ICO of 2-3 patches, sometimes coalesced.

Remarks: Indo-Pacific species; one unconfirmed record (MCZ 115080) from just outside the area (35.93°S, 17.33°E).



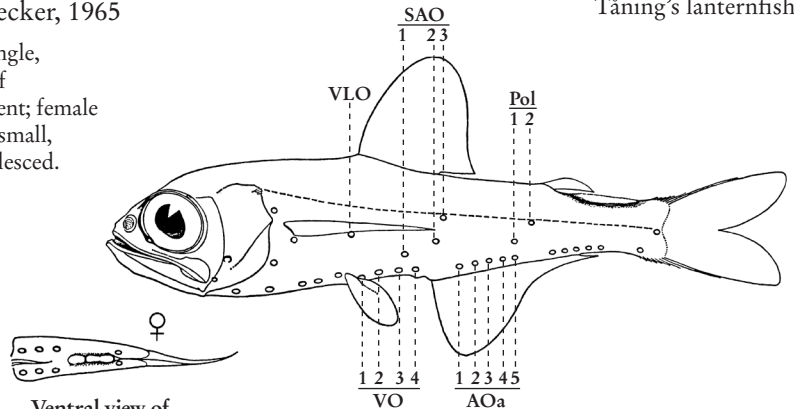
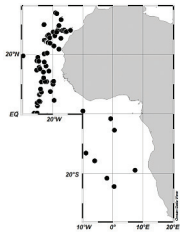
Size: 5.0 cm SL

6a. SAO₁ on, touching, or behind vertical through VO₃, well below line uniting lower edges of VLO and SAO₂; line through SAO₃ to SAO₂ passing posterior to VO₄; VLO closer to lateral line than to pelvic-fin base; pectoral-fin rays not reaching vertical through AOa₁ *Hygophum taaningi*

Hygophum taaningi Becker, 1965

Tāning's lanternfish

Other characters: male SCO single, massive, extending about 80% of supracaudal space, and ICO absent; female SCO absent, and ICO with 2-3 small, elongate patches, sometimes coalesced.



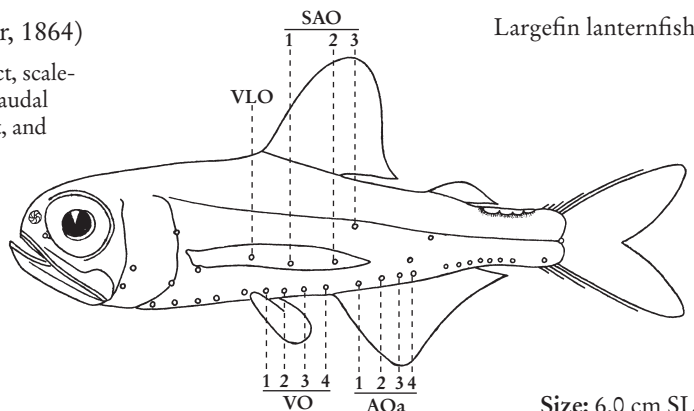
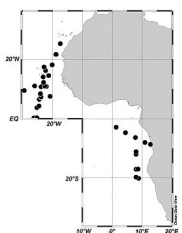
Size: 6.1 cm SL

6b. SAO₁ in front of vertical through VO₃, on line uniting lower edges of VLO and SAO₂; line through SAO₃ to SAO₂ passing through or slightly in front of VO₄; VLO midway between lateral line and pelvic-fin base; pectoral-fin rays extending beyond vertical through AOa₁ *Hygophum macrochir*

Hygophum macrochir (Günther, 1864)

Largefin lanternfish

Other characters: male SCO of 5-7 distinct, scale-like patches extending almost entire supracaudal space, and ICO absent; female SCO absent, and ICO of 2-3 patches, sometimes coalesced.



Size: 6.0 cm SL

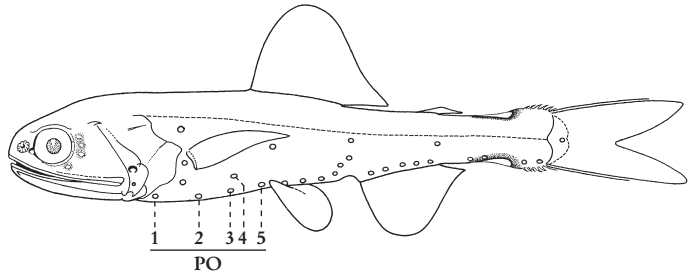
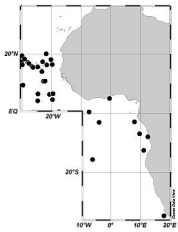
KEY TO THE SPECIES OF *LAMPADENA* OCCURRING IN THE AREA

- 1a. PO₄ highly elevated and anteriorly displaced towards vertical through PO₃. *Lampadena luminosa*
 1b. All PO approximately level. → 2

Lampadena luminosa (Garman, 1899)

Luminous lanternfish

Other characters: no information.



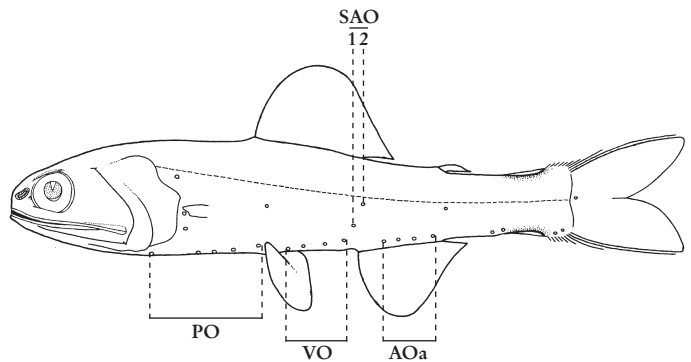
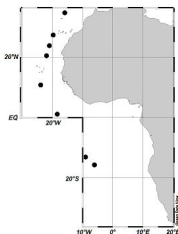
Size: 20.0 cm SL

- 2a. VO plus SAO = 5-6; 3-4 AOa; SCO and ICO weakly developed with moderate amount of black border, flat in cross-section; body soft *Lampadena anomala*
 2b. VO plus SAO = 7-9; 5-7 AOa; SCO and ICO well developed with heavy black border, deep in cross-section (except ICO in *L. chavesi*); body firm. → 3

Lampadena anomala Parr, 1928

Anomalous lanternfish

Other characters: photophores smaller than in other species of the genus.



Size: 20.0 cm SL

- 3a. Prc₁-Prc₂ interspace equal to, or more than, 3 times diameter of photophore of this series (Fig. 1a). → 4
 3b. Prc₁-Prc₂ interspace much less than 3 times diameter of photophore of this series (Fig. 1b) → 5

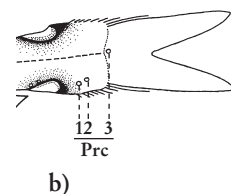
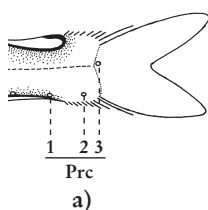


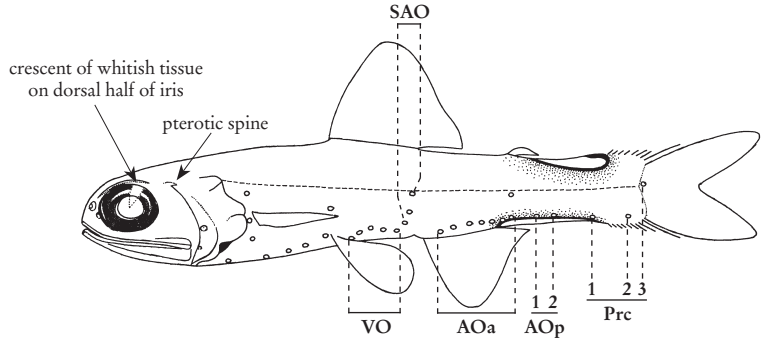
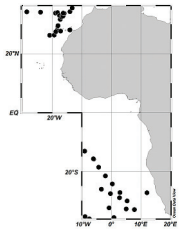
Fig. 1

4a. Last 2-3 AOa entirely behind anal-fin base; 2 AOp; length of ICO at least 1.5 times depth of caudal peduncle; pterotic spine directed posteriorly; crescent of whitish tissue on dorsal half of iris *Lampadena chavesi*

Lampadena chavesi Collett, 1905

Chaves' lanternfish

Other characters: no information.



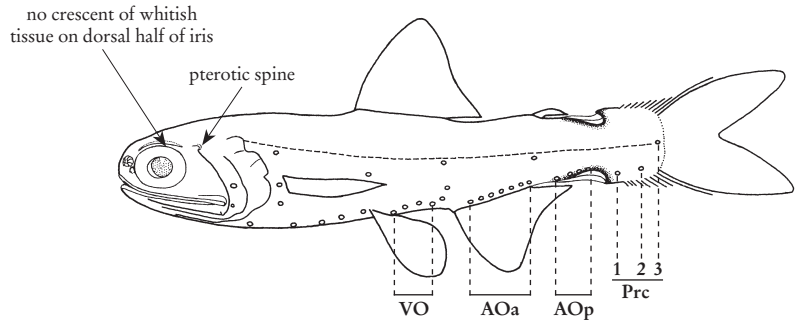
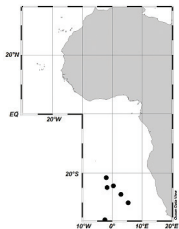
Size: 8.0 cm SL

4b. No AOa behind anal-fin base; 4-5 (rarely 3) AOp; length of ICO less than 1.5 times depth of caudal peduncle; pterotic spine directed downward and forward; no crescent of whitish tissue on iris *Lampadena dea*

Lampadena dea Fraser-Brunner, 1949

Goddess lanternfish

Other characters: no information.



Size: 8.9 cm SL

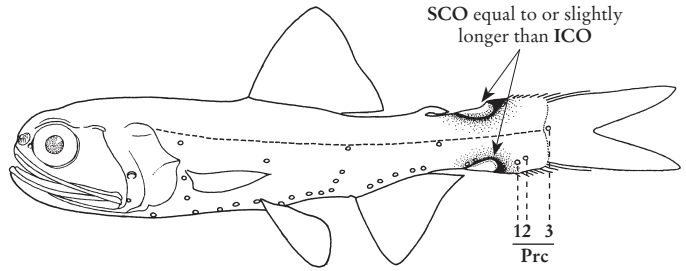
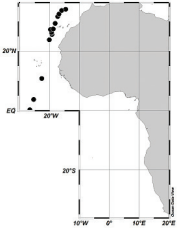
5a. Total gill rakers 16 or less, usually 14; SCO equal to or slightly longer than ICO. *Lampadena urophaos atlantica*

5b. Total gill rakers 18 or more; SCO shorter than ICO. → 6

Lampadena urophaos atlantica Maul, 1969

Atlantic tail-light lanternfish

Other characters: no information.



Size: 20.0 cm SL

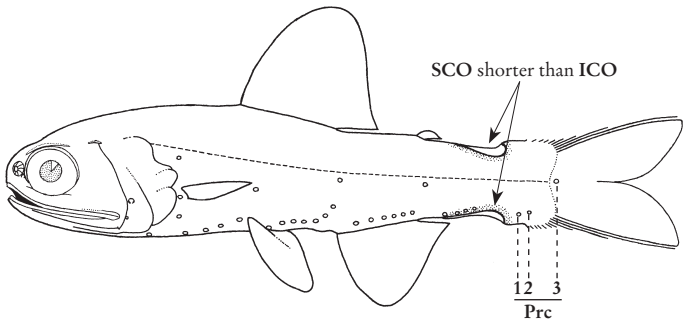
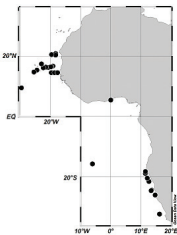
6a. Distance between vertical through rear margin of orbit and end of maxilla subequal to or longer than horizontal diameter of eye. *Lampadena pontifex*

6b. Distance between vertical through rear margin of orbit and end of maxilla about 1/2 diameter of eye → 7

Lampadena pontifex Krefft, 1970

Priestly lanternfish

Other characters: no information.



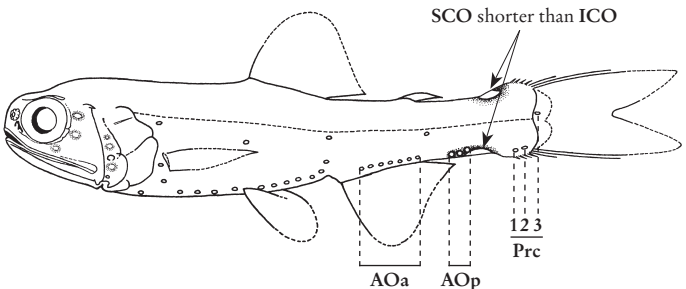
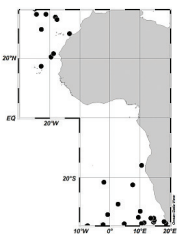
Size: 11.0 cm SL

7a. Distance between anal-fin base and anterior margin of ICO equal to, or greater than length of ICO; photophores small; AOp₁ (and usually AOp₂) in front of ICO; AOa level; total gill rakers 19-23 (rarely 18) *Lampadena speculigera*

Lampadena speculigera Goode & Bean, 1896

Mirror lanternfish

Other characters: no information.



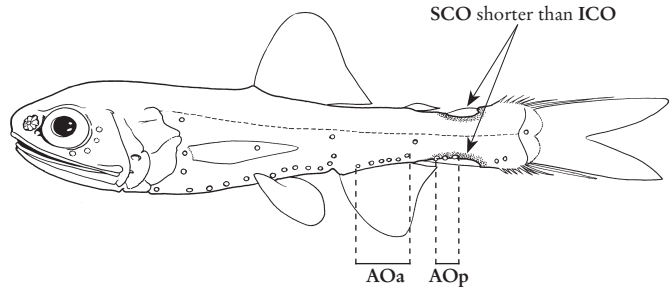
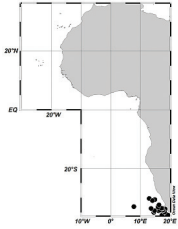
Size: 15.3 cm SL

7b. Distance between anal-fin base and anterior margin of ICO equal to 1/4 length of ICO; photophores large; all AOp over ICO; last AOa usually distinctly raised or elevated above rest of series; total gill rakers 24-28 (rarely 23). *Lampadena notialis*

Lampadena notialis Nafpaktitis & Paxton, 1968

Notal lanternfish

Other characters: no information.



Size: 13.9 cm SL

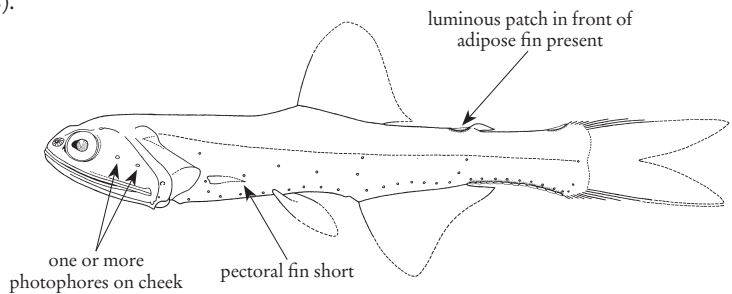
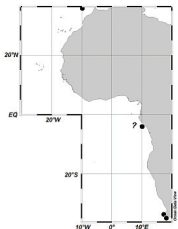
KEY TO THE SPECIES OF *LAMPANYCTUS* OCCURRING IN THE AREA

- 1a. Pectoral fins absent, rudimentary or short, seldom reaching PO_4 → 2
- 1b. Pectoral fins long, reaching at least to SAO_1 → 9
- 2a. Gill rakers 21-26; musculature strong, body firm; cheek photophores and luminous patch at adipose-fin origin present. *Lampanyctus macdonaldi*

Lampanyctus macdonaldi (Goode & Bean, 1896)

MacDonald's lanternfish

Remarks: doubtful record from 04.12°S, 10.13°E (USNM 00219784: GR 8+1+18).



Size: 16.0 cm SL

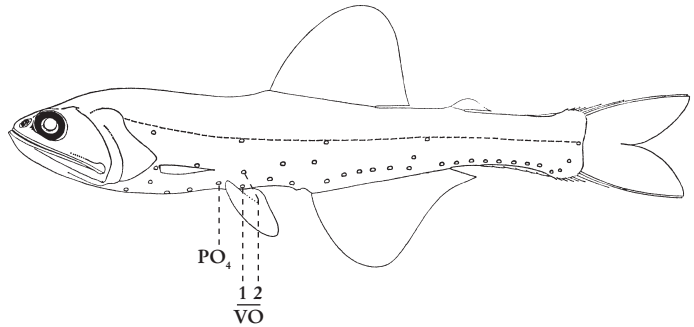
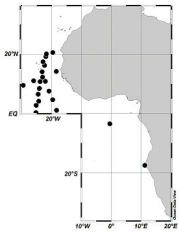
- 2b. Gill rakers less than or equal to 20; musculature weak, body usually soft and flaccid; no cheek photophores or luminous patch at adipose-fin origin → 3
- 3a. Pectoral fins present → 4
- 3b. Pectoral fins absent → 8

- 4a. VO_2 elevated and anteriorly displaced to above VO_1 *Lampanyctus isaacsi*
 4b. VO_2 not, or only slightly raised and not displaced, approximately midway between VO_1 and VO_3 → 5

Lampanyctus isaacsi Wisner, 1974

Isaacs' lanternfish

Other characters: no information.



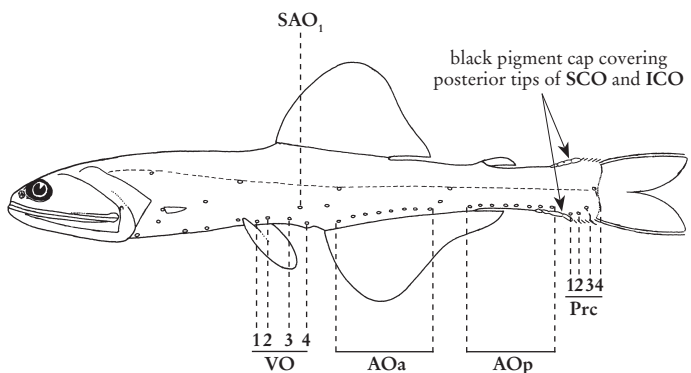
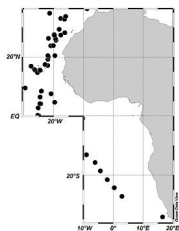
Size: 13.3 cm SL

- 5a. Black pigment cap covering posterior tips of SCO and ICO (sometimes abraded); SAO_1 behind vertical through VO_3 → 6
 5b. No black pigment cap covering posterior tips of SCO and ICO; SAO_1 before vertical through VO_3 → 7
 6a. Caudal-peduncle length more than upper-jaw length; total AO 14-17 *Lampanyctus lineatus*

Lampanyctus lineatus Tåning, 1928

Longtail blackcap lanternfish

Other characters: Prc_3 touching Prc_2 - Prc_4 line or slightly displaced posteroventrally.



Size: 23.5 cm

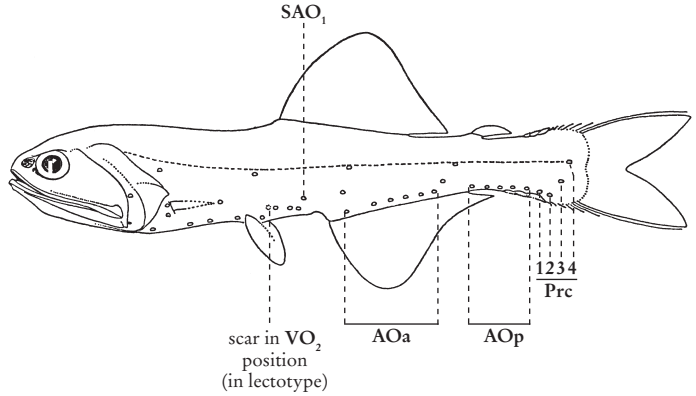
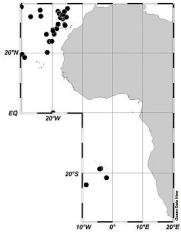
- 6b. Caudal-peduncle length less than upper-jaw length; total AO 11-12; Prc_3 on Prc_2 - Prc_4 straight oblique line *Lampanyctus cuprarius*

Lampanyctus cuprarius Tåning, 1928

Atlantic blackcap lanternfish

Other characters: no information.

Remarks: atypically lectotype (figure) has 5 VO (4 + 1 scar) on left side.



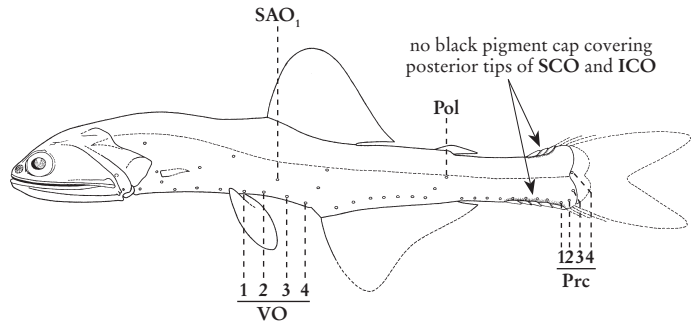
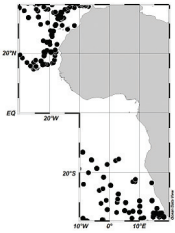
Size: 11.0 cm SL

7a. Pol on, slightly before or slightly behind vertical through adipose-fin origin; adipose-fin origin well in advance of vertical through base of last anal-fin ray *Lampanyctus ater*

Lampanyctus ater Tåning, 1928

Dusky lanternfish

Other characters: no information.



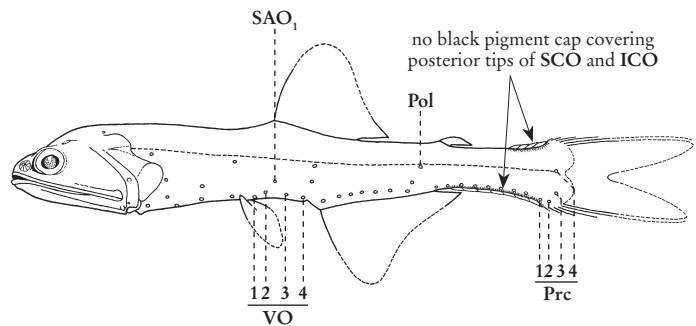
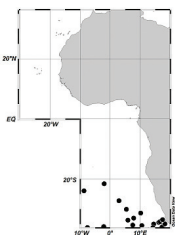
Size: 13.0 cm SL

7b. Pol well in front of vertical through adipose-fin origin; adipose-fin origin on, slightly before or slightly behind vertical through base of last anal-fin ray (Note: very small juvenile specimens of *L. achirus* with pectoral fins) *Lampanyctus achirus* (in part)

Lampanyctus achirus Andriashev, 1962

Cripplefin lanternfish

Other characters: no information.



Size: 16.2 cm SL

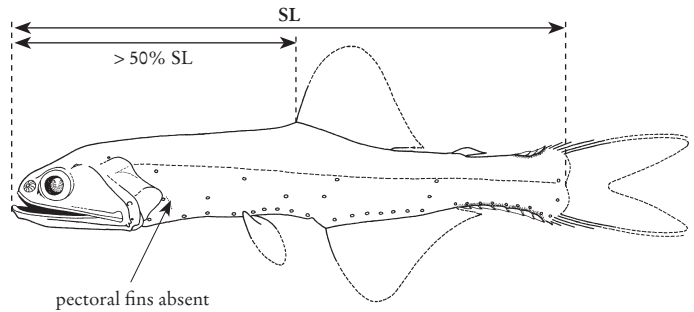
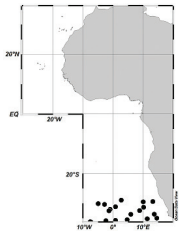
8a. Gill rakers 4-5 + 1 + 10-11, total 15-17; distance from tip of snout to dorsal-fin origin slightly more than 50% Standard Length *Lampanyctus wisneri*

Lampanyctus wisneri (Zahuranec, 2000)

Wisner's lanternfish

Other characters: no information.

Remarks: specimen in figure atypical with 5 VO on both sides.



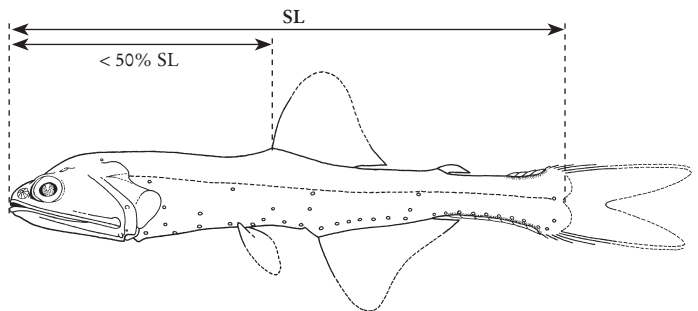
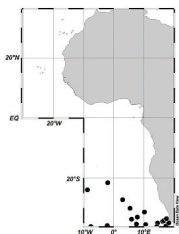
Size: 9.0 cm SL

8b. Gill rakers 5-6 + 1 + 11-13, total 17-20; distance from tip of snout to dorsal-fin origin notably less than 50% Standard Length (Note: large juveniles and adult specimens of *L. achirus* without pectoral fins). *Lampanyctus achirus* (in part)

Lampanyctus achirus Andriashev, 1962

Cripplefin lanternfish

Other characters: no information.



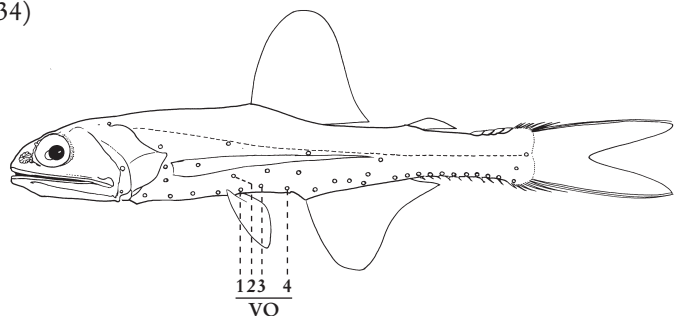
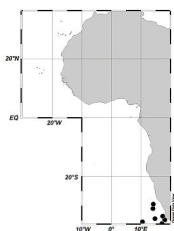
Size: 16.2 cm SL

9a. VO₂ elevated and anteriorly displaced to lie in front of, on, or slightly behind vertical through VO₁ *Lampanyctus turneri*

9b. VO₂ level with rest of series or elevated, but not anteriorly displaced to above VO₁ → 10

Lampanyctus turneri (Fowler, 1934)

Other characters: no information.



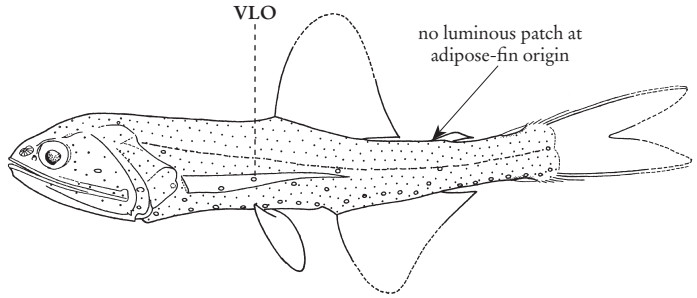
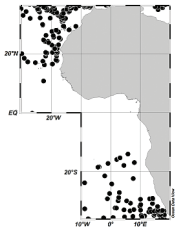
Size: 7.0 cm SL

- 10a. Branchiostegal membrane with minute serial photophores between branchiostegal rays → 11
 10b. No minute serial photophores on branchiostegal membrane between branchiostegal rays → 13
 11a. Luminous patch at adipose-fin origin absent; VLO midway between lateral line and pelvic-fin base *Lampanyctus pusillus*

Lampanyctus pusillus (Johnson, 1890)

Pigmy lanternfish

Other characters: no information.



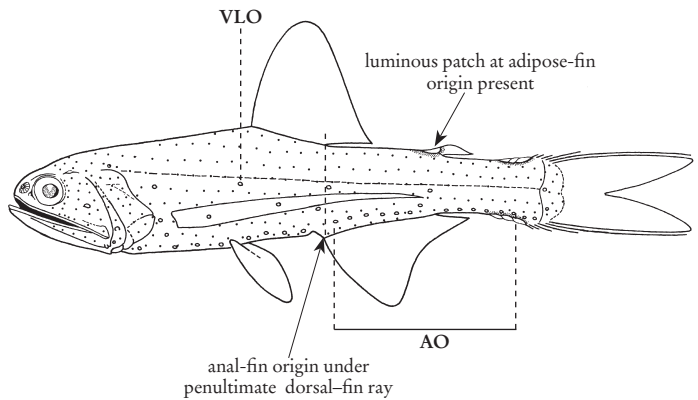
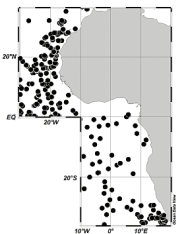
Size: 4.3 cm SL

- 11b. Luminous patch present at adipose-fin origin; VLO at or 1 photophore diameter below lateral line → 12
 12a. Gill rakers 3-4 + 1+ 9 (8), total 13-14; AO 6 (5-7) + 6-7 (5-8), total 12-13 (11); anal-fin origin under penultimate dorsal-fin ray *Lampanyctus alatus*

Lampanyctus alatus Goode & Bean, 1896

Winged lanternfish

Other characters: no information.



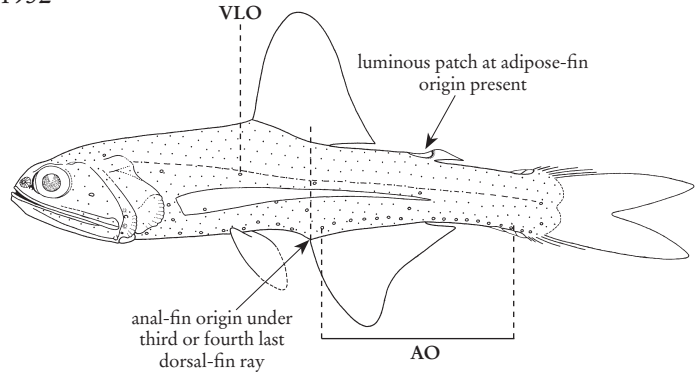
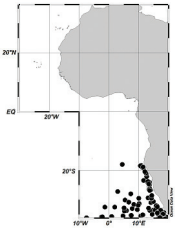
Size: 6.1 cm SL

- 12b. Gill rakers 6 (7) + 1 + 13-14 (15), total 20-21 (22-23); AO 7-8 (rarely 9) + 7-8 (rarely 6 or 9), total 15 (14, rarely 16); anal-fin origin under third or fourth last dorsal-fin ray *Lampanyctus australis*

Lampanyctus australis Tåning, 1932

Austral lanternfish

Other characters: no information.



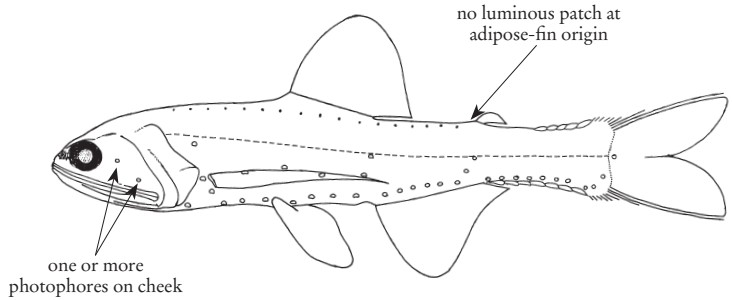
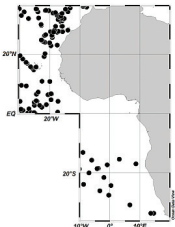
Size: 13.1 cm SL

- 13a. One or more photophores on cheek → 14
- 13b. No photophores on cheek → 17
- 14a. Luminous patch at adipose-fin origin absent *Lampanyctus photonotus*
- 14b. Luminous patch at adipose-fin origin present → 15

Lampanyctus photonotus Parr, 1928

Dotback lanternfish

Other characters: no information.



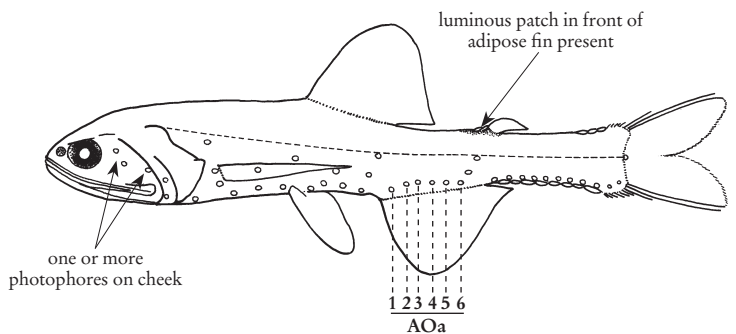
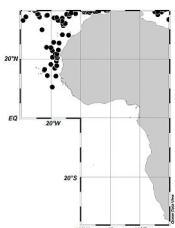
Size: 8.5 cm SL

- 15a. AOa 6 (7), with AOa₁ and AOa₂ not abruptly depressed, line passing through AOa₁ to AOa₂ above AOa₃; gill rakers 5 (rarely 4) + 1 + 11 (10-12), total 17 (16-18). *Lampanyctus crocodilus*

Lampanyctus crocodilus (Risso, 1810)

Crocodile lanternfish

Other characters: no information.



Size: 17.2 cm SL

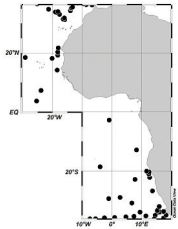
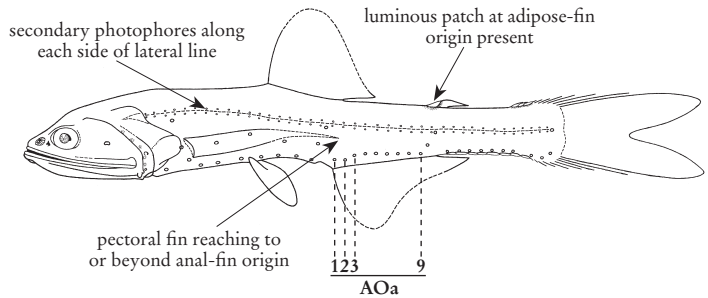
15b. AOA₁ 9 (8-10), with AOA₁ and/or AOA₂ abruptly depressed, line passing through AOA₁ to AOA₂, below AOA₃; gill rakers 4 (rarely 3) + 1 + 10 (9, rarely 8 or 11), total 15 (14, rarely 13 or 16). → 16

16a. Pectoral fin reaching to or beyond anal-fin origin; vertical distance between margin of orbit and upper lip, taken on vertical through middle of eye, 2 or more times in length of pectoral-fin base; caudal-peduncle depth less than head depth, taken on vertical through middle of orbit; secondary photophores along each side of lateral line *Lampanyctus intricarius*

Lampanyctus intricarius Tåning, 1928

Intricate lanternfish

Other characters: luminous patch at adipose-fin origin shorter than adipose-fin base.



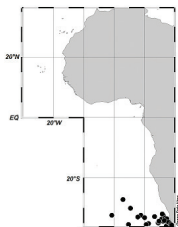
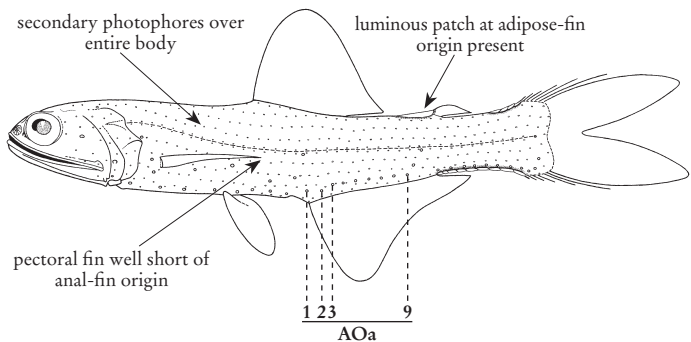
Size: 20.0 cm SL

16b. Pectoral fin reaching to between VO₂ and VO₃, well short of anal-fin origin; vertical distance between margin of orbit and upper lip, taken on vertical through middle of eye, about equal to length of pectoral-fin base; caudal-peduncle depth equal to or greater than head depth, taken on vertical through middle of orbit; secondary photophores over entire body *Lampanyctus lepidolychnus*

Lampanyctus lepidolychnus Becker, 1967

Mermaid lanternfish

Other characters: luminous patch at adipose-fin origin longer than adipose-fin base.



Size: 11.9 cm SL

17a. Prc₂-Prc₄ forming straight oblique line, with Prc₃ on or touching Prc₂-Prc₄ line, or Prc₂-Prc₄ only slightly arched with concavity directed posteriorly and ventrally (Fig. 1a) → 18

17b. Prc₂-Prc₄ forming an arc with concavity directed anteriorly and dorsally (Fig. 1b). → 19

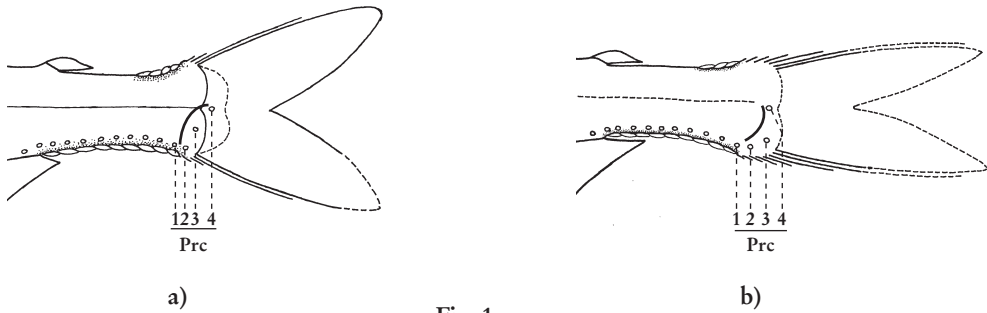


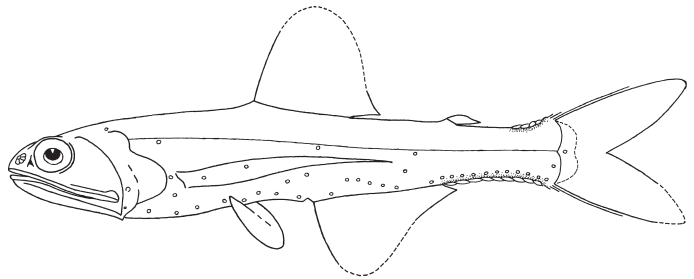
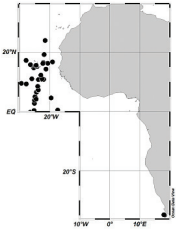
Fig. 1

18a. Gill rakers 4 + 1 + 10 (rarely 9 or 11), total 15 (rarely 14 or 16); eye diameter 2.8-3.2 in upper-jaw length. *Lampanyctus vadulus*

Lampanyctus vadulus Hulley, 1981

Nacreous lanternfish

Other characters: no information.



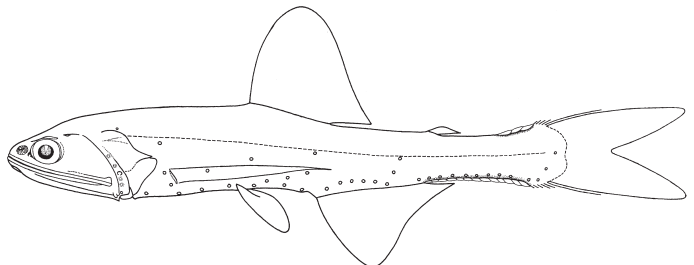
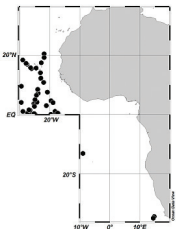
Size: 9.9 cm SL

18b. Gill rakers 3 + 1 + 9 (rarely 8 or 10), total 13 (rarely 12 or 14); eye diameter 3.5-3.9 in upper-jaw length *Lampanyctus nobilis*

Lampanyctus nobilis Tåning, 1928

Noble lanternfish

Other characters: no information.



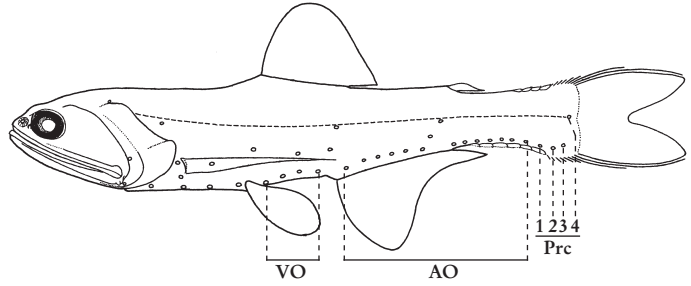
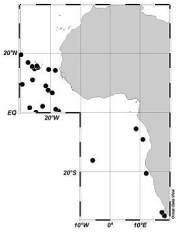
Size: 12.4 cm SL

19a. VO series level; ICO not extending entire distance from procurrent caudal rays to anal-fin base; Prc₃ at level of Prc₂; pectoral-fin rays 13-14; total AO 12-13 *Lampanyctus tenuiformis*

Lampanyctus tenuiformis (Bauer, 1906)

Slender lanternfish

Other characters: no information.



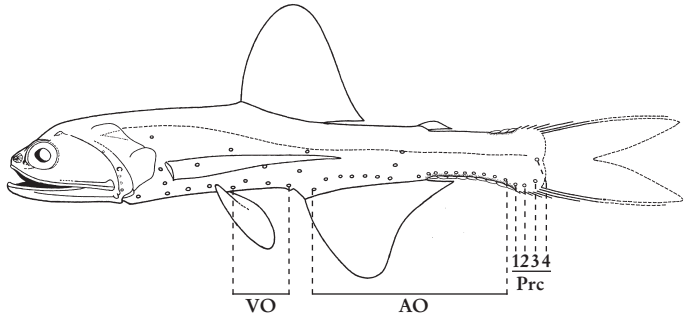
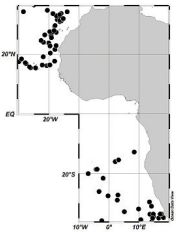
Size: 15.3 cm SL

19b. VO series arched; ICO extending entire distance from procurrent caudal rays to anal-fin base; Prc₃ above level of Prc₁; pectoral-fin rays 15-17; total AO 15-16 *Lampanyctus festivus*

Lampanyctus festivus Tåning, 1928

Festive lanternfish

Other characters: no information.



Size: 13.8 cm SL

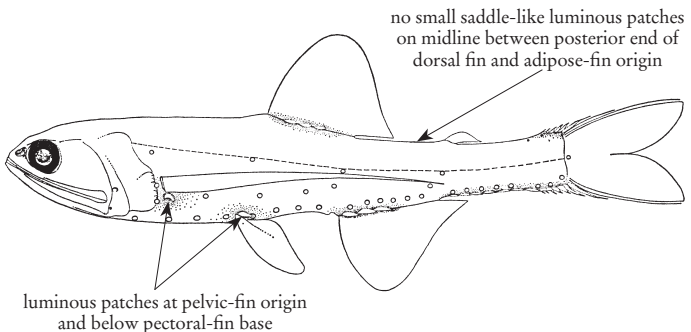
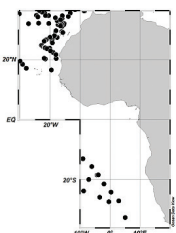
KEY TO THE SPECIES OF *LEPIDOPHANES* OCCURRING IN THE AREA

1a. Gill rakers 3 + 1 + 8 (rarely 7), total 12 (rarely 11); no small saddle-like luminous patches on midline between posterior end of dorsal fin and adipose-fin origin; luminous patches at pelvic-fin origin and below pectoral-fin base *Lepidophanes gausi*

Lepidophanes gausi (Brauer, 1906)

Gauss' lanternfish

Other characters: small supracaudal luminous patches directly in front of 1st procurrent ray present.



Size: 5.0 cm SL

1b. Gill rakers 4 + 1 + 9 (rarely 8 or 10), total 14 (rarely 13 or 15); small saddle-like luminous patches on midline between posterior end of dorsal fin and adipose-fin origin; no luminous patches at pelvic-fin base or below pectoral-fin base. *Lepidophanes guentheri*

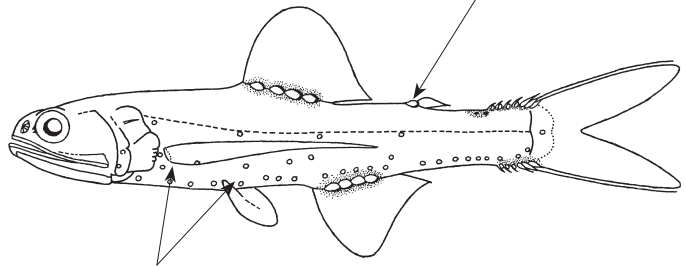
Lepidophanes guentheri (Goode & Bean, 1896)

Günther's lanternfish

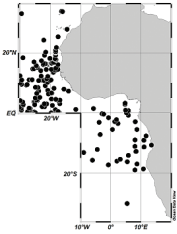
Other characters: small supracaudal luminous patches directly in front of 1st procurrent caudal-ray present.

Remarks: freshly caught specimens with metallic green sheen on head.

small saddle-like luminous patches on midline between posterior end of dorsal fin and adipose-fin origin



no luminous patches at pelvic-fin origin and below pectoral-fin base



Size: 7.8 cm SL

KEY TO THE SPECIES OF *LOBIANCHIA* OCCURRING IN THE AREA

1a. Pol much closer to lateral line than anal-fin base or ventral contour of caudal peduncle; SAO forming gentle arc, with concavity directed anterodorsally; Prc₄ separated from Prc₃ by enlarged interspace, lying at base of middle caudal-fin rays; distance between Prc₄ and Prc₃ equal to or usually greater than distance between Prc₁ and Prc₃ *Lobianchia dofleini*

Lobianchia dofleini (Zugmayer, 1911)

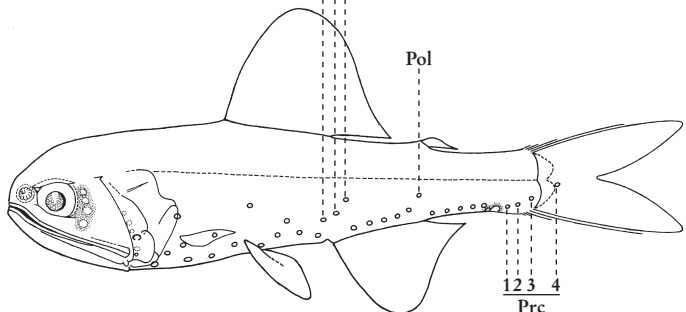
Doflein's lanternfish

Other characters: no information.

Remarks: fresh material with golden iris, yellowish-brown body and electric-blue photophores.

SAO
123

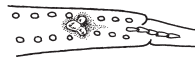
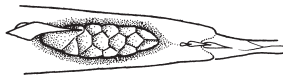
Pol



123 4
Prc

♂

♀



Dorsal view of caudal region

Ventral view of caudal region

Size: 5.0 cm SL

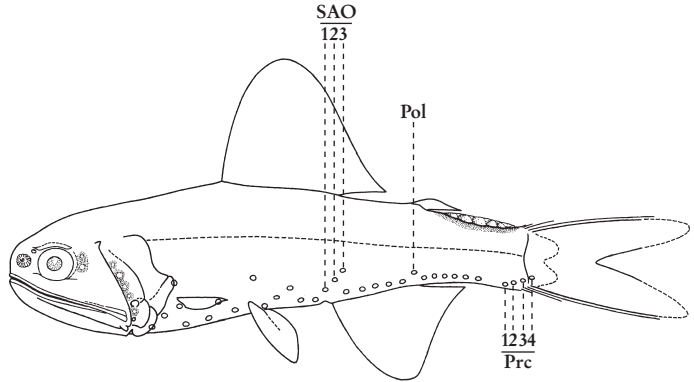
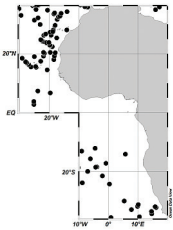
1b. Pol midway between lateral line and anal-fin base or lower; SAO series on a straight or slightly curved line, with concavity directed posteroventrally; Prc evenly spaced, sometimes Prc₄ somewhat displaced posteriorly; distance between Prc₄ and Prc₃ always shorter than distance between Prc₁ and Prc₃ *Lobianchia gemellarii*

Lobianchia gemellarii (Cocco, 1838)

Gemellaro's lanternfish

Other characters: no information.

Remarks: fresh material with pale body.



Dorsal view of caudal region

Ventral view of caudal region

Size: 6.0 cm SL

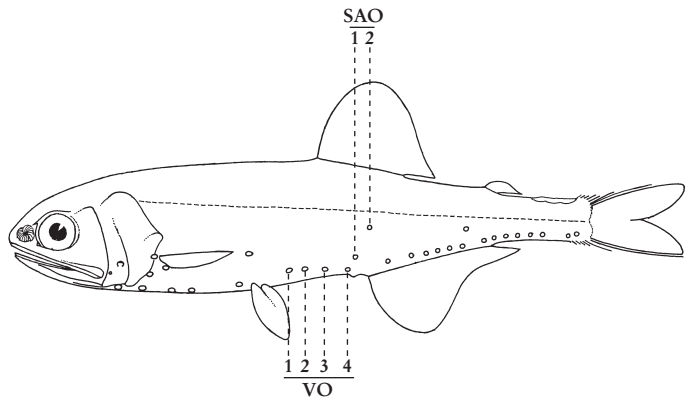
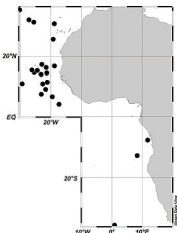
KEY TO THE SPECIES OF *LOWEINA* OCCURRING IN THE AREA

1a. SAO photophores 2; VO photophores 4; gill rakers 2 + 1 + 5-6, total 8-9 *Loweina rara*

Loweina rara (Lütken, 1892)

Rare lanternfish

Other characters: lateral line weakly developed and incomplete, with 6-7 perforated scales anterior to vertical through pelvic-fin origin.



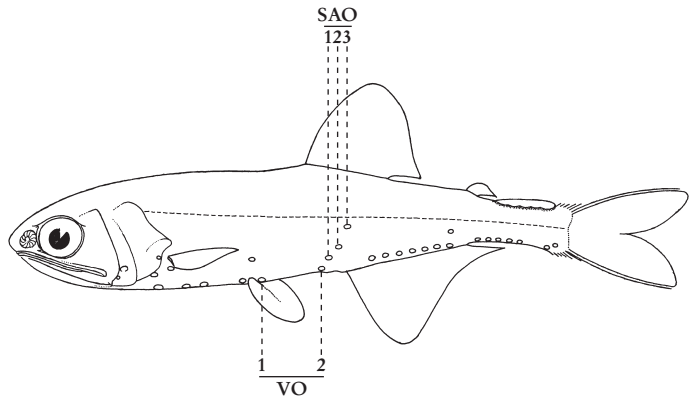
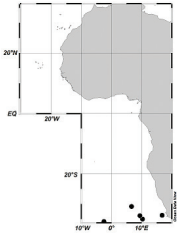
Size: 4.5 cm SL

1b. SAO photophores 3; VO photophores 2, at positions corresponding to VO₁ and VO₄; gill rakers 3 + 1 + 8-9 (7-10), total 12-13 (11-14). *Loweina interrupta*

Loweina interrupta (Tåning, 1928)

Barebelly lanternfish

Other characters: lateral line weakly developed and incomplete, with 8 perforated scales anterior to vertical through pelvic-fin origin.



Size: 3.9 cm SL

KEY TO THE SPECIES OF *MYCTOPHUM* / *DASYSCOPELUS*
OCCURRING IN THE AREA

1a. Body short and deep, with body depth 3-3.4 times in Standard Length; SCO present in males and females, ICO absent *Dasyscopelus selenops*

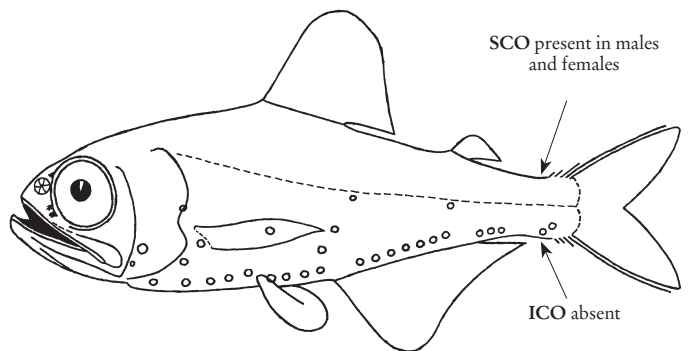
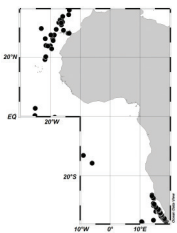
1b. Body elongate, with body depth 3.8 times or more in Standard Length; SCO present in males, very rarely in females; ICO present in females, very rarely in males → 2

Dasyscopelus selenops (Tåning, 1928)

Lunar lanternfish

Other characters: no information.

Remarks: similar body shape to *Electrona risso*, but may be easily identified by PLO, PVO₁, PVO₂ grouping and separate AOa and AOp series.



Size: 7.2 cm SL

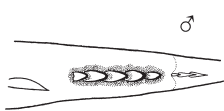
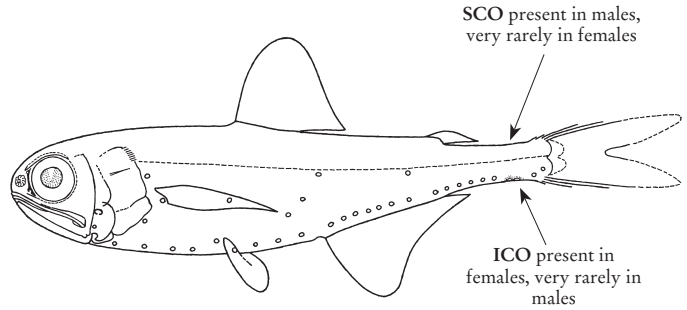
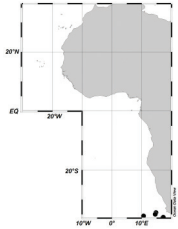
2a. Scales overlying AO photophores very strongly spinoid, each scale with 1-3 elongate ventral posteriorly-directed spines, the most ventral about 3 times length of upper spines *Dasyscopelus spinosus*

2b. Scales overlying AO photophores cycloid, crenulate or spinoid, the most ventral spine (if present) less than 2 times length of upper spines → 3

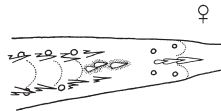
Dasyscopelus spinosus (Steindachner, 1867)

Spiny lanternfish

Other characters: posterodorsal margin of opercle serrate.



Dorsal view of caudal region



Ventral view of caudal region



Detail of scales overlying AO photophores

Size: 9.0 cm SL

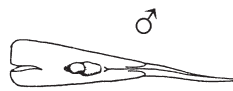
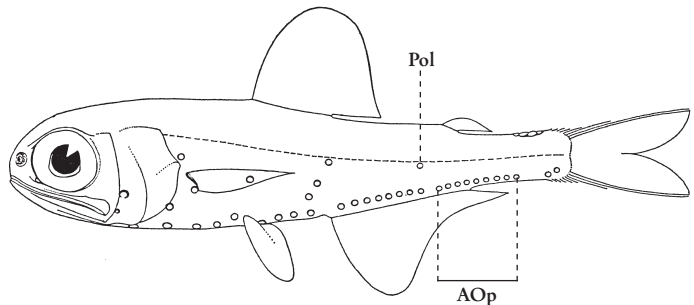
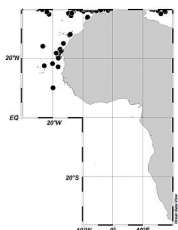
3a. Three or more AOp photophores above anal-fin base; Pol more than 1 photophore diameter in front of vertical through adipose-fin origin. *Myctophum punctatum*

3b. Two or less AOp photophores above anal-fin base; Pol under adipose-fin base or less than 1 photophore diameter in front of vertical through adipose-fin origin. → 4

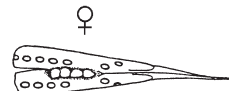
Myctophum punctatum Rafinesque, 1810

Spotted lanternfish

Other characters: scales cycloid.



Dorsal view of caudal region



Ventral view of caudal region

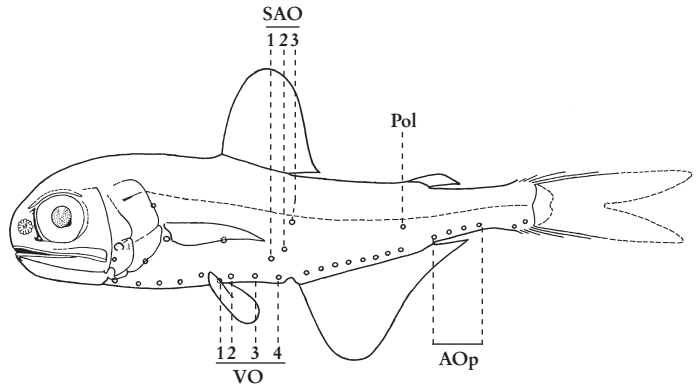
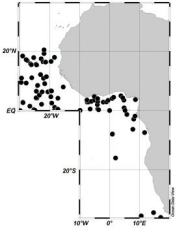
Size: 11.0 cm SL

- 4a. Line through centres of SAO₁ and SAO₂ passing closer to VO₂ than VO₃, or farther anteriorly.
 *Dasyscopelus asper*
- 4b. Line through centres of SAO₁ and SAO₂ passing through or behind VO₃. → 5

Dasyscopelus asper (Richardson, 1845)

Prickly lanternfish

Other characters: scales distinctly spinoid.



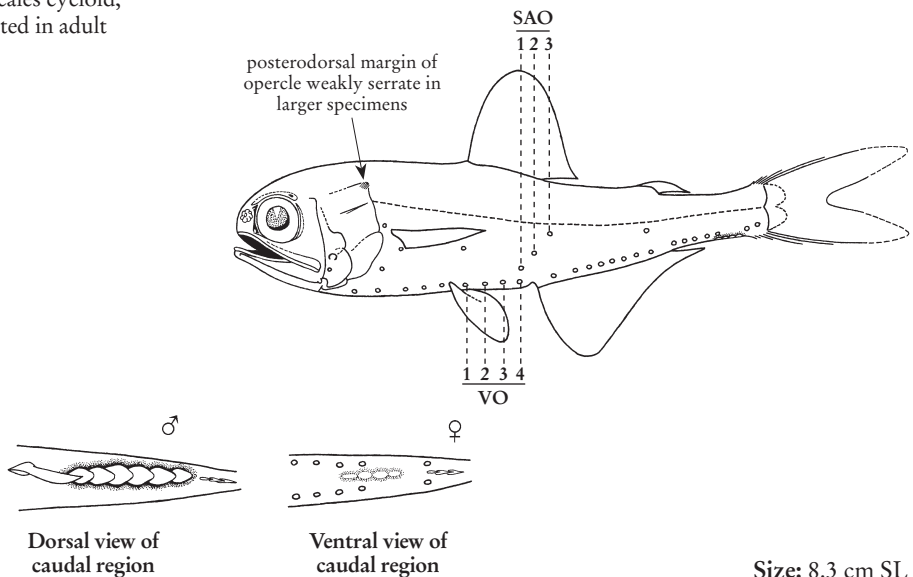
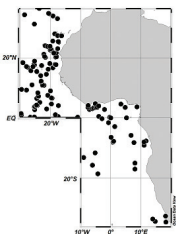
Size: 7.2 cm SL

- 5a. Posterodorsal margin of opercle sharply angulate (juveniles) to pointed (adults) with small area of serrations in best specimens; palatine teeth large and in single row along outer lateral margin.
 *Myctophum nitidulum*
- 5b. Posterodorsal margin of opercle evenly rounded, with or without serrations; palatine teeth minute and irregularly scattered. → 6

Myctophum nitidulum Garman, 1899

Pearlyspotted lanternfish

Other characters: scales cycloid; pectoral fins pigmented in adult specimens.



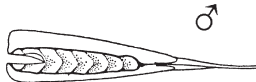
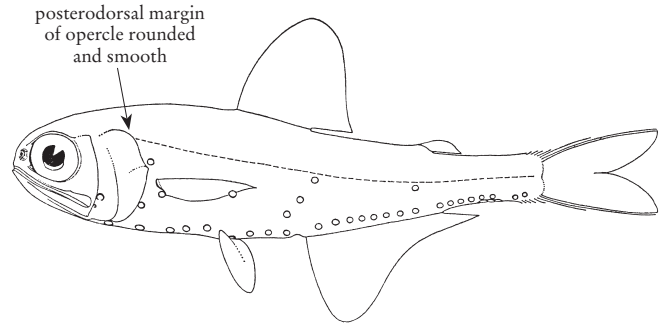
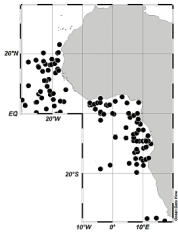
Size: 8.3 cm SL

6a. Total gill rakers 21 or less; scales spinoid in specimens over 30 mm SL; posterodorsal margin of opercle smooth *Myctophum affine*

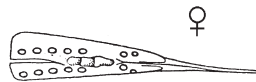
Myctophum affine (Lütken, 1892)

Metallic lanternfish

Other characters: no information.



Dorsal view of caudal region



Ventral view of caudal region

Size: 7.9 cm SL

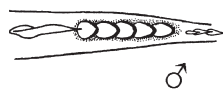
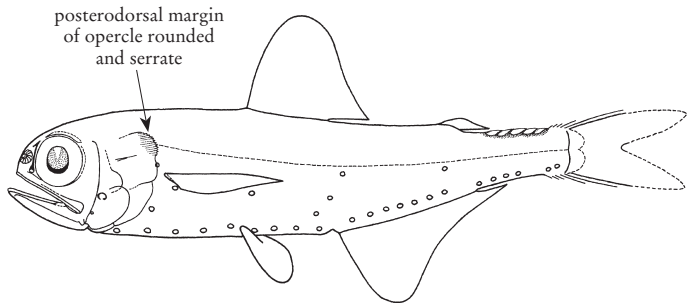
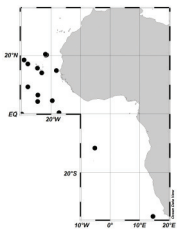
6b. Total gill rakers 23 or more; scales cycloid; posterodorsal margin of opercle serrate in specimens over 30 mm SL *Dasyscopelus obtusirostris*

Dasyscopelus obtusirostris (Tåning, 1928)

Bluntsnout lanternfish

Other characters: no information.

Remarks: row of weakly crenulate scales below anterior lateral line in Pacific specimens.



Dorsal view of caudal region

Size: 8.5 cm SL

KEY TO THE SPECIES OF *NOTOSCOPELUS* (SUBGENERA *NOTOSCOPELUS* AND *PAREIOPHUS*) OCCURRING IN THE AREA

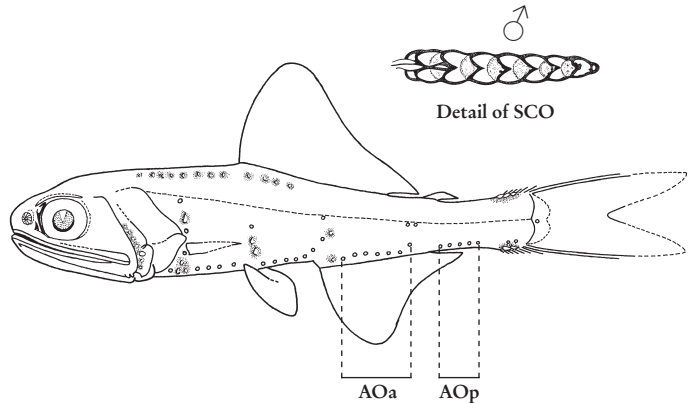
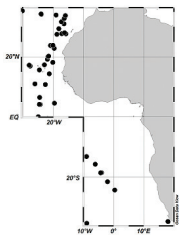
- 1a. Total gill rakers more than 18; total AO 13-17 (rarely 12); no enlarged teeth on rear half of lower jaw → 2
- 1b. Gill rakers 4 + 1 + 9 (rarely 8 or 10), total 14 (rarely 13 or 15); AO 7 (6-8) + 4 (3-5), total 11 (10-12); enlarged teeth on rear half of lower jaw *Notoscopelus (N.) caudispinosus*

Notoscopelus (N.) caudispinosus (Johnson, 1863)

Spinetail lanternfish

Other characters: SCO present in adult males.

Remarks: occasional specimens with 3 Pol in straight line.



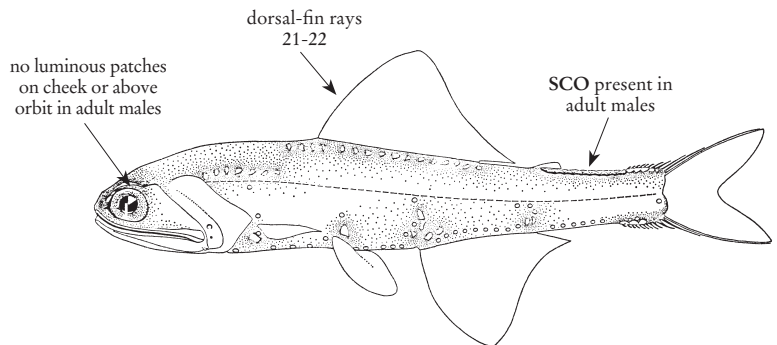
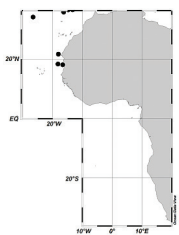
Size: 14.0 cm SL

- 2a. Gill rakers 26 or more → 3
- 2b. Gill rakers 25 or less → 4
- 3a. Dorsal-fin rays 22 (21); gill rakers 8 + 1 + 17 (18), total 26 (27) [higher count north of area]; adult males with SCO, but no luminous patches on cheek or above orbit *Notoscopelus (N.) kroeyerii*

Notoscopelus (N.) kroeyerii (Malm, 1861)

Krøyer's lanternfish

Other characters: SCO present in adult males.



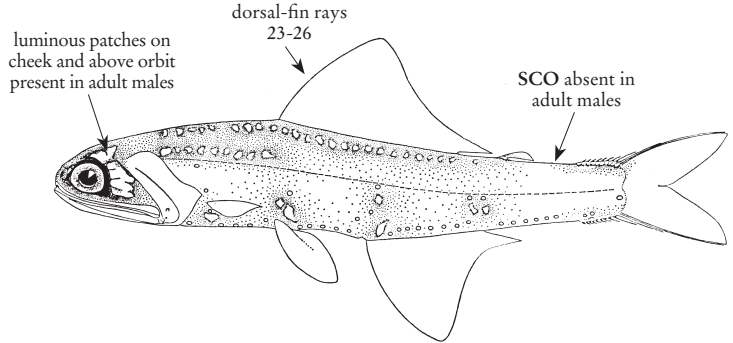
Size: 14.3 cm SL

3b. Dorsal-fin rays 23-26; gill rakers 9 (8) + 1 + 18 (17-19), total 28 (26-29); adult males with luminous patches on cheek and above orbit, but no SCO *Notoscopelus (P.) bolini*

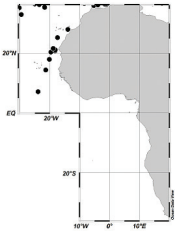
Notoscopelus (P.) bolini Nafpaktitis, 1975

Fanfare lanternfish

Other characters: SCO absent in adult males.



Size: 10.2 cm SL



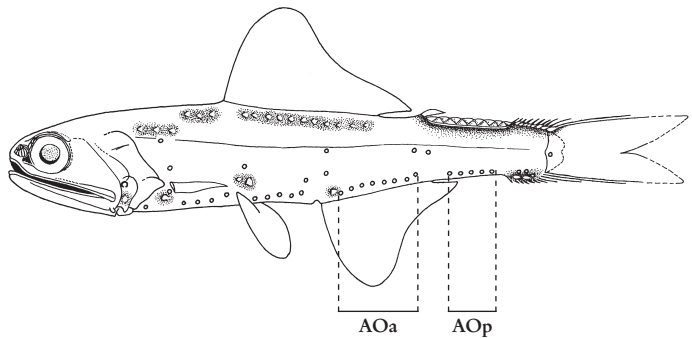
4a. Total gill rakers 20-21 (rarely 19 or 22-23); total AO 13-14 (rarely 12) . . . *Notoscopelus (N.) resplendens*

Notoscopelus (N.) resplendens (Richardson, 1845)

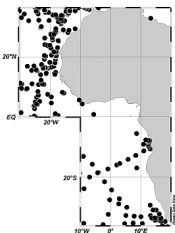
Patchwork lanternfish

Other characters: SCO present in adult males.

Remarks: occasional specimens with 3 Pol in straight line.



Size: 9.5 cm SL

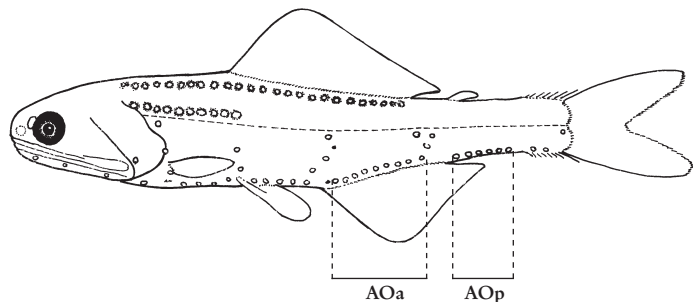


4b. Total gill rakers 24 (rarely 23 or 25); total AO 15-17 [not in the area] *Notoscopelus (N.) elongatus*

Notoscopelus (N.) elongatus (Costa, 1844)

Other characters: adult males with SCO, similar in size and structure to that in *N. kroeyeri*.

Remarks: endemic Mediterranean species; no records in the area, but could possibly occur in Mediterranean Outflow Waters.



Size: 9.8 cm SL

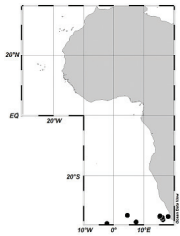
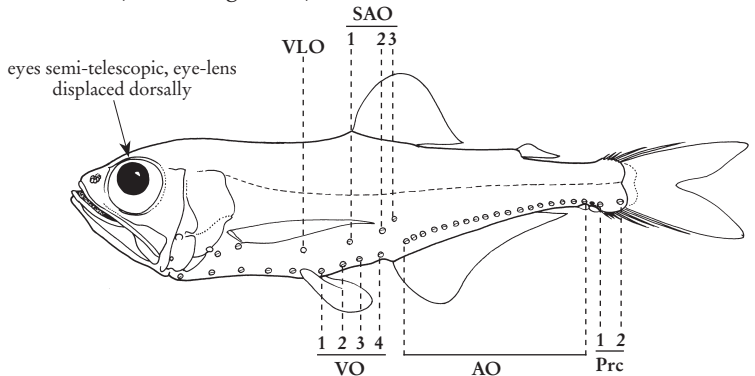
KEY TO THE SPECIES OF *PROTOMYCTOPHUM* (SUBGENERA *PROTOMYCTOPHUM* AND *HIEROPS*) OCCURRING IN THE AREA

- 1a. Eyes semi-telescopic, eye-lens displaced dorsally; narrowest interorbital width less than expanded posterior end of maxilla [subgenus *Hierops*] → 2
- 1b. Eyes normal, eye-lens not displaced dorsally; narrowest interorbital width greater than expanded posterior end of maxilla [subgenus *Protomyctophum*] → 4
- 2a. SAO_1 above VO_2 - VO_3 interspace, sometimes closer to VO_2 than VO_3 ; SAO_1 - SAO_2 interspace subequal to VLO - SAO_1 interspace; Prc_1 - Prc_2 interspace equal to or greater than AO - Prc_1 interspace; 6-7 (rarely 5) AO photophores posterior to vertical through base of last anal-fin ray.
Protomyctophum (*H.*) *parallellum*
- 2b. SAO_1 above VO_3 - VO_4 interspace, rarely directly above VO_3 or VO_4 ; SAO_1 - SAO_2 interspace 2 or more times in VLO - SAO_1 interspace; Prc_1 - Prc_2 interspace less than AO - Prc_1 interspace; 3-5 AO photophores posterior to vertical through base of last anal-fin ray → 3

Protomyctophum* (*H.*) *parallellum (Lönnberg, 1905)

Parallel lanternfish

Other characters: no information.



Size: 5.0 cm SL

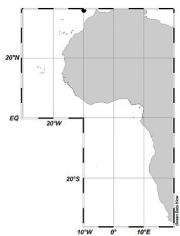
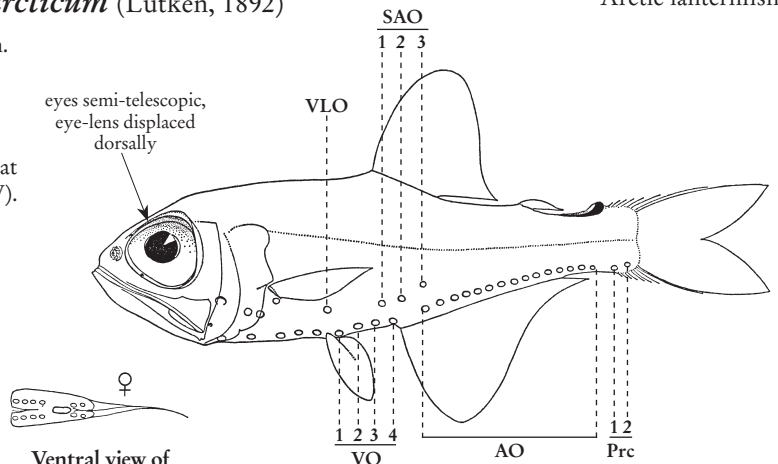
- 3a. Prc_1 - Prc_2 interspace 2-3 times in AO - Prc_1 interspace; interorbital distance about 3.5-4 times in expanded posterior margin of maxilla *Protomyctophum* (*H.*) *arcticum*

Protomyctophum* (*H.*) *arcticum (Lütken, 1892)

Arctic lanternfish

Other characters: no information.

Remarks: endemic to North Atlantic, with North Temperate Pattern; not yet recorded in the area; known from a single record at northern border (36.78°N, 9.89°W).



Size: 6.0 cm SL

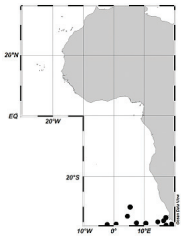
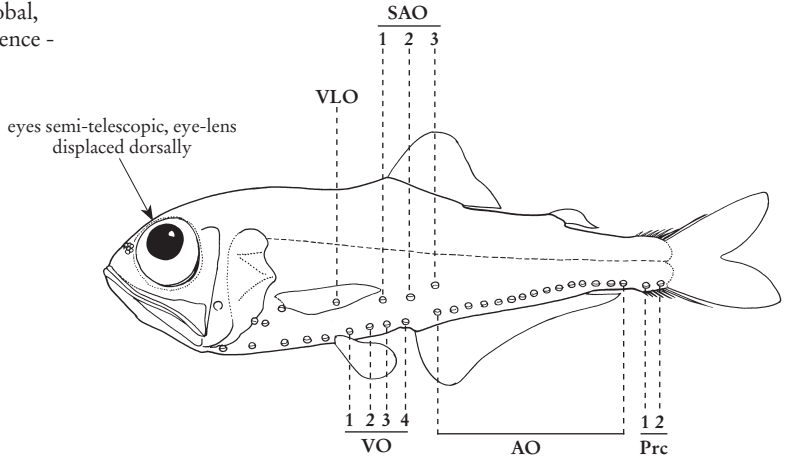
3b. Prc_1 - Prc_2 interspace 1.5-2 times in AO - Prc_1 interspace; interorbital distance 6-7 times in expanded posterior margin of maxilla. *Protomyctophum (H.) subparallelum*

Protomyctophum (H.) subparallelum (Tåning, 1932)

Subparallel lanternfish

Other characters: no information.

Remarks: distribution circumglobal, with South Subtropical Convergence - South Temperate Pattern.



Size: 3.6 cm SL

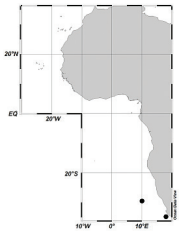
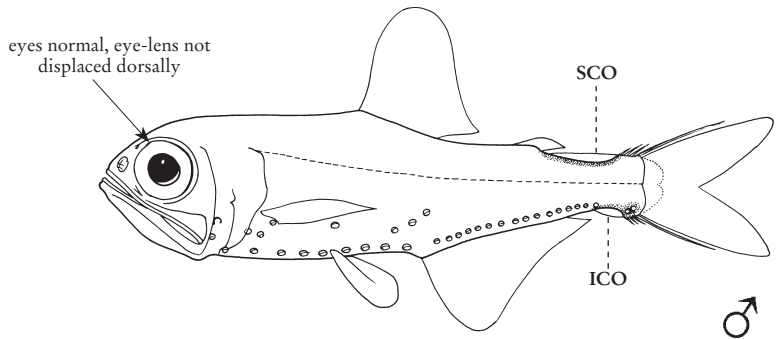
4a. Total gill rakers 18-21; males with single, large SCO, extending from procurrent caudal-fin rays to adipose-fin base, and small ICO; females with single, minute SCO only *Protomyctophum (P.) andriashevi*

4b. Total gill rakers 22-28; males with SCO and ICO; females with or without SCO and ICO, or with ICO only. → 5

Protomyctophum (P.) andriashevi Becker, 1963

Andriashev's lanternfish

Other characters: no information.



Size: 6.0 cm SL

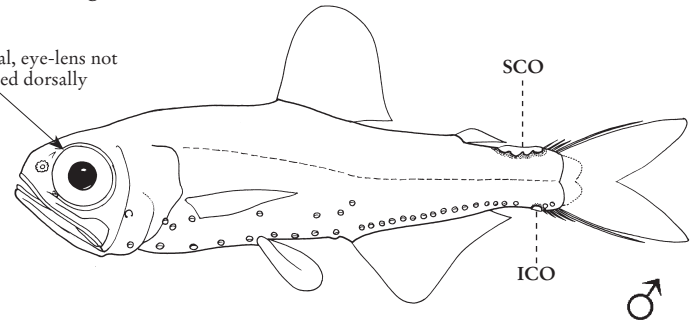
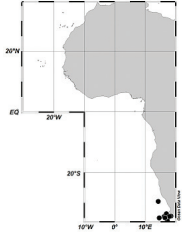
5a. Males with single SCO, extending about 60% of distance from procurrent caudal-fin rays to adipose-fin base, and an ICO of 2-4 separate, indistinct, luminous patches, the most posterior being the best developed; females with ICO only, comprising 2-4 separate, luminous patches; gill rakers 25-28 (rarely 24) *Protomyctophum (P.) normani*

Protomyctophum (P.) normani (Tåning, 1932)

Norman's lanternfish

Other characters: no information.

eyes normal, eye-lens not displaced dorsally



Size: 5.6 cm SL

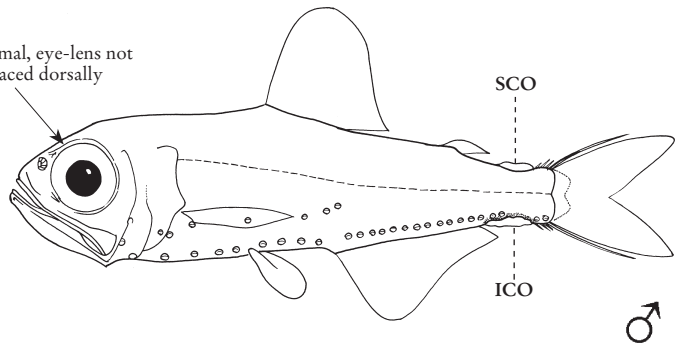
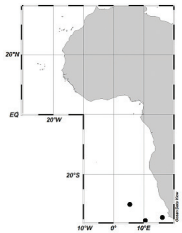
5b. Males with single SCO, extending about 50% of distance from procurrent caudal-fin rays to adipose-fin base, and single, coalesced ICO, extending from procurrent caudal-fin rays to anal-fin base; females with single, minute, black-edged ICO; total gill rakers 22-24 (rarely 25) *Protomyctophum (P.) luciferum*

Protomyctophum (P.) luciferum Hulley, 1981

Damsel lanternfish

Other characters: no information.

eyes normal, eye-lens not displaced dorsally



Size: 6.1 cm SL

KEY TO THE SPECIES OF *SYMBOLOPHORUS* OCCURRING IN THE AREA

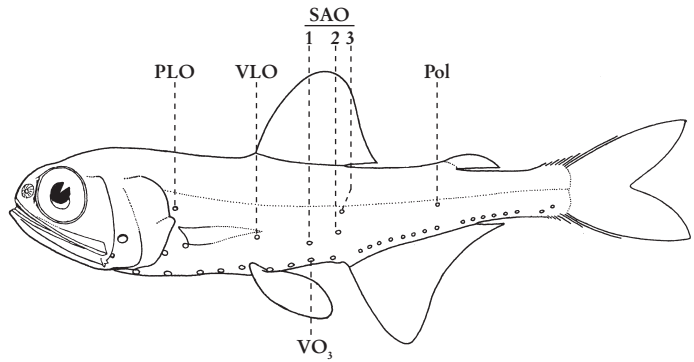
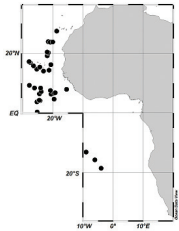
- 1a. Pol on or behind vertical through adipose-fin origin; PLO nearer to lateral line than to upper pectoral-fin base; palatine and dentary with numerous rows of minute subequal teeth; gill rakers slender and lath-like → 2
- 1b. Pol well in advance of vertical through adipose-fin origin; PLO midway between lateral line and upper pectoral-fin base, or nearer upper pectoral-fin base; outer row of teeth on palatine and dentary enlarged; gill rakers spatulate → 3

2a. SAO₁ on or slightly anterior to vertical through VO₃, nearer to SAO₂ than to VLO; pectoral fin extending to slightly beyond VLO; VLO on or posterior to vertical through outer pelvic-fin base and below line connecting PLO and SAO₁ *Symbolophorus rufinus*

Symbolophorus rufinus (Tåning, 1928)

Rufous lanternfish

Other characters: no information.



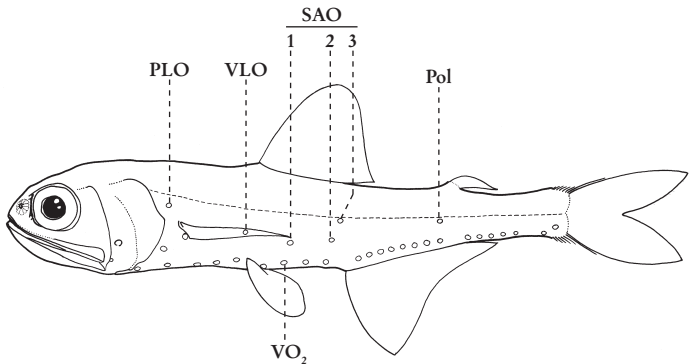
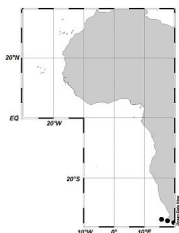
Size: 9.4 cm SL

2b. SAO₁ on or slightly posterior to vertical through VO₂, about midway between VLO and SAO₂; pectoral fin extending to about SAO₁; VLO slightly anterior to vertical through outer pelvic-fin base, and on or slightly above line connecting PLO and SAO₁ *Symbolophorus evermanni*

Symbolophorus evermanni (Gilbert, 1905)

Evermann's lanternfish

Other characters: no information.



Size: 8.0 cm SL

3a. Pectoral fin with pigment spot; tips of caudal-fin rays pigmented; also pigment on pelvic-fin base (specimens larger than 60 mm SL); gill rakers 21 or more (very rarely 20); gill raker count 6 (7, very rarely 5) + 1 + 15 (14-16, rarely 13), total 22 (21-23, very rarely 20 or 24) *Symbolophorus boops*

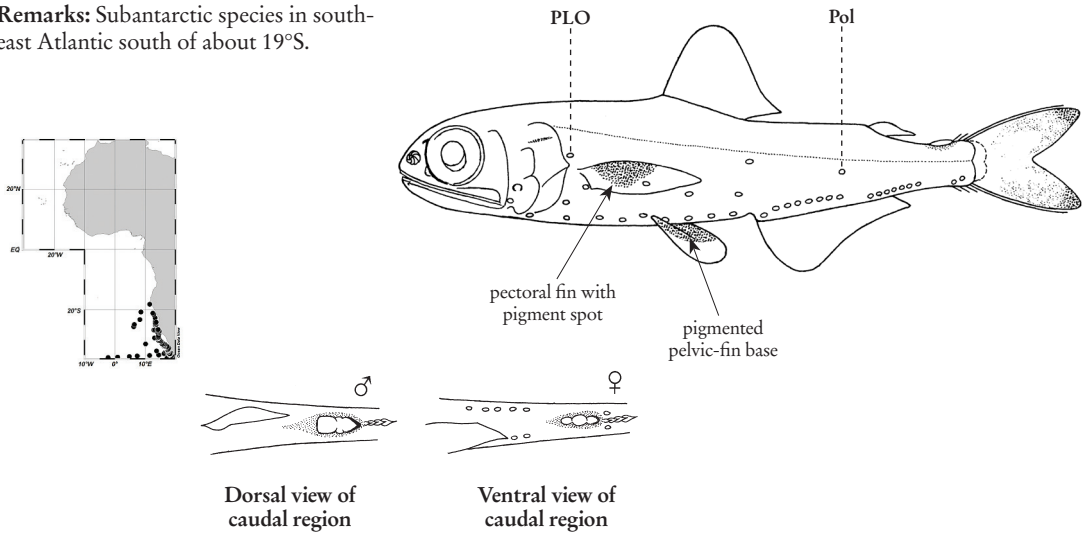
3b. Pectoral fin, tips of caudal-fin rays and pelvic-fin base without pigmentation; gill rakers 20 or less (very rarely 21) → 4

Symbolophorus boops (Richardson, 1845)

Spotfin lanternfish

Other characters: no information.

Remarks: Subantarctic species in south-east Atlantic south of about 19°S.



Size: 15.7 cm SL

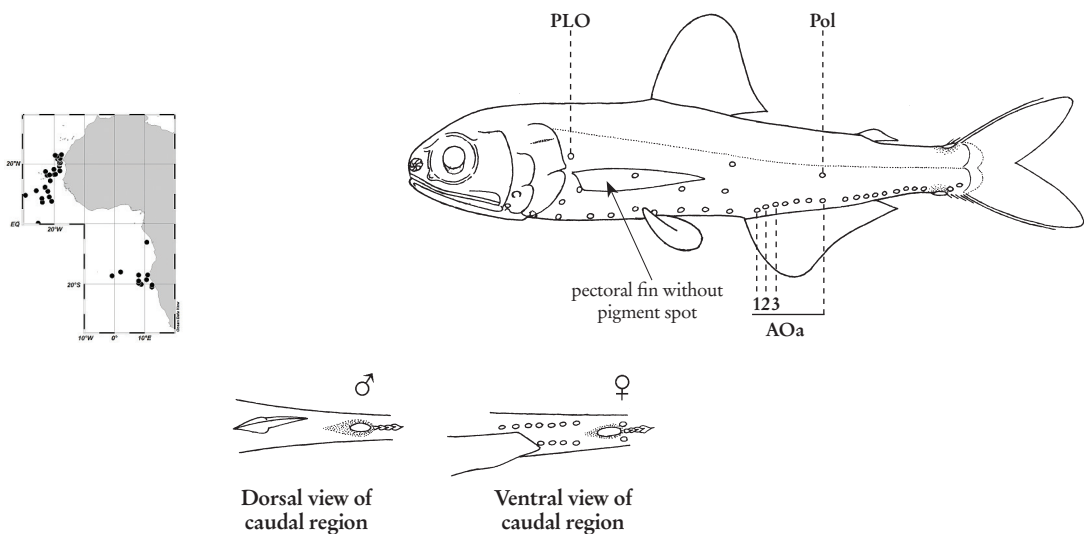
4a. AOa series noticeably arched, AOa₁ depressed with line through centres of AOa₃ to AOa₂ passing above AOa₁ → 5

4b. AOa series straight or only very slightly arched, AOa₁ on level with or slightly lower than AOa₂ with line through centres of AOa₃ to AOa₂ passing through AOa₁ or touching dorsal rim of AOa₁ photophore; gill raker count 5 (rarely 4) + 1 + 12 (11-13), total 18 (17-19) *Symbolophorus kreffti*

Symbolophorus kreffti Hulley, 1981

Kreffft's lanternfish

Other characters: no information.



Size: 11.2 cm SL

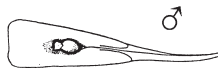
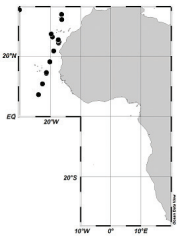
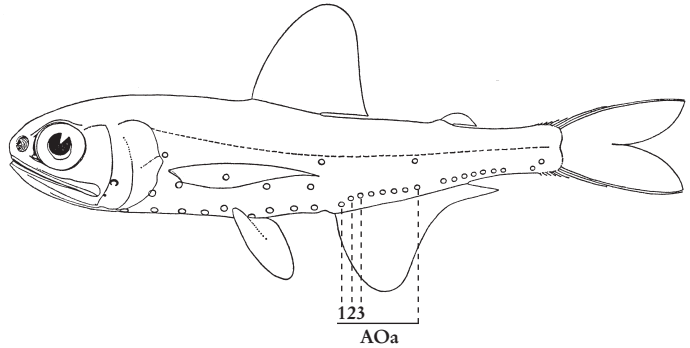
5a. Females with **ICO** only, of 3 (2-4) luminous patches, sometimes overlapping or partially coalesced; males with **SCO** only, of 1-3 coalesced, luminous patches immediately in front of dorsal procurrent caudal-fin rays; gill raker count 5 (rarely 6) + 1 + 13 (12-14), total 19 (18-20, rarely 21) *Symbolophorus veranyi*

Symbolophorus veranyi (Moreau, 1888)

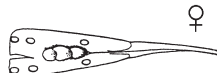
Vérany's lanternfish

Other characters: no information.

Remarks: North Atlantic temperate-subtropical species, between about 54°N-34°N, with isolated specimens to about 18°N in upwelled waters off West Africa.



Dorsal view of caudal region



Ventral view of caudal region

Size: 12.0 cm SL

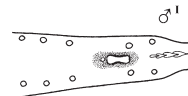
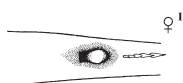
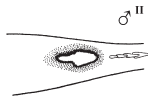
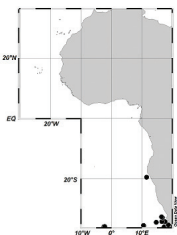
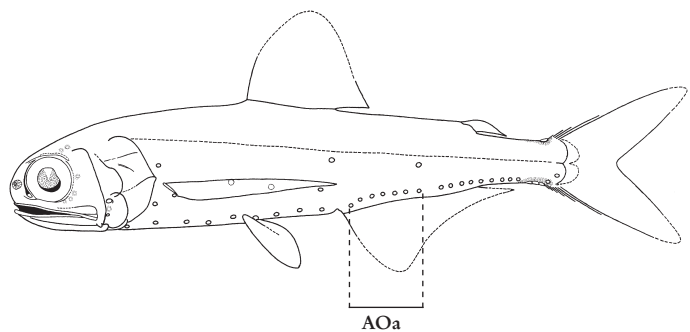
5b. Females with both **SCO** and **ICO**, of 2 (1) coalesced luminous patches supracaudally and 3 (2) partially coalesced luminous patches infracaudally; males either with **SCO** of 1 or 2 oval, coalesced luminous patches only, or with both **SCO** (as above) and **ICO** of 1 (2) small, oval, luminous patches (see figure for variations in 2 male specimens); gill raker count 5 (rarely 4 or 6) + 1 + 13 (12-14), total 19 (18-20, rarely 17 or 21) *Symbolophorus barnardi*

Symbolophorus barnardi (Tåning, 1932)

Barnard's lanternfish

Other characters: no information.

Remarks: Southern Convergence species: in southeast Atlantic between 29°S-42°S.



Dorsal views of caudal region

Ventral views of caudal region

Size: 11.6 cm SL

KEY TO THE SPECIES OF *TAANINGICHTHYS* OCCURRING IN THE AREA

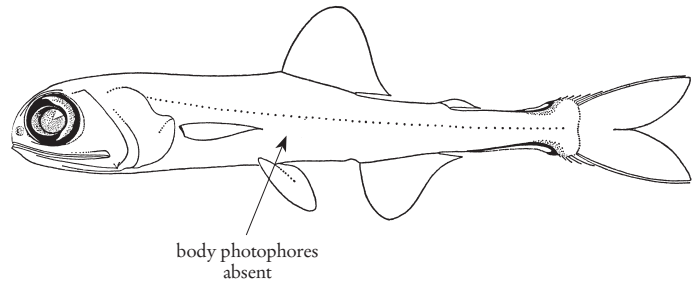
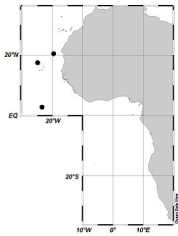
- 1a. Body photophores absent *Taaningichthys paurolychnus*
 1b. Body photophores present → 2

Taaningichthys paurolychnus Davy, 1972

Naked lanternfish

Other characters: no information.

Remarks: rare, bathypelagic species usually taken below 900 m; non-migratory.



Size: 9.5 cm SL

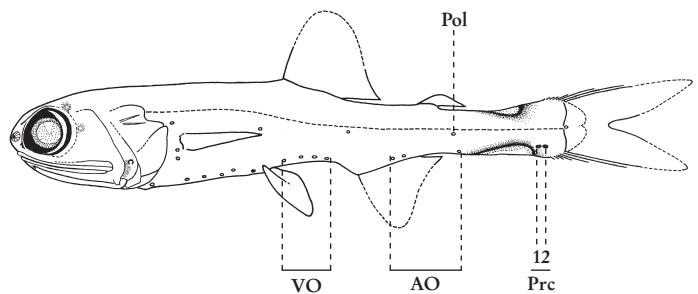
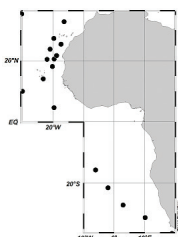
- 2a. VO 3-5; AO 1-4 + 1-2, total 2-5; Pol well behind vertical through adipose-fin origin; Prc₁-Prc₂ interspace equal to or less than 1 photophore diameter *Taaningichthys bathyphilus*

Taaningichthys bathyphilus (Tåning, 1928)

Deepwater lanternfish

Other characters: trawled specimens somewhat resemble *Lampichthys procerus* (black heads with pale white bodies), because they are usually badly abraded, with scales, scale pockets and photophores missing; the two species may be identified by the structure of the SCO and ICO in *T. bathyphilus*, and by the cheek photophores in *L. procerus*.

Remarks: uncommon, bathypelagic species usually taken below 675 m, although juveniles may occur at shallower depths; non-migratory.



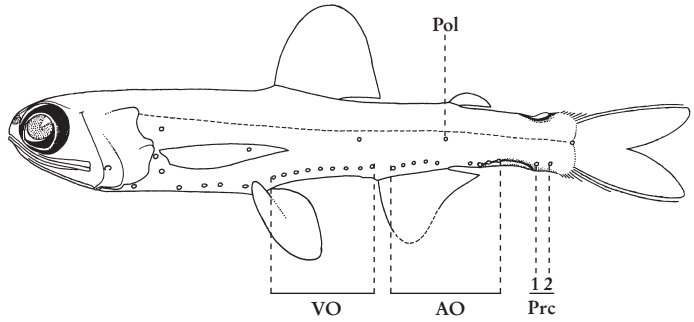
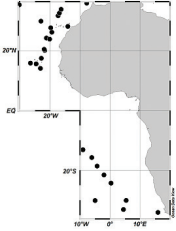
Size: 8.0 cm SL

2b. VO 8-10; AO 5-7 + 4-6, total 9-13; Pol on or anterior to vertical through adipose-fin origin; Prc₁-Prc₂ interspace equal to or more than 2 photophore diameters *Taaningichthys minimus*

Taaningichthys minimus (Tåning, 1928)

Waistcoat lanternfish

Other characters: no information.



Size: 6.5 cm SL

STYLEPHORIFORMES - STYLEPHORIDAE

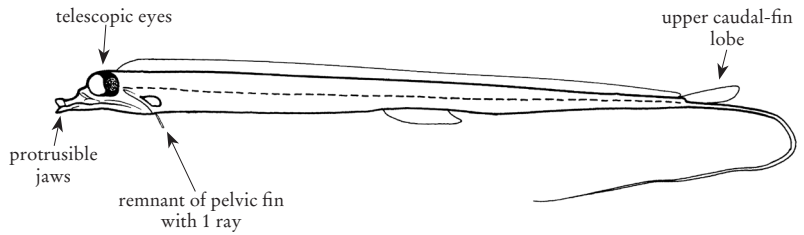
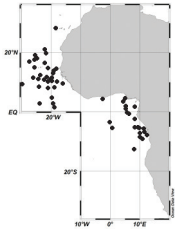
Tube-eyes

Note: this order contains only one family, genus and species, which occurs in the area.

Stylephorus chordatus Shaw, 1791

Tube-eye

Other characters: body colour silver; head darkly pigmented, inside of mouth and gill chambers black.



Size: 28.0 cm SL

LAMPRIFORMES

Tapertails, Crestfishes, Ribbonfishes and Oarfishes

KEY TO THE FAMILIES OF LAMPRIFORMES OCCURRING IN THE AREA

1a. Anal fin present, short (Fig. 1)	→ 2
1b. Anal fin absent (Figs. 2 & 3)	→ 3
2a. Head with an elevated occipital crest bearing anterior dorsal-fin rays and extending forward to level of mouth or far beyond; anus and anal fin at posterior end of body near caudal fin; caudal fin small and pointed, without filament; dorsal fin red (Fig. 1)	Lophotidae (p. 223)

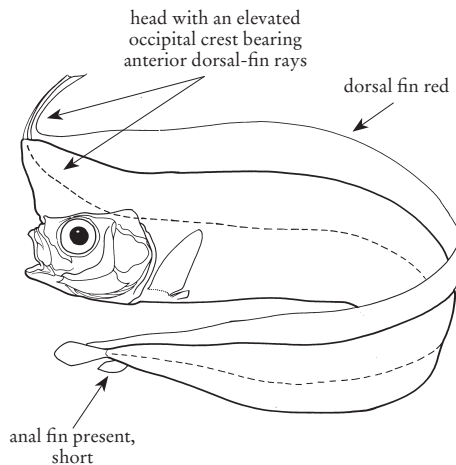


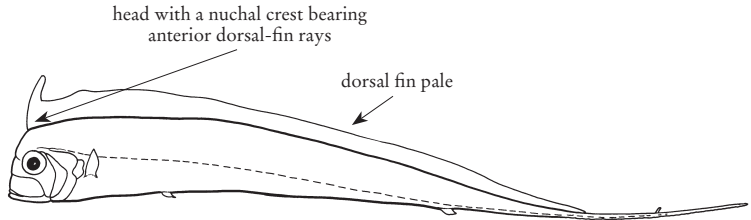
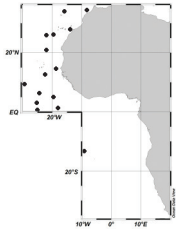
Fig. 1 Lophotidae

2b. Head with a nuchal crest bearing anterior dorsal-fin rays; anus at about 1/3 and anal fin at about 2/3 of Total Length; lower rays of caudal fin forming a slender filament; dorsal fin pale Radiicephalidae (monogeneric: *Radiicephalus* - one species in the area: *Radiicephalus elongatus*)

***Radiicephalus elongatus* Osório, 1917**

Tapertail

Other characters: anal-fin rays 7, pectoral-fin rays 10, pelvic-fin rays 9-10; body and tail silvery in colour; dorsal-fin base blackish.



Size: 76.0 cm TL

3a. Pelvic fins consisting of a single, sometimes extremely long ray with fleshy membrane at tip; anus on anterior 1/3 of body; lateral-line plates smooth; body greatly elongate, its depth 15-16 times in Standard Length; dorsal-fin rays about 400 (Fig. 2) Regalecidae (p. 225)

3b. Pelvic fins with 3-9 rays, elongate in young, becoming reduced or disappearing with age; anus at about midpoint of body; lateral-line plates with a spine; body less elongate, its depth 4-10 times in Standard Length; dorsal-fin rays 120-200 (Fig. 3) Trachipteridae (p. 226)

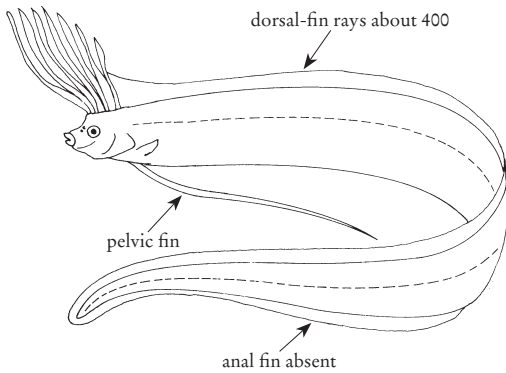


Fig. 2 Regalecidae

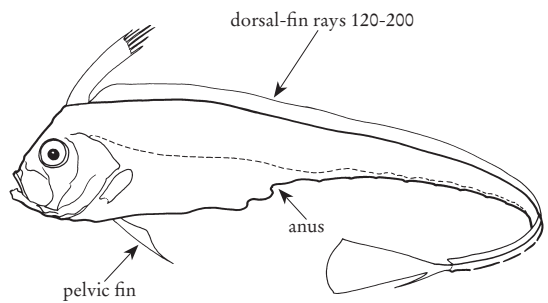


Fig. 3 Trachipteridae

LOPHOTIDAE

Crestfishes

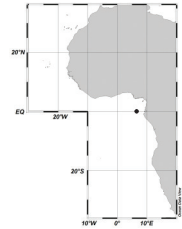
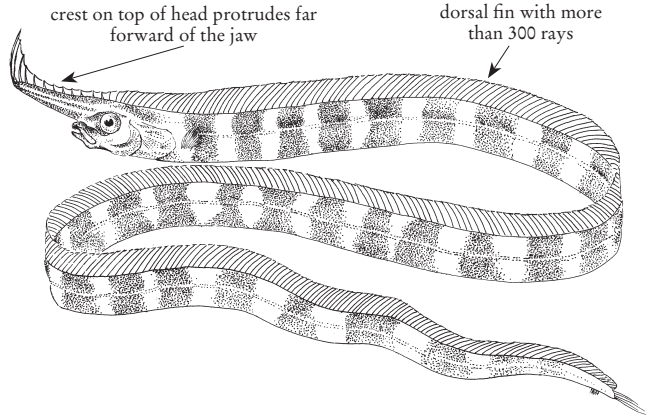
KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF LOPHOTIDAE OCCURRING IN THE AREA

- 1a. Crest on top of head protrudes far forward of the jaw; body depth 19-30 times in Standard Length; dorsal fin with more than 300 rays; anal fin rudimentary with 5-9 rays *Eumecichthys fiski*
- 1b. Crest on top of head extends forward to the tip of jaw; body depth 5-8 times in Standard Length; dorsal fin with fewer than 300 rays; anal fin small but distinct with more than 10 rays *Lophotus* (p. 223)

Eumecichthys fiski (Günther, 1890)

Unicorn crestfish

Other characters: head and body silvery in colour with 24-60 dark sub vertical bands; dorsal and caudal fins crimson in colour.



Size: 150.0 cm TL

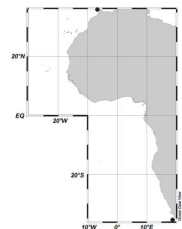
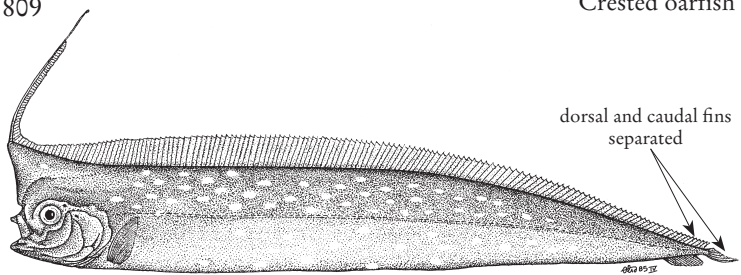
KEY TO THE SPECIES OF *LOPHOTUS* OCCURRING IN THE AREA

- 1a. Dorsal and caudal fins separated; dorsal-fin pterygiophores do not run entire length of dorsum *Lophotus lacepede*
- 1b. Dorsal and caudal fins not separated → 2

Lophotus lacepede Giorna, 1809

Crested oarfish

Other characters: head and body silvery in colour and possibly with silvery spots; fins red.



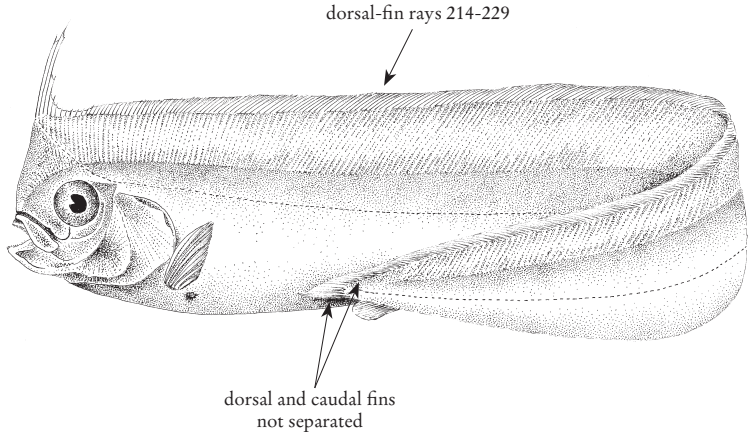
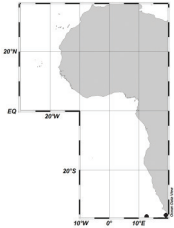
Size: 200.0 cm TL

2a. Dorsal-fin rays 214-229; body pale blue becoming white ventrally, head blackish blue on dorsal surface *Lophotus capellei*

Lophotus capellei Temminck & Schlegel, 1845

Unicornfish

Other characters: no information.



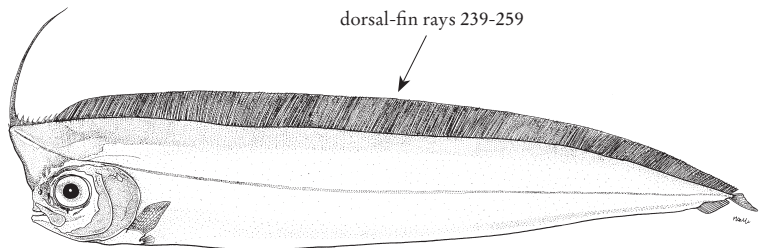
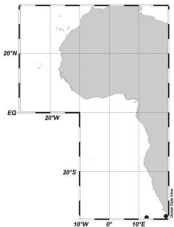
Size: 200.0 cm SL

2b. Dorsal-fin rays 239-259; body and head faint pink; interorbital area to snout blackened; dorsal-fin membranes red anteriorly, and translucent posteriorly; anal and caudal fins pale; pectoral fin pink *Lophotus guentheri*

Lophotus guentheri Johnston, 1883

Crested bandfish

Other characters: no information.



Size: 200.0 cm SL

REGALECIDAE

Oarfishes

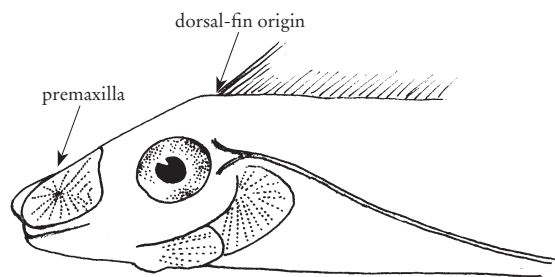
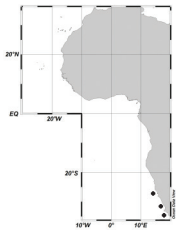
KEY TO THE GENERA, AND SOLE SPECIES OF GENERA OF REGALECIDAE OCCURRING IN THE AREA

1a. Premaxilla extending forward along dorsal profile of head; dorsal-fin origin usually behind center of eye; first 1-3 dorsal-fin rays elongated, not forming a crest but joined to each other and the other dorsal-fin rays by a membrane; gill rakers on first arch 6-10 *Agrostichthys* (monospecific: *A. parkeri*)

Agrostichthys parkeri (Benham, 1904)

Streamer fish

Other characters: body silvery in colour; dorsal fin rose-colored and with more than 400 soft rays.



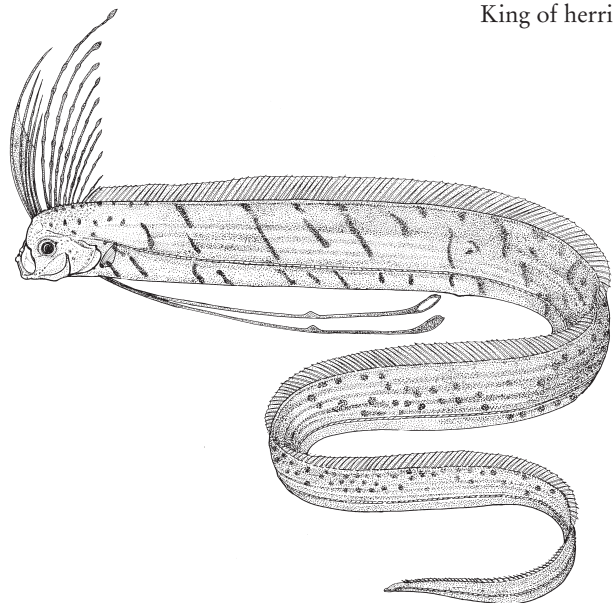
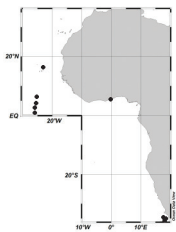
Size: 300.0 cm TL

1b. Premaxilla usually not extending forward along dorsal profile of head; dorsal-fin origin usually before center of eye; first 4-19 dorsal-fin rays elongated, forming a double crest, the first crest with 6-8 rays joined by a membrane and the second crest with 5-11 free rays; gill rakers on first arch 33-47. *Regalecus glesne*

Regalecus glesne Ascanius, 1772

King of herrings

Other characters: head and body silver in colour with blue streaks; body with blackish streaks and spots; dorsal fins crimson in colour.



(after Smitt, 1893)

Size: 800.0 cm TL

TRACHIPTERIDAE

Ribbonfishes

KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF TRACHIPTERIDAE OCCURRING IN THE AREA

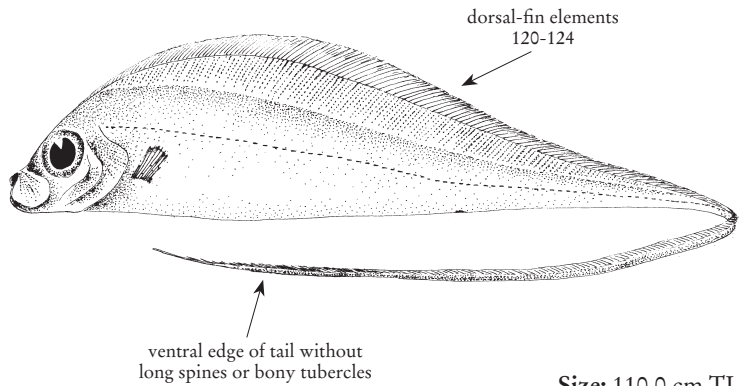
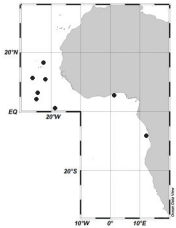
1a. Ventral edge of tail without long spines or bony tubercles; caudal fin with dorsal lobe only, which is not sharply upturned; dorsal-fin elements 120-124 *Desmodema polystictum*

1b. Ventral edge of tail with long spiny plates or bony tubercles; caudal fin with dorsal and ventral lobe, dorsal lobe sharply upturned and fan-like, ventral lobe rudimentary in some species or at large sizes; dorsal-fin elements usually more than 124 (Figs. 1 & 2). → 2

Desmodema polystictum (Ogilby, 1898)

Polka-dot ribbonfish

Other characters: specimens less than 10 cm silvery in colour with many dark spots.



Size: 110.0 cm TL

2a. Posterior portion of lateral line runs well above the ventral edge of tail, with lateral-line spines projecting laterally; ventral body margin straight with bony tubercles; body depth 3.7-4.1 in distance from snout to anus; body scaleless; lower caudal-fin rays reduced to stumps in adults; no bulbous flaps on fin rays at any stage (Fig. 1) *Trachipterus* (p. 227)

2b. Posterior portion of lateral line runs along ventral edge of tail as a series of sharp spines that point in alternating directions; ventral body margin wavy or notched (in subadults smaller than 80 cm); body depth 1.5-2.9 in distance from snout to anus; body with deciduous cycloid scales; lower caudal-fin rays not reduced to stumps in adults; bulbous flaps present on dorsal and pelvic-fin rays in young stages (Fig. 2). *Zu* (p. 228)

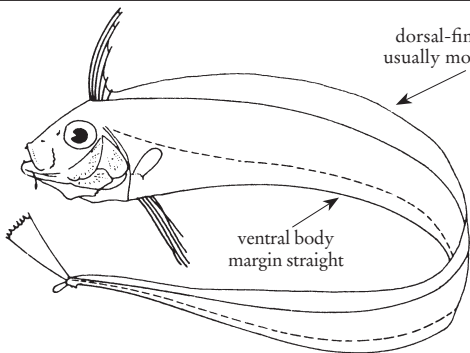


Fig. 1 *Trachipterus*

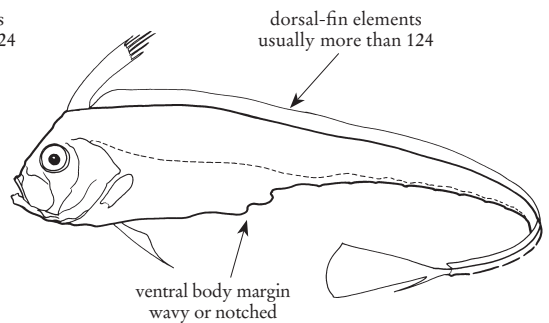


Fig. 2 *Zu*

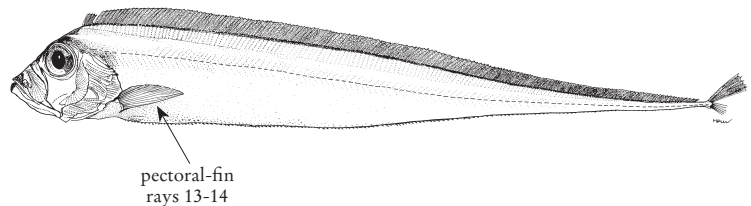
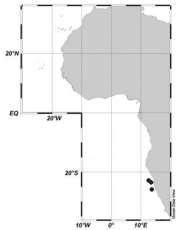
KEY TO THE SPECIES OF *TRACHIPTERUS* OCCURRING IN THE AREA

1a. Pectoral-fin rays 13-14; vertebrae 81-83 *Trachipterus jacksonensis*

Trachipterus jacksonensis (Ramsay, 1881)

Blackflash ribbonfish

Other characters: silvery in colour except for front of head, interorbital area, dorsal part of upper jaw, and tip of lower jaw which are black.



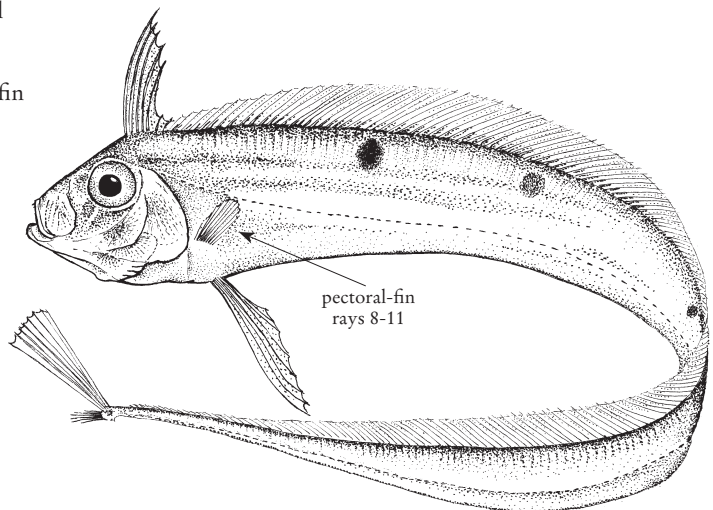
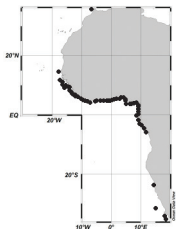
Size: 220.0 cm TL

1b. Pectoral-fin rays 8-11; vertebrae 84-96 *Trachipterus trachypterus*

Trachipterus trachypterus (Gmelin, 1789)

Mediterranean dealfish

Other characters: silvery in colour except for front of head, interorbital area, dorsal part of upper jaw, and tip of lower jaw which are black; dusky blotches usually seen on body at bases of 20th-28th dorsal-fin rays.



Size: 300.0 cm TL

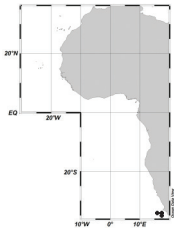
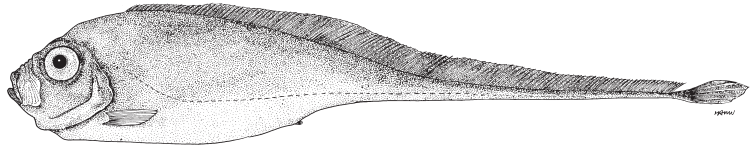
KEY TO THE SPECIES OF *ZU* OCCURRING IN THE AREA

1a. Maximum body depth 12-16% Standard Length; eye 9-10% of distance from snout to anus; lateral-line plates 126-130; body of pre-juveniles not abruptly constricted behind anus *Zu elongatus*

Zu elongatus Heemstra & Kannemeyer, 1984

Taper-tail ribbonfish

Other characters: adult specimens preserved in alcohol tan in colour; front of head with triangular dark area extending onto lips and gular region; posterior dorsal-fin rays black; caudal fin black, base of fin pale.



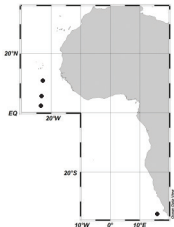
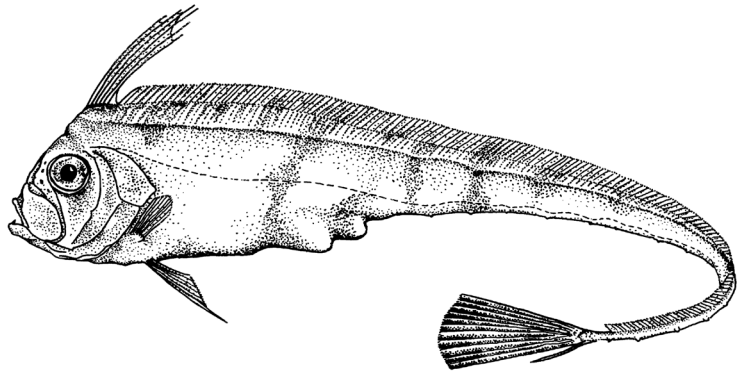
Size: 120.0 cm TL

1b. Maximum body depth 20-26% Standard Length; eye 13-16% of distance from snout to anus; lateral-line plates 99-106; body of pre-juveniles abruptly constricted behind anus *Zu cristatus*

Zu cristatus (Bonelli, 1819)

Scalloped ribbonfish

Other characters: young silvery in colour with around 6 vertical bars on dorsal part of body and 4 on ventral part; tail with around 6 complete black bars; caudal fin blackish, base of fin pale; adults silver grey in colour but paler ventrally; dorsal fin scarlet; caudal fin reddish black, darker distally.



Size: 118.0 cm TL

GADIFORMES

Hakes, Cods and Allies

KEY TO THE FAMILIES OF GADIFORMES OCCURRING IN THE AREA

1a. Two dorsal fins; first a single, elongate ray inserted on top of head and fitting into a mid-dorsal groove when depressed; second dorsal and anal fin deeply notched, middle rays notably shorter than those preceding and following; pelvic fins very long with several strong rays (Fig. 1); lateral lines directed dorsally; no free neuromasts (sensory organs) on head **Bregmacerotidae (p. 229)**

1b. Dorsal fin single and long-based, originating at rear of or behind head, anterior rays longer than those following; pelvic and pectoral fins subequal (Fig. 2); lateral lines on side of body; head covered with parallel ridges bearing free neuromasts (sensory organs) **Melanonidae (p. 230)**

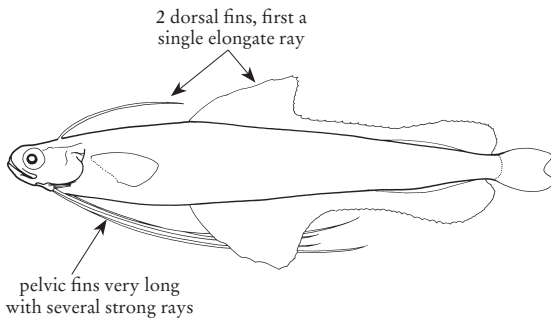


Fig. 1 Bregmacerotidae

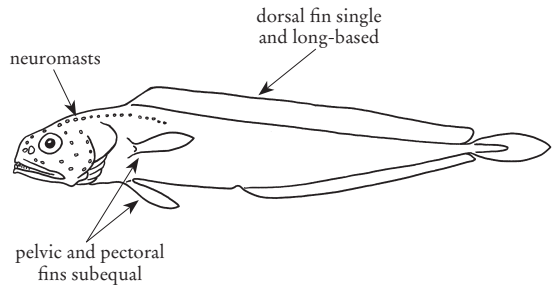


Fig. 2 Melanonidae

BREGMACEROTIDAE

Codlets

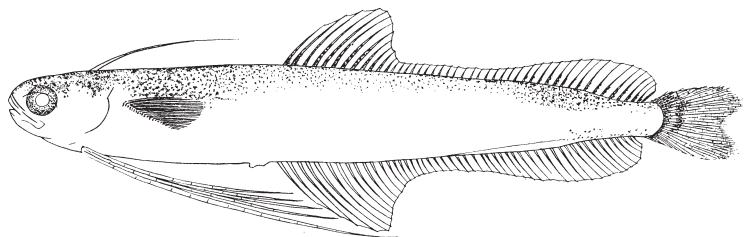
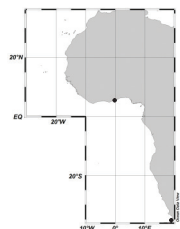
KEY TO THE SPECIES OF BREGMACEROTIDAE OCCURRING IN THE AREA

1a. Transverse scales between second dorsal and anal fin 15-17 ***Bregmaceros nectabanus***

Bregmaceros nectabanus Whitley, 1941

Smallscale codlet

Other characters: body yellowish-white with a brownish stripe along each side of the back.



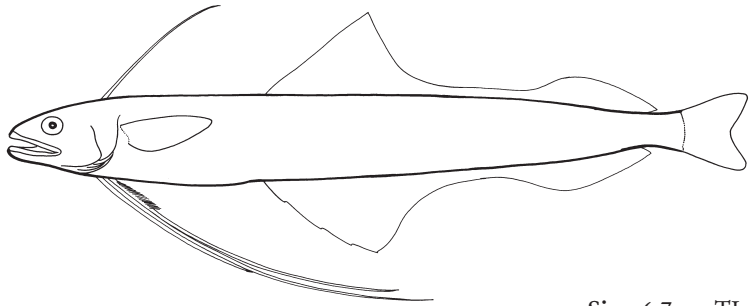
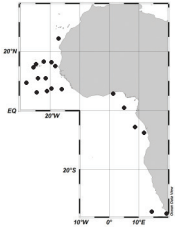
Size: 7.6 cm SL

1b. Transverse scales between second dorsal and anal fin 10-13 *Bregmaceros atlanticus*

Bregmaceros atlanticus Goode & Bean, 1886

Antenna codlet

Other characters: body brownish above, silvery below.



Size: 6.7 cm TL

MELANONIDAE

Pelagic cods

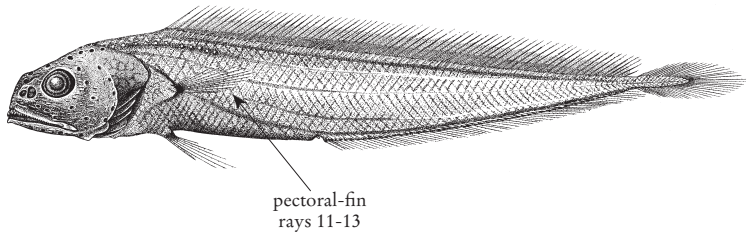
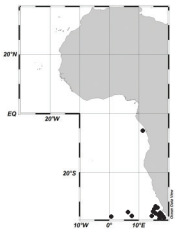
KEY TO THE SPECIES OF MELANONIDAE OCCURRING IN THE AREA

1a. All teeth in lower jaw small, villiform; pectoral-fin rays 11-13 *Melanonus gracilis*

Melanonus gracilis Günther, 1878

Pelagic cod

Other characters: pale to dark brown in colour.



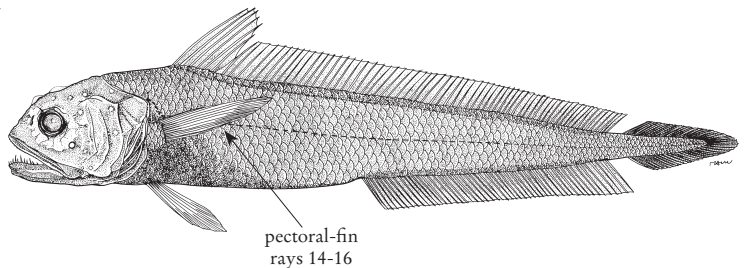
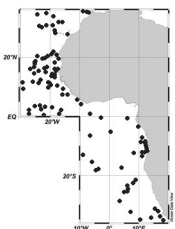
Size: 18.7 cm SL

1b. Some teeth in lower jaw large, fang- or needle-like; pectoral-fin rays 14-16. . . *Melanonus zugmayeri*

Melanonus zugmayeri Norman, 1930

Arrowtail

Other characters: pale to dark brown in colour.



Size: 28.0 cm TL

LOPHIIFORMES

Anglerfishes and allies

KEY TO THE FAMILIES OF LOPHIIFORMES OCCURRING IN THE AREA

- 1a. Dorsal-fin rays 4 (rarely 3 or 5)(Fig. 1) Ceratiidae (p. 231)
- 1b. Dorsal-fin rays 13-16 (rarely 12 or 17)(Fig. 2) Melanocetidae (p. 233)

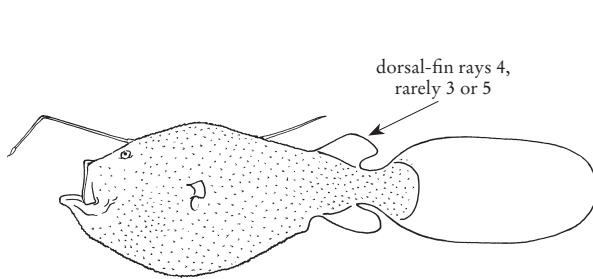


Fig. 1 Ceratiidae

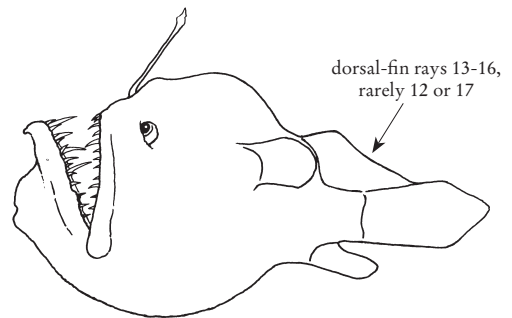


Fig. 2 Melanocetidae

CERATIIDAE

KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF CERATIIDAE OCCURRING IN THE AREA

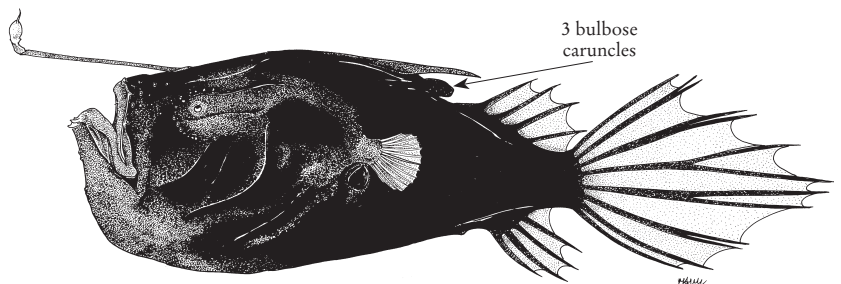
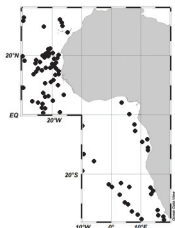
Note: the following key is specific for female individuals.

- 1a. Three bulbose caruncles (fleshy outgrowths) on back, in front of dorsal fin . . . *Cryptopsaras couesii*
- 1b. Two bulbose caruncles (fleshy outgrowths) on back, in front of dorsal fin *Cerantias* (p. 232)

Cryptopsaras couesii Gill, 1883

Triplewart seadevil

Other characters: no information.



Size: 44.0 cm TL (female)

KEY TO THE SPECIES OF *CERATIAS* OCCURRING IN THE AREA

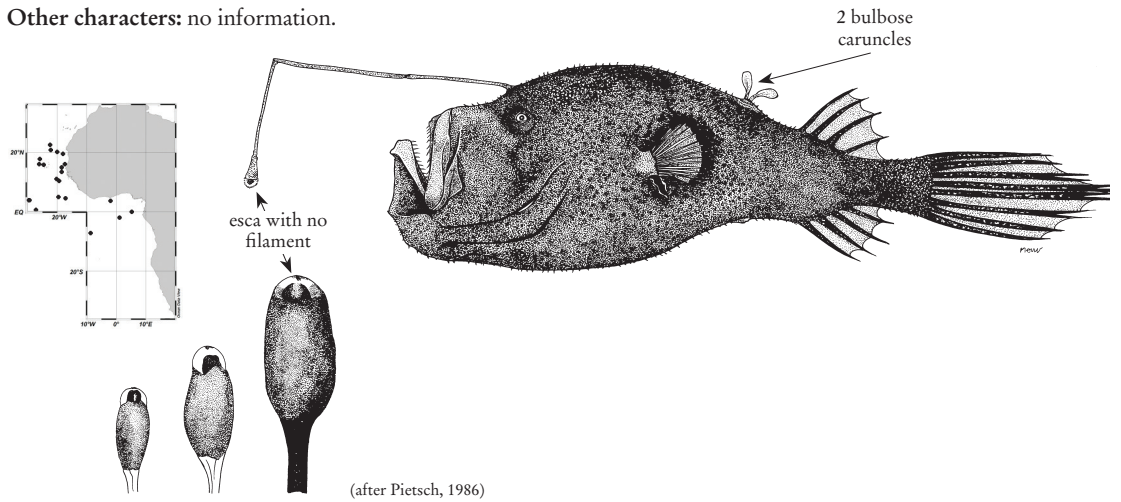
Note: the following key is specific for female individuals.

- 1a. Esca with no filament *Ceratias uranoscopus*
- 1b. Esca with 1 or more filaments. → 2

Ceratias uranoscopus Murray, 1877

Stargazing seadevil

Other characters: no information.



escae
(female specimens of 6.1, 11.9 and 17.3 cm SL)

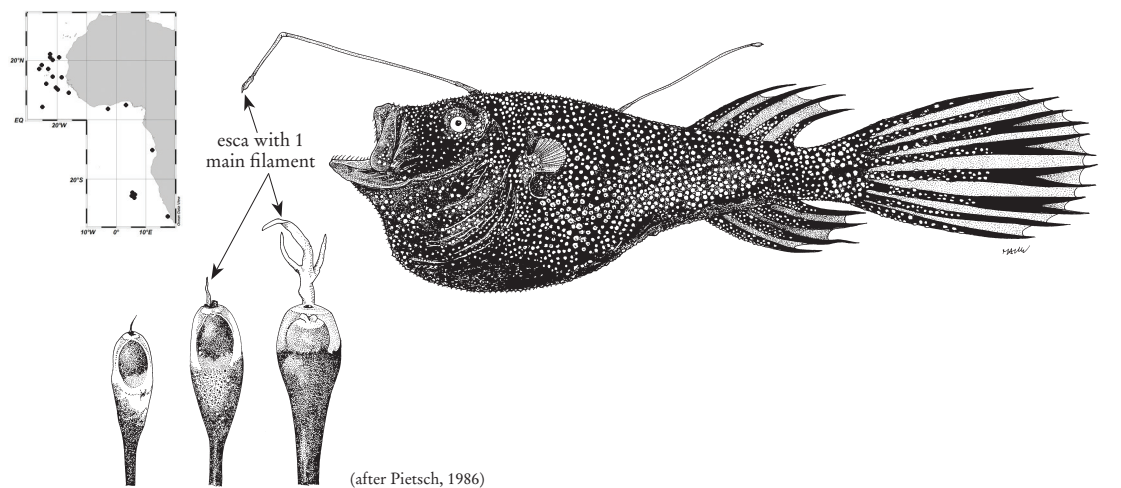
Size: 24.0 cm TL (female)

- 2a. Esca with 1 main filament *Ceratias holboelli*

Ceratias holboelli Krøyer, 1845

Kroyer's deep-sea angler fish

Other characters: no information.



escae
(female specimens of 3.2, 6.6 and 59 cm SL)

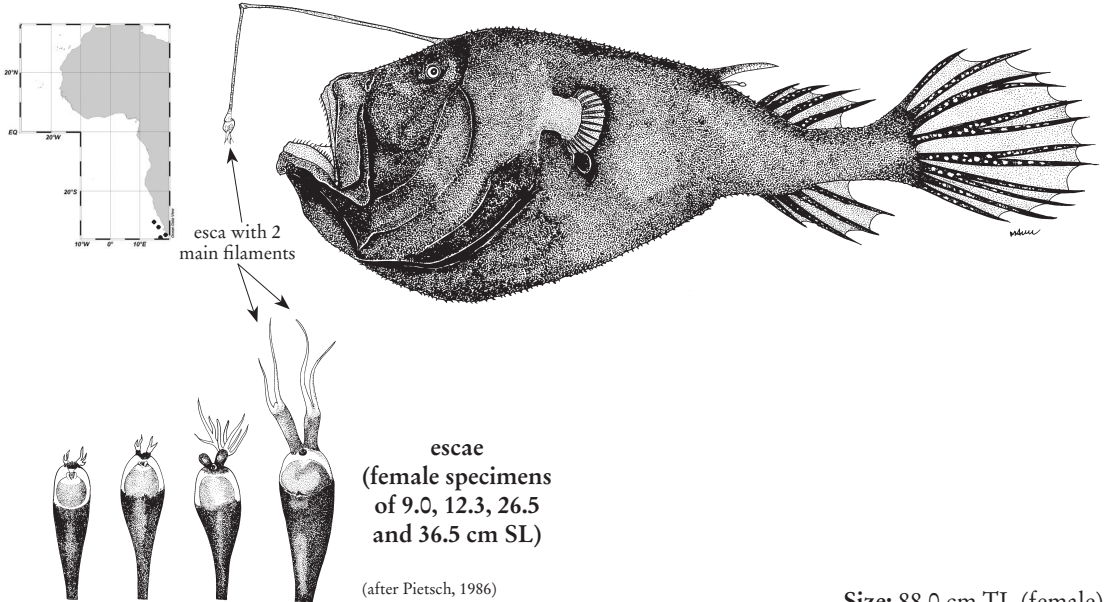
Size: 120.0 cm TL (female)

2b. Esca with 2 filaments, each simple or divided into multiple filaments. *Ceratias tentaculatus*

Ceratias tentaculatus (Norman, 1930)

Southern seadevil

Other characters: no information.



MELANOCETIDAE

Black seadevils

KEY TO THE SPECIES OF MELANOCETIDAE OCCURRING IN THE AREA

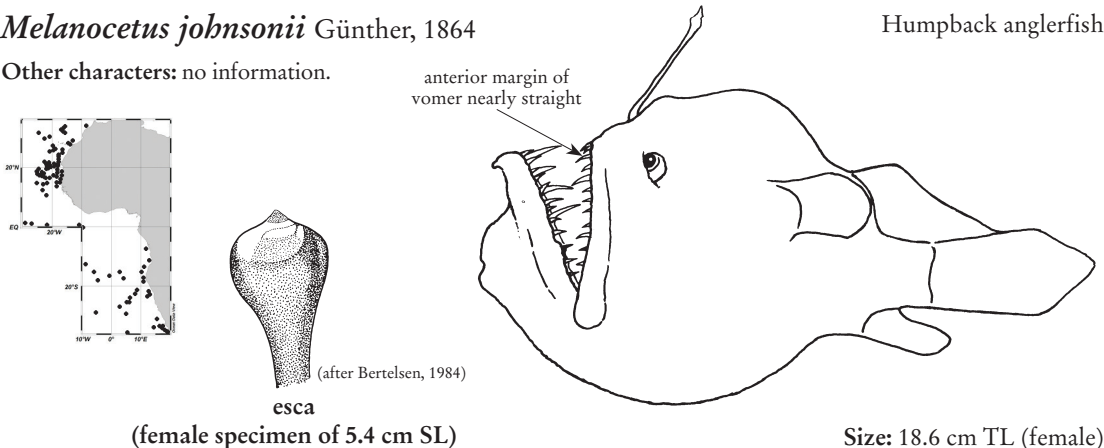
Note: the following key is specific for female individuals.

1a. Anterior margin of vomer nearly straight; esca with compressed posterior (and usually anterior) crests *Melanocetus johnsonii*

Melanocetus johnsonii Günther, 1864

Humpback anglerfish

Other characters: no information.

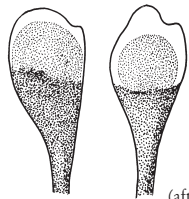
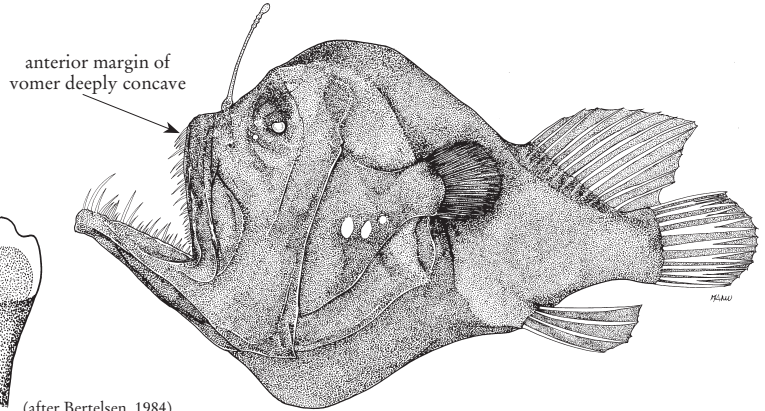
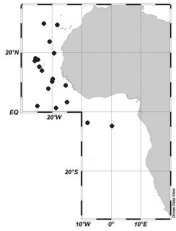


1b. Anterior margin of vomer deeply concave; esca round and not compressed posteriorly
 *Melanocetus murrayi*

Melanocetus murrayi Günther, 1887

Murray's abyssal anglerfish

Other characters: no information.



(after Bertelsen, 1984)

escae
(female specimens of 8.5 cm TL)

Size: 12.0 cm TL (female)

BERYCIFORMES - MELAMPHAIDAE

Big scales

KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF MELAMPHAIDAE OCCURRING IN THE AREA

- 1a. Scales very large, fewer than 15 transverse scale rows from nape to caudal-fin base, but scales almost always lost, leaving large, ill-defined scale pockets; scales on cheek absent (no apparent scale pockets); supramaxilla absent (Fig. 1a) *Scopelogadus* (p. 246)
- 1b. Scales smaller (Figs. 2a & 2b), more than 20 transverse scale rows from nape to caudal-fin base, but scales mostly lost, leaving well defined scale pockets; scales on cheek present (leaving discernable scale pockets); supramaxilla present (Fig. 1b) → 2
- 2a. Ridges on top of head crest-like and with serrate edges; conspicuous dorsally-directed spine present between nostrils; ventral edge, angle, and most of posterior edge of preopercle serrate (Fig. 1b) . . . *Poromitra* (p. 242)
- 2b. Ridges on top of head not crest-like and with smooth edges; dorsally-directed spine between nostrils inconspicuous or absent; ventral edge, angle, and posterior edge of preopercle smooth, or weakly serrate (in genus *Sio*) → 3

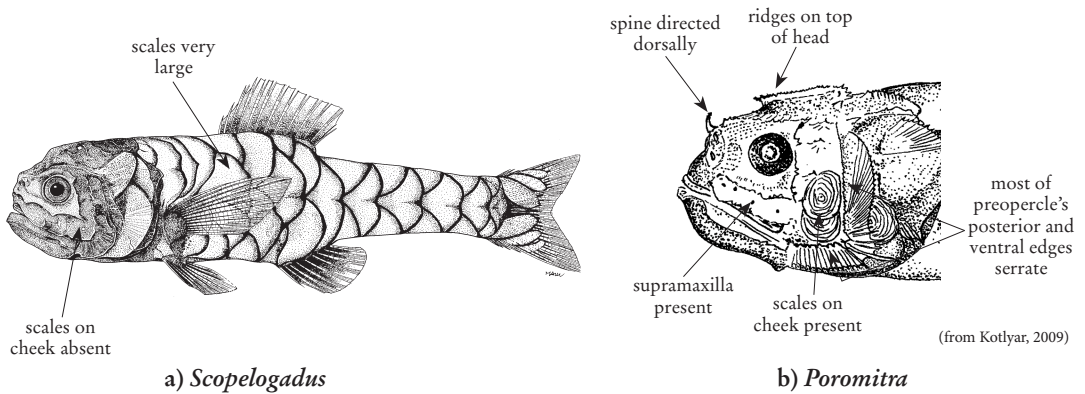
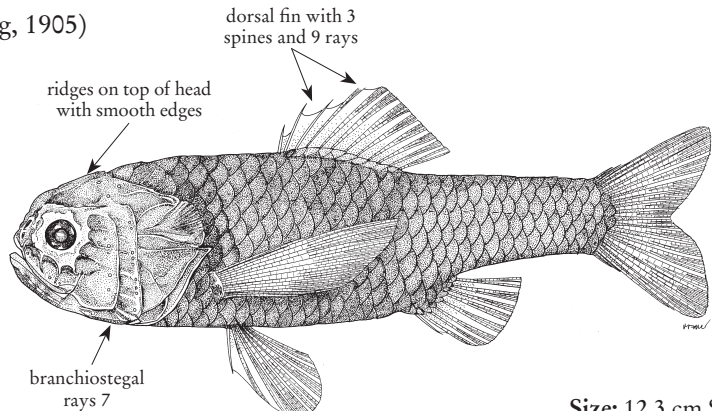
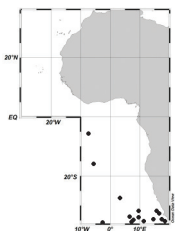


Fig. 1

- 3a. Dorsal-fin elements 12 (3 spines + 9 rays); branchiostegal rays 7 *Sio nordenskjoldii*
- 3b. Dorsal-fin elements (spines + rays) 13-21; branchiostegal rays 8 → 4

Sio nordenskjoldii (Lönnerberg, 1905)

Other characters: body uniformly brown to black.



Size: 12.3 cm SL

- 4a. Dorsal-fin elements (spines + rays) 13-15 (Fig. 2a) *Scopeloberyx* (p. 245)
 4b. Dorsal-fin elements (spines + rays) 17-21 (Fig. 2b) *Melamphaes* (p. 236)

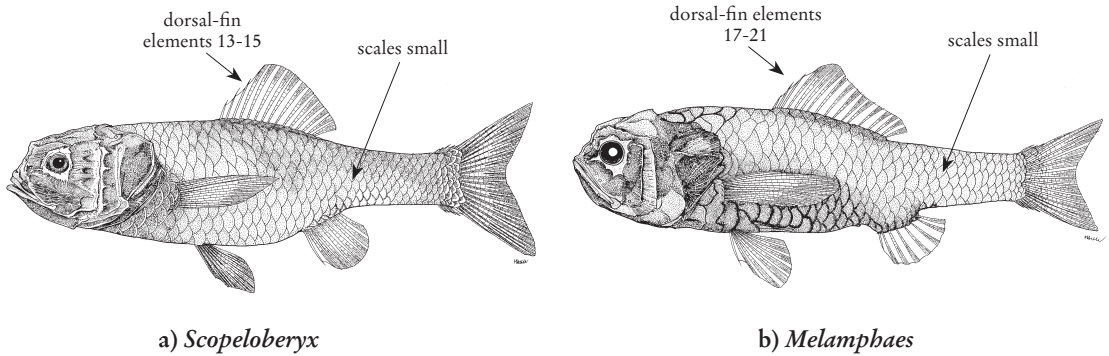
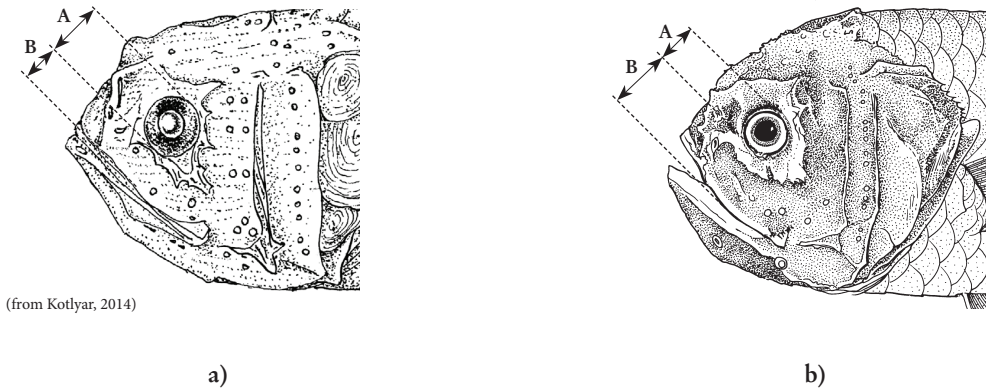


Fig. 2

KEY TO THE SPECIES OF *MELAMPHAES* OCCURRING IN THE AREA

- 1a. Total gill rakers on first arch 19 or less → 2
 1b. Total gill rakers on first arch 20 or more → 10
 2a. Eye diameter (A) equal to or larger than distance between upper jaw and eye (B)(i.e. width of suborbital bone)(Fig. 1a) → 3
 2b. Eye diameter (A) distinctly less than distance between upper jaw and eye (B)(i.e. width of suborbital bone)(Fig. 1b) → 8



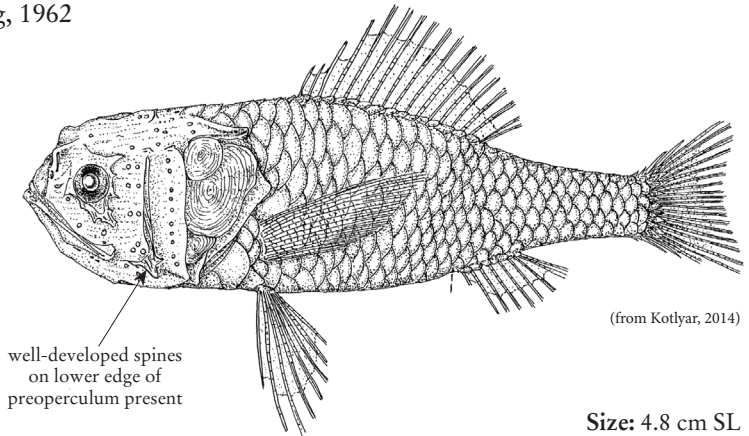
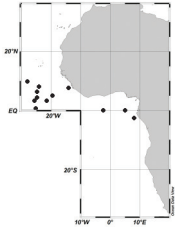
(from Kotlyar, 2014)

Fig. 1

- 3a. Spines on preoperculum absent; cranial bones not widened and rough; scales shed easily, most often (almost) totally lost → 4
 3b. Well-developed spines on lower edge of preoperculum present; cranial bones widened and rough, partly or fully without epidermal cover; scales on body remain partly or fully *Melamphaes eulepis*

Melamphaes eulepis Ebeling, 1962

Other characters: anal-fin origin under the last 1-3 dorsal-fin rays; body uniformly dark to black.



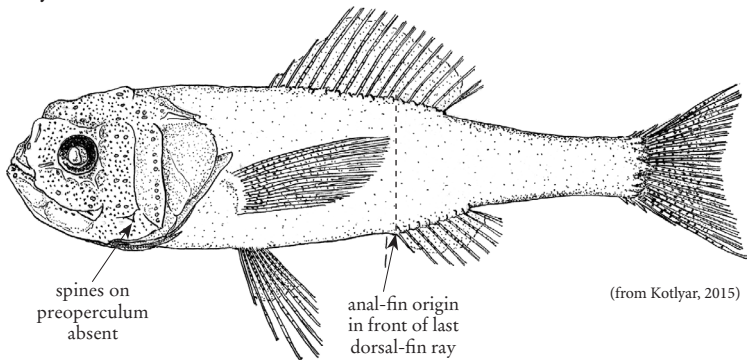
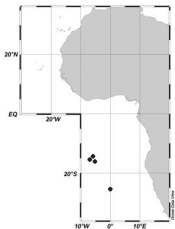
(from Kotlyar, 2014)

Size: 4.8 cm SL

- 4a. Anal-fin origin in front of last dorsal-fin ray (below the 3rd-5th dorsal-fin ray from the end of the fin) *Melamphaes lentiginosus*
 4b. Anal-fin origin under or behind last dorsal-fin ray → 5

Melamphaes lentiginosus Kotlyar, 2015

Other characters: coloration light brown.



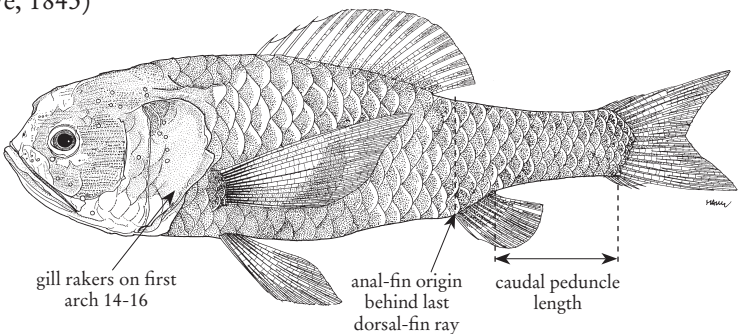
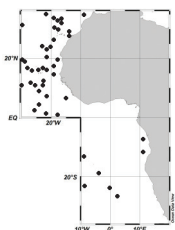
(from Kotlyar, 2015)

Size: 1.8 cm SL

- 5a. Anal-fin origin distinctly behind last dorsal-fin ray; total gill rakers on first arch 14-16 (3-4 + 1 + 10-11); caudal-peduncle depth (measured at its narrowest point) 1.8-2.0 times in its length *Melamphaes typhlops*
 5b. Anal-fin origin under or only slightly behind last dorsal-fin ray; total gill rakers on first arch 12-14 (4-5 + 1 + 12-14); caudal-peduncle depth (measured at its narrowest point) 2.1-3.4 times in its length → 6

Melamphaes typhlops (Lowe, 1843)

Other characters: pectoral fins reach last dorsal-fin ray; body uniformly dark brown to black.



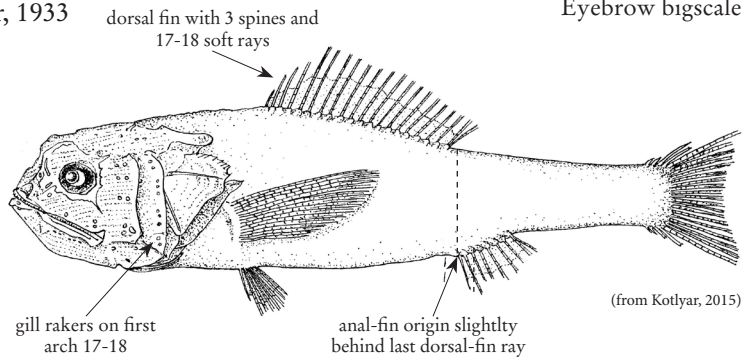
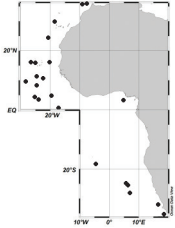
Size: 10.0 cm SL

- 6a. Dorsal fin with 3 spines and 17-18 soft rays. *Melamphaes longivelis*
 6b. Dorsal fin with 3 spines and 14-16 soft rays → 7

Melamphaes longivelis Parr, 1933

Eyebrow bigscale

Other characters: body uniformly dark to black.



(from Kotlyar, 2015)

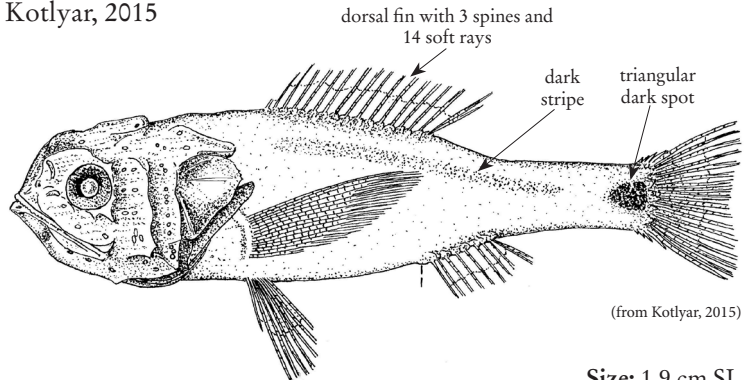
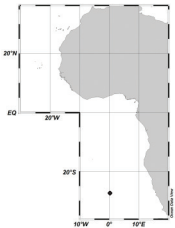
Size: 12.7 cm SL

- 7a. Dorsal fin with 3 spines and 14 soft rays; immature specimens with a dark longitudinal stripe from below dorsal fin to middle of caudal peduncle and a triangular dark spot on peduncle just before caudal fin
 *Melamphaes kobylyanskyi*

Melamphaes kobylyanskyi Kotlyar, 2015

Other characters: no information.

Remarks: the holotype (1.9 cm SL) is the only known specimen.



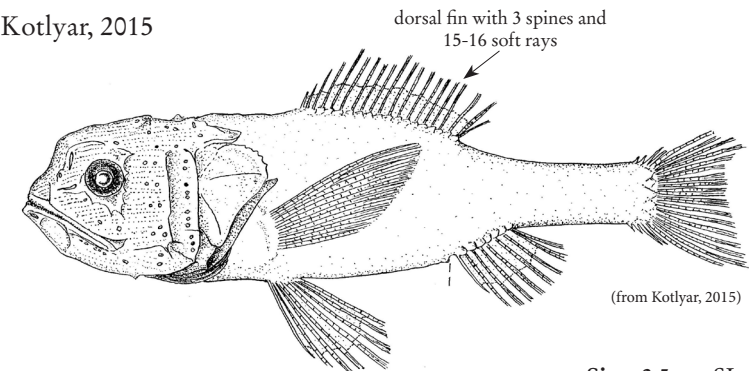
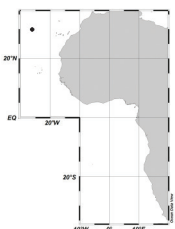
(from Kotlyar, 2015)

Size: 1.9 cm SL

- 7b. Dorsal fin with 3 spines and 15-16 soft rays; immature specimens without dark markings on flanks and caudal peduncle *Melamphaes inconspicuus*

Melamphaes inconspicuus Kotlyar, 2015

Other characters: no information.



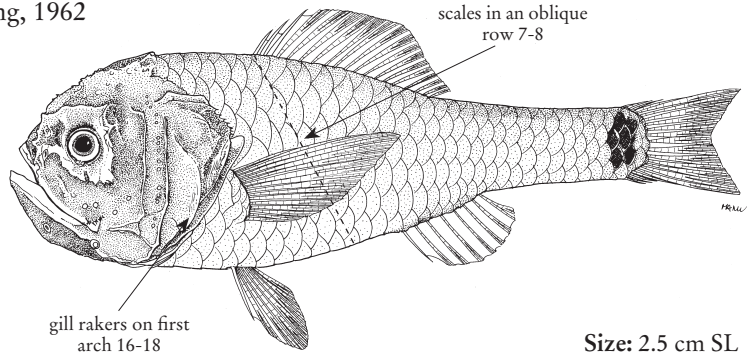
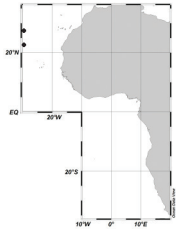
(from Kotlyar, 2015)

Size: 2.5 cm SL

- 8a. Scales in an oblique row from dorsal-fin origin to the direction of the anal fin 7-8; gill rakers on the first arch 4 + 1 + 11-13 (total 16-18) *Melamphaes pumilus*
- 8b. Scales in an oblique row from dorsal-fin origin to the direction of the anal fin 10-11 → 9

Melamphaes pumilus Ebeling, 1962

Other characters: no information.

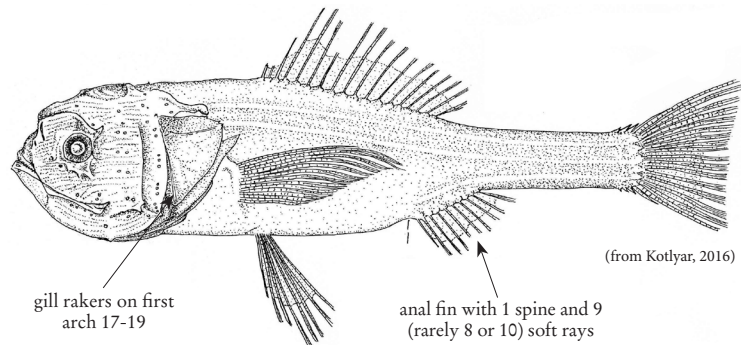
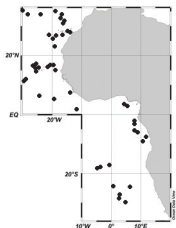


Size: 2.5 cm SL

- 9a. Total gill rakers on first arch 17-19 (4-5 + 1 + 12-13); anal fin with 1 spine and 9 (rarely 8 or 10) soft rays *Melamphaes simus*

Melamphaes simus Ebeling, 1962

Other characters: many (not all) specimens with 3 longitudinal albescent stripes (two running from head to caudal fin, one from anterior margin of anal fin to caudal fin).



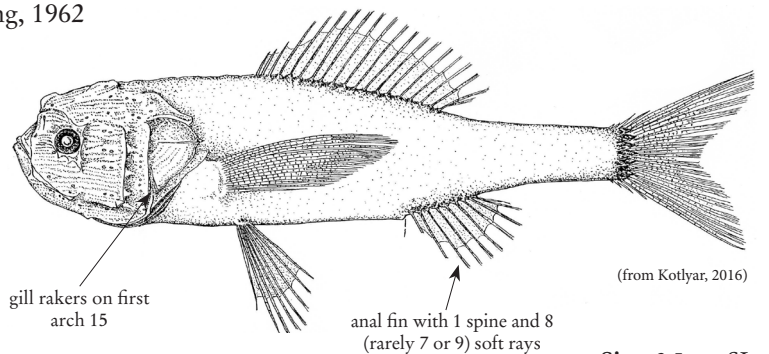
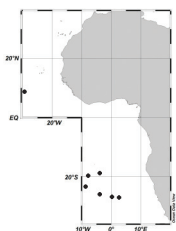
(from Kotlyar, 2016)

Size: 2.9 cm SL

- 9b. Total gill rakers on first arch 15 (3 + 1 + 11); anal fin with 1 spine and 8 (rarely 7 or 9) soft rays *Melamphaes hubbsi*

Melamphaes hubbsi Ebeling, 1962

Other characters: no information.



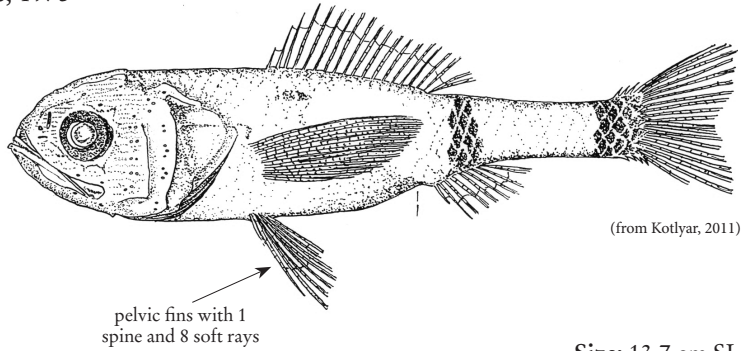
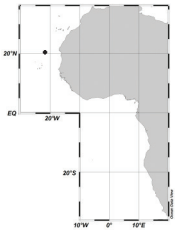
(from Kotlyar, 2016)

Size: 2.5 cm SL

- 10a. Pelvic fin with 1 spine and 8 soft rays *Melamphaes ebelingi*
 10b. Pelvic fin with 1 spine and 7 soft rays → 11

Melamphaes ebelingi Keene, 1973

Other characters: small specimens with vertical dark stripe above anal fin and just before caudal fin; stripes getting less prominent with growth.



(from Kotlyar, 2011)

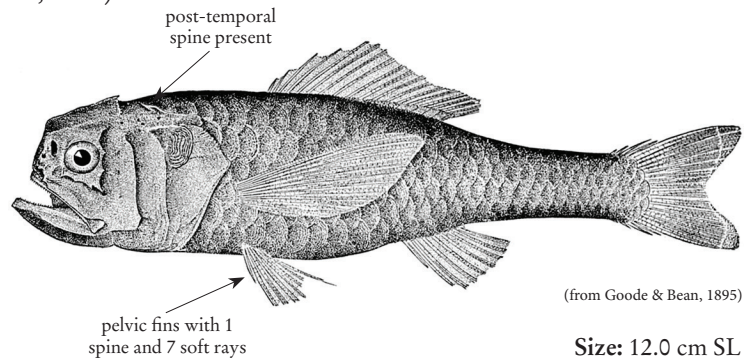
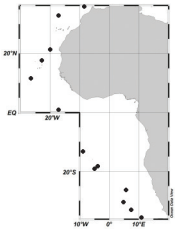
Size: 13.7 cm SL

- 11a. Post-temporal/temporal spine present and directed anteriorly-upwards . . . *Melamphaes suborbitalis*
 11b. Post-temporal/temporal spine absent → 12

Melamphaes suborbitalis (Gill, 1883)

Shoulderspine bigscale

Other characters: no information.



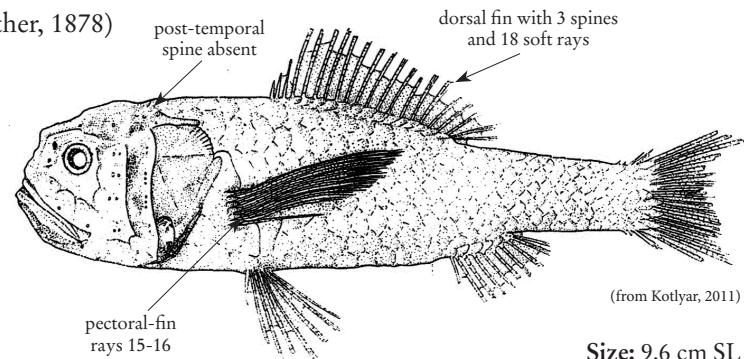
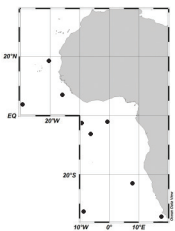
(from Goode & Bean, 1895)

Size: 12.0 cm SL

- 12a. Pectoral-fin rays 15-17 (if 15 then 18 dorsal-fin rays) → 13
 12b. Pectoral-fin rays 14-15 (if 15 then 13-16 dorsal-fin rays) → 14
 13a. Dorsal fin with 3 spines and 18 soft rays; scales in an oblique row from dorsal-fin origin to the direction of the anal fin 8 *Melamphaes microps*

Melamphaes microps (Günther, 1878)

Other characters: no information.



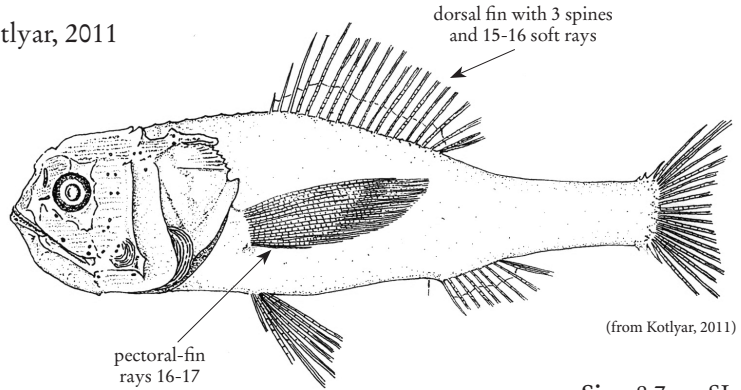
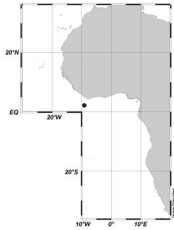
(from Kotlyar, 2011)

Size: 9.6 cm SL

13b. Dorsal fin with 3 spines and 15-16 soft rays; scales in an oblique row from dorsal-fin origin to the direction of the anal fin 9-10 *Melamphaes manifestus*

Melamphaes manifestus Kotlyar, 2011

Other characters: no information.



(from Kotlyar, 2011)

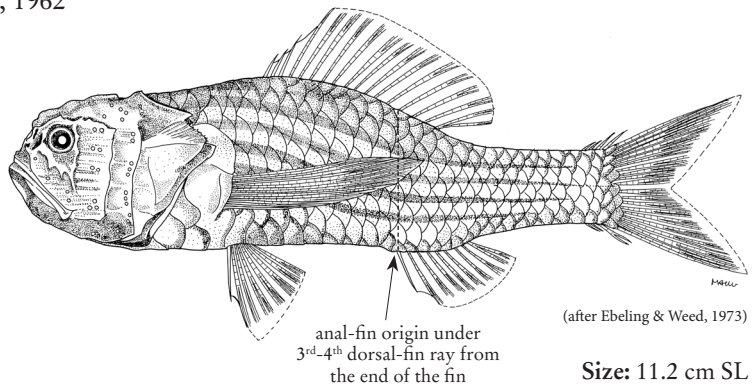
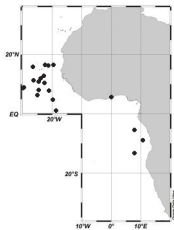
Size: 8.7 cm SL

14a. Anal-fin origin under 3rd-4th dorsal-fin ray from the end of the fin *Melamphaes leprus*

14b. Anal-fin origin under or behind last dorsal-fin ray → 15

Melamphaes leprus Ebeling, 1962

Other characters: no information.



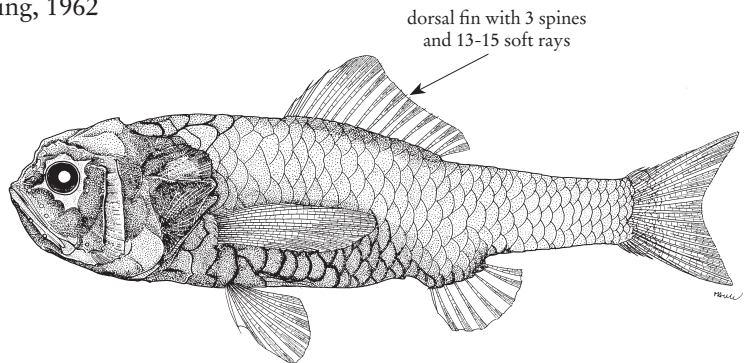
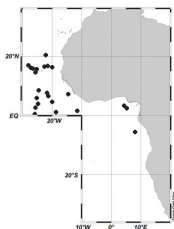
(after Ebeling & Weed, 1973)

Size: 11.2 cm SL

15a. Dorsal fin with 3 spines and 13-15 soft rays; eye diameter 10.0-16.3% in head length
. *Melamphaes polylepis*

Melamphaes polylepis Ebeling, 1962

Other characters: no information.



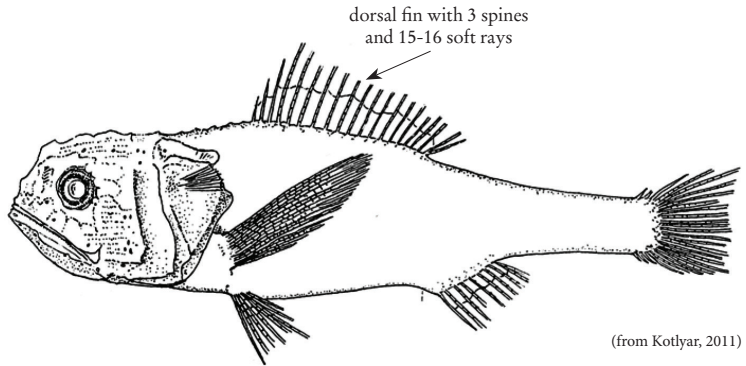
Size: 6.8 cm SL

15b. Dorsal fin with 3 spines and 15-16 soft rays; eye diameter 16.4-19.2% in head length.
 *Melamphaes falsidicus*

Melamphaes falsidicus Kotlyar, 2011

Other characters: no information.

Remarks: the species inhabits the northern Atlantic Ocean (approximately 34°–58°N) in the temperate and northern part of the subtropical zone.



(from Kotlyar, 2011)

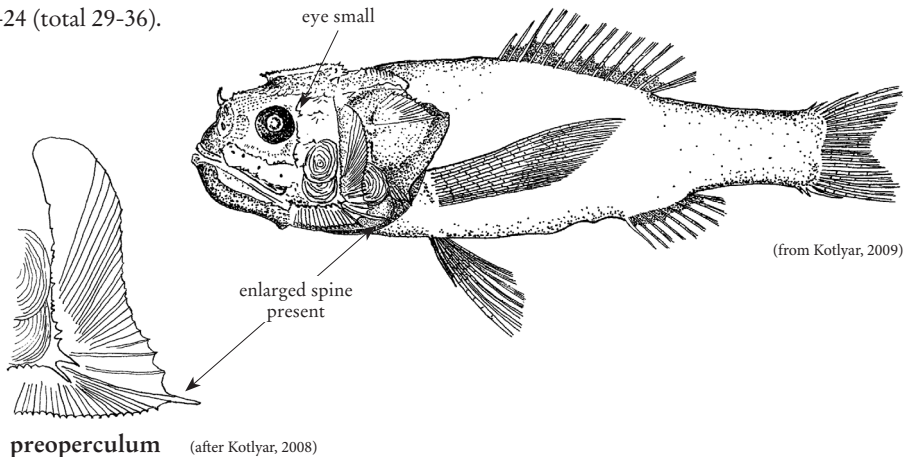
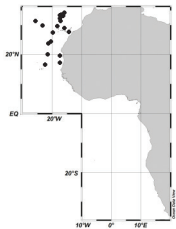
Size: 8.7 cm SL

KEY TO THE SPECIES OF *POROMITRA* OCCURRING IN THE AREA

- 1a. Enlarged spine at the angle of the preoperculum present. *Poromitra capito*
- 1b. Enlarged spine at the angle of the preoperculum absent → 2

Poromitra capito Goode & Bean, 1883

Other characters: gill rakers on first arch 10-12 + 1 + 18-24 (total 29-36).



(from Kotlyar, 2009)

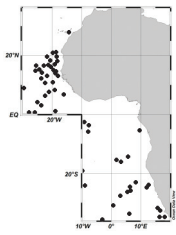
preoperculum (after Kotlyar, 2008)

Size: 10.2 cm SL

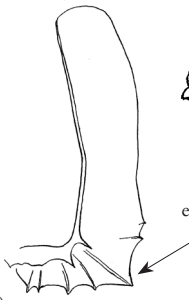
- 2a. Eye small, clearly less than 25% (12.8-21.3%) head length → 3
- 2b. Eye large, 31.3-34.4% head length *Poromitra megalops*

***Poromitra megalops* (Lütken, 1878)**

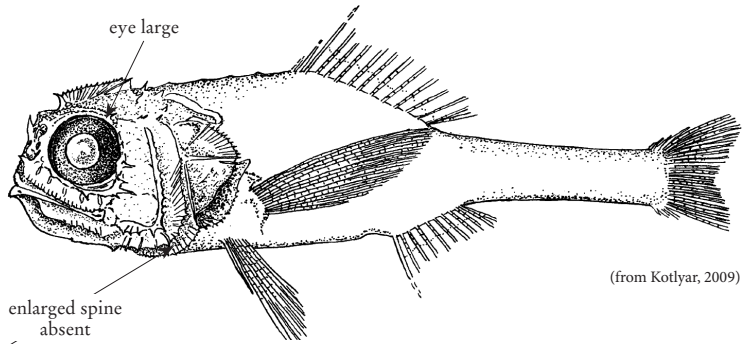
Other characters: gill rakers on first arch 8+1+17-19 (total 26-28).



(after Kotlyar, 2009)



preoperculum



(from Kotlyar, 2009)

Size: 6.4 cm SL

- 3a. Angular part of the preoperculum rounded and spinulated along the lower and posterior margins (Fig. 1a) → 4
- 3b. Angular part of the preoperculum with an unspinulated notch (Fig. 1b) → 5

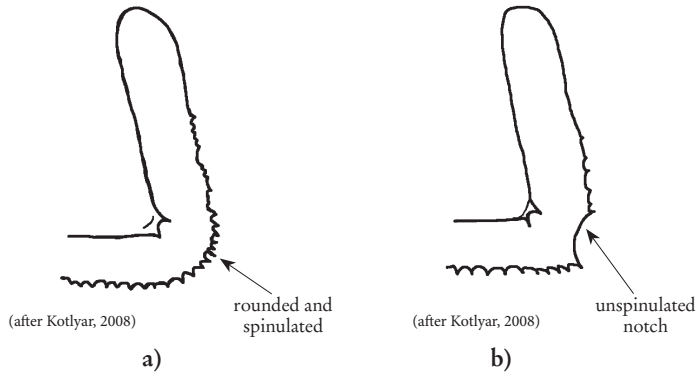


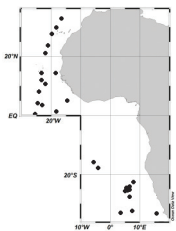
Fig. 1 Preoperculum

- 4a. Dorsal fin with 3 spines and 12-13 soft rays; total gill rakers on first arch 28-30 (8-10 + 1 + 18-20); pelvic-fin origin behind vertical of posterior margin of pectoral-fin insertion *Poromitra crassiceps*

***Poromitra crassiceps* (Günther, 1878)**

Crested bigscale

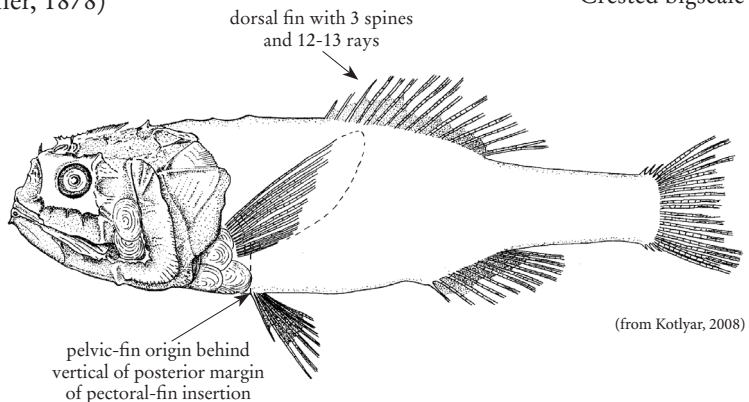
Other characters: no information.



(after Kotlyar, 2008)



preoperculum



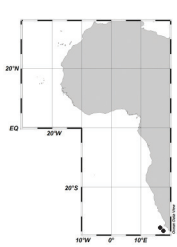
(from Kotlyar, 2008)

Size: 18.7 cm SL

4b. Dorsal fin with 3 spines and 10 soft rays; total gill rakers on first arch 31 (9 + 1 + 21); pelvic-fin origin in front or at level of vertical of posterior margin of pectoral-fin insertion. *Poromitra coronata*

Poromitra coronata (Gilchrist & von Bonde, 1924)

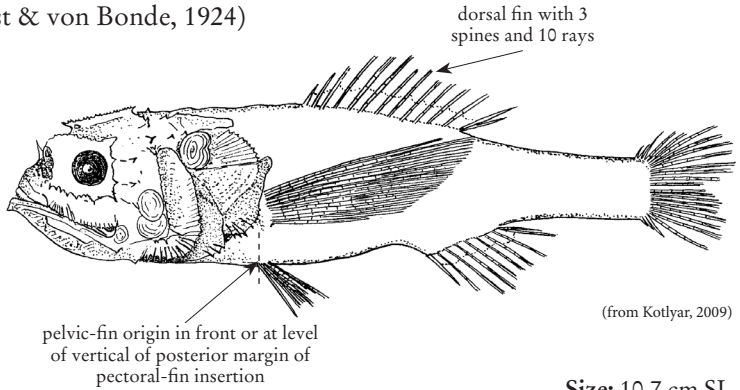
Other characters: no information.



(after Kotlyar, 2008)



preoperculum



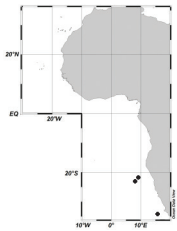
(from Kotlyar, 2009)

Size: 10.7 cm SL

5a. Dorsal fin with 3 spines and 14-16 soft rays; anal fin originates below the 7th-12th dorsal-fin ray from the end of the fin; upper jaw extends to the vertical of the posterior margin of the eye or slightly does not reach this vertical *Poromitra atlantica*

Poromitra atlantica (Norman, 1929)

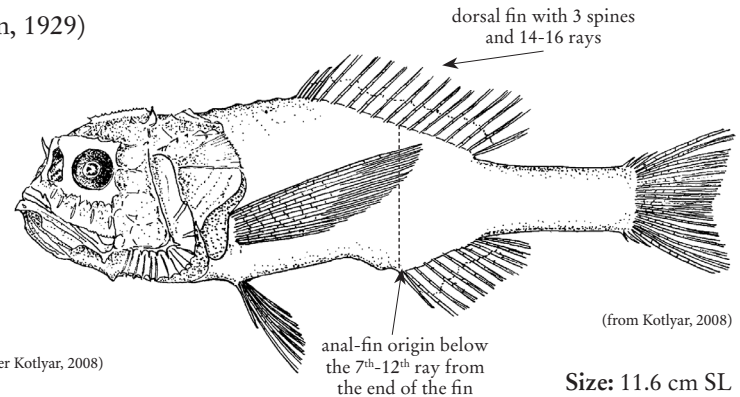
Other characters: no information.



(after Kotlyar, 2008)



preoperculum



(from Kotlyar, 2008)

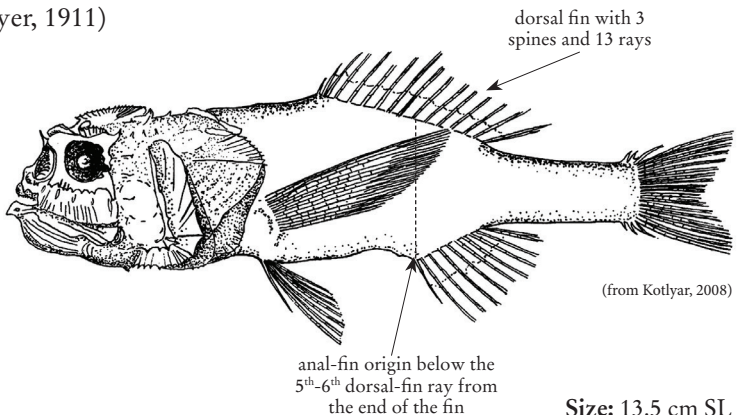
Size: 11.6 cm SL

5b. Dorsal fin with 3 spines and 13 soft rays; anal fin originates below the 5th-6th dorsal-fin ray from the end of the fin; upper jaw extends beyond the vertical of the posterior eye margin *Poromitra nigriceps*

Poromitra nigriceps (Zugmayer, 1911)

Other characters: no information.

Remarks: *P. nigriceps* inhabits the northern part of the Atlantic Ocean, from Greenland in the north to the Azores in the south (Kotlyar, 2009).



(from Kotlyar, 2008)

Size: 13.5 cm SL

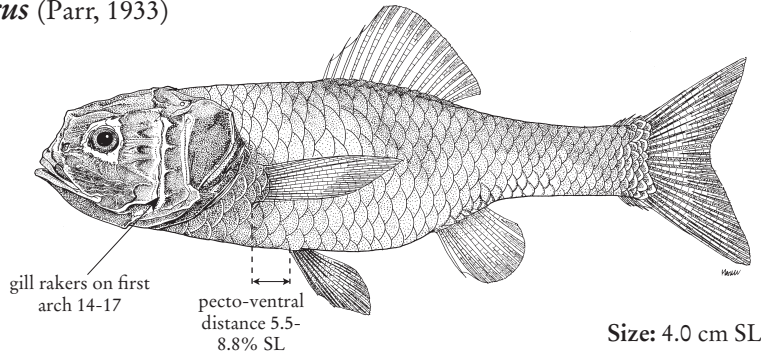
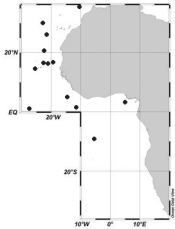
KEY TO THE SPECIES OF *SCOPELOBERYX* OCCURRING IN THE AREA

1a. Total gill rakers on first arch 14-17 (3-4 + 1 + 10-12); pecto-ventral distance (horizontal distance between the verticals through the ventral margin of the pectoral fin and the origin of the pelvic fin) 5.5-8.8% Standard Length *Scopeloberyx opisthopterus*

1b. Total gill rakers on first arch 20-23; pecto-ventral distance 1.0-4.0% Standard Length → 2

Scopeloberyx opisthopterus (Parr, 1933)

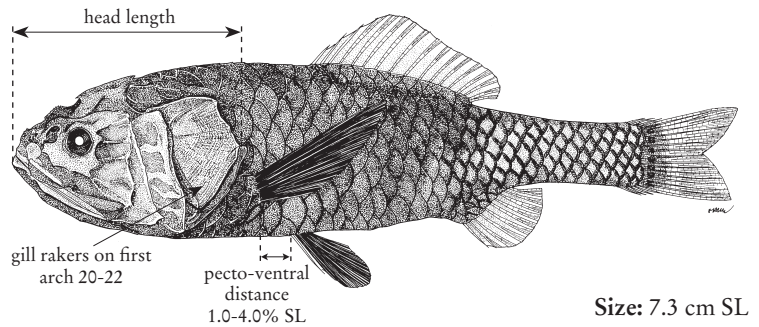
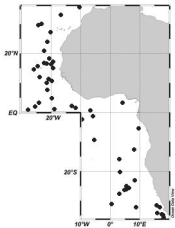
Other characters: no information.



2a. Total gill rakers on first arch 20-22 (5 + 1 + 14-16); head length 32.4-41.7% Standard Length
 *Scopeloberyx robustus*

Scopeloberyx robustus (Günther, 1887)

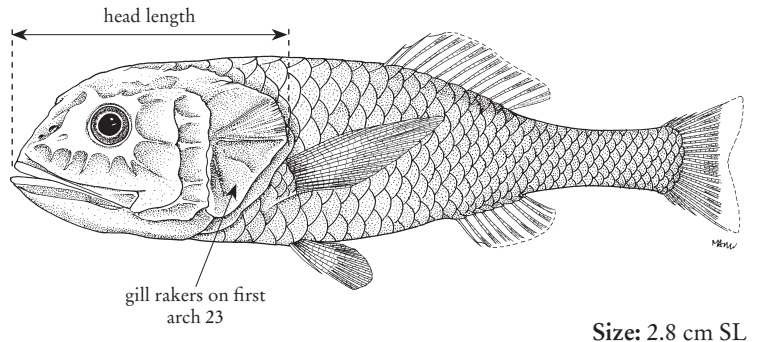
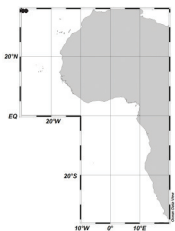
Other characters: no information.



2b. Total gill rakers on first arch 23; head length 44.6-50.0% Standard Length . . . *Scopeloberyx rubriventer*

Scopeloberyx rubriventer (Koefoed, 1953)

Remarks: only known from south of the Azores (36°53'N, 29°47'W).

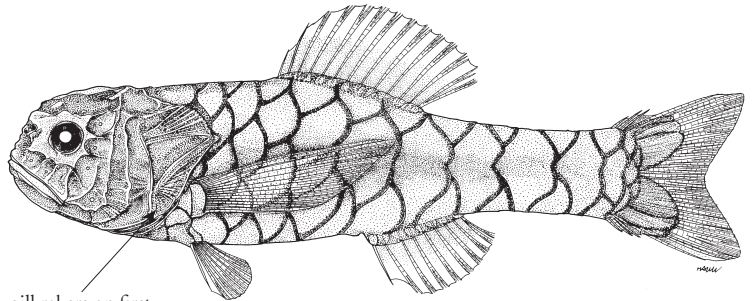
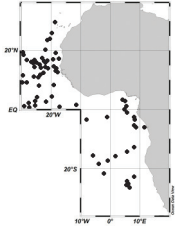


KEY TO THE SPECIES OF *SCOPELOGADUS* OCCURRING IN THE AREA

1a. Total gill rakers on first arch 21-26 (6-8 + 15-18); stomach noticeably darkened posteriorly.
 *Scopelogadus mizolepis*

Scopelogadus mizolepis (Günther, 1878)

Other characters: no information.



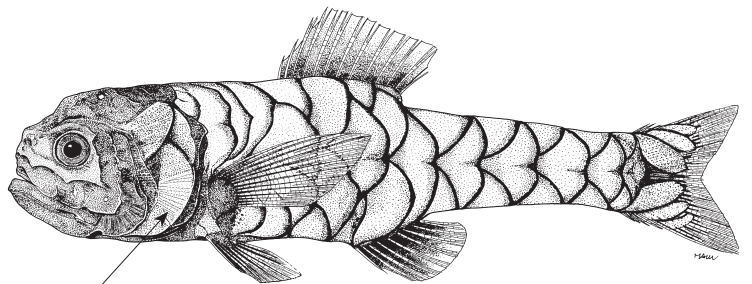
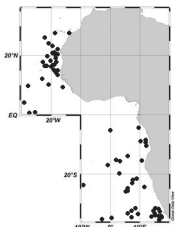
gill rakers on first arch 21-26

Size: 9.4 cm SL

1b. Total gill rakers on first arch 26-32 (8-10 + 18-22); stomach not darkened posteriorly
 *Scopelogadus beanii*

Scopelogadus beanii (Günther, 1887)

Other characters: no information.



gill rakers on first arch 26-32

Size: 12.2 cm SL

TRACHICHTHYIFORMES

Fangtooths and Spinyfins

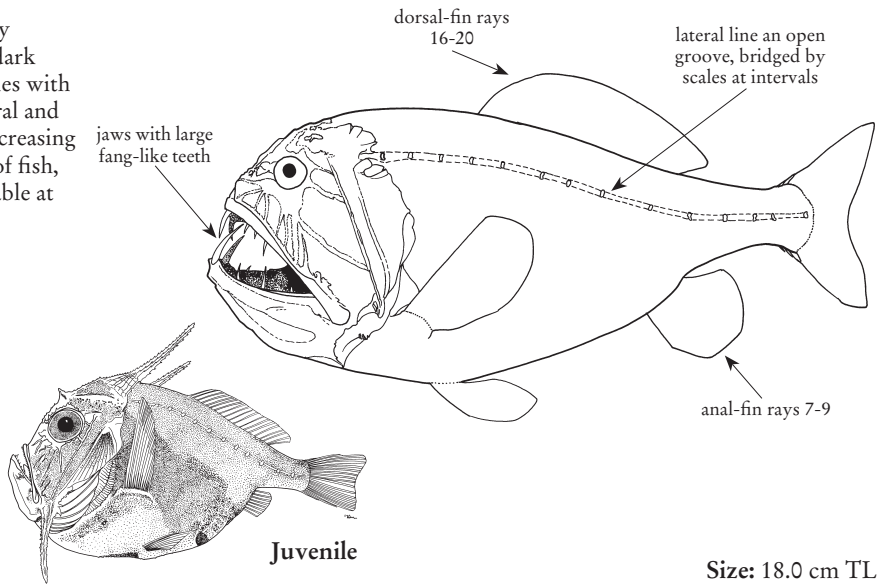
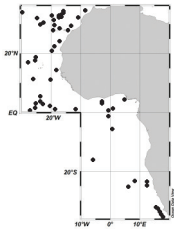
KEY TO THE FAMILIES OF TRACHICHTHYIFORMES OCCURRING IN THE AREA

1a. Body deep, only compressed posteriorly; lateral line an open groove, bridged by scales at intervals; jaws with large fang-like teeth; no fin spines; dorsal-fin rays 16-20, anal-fin rays 7-9, dorsal-fin base 2-4 times longer than anal-fin base; lower lobe of caudal fin prolonged; dorsal adipose fin absent; eyes large, tubular and directed anteriorly **Anoplogastridae** (only one species in the area: *Anoplogaster cornuta*)

Anoplogaster cornuta (Valenciennes, 1833)

Common Fangtooth

Other characters: body uniformly blackish or dark blackish brown; juveniles with prominent long temporal and preopercular spines, decreasing in length with growth of fish, short but still recognisable at 7.5 cm SL.



1b. Body high and strongly compressed, disc-like or oval; no visible lateral line; teeth small in villiform bands; only pelvic fins with one strong, serrated spine; dorsal-fin rays 24-30, anal-fin rays 18-24; dorsal- and anal-fin bases subequal in length (Fig. 1) **Diretmidae** (p. 248)

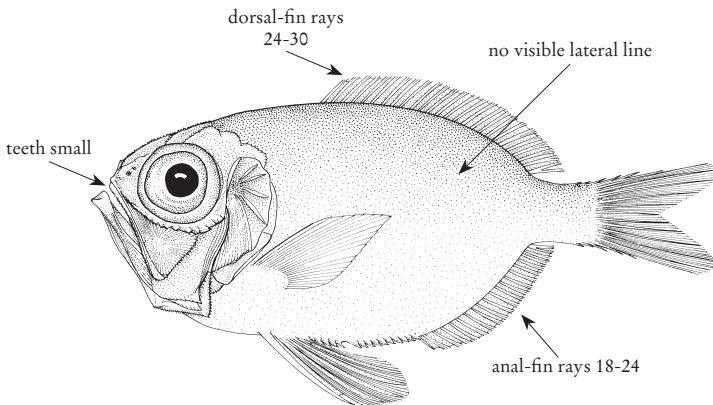


Fig. 1 Diretmidae

DIRETMIDAE

Spinyfins

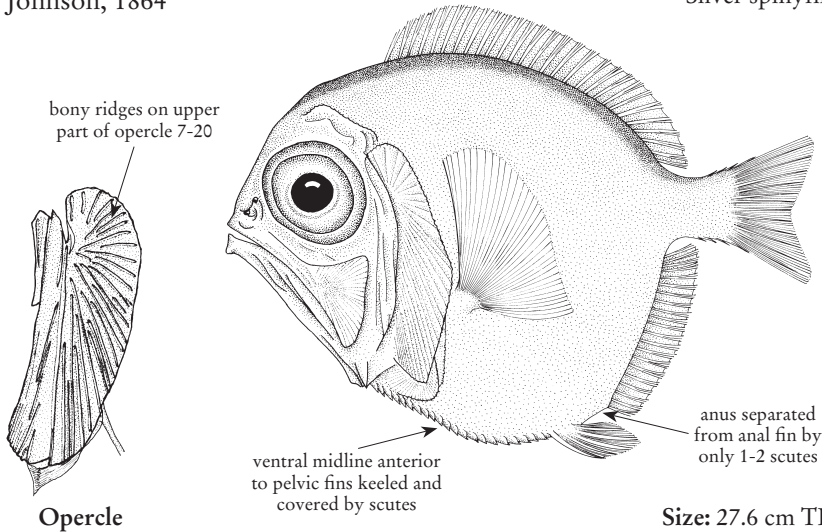
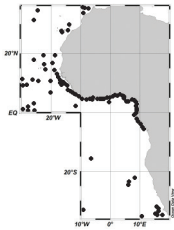
KEY TO THE SPECIES OF DIRETMIDAE OCCURRING IN THE AREA

- 1a. Anus immediately anterior to anal fin or separated from it by only 1-2 scutes; ventral midline anterior to pelvic fins keeled and covered by scutes; bony ridges on upper part of opercle 7-20; body profile in adults round or rhomboid ***Diretmus argenteus***
- 1b. Anus separated from anal fin by at least 5 scutes, midway between pelvic and anal fins; ventral midline anterior to pelvic fins not keeled but normally scaled; bony ridges on upper part of opercle 3-6; body profile in adults oval or elliptical → 2

Diretmus argenteus Johnson, 1864

Silver spinyfin

Other characters: body black dorsally, silvery on sides; large adults very dark brown.

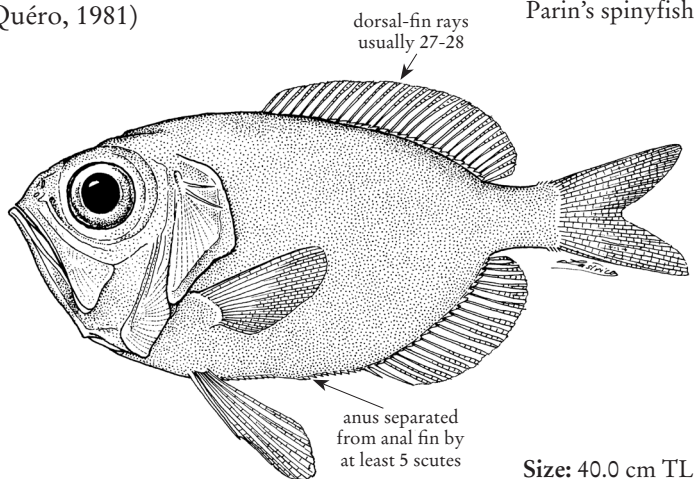
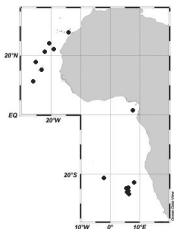


- 2a. Dorsal-fin rays 26-30 (usually 27 or 28); pelvic-fin tips extend to or beyond anal-fin origin; gill rakers on first arch 16-20. ***Diretmichthys parini***

Diretmichthys parini (Post & Quéro, 1981)

Parin's spinyfish

Other characters: adults greyish-black in colour.

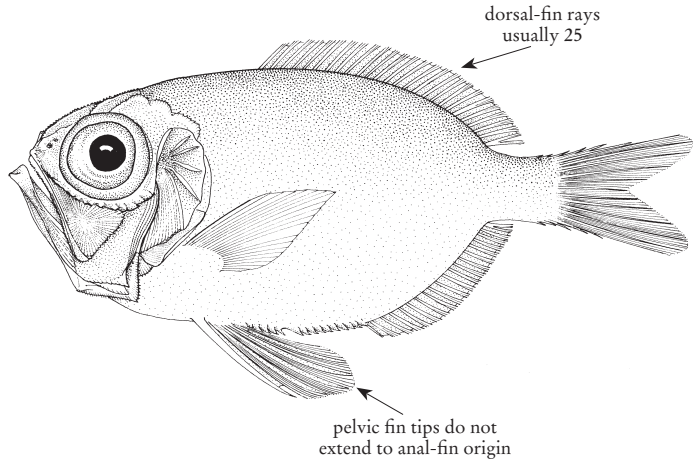
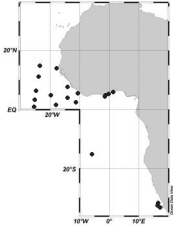


2b. Dorsal-fin rays 24-26 (usually 25); pelvic-fin tips do not extend to anal-fin origin; gill rakers on first arch 12-16. *Diretmoides pauciradiatus*

Diretmoides pauciradiatus (Woods, 1973)

Longwing spinyfin

Other characters: adults
greyish- black in colour.



Size: 37.0 cm SL

OPHIDIIFORMES - PARABROTULIDAE

False brotulas

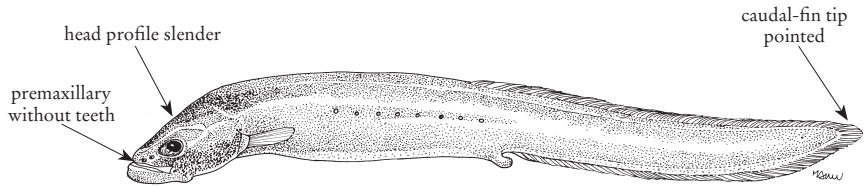
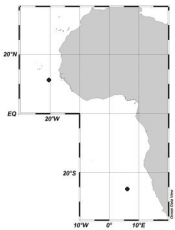
KEY TO THE SPECIES OF PARABROTULIDAE OCCURRING IN THE AREA

1a. Black to brownish skin; premaxillaries without teeth; head profile slender; caudal-fin tip pointed Parabrotula plagiophthalma

Parabrotula plagiophthalma Zugmayer, 1911

False cusk

Other characters: skin loose, thin but not gelatinous.

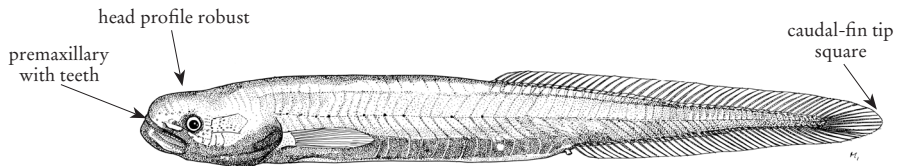


Size: 5.4 cm SL

1b. Skin ransparent; premaxillaries with teeth; head profile robust; caudal-fin tip square. Leucobrotula adipata

Leucobrotula adipata Koefoed, 1952

Remarks: no records in the area (closest specimen collected at 37°08'N, 13°0'W).



Size: 4.5 cm SL

SCOMBRIFORMES

Tunas and relatives

KEY TO THE FAMILIES OF SCOMBRIFORMES OCCURRING IN THE AREA

- 1a. Pelvic fins developed, each with 1 spine and 4-5 rays (Figs. 1, 3-6) → 2
- 1b. Pelvic fins reduced, each with 0-1 spine and fewer than 4 rays (Fig. 2) → 8

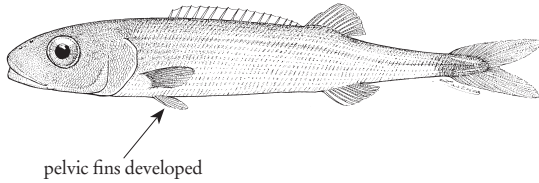


Fig. 1 Tetragonuridae

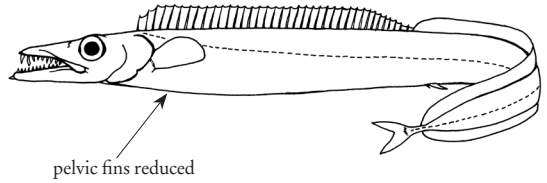


Fig. 2 Trichiuridae

- 2a. Body fusiform; series of finlets behind second dorsal and anal fins; 2 or more keels on caudal peduncle (Fig. 3) → 3
- 2b. Body variable in shape, series of finlets behind second dorsal and anal fins absent (Fig. 4) → 4

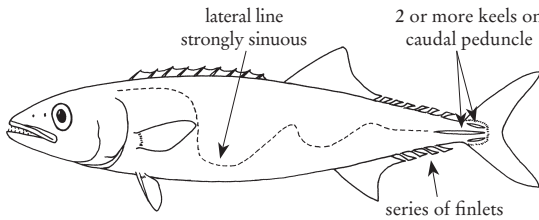


Fig. 3 Gempylidae

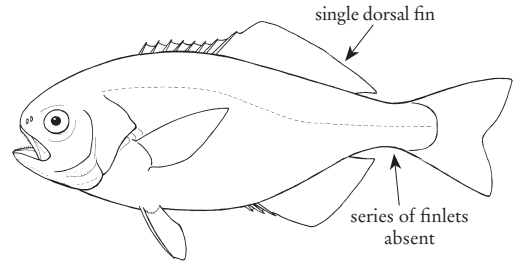
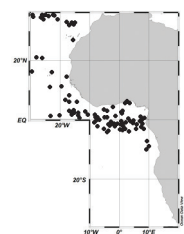


Fig. 4 Centrolophidae

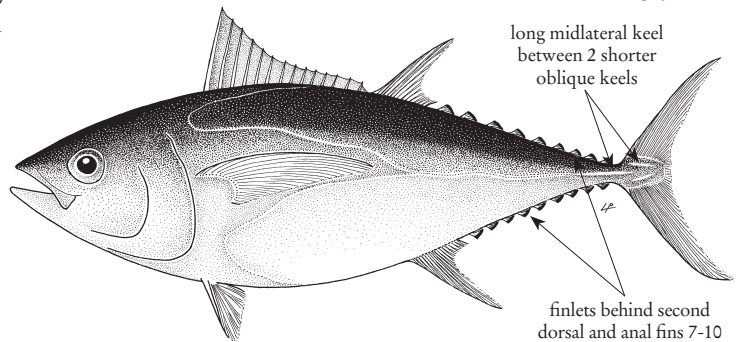
- 3a. Jaw teeth small; finlets behind second dorsal and anal fins 7-10; caudal peduncle bearing a long midlateral keel between 2 shorter oblique keels **Scombridae** (only one mesopelagic species: *Thunnus obesus*)
- 3b. Jaw teeth large, often fanglike; lateral line strongly sinuous (Fig. 3) . . . **Gempylidae (in part)**(p. 257)

Thunnus obesus (Lowe, 1839)

Other characters: lower sides and belly whitish; first dorsal fin deep yellow, second dorsal and anal fins light yellow; finlets bright yellow edged with black.



Bigeye tuna



Size: 250.0 cm TL

- 4a. Single dorsal fin, may be notched to 1/2 of fin height; jaw teeth fine and uniserial (Fig. 4)
 **Centrolophidae (p. 255)**
- 4b. Two separate dorsal fins, or single dorsal fin notched more than 1/2 of fin height (Fig. 5). → 5
- 5a. First dorsal-fin base shorter than second dorsal-fin base; body with symmetrical dorsal and ventral profiles (Fig. 5). **Nomeidae (p. 261)**
- 5b. First dorsal-fin base longer than second dorsal-fin base, or spinous section of dorsal fin longer than rayed section (Fig. 6) → 6

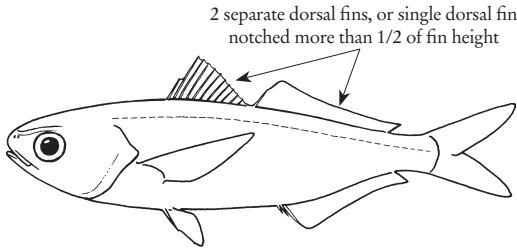


Fig. 5 Nomeidae

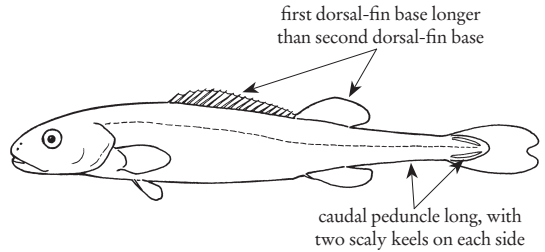


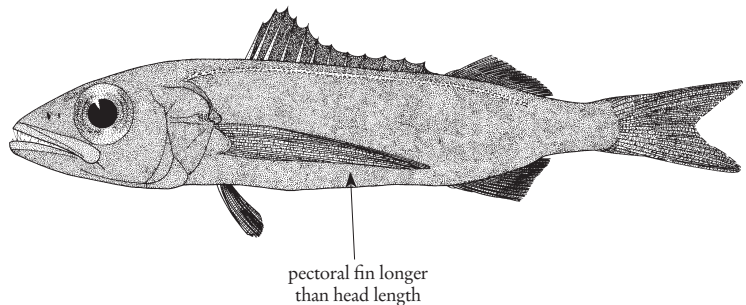
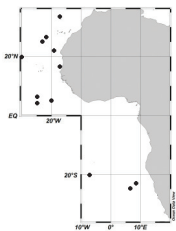
Fig. 6 Tetragonuridae

- 6a. Caudal peduncle long, with 2 scaly keels on each side (almost square in cross section)(Fig. 6)
 **Tetragonuridae (p. 267)**
- 6b. Caudal peduncle compressed; no scaly keels → 7
- 7a. Pectoral fin longer than head length; lower limb of first gill arch with 4-5 toothed gill rakers
 **Scombrolabracidae (only one species in this family: *Scombrolabrax heterolepis*)**
- 7b. Pectoral fin shorter than head length; lower limb of first gill arch without gill rakers or with gill rakers represented by tubercles **Gempylidae (in part)(p. 257)**

***Scombrolabrax heterolepis* Roule, 1921**

Longfin escolar

Other characters: body dark brown in colour.



Size: 30.0 cm TL

- 8a. Caudal fin well developed; spinous section of dorsal fin longer than rayed section; paired nares on each side of snout (Fig. 7) **Gempylidae (in part)(p. 257)**
- 8b. Caudal fin very small or absent; spinous section of dorsal fin shorter than rayed section; single nare on each side of snout (Fig. 8) **Trichiuridae (p. 267)**

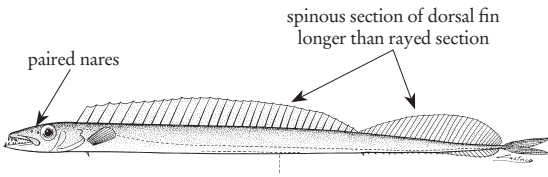


Fig. 7 Gempylidae

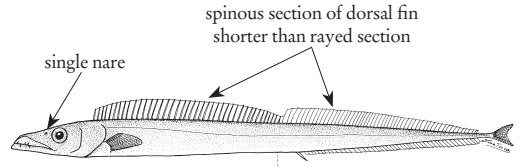


Fig. 8 Trichiuridae

CENTROLOPHIDAE

Medusafishes (Ruffs, Barrelfish)

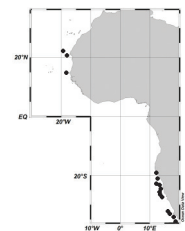
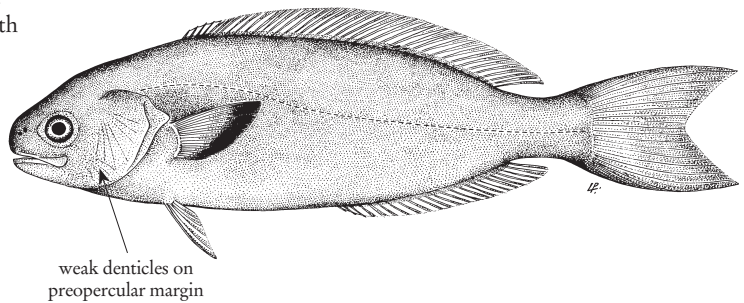
**KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF
CENTROLOPHIDAE OCCURRING IN THE AREA**

- 1a. Weak denticulations on preopercular margin; dorsal-fin origin usually well behind pectoral-fin insertion (but over pectoral-fin insertion in very small specimens); body elongate, maximum depth usually less than 30% Standard Length *Centrolophus niger*
- 1b. Small spines on preopercular margin 9-15; dorsal-fin origin usually before pectoral-fin insertion (but over pectoral-fin insertion in very large specimens); body deep, maximum depth usually greater than 35% Standard Length (except for *Schedophilus huttoni*) *Schedophilus* (p. 255)

Centrolophus niger (Gmelin, 1789)

Rudderfish

Other characters: dark brown to black, occasionally almost bluish; median and pelvic fins darker than body; young with 2-4 vertical bars.



Size: 150.0 cm SL

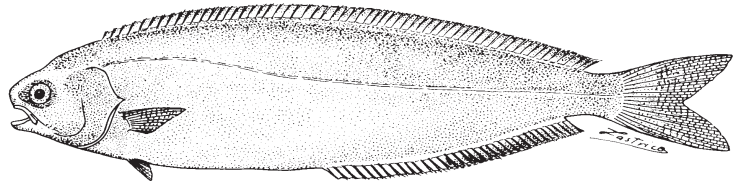
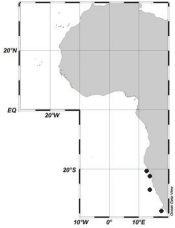
KEY TO THE SPECIES OF *SCHEDOPHILUS* OCCURRING IN THE AREA

- 1a. Total dorsal-fin elements 28-42; dorsal- and anal-fin spines distinct; body usually firm → 2
- 1b. Total dorsal-fin elements 55-65; dorsal- and anal-fin spines weak; body soft and flabby.
 *Schedophilus huttoni*

Schedophilus buttoni (Waite, 1910)

New Zealand ruffe

Other characters: plain blackish grey to brown in colour; inside of mouth and opercles black.



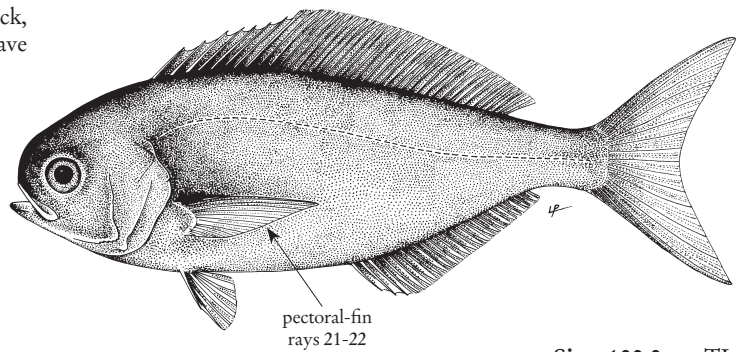
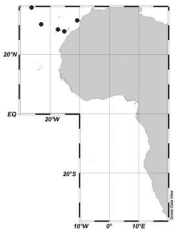
Size: 90.0 cm TL

- | | |
|--|----------------------------|
| 2a. Dorsal-fin rays 31-34 | → 3 |
| 2b. Dorsal-fin rays 29 or fewer | → 4 |
| 3a. Pectoral-fin rays 21-22; predorsal bones 2 | <i>Schedophilus ovalis</i> |

Schedophilus ovalis (Cuvier, 1833)

Imperial blackfish

Other characters: dark green on the back, silvery on the sides and below; young have a mottled pattern.



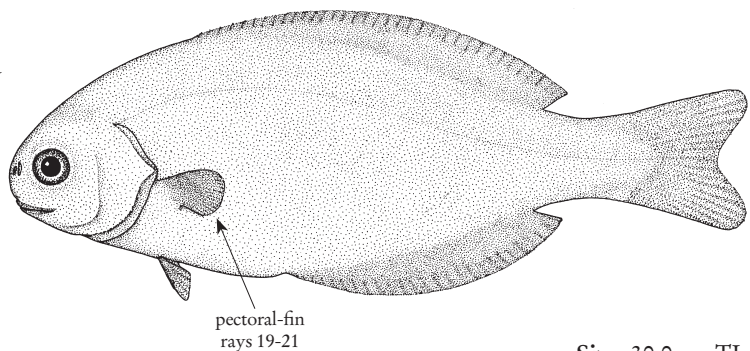
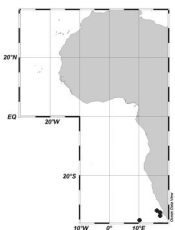
Size: 100.0 cm TL

- | | |
|--|-------------------------------|
| 3b. Pectoral-fin rays 19-21; predorsal bones 3 | <i>Schedophilus maculatus</i> |
|--|-------------------------------|

Schedophilus maculatus Günther, 1860

Pelagic butterfish

Other characters: juveniles with dark and light ill-defined vertical bands or dark blotches extending onto median fins; pectoral fins dusky and pelvic fins black.



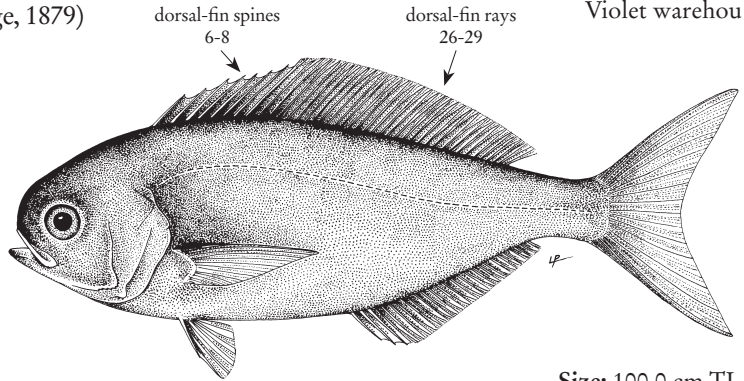
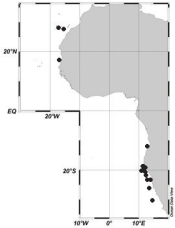
Size: 30.0 cm TL

4a. Dorsal-fin with 6-8 spines and 26-29 rays; anal-fin with 3 spines and 18-20 rays; dark green dorsally, silvery laterally and ventrally *Schedophilus velaini*

Schedophilus velaini (Sauvage, 1879)

Other characters: no information.

Violet warehou



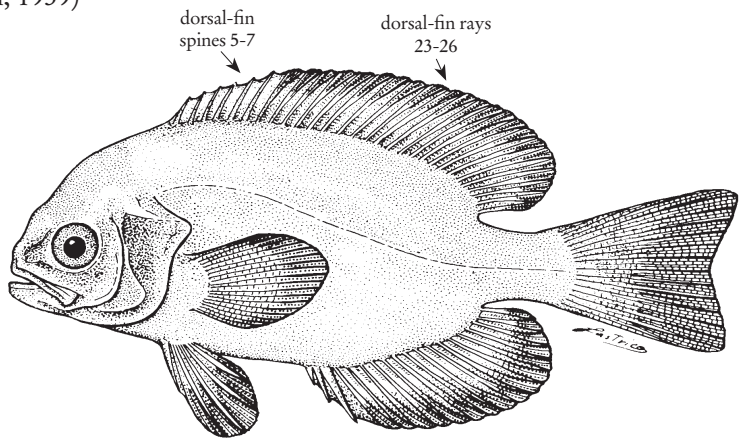
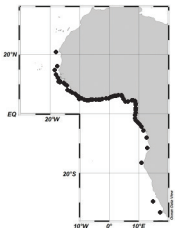
Size: 100.0 cm TL

4b. Dorsal-fin with 5-7 spines and 23-26 rays; anal-fin with 3 spines and 16-18 rays; dark grey-blue to brownish in colour *Schedophilus pamarco*

Schedophilus pamarco (Poll, 1959)

Other characters: juveniles with irregular horizontal stripes on flanks; adults with fins darker than body, pelvic fins black, inner side of opercle black and eyes bluish.

Pamarco blackfish



Size: 50.0 cm TL

GEMPYLIDAE

Snake mackerels, Escolars and Oilfishes

KEY TO THE SPECIES OF GEMPYLIDAE OCCURRING IN THE AREA

- 1a. Dorsal-fin elements more than 60; distance from anus to anal fin equal to or greater than snout length (Fig. 1) → 2
- 1b. Dorsal-fin elements, including finlets, less than 55; distance from anus to anal-fin origin much shorter than snout length, about equal to eye diameter (Fig. 2) → 3

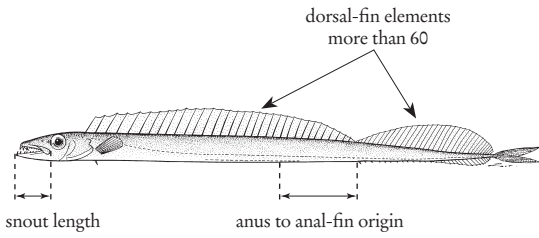


Fig. 1

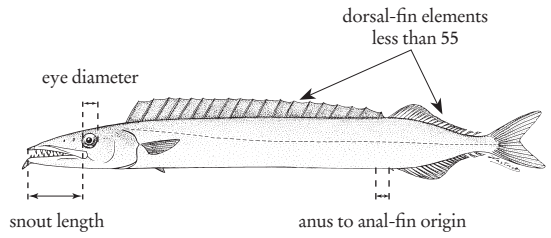


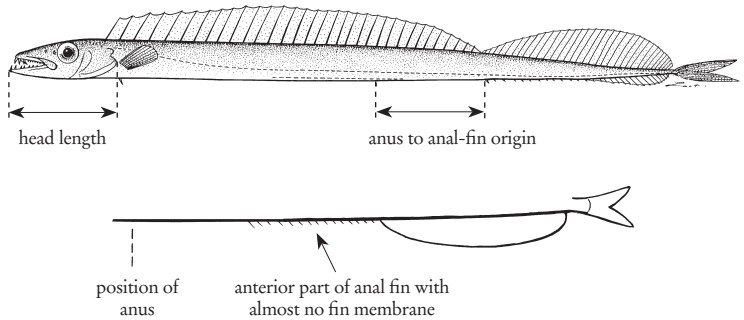
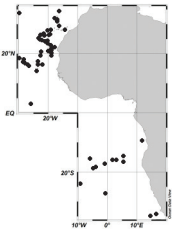
Fig. 2

2a. Anus midway between tip of snout and tip of caudal fin, in front of first anal-fin spine by a distance equal to head length (much longer than snout length); anterior part of anal fin with almost no fin membrane *Diplospinus multistriatus*

Diplospinus multistriatus Maul, 1948

Striped escolar

Other characters: colour silvery with narrow dark dotted lines along the body; gill membranes jet-black.



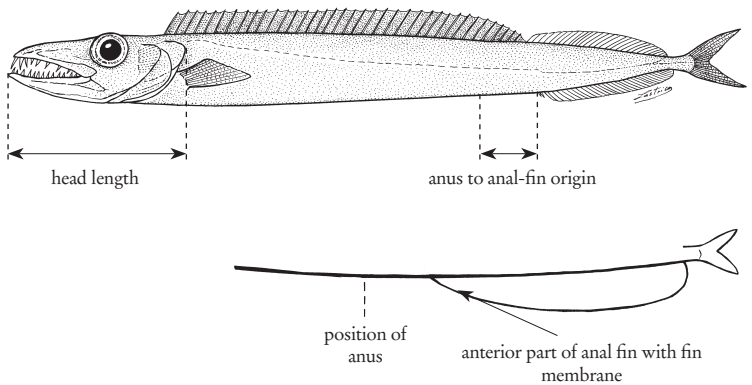
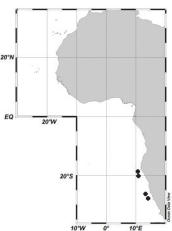
Size: 33.0 cm SL

2b. Anus nearer to tip of caudal fin than to tip of snout, in front of first anal-fin spine by a distance much shorter than head length (about equal to snout length); anterior part of anal fin with fin membrane *Paradiplospinus gracilis*

Paradiplospinus gracilis (Brauer, 1906)

Slender escolar

Other characters: colour of body and fins brownish black.



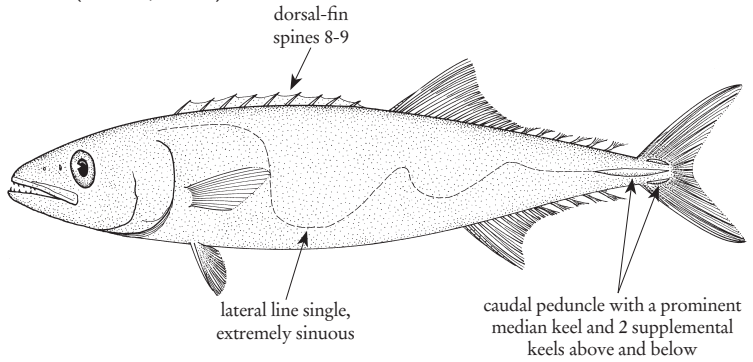
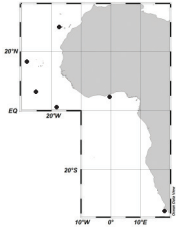
Size: 52.0 cm SL

- 3a. Caudal peduncle with a prominent keel and 2 small supplemental keels above and below; lateral line single, extremely sinuous *Lepidocybium flavobrunneum*
- 3b. Caudal peduncle without keels; lateral line single or bifurcated, but not sinuous → 4

Lepidocybium flavobrunneum (Smith, 1843)

Escolar

Other characters: body almost uniformly dark brown, becoming almost black with age.



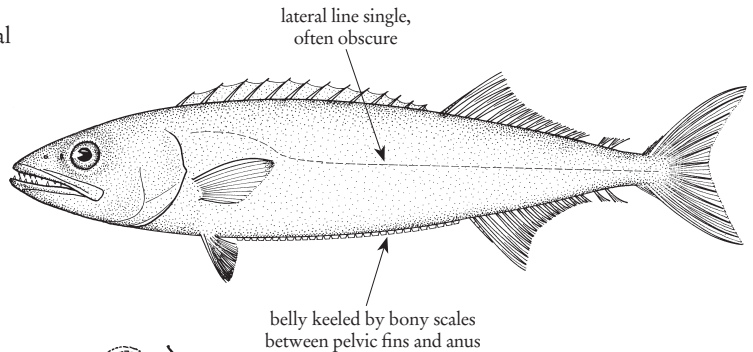
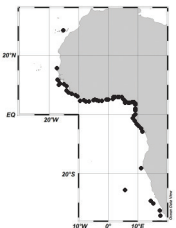
Size: 200.0 cm SL

- 4a. Skin very rough; scales medium-sized, interspersed with spinous bony tubercles; mid-ventral keel on belly; lateral line single, obscure. *Ruvettus pretiosus*
- 4b. Skin smooth, scales small, not interspersed with bony tubercles; no mid-lateral keel on belly; lateral line single or double, always obvious → 5

Ruvettus pretiosus Cocco, 1833

Oilfish

Other characters: body uniformly brown to dark brown, tips of pectoral and pelvic fins black.



skin, scales and bony tubercles

Size: 300.0 cm SL

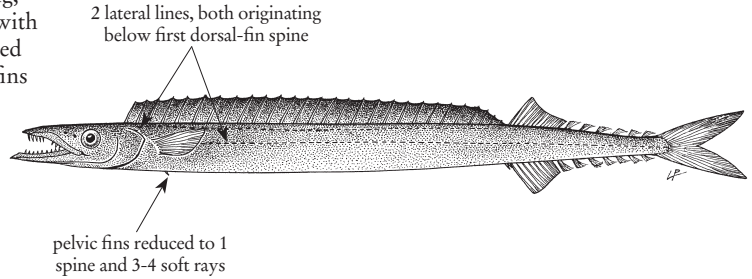
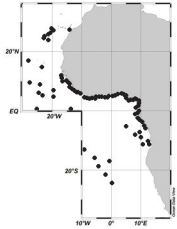
- 5a. Pelvic fin rudimentary (1 spine, 0-4 rays) or absent → 6
- 5b. Pelvic fins well developed, with 1 spine and 5 rays. → 8

- 6a. Lateral line double *Gempylus serpens*
 6b. Lateral line single. → 7

Gempylus serpens Cuvier, 1829

Snake mackerel

Other characters: first dorsal fin long, with 26-32 spines; second dorsal fin with a minute spine and 11-14 rays followed by 5-6 finlets; body dark brown; all fins dark brown with darker margins.



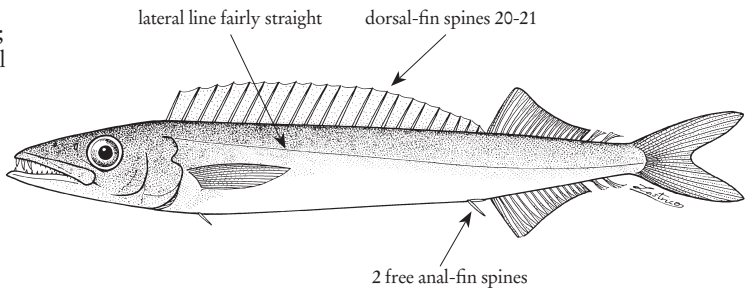
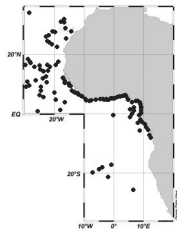
Size: 100.0 cm SL

- 7a. Two free anal-fin spines behind anus, first large and dagger-shaped; dorsal-fin spines 20-21
 *Nealotus tripes*

Nealotus tripes Johnson, 1865

Black snake mackerel

Other characters: second dorsal fin with 16-19 rays followed by 2 finlets; body blackish brown, dorsal and anal fins brownish.



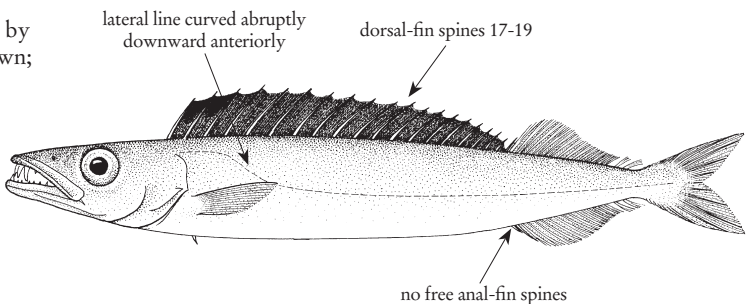
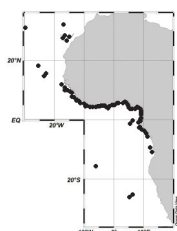
Size: 25.0 cm SL

- 7b. No free anal-fin spines behind anus; dorsal-fin-spines 17-19 *Promethichthys prometheus*

Promethichthys prometheus (Cuvier, 1832)

Roudi escolar

Other characters: second dorsal fin with 1 spine and 17-20 rays followed by 2 finlets; body greyish to copper brown; fins blackish.



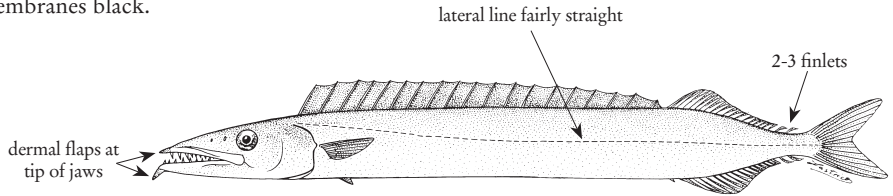
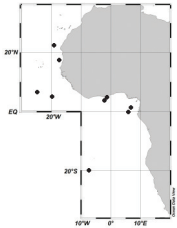
Size: 100.0 cm SL

8a. Dermal flaps at tips of jaws; lateral line fairly straight. *Nesiarchus nasutus*

Nesiarchus nasutus Johnson, 1862

Black gemfish

Other characters: body dark brown, with violet tint; fin membranes black.



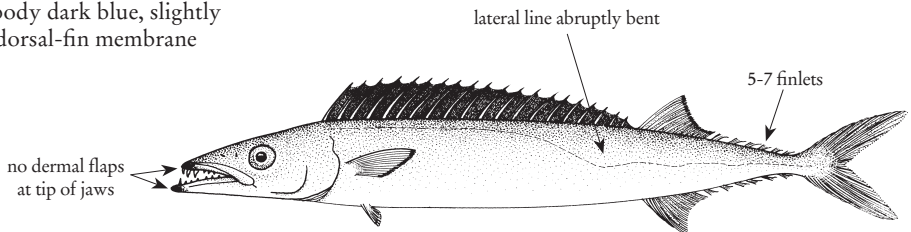
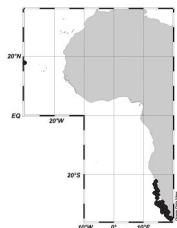
Size: 130.0 cm SL

8b. No dermal flaps at tips of jaws; lateral line abruptly bent below posterior dorsal-fin spines
. *Thyrsites atun*

Thyrsites atun (Euphrasen, 1791)

Snoek

Other characters: body dark blue, slightly paler on belly; first dorsal-fin membrane black.



Size: 200.0 cm SL

NOMEIDAE

Driftfishes (Man-of-war fishes)

KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF NOMEIDAE OCCURRING IN THE AREA

1a. Dorsal-fin origin in front, or in large specimens over, pectoral-fin origin; no scales on head forward of the eyes (Figs. 1 & 2) *Psenes* (p. 265)

1b. Dorsal-fin origin behind, or in very small specimens over, pectoral-fin origin; scales on top of head extend forward of eyes (Figs. 3 & 4) → 2

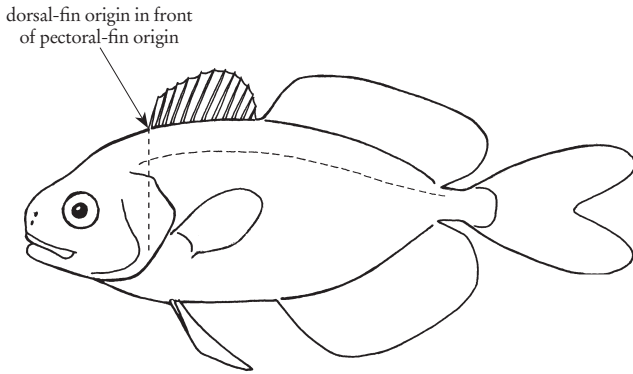


Fig. 1 *Psenes*

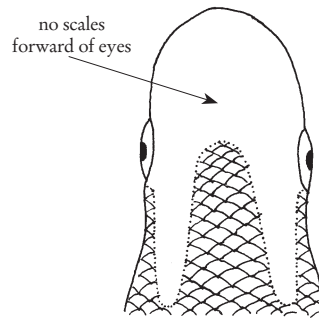


Fig. 2 *Psenes* - dorsal view of head

2a. Anal fin with 1-3 spines and 14-25 rays; an oval patch of teeth on the tongue (all species except *C. paradoxus*) *Cubiceps* (p. 263)

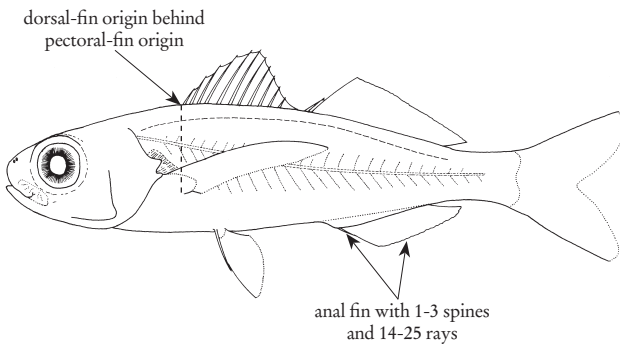


Fig. 3 *Cubiceps*

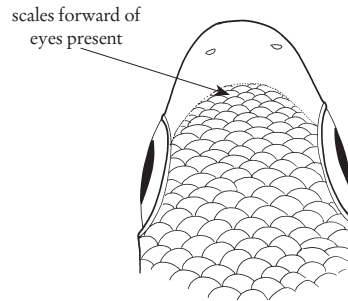


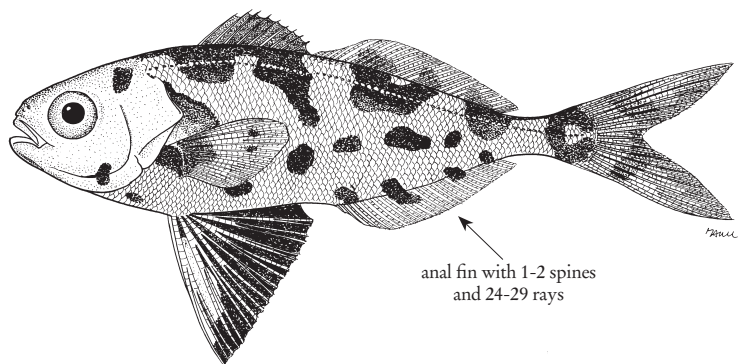
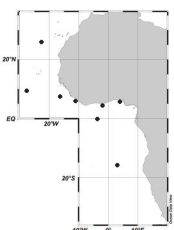
Fig. 4 *Cubiceps* - dorsal view of head

2b. Anal fin with 1-2 spines and 24-29 rays; no teeth on tongue *Nomeus gronovii*

Nomeus gronovii (Gmelin, 1789)

Man-of-war fish

Other characters: juveniles whitish or silvery with dark blue mottlings; pelvic fins black; dark blue above, side silvery with patches of dark blue; pelvic fins with inner rays joined to abdomen by membrane for their entire length.



Size: 39.0 cm TL

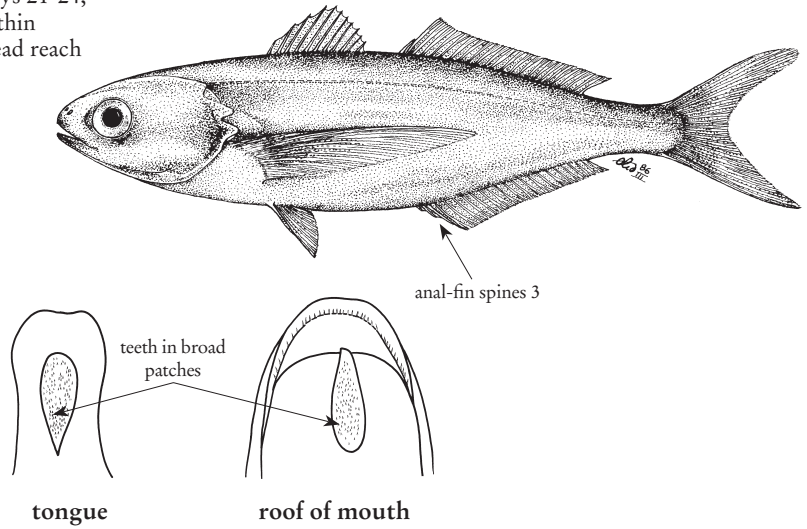
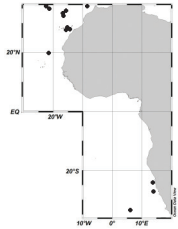
KEY TO THE SPECIES OF *CUBICEPS* OCCURRING IN THE AREA

- 1a. Teeth on vomer (roof of mouth) in broad and knobby patches → 2
- 1b. Teeth on vomer in a single row (see Fig. in *Cubiceps capensis* account, p. 265) or absent → 4
- 2a. Anal-fin spines 3 *Cubiceps gracilis*
- 2b. Anal-fin spines 2 → 3

***Cubiceps gracilis* (Lowe, 1843)**

Driftfish

Other characters: dorsal-fin rays 21-24; vertebrae 32-34, usually 33; no thin bony keel on chest; scales on head reach to tip of snout.



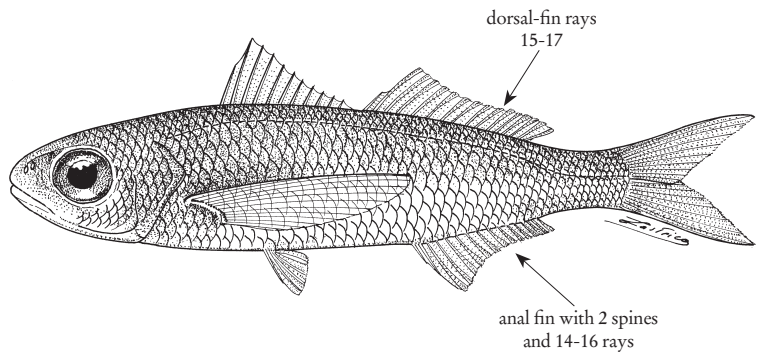
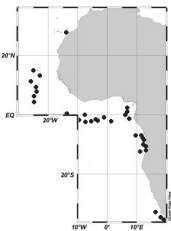
Size: 107.0 cm TL

- 3a. Dorsal-fin rays 15-17; anal-fin rays 14-16 *Cubiceps pauciradiatus*

***Cubiceps pauciradiatus* Günther, 1872**

Bigeye cigarfish

Other characters: light tan to brown in colour; caudal fin dusky, other fins clear.



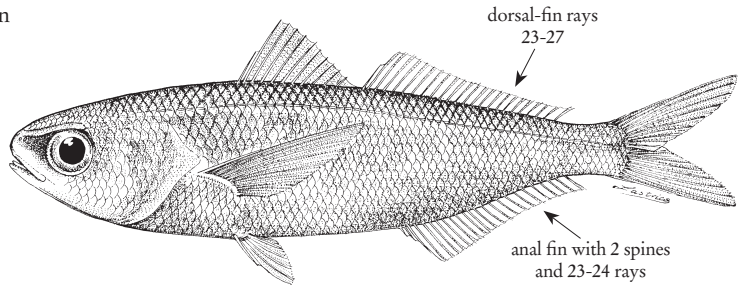
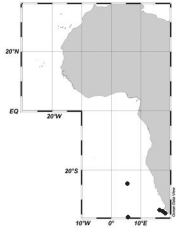
Size: 20.0 cm TL

3b. Dorsal-fin rays 23-27; anal-fin rays 23-24 *Cubiceps caeruleus*

Cubiceps caeruleus Regan, 1914

Blue fathead

Other characters: pale to dark blue-grey, back darker than sides; caudal fin dark, other fins clear.



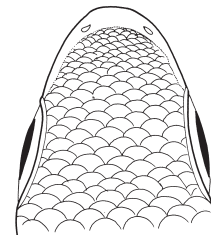
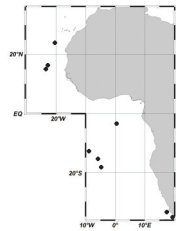
Size: 28.5 cm TL

4a. Upper procurrent caudal-fin rays 8-10. *Cubiceps baxteri*

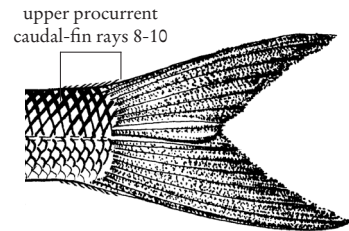
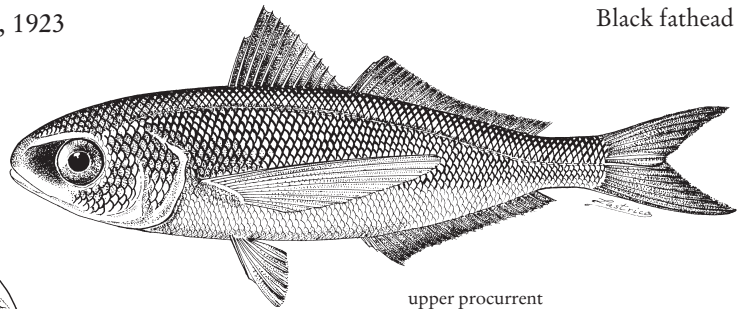
Cubiceps baxteri McCulloch, 1923

Black fathead

Other characters: dark brown in colour, large specimens black; median fins dark, pectoral fins pale; eyes blue.



dorsal view of head



Size: 100.0 cm TL

4b. Upper procurrent caudal-fin rays 11-12 (Fig. 1) → 5

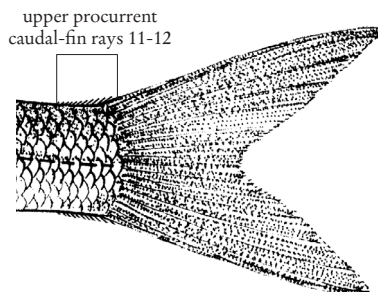


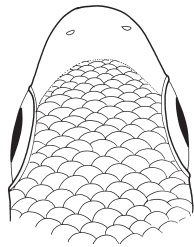
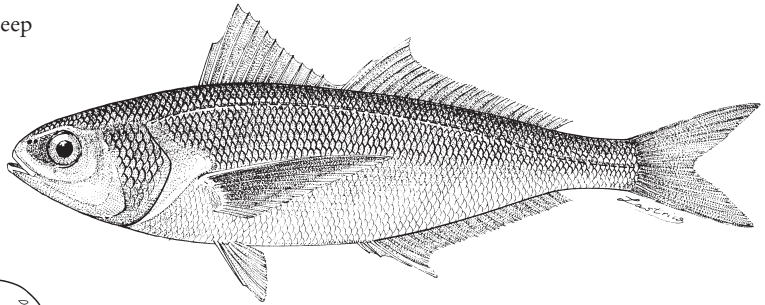
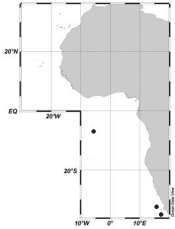
Fig. 1 Lateral view of the caudal-fin

5a. Teeth on tongue in a single row *Cubiceps capensis*

Cubiceps capensis (Smith, 1845)

Cape fathead

Other characters: dark brown to deep purple, fins dark.

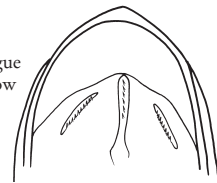


dorsal view of head



tongue

teeth on tongue
in a single row



roof of mouth

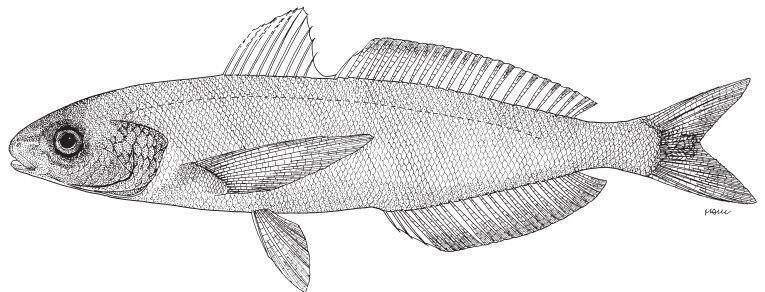
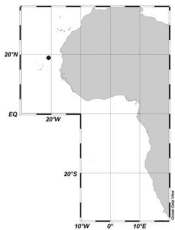
Size: 101.0 cm TL

5b. Teeth on tongue absent *Cubiceps paradoxus*

Cubiceps paradoxus Butler, 1979

Longfin cigarfish

Other characters: eye small, its diameter approximately two times in snout length.



Size: 127.0 cm TL

KEY TO THE SPECIES OF *PSENES* OCCURRING IN THE AREA

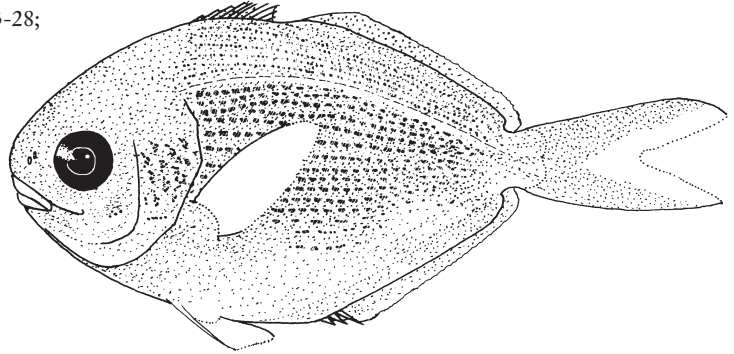
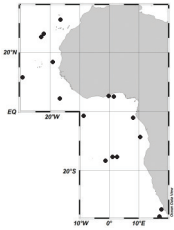
1a. Lower-jaw teeth long, compressed, contiguous, very different from those in upper jaw → 2

1b. Lower-jaw teeth pointed or only slightly flattened, similar to those in upper jaw . . . *Psenes cyanophrys*

Psenes cyanophrys Valenciennes, 1833

Freckled driftfish

Other characters: dorsal-fin rays 23-28; dark horizontal lines laterally.



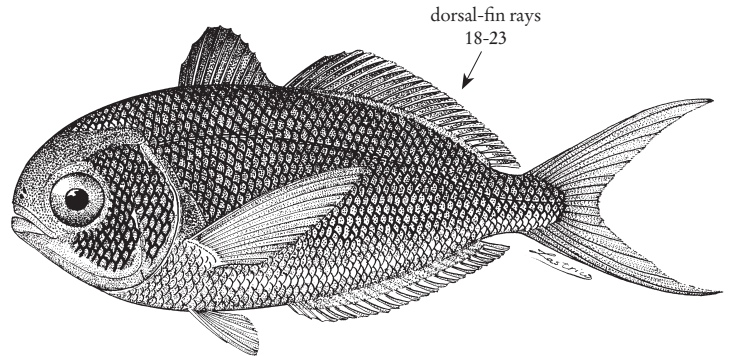
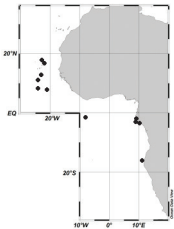
Size: 23.0 cm SL

2a. Body depth 1.4-2.4 times in Standard Length; lateral-line scales 55-62 *Psenes arafurensis*

Psenes arafurensis Günther, 1889

Banded driftfish

Other characters: small specimens mottled or banded; adult uniformly black.



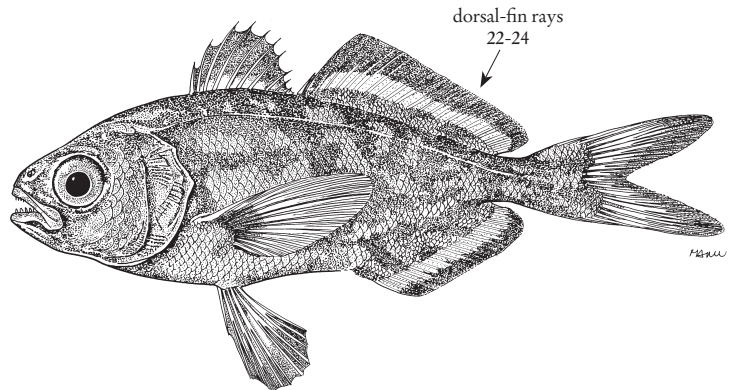
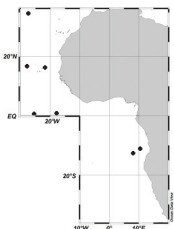
Size: 25.0 cm TL

2b. Body depth 2.4-3.4 times in Standard Length; lateral-line scales 70-85 *Psenes maculatus*

Psenes maculatus Lütken, 1880

Silver driftfish

Other characters: brown with darker brown vertical bands.



Size: 30.0 cm SL

TETRAGONURIDAE

Squaretails

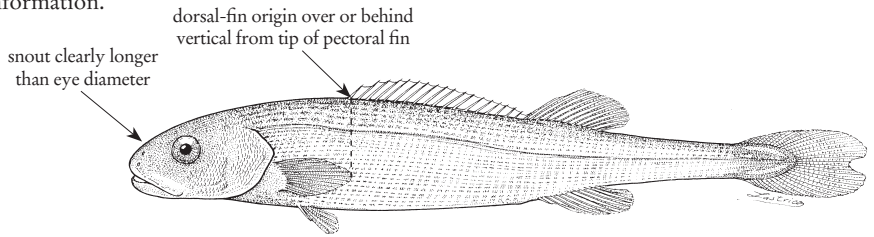
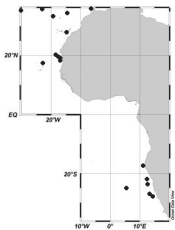
KEY TO THE SPECIES OF TETRAGONURIDAE OCCURRING IN THE AREA

1a. Dorsal-fin origin over or behind vertical through pectoral-fin tip; snout distinctly longer than eye diameter *Tetragonurus cuvieri*

Tetragonurus cuvieri Risso, 1810

Smalleye squaretail

Other characters: no information.



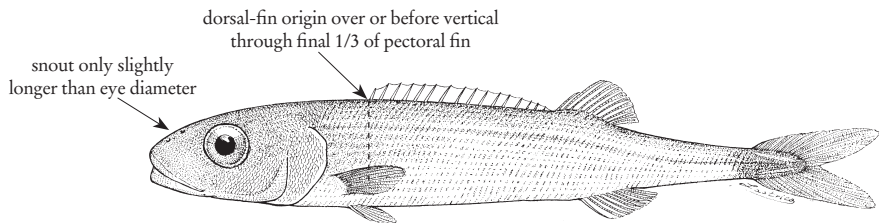
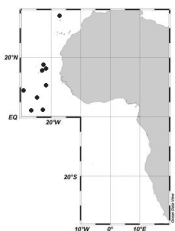
Size: 70.0 cm TL

1b. Dorsal-fin origin over or before vertical through final 1/3 of pectoral fin; snout only slightly longer than eye diameter *Tetragonurus atlanticus*

Tetragonurus atlanticus Lowe, 1839

Bigeye squaretail

Other characters: no information.



Size: 50.0 cm TL

TRICHIURIDAE

Scabbardfishes (Hairtails, Frostfishes)

KEY TO THE SPECIES OF TRICHIURIDAE OCCURRING IN THE AREA

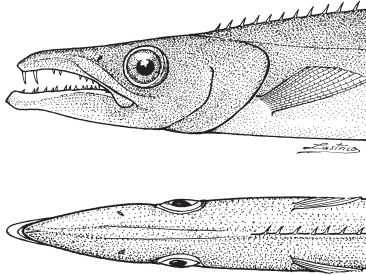
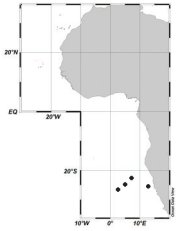
1a. Total dorsal-fin elements (spines + rays) 90-102 → 2

1b. Total dorsal-fin elements (spines + rays) 104-109 *Aphanopus mikhailini*

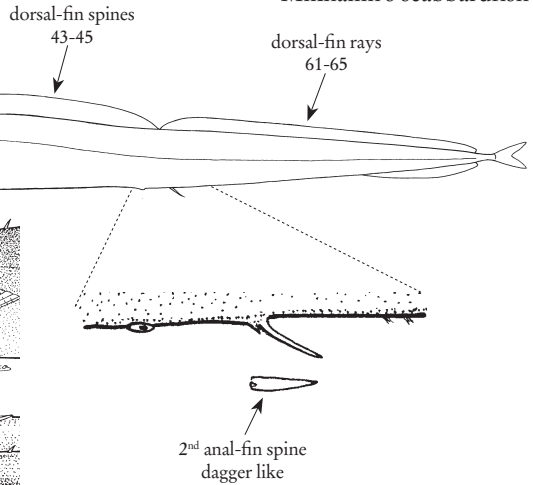
Aphanopus mikhailini Parin, 1983

Other characters: pelvic fins represented by a single spine in juveniles, inserted before the base of the pectoral fins, but entirely absent in adults; body coppery black with iridescent tint; inside of mouth and gill cavities black.

Mikhailin's scabbardfish



lateral and dorsal view of head



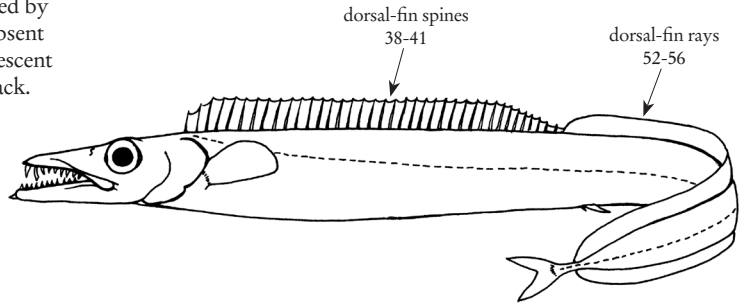
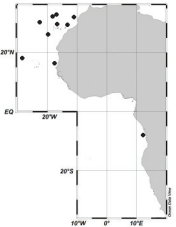
Size: 90.0 cm TL

2a. Total dorsal-fin elements (spines + rays) 90-97 *Aphanopus carbo*

Aphanopus carbo Lowe, 1839

Black scabbardfish

Other characters: pelvic fins represented by a single spine in juveniles but entirely absent in adults; body coppery black with iridescent tint; inside of mouth and gill cavities black.



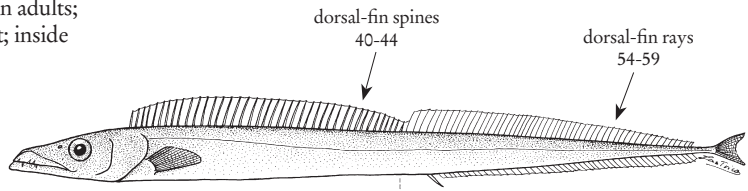
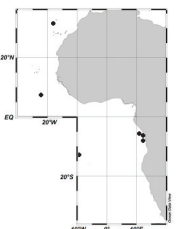
Size: 110.0 cm SL

2b. Total dorsal-fin elements (spines + rays) 96 (rarely 95)-102 *Aphanopus intermedius*

Aphanopus intermedius Parin, 1983

Intermediate scabbardfish

Other characters: pelvic fins represented by a single spine in juveniles inserted before the base of the pectoral fins but entirely absent in adults; body coppery black with iridescent tint; inside of mouth and gill cavities black.



Size: 148.0 cm TL

PERCIFORMES

Perch-like fishes

KEY TO THE FAMILIES OF PERCIFORMES OCCURRING IN THE AREA

1a. A single dorsal fin (Figs. 1 & 2)	→ 2
1b. Two separate dorsal fins (Figs. 3 & 4)	→ 3
2a. Caudal fin truncate (Fig. 1).	Caristiidae (p. 276)
2b. Caudal fin usually deeply forked (Fig. 2).	Bramidae (p. 270)

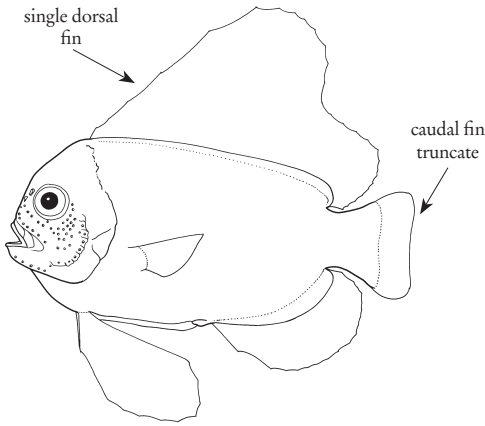


Fig. 1 Caristiidae

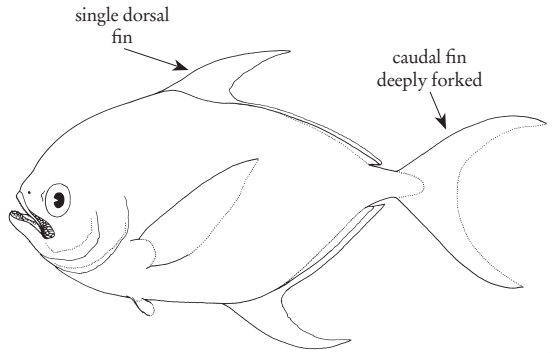


Fig. 2 Bramidae

3a. Eyes large (Fig. 3)	Howellidae (p. 288)
3b. Eyes small to moderate (Fig. 4)	Chiasmodontidae (p. 283)

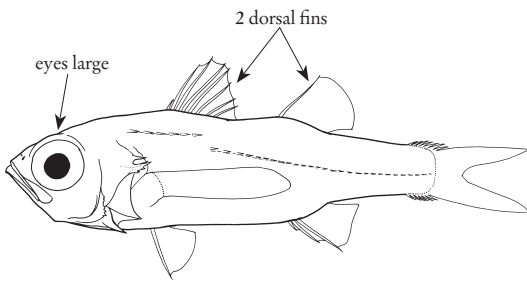


Fig. 3 Howellidae

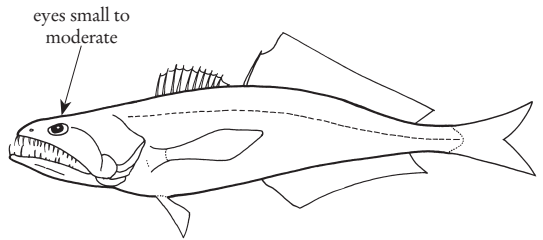


Fig. 4 Chiasmodontidae

BRAMIDAE

Pomfrets

**KEY TO THE GENERA, AND SOLE SPECIES OF GENERA OF
BRAMIDAE OCCURRING IN THE AREA**

- 1a. Dorsal and anal fins broadly expanded, scaleless, flexible, can be retracted into a fleshy sheath formed by elongate scales at base of fin (Fig. 1) → 2
- 1b. Dorsal and anal fins not broadly expanded, with scales along at least part of the length of the rays; no fleshy sheath at base of fin (Fig. 2) → 3

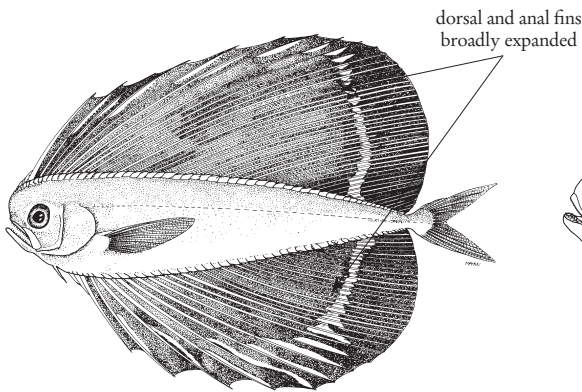


Fig. 1 *Pteraclis*

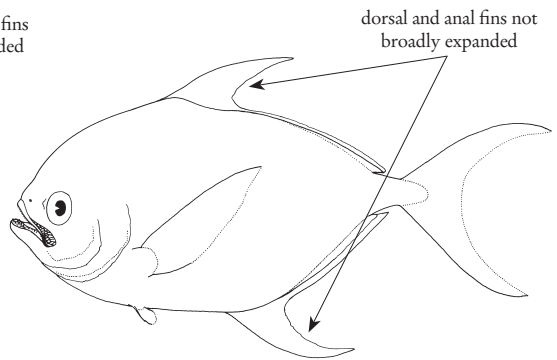


Fig. 2 *Taractichthys*

- 2a. Anterior dorsal- and anal-fin rays thickened; basal sheath at dorsal-fin base extended onto snout; in adults, dorsal-fin origin over snout (Figs. 1 & 3) *Pteraclis* (p. 273)
- 2b. Dorsal and anal-fin rays all similar in thickness; basal sheath at dorsal-fin base ending at dorsal-fin origin; in adults, dorsal-fin origin above or behind eyes (Fig. 4) *Pterycombus* (p. 274)

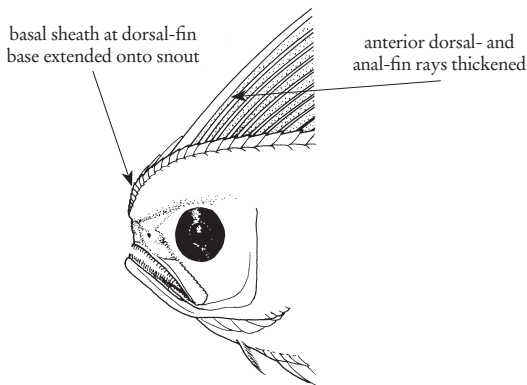


Fig. 3 *Pteraclis*

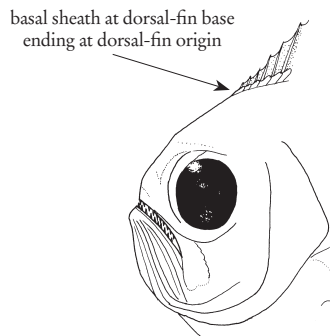


Fig. 4 *Pterycombus*

- 3a. Transverse precaudal grooves present, usually well developed (Fig. 5) → 4
- 3b. Transverse precaudal grooves absent (Fig. 6) *Brama* (p. 271)

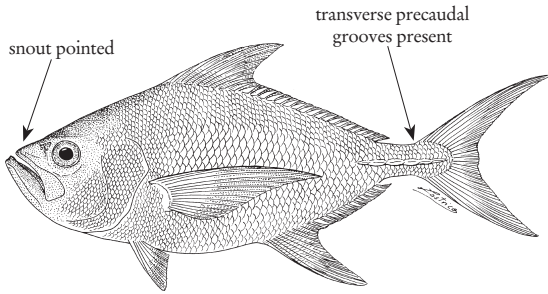


Fig. 5 *Taractes*

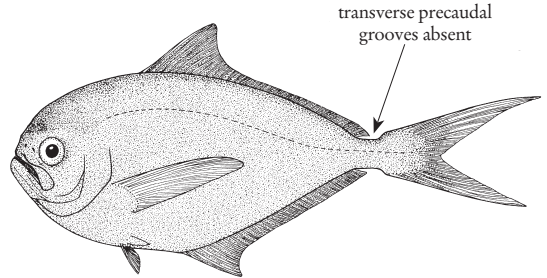


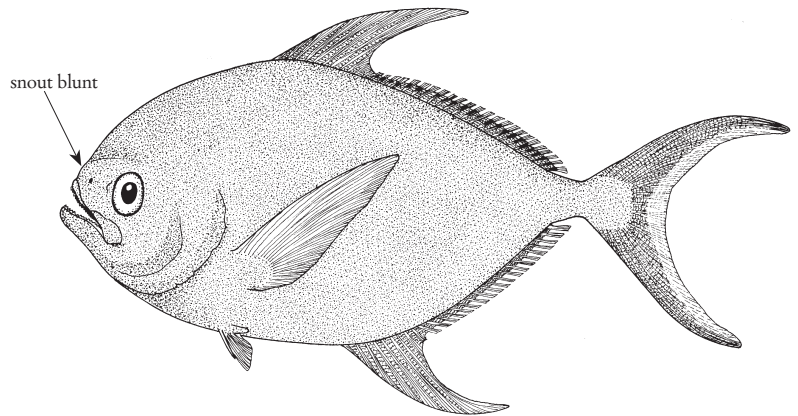
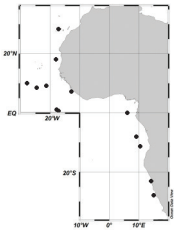
Fig. 6 *Brama*

- 4a. Lateral profile of body rounded, depth 48-61% Standard Length; snout blunt; pelvic fins 7-9% SL; pectoral fins greater than 40% SL. *Taractichthys longipinnis*
- 4b. Lateral profile of body more elongate, depth 36-45% Standard Length; snout pointed; pelvic fins longer, 13-19% SL; pectoral fins less than 38% SL (Fig. 5). *Taractes* (p. 275)

Taractichthys longipinnis (Lowe, 1843)

Big-scale pomfret

Other characters: grey or silvery in colour, with coppery reflections



Size: 100.0 cm TL

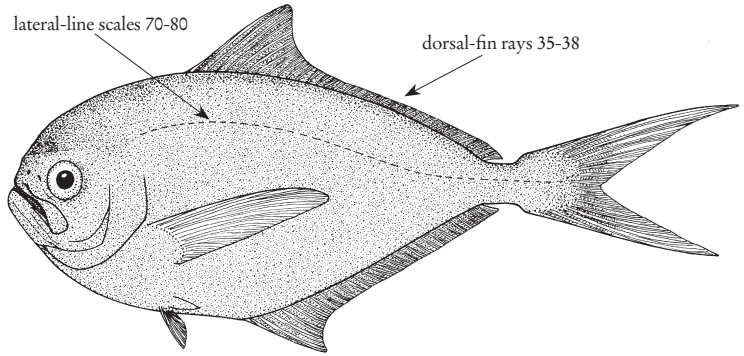
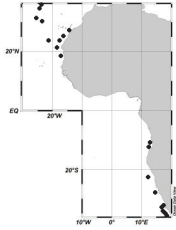
KEY TO THE SPECIES OF *BRAMA* OCCURRING IN THE AREA

- 1a. Dorsal fin rays 31-35; anal-fin rays less than 29; lateral-line scales less than 66 → 2
- 1b. Dorsal fin rays 35-38; anal-fin rays 29-32; lateral-line scales 70-80 *Brama brama*

Brama brama (Bonnaterre, 1788)

Atlantic pomfret

Other characters: dorsal and anal fins scaled and with rigid fin rays.



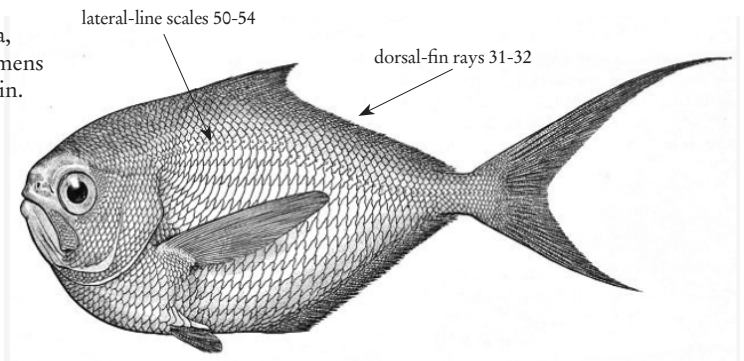
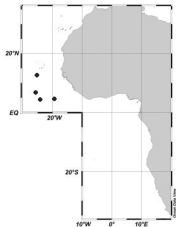
Size: 100.0 cm TL

2a. Dorsal-fin rays 31-32; anal-fin rays 26-27; lateral-line scales 50-54 *Brama caribbea*

Brama caribbea Mead, 1972

Caribbean pomfret

Other characters: three juvenile specimens were caught off West Africa, but the correspondence of these specimens with the Caribbean samples is uncertain.



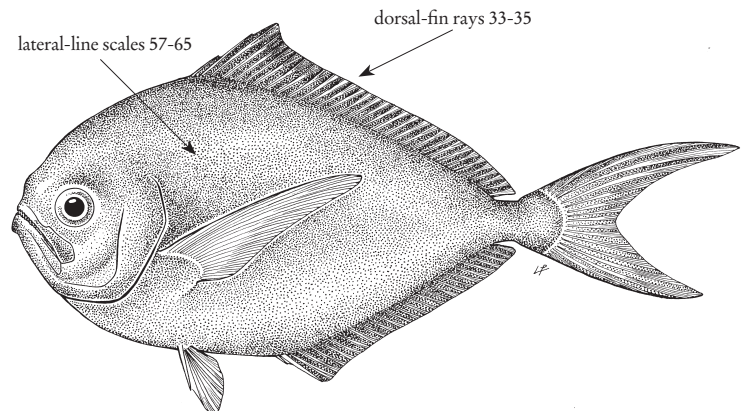
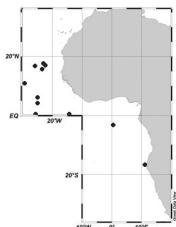
Size: 25.0 cm TL

2b. Dorsal-fin rays 33-35; anal-fin rays 26-28; lateral-line scales 57-65 *Brama dussumieri*

Brama dussumieri Cuvier, 1831

Lesser bream

Other characters: no information.



Size: 22.5 cm SL

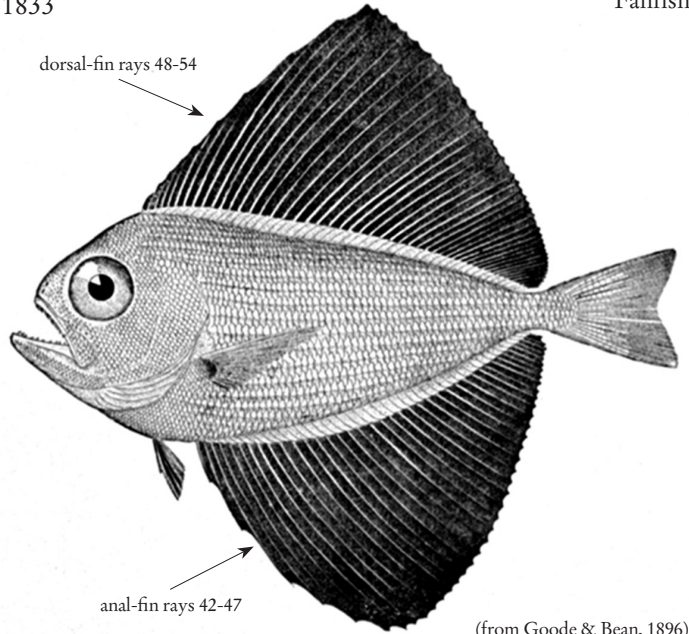
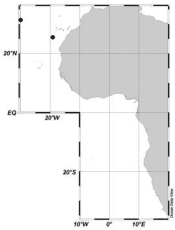
KEY TO THE SPECIES OF *PTERACLIS* OCCURRING IN THE AREA

1a. Dorsal-fin rays 48-54; pectoral-fin rays 18-19; anal-fin rays 42-47. *Pteraclis carolinus*

Pteraclis carolinus Valenciennes, 1833

Fanfish

Other characters: no information.



(from Goode & Bean, 1896)

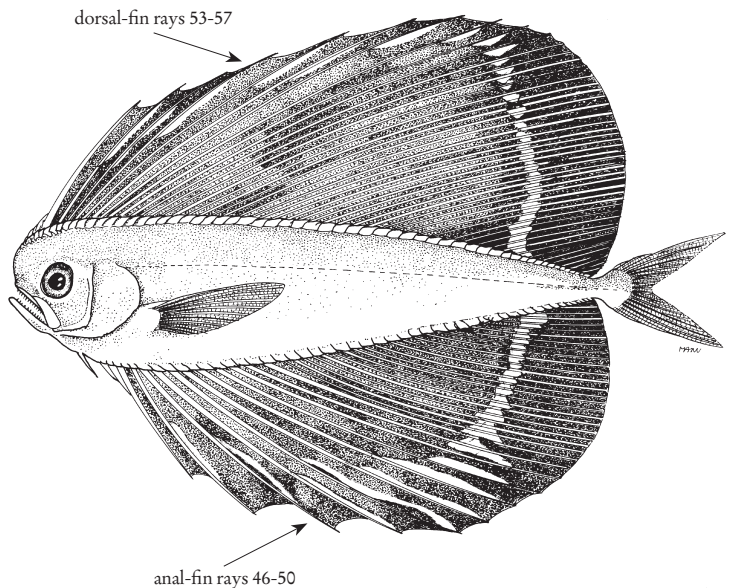
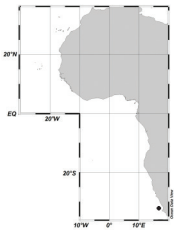
Size: 50.0 cm SL

1b. Dorsal-fin rays 53-57; pectoral-fin rays 18-20; anal-fin rays 46-50. *Pteraclis velifera*

Pteraclis velifera (Pallas, 1770)

Spotted fanfish

Other characters: no information.



Size: 50.0 cm TL

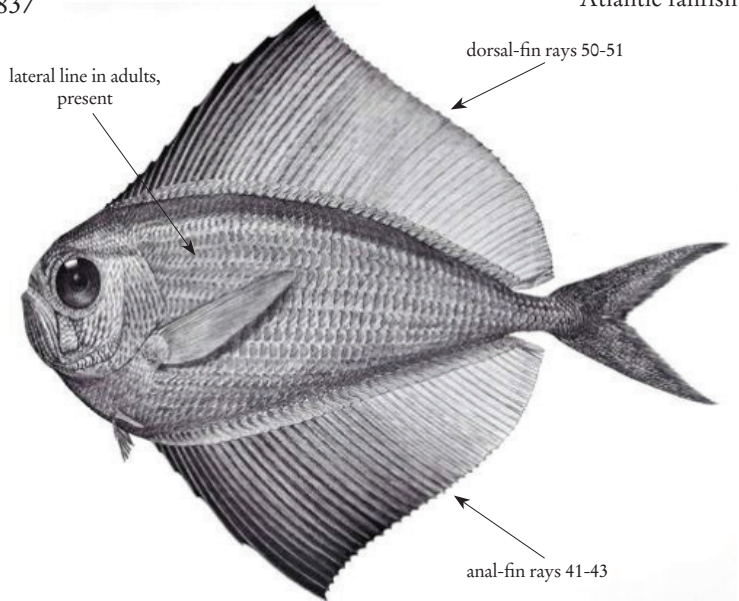
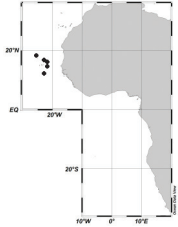
KEY TO THE SPECIES OF *PTERYCOMBUS* OCCURRING IN THE AREA

1a. Lateral line in adults, present; dorsal-fin rays 50-51; anal-fin rays 41-43; in small specimens (about 10 cm), longest dorsal- and anal-fin rays longer than 1/2 Standard Length. *Pterycombus brama*

Pterycombus brama Fries, 1837

Atlantic fanfish

Other characters: no information.



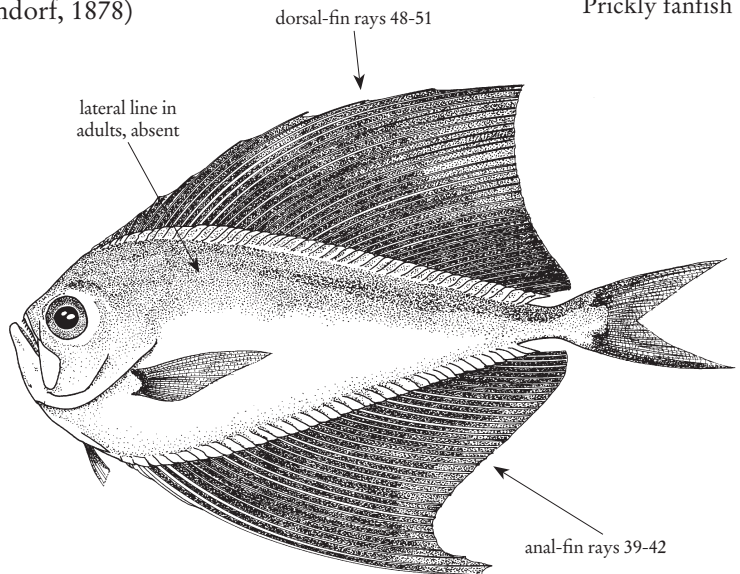
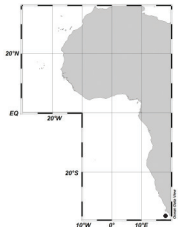
Size: 46.0 cm TL

1b. Lateral line in adults, absent; dorsal-fin rays 48-51; anal-fin rays 39-42; in small specimens (about 10 cm), longest dorsal- and anal-fin rays shorter than 1/2 Standard Length. *Pterycombus petersii*

Pterycombus petersii (Hilgendorf, 1878)

Prickly fanfish

Other characters: no information.



Size: 36.4 cm SL

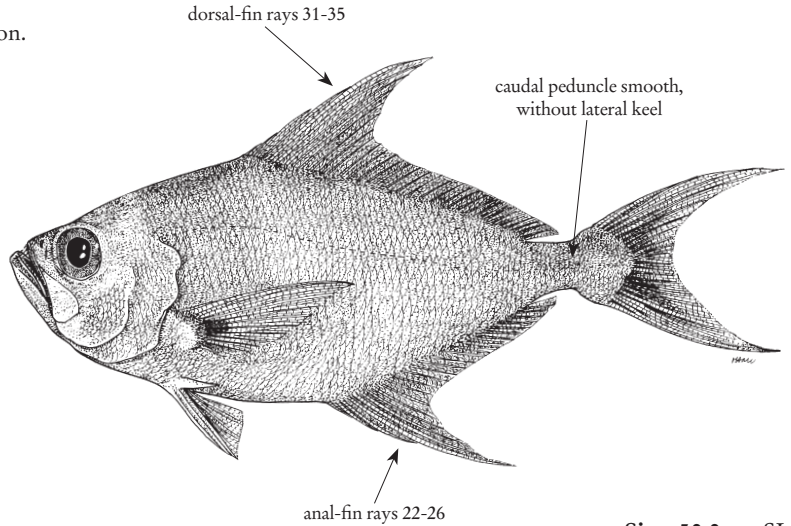
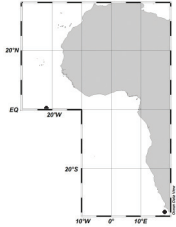
KEY TO THE SPECIES OF *TARACTES* OCCURRING IN THE AREA

1a. Dorsal-fin rays 31-35; anal-fin rays 22-26; scales in lateral series 43-46; caudal peduncle smooth, without a lateral keel; lateral line usually present, with a sharp bend on the forward part of the body *Taractes asper*

Taractes asper Lowe, 1843

Rough pomfret

Other characters: no information.



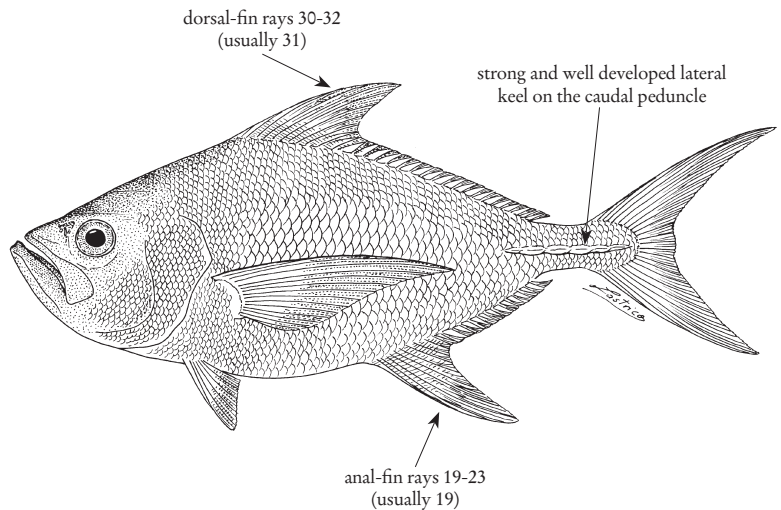
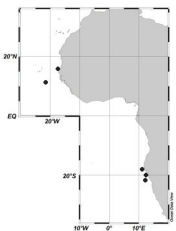
Size: 50.0 cm SL

1b. Dorsal-fin rays 30-32, usually 31; anal-fin rays 19-23 (usually 19); scales in lateral line 46-48; strong and well developed lateral keel on the caudal peduncle; lateral line usually absent in adults, but if present forming a gentle arch on the forward part of the body (curving gently to midline of side, in juveniles). *Taractes rubescens*

Taractes rubescens (Jordan & Evermann, 1887)

Pomfret

Other characters: no information.



Size: 89.0 cm TL

CARISTIIDAE

Manefishes

KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF CARISTIIDAE OCCURRING IN THE AREA

- 1a.** Mouth small; suborbital space broad; upper jaw short, extending approximately to midorbit and almost completely covered by the thin bones of the suborbital series; palatine teeth absent (Fig. 1). → **2**
- 1b.** Mouth large; suborbital space narrow; long visible upper jaw extending to mid, or beyond, orbit; palatine teeth present (Figs. 2 & 3) → **3**

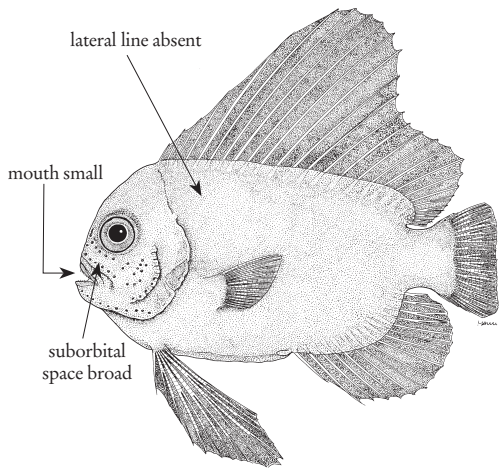


Fig. 1 *Paracaristius*

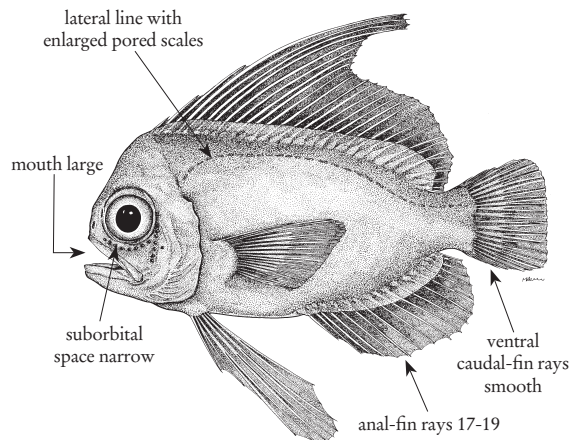
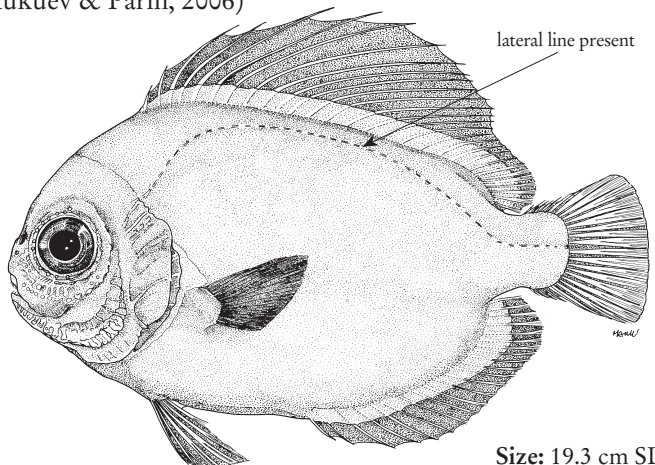
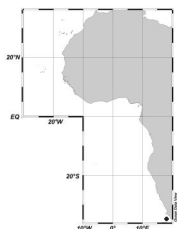


Fig. 2 *Platyberyx*

- 2a.** Lateral line present; predorsal distance greater than 87% head length; vomerine teeth present (rarely absent); pharyngobranchial teeth shorter than rakers of first gill arch; *Neocaristius heemstrai*
- 2b.** Lateral line absent; predorsal distance less than 87% head length; vomerine teeth absent; pharyngobranchial teeth long and needle-like, approximately as long as rakers of first gill arch (Fig. 1). . . *Paracaristius* (p. 279)

Neocaristius heemstrai (Trunov, Kukuev & Parin, 2006)

Other characters: posterior margin of upper jaw not reaching midorbit; premaxilla and maxilla almost completely hidden by suborbital series.



Size: 19.3 cm SL

- 3a.** Lateral line present with enlarged pored scales; ventral caudal-fin rays smooth; dorsal-fin rays 25-32; anal-fin rays 17-19 (except for *Platyberix andriashevi* which has 31-35 dorsal-fin rays and 20-22 anal-fin rays)(Fig. 2). *Platyberyx* (p. 281)
- 3b.** Lateral line inconspicuous, without enlarged pored scales; ventral caudal-fin rays serrated; dorsal-fin rays 32-37; anal-fin rays 19-23 (Fig. 3) *Caristius* (p. 277)

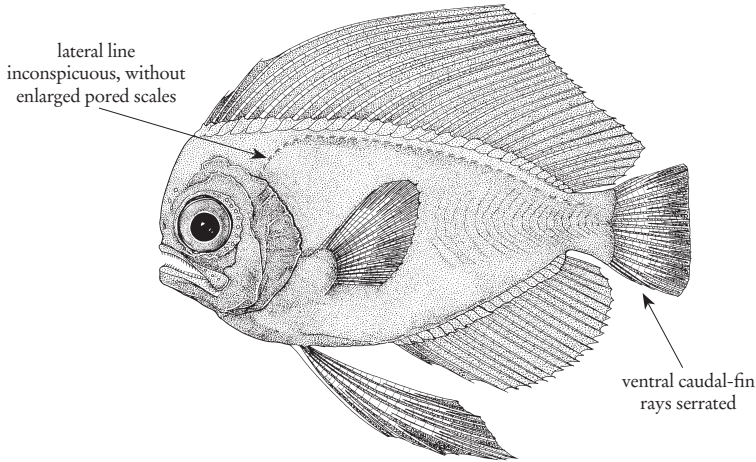


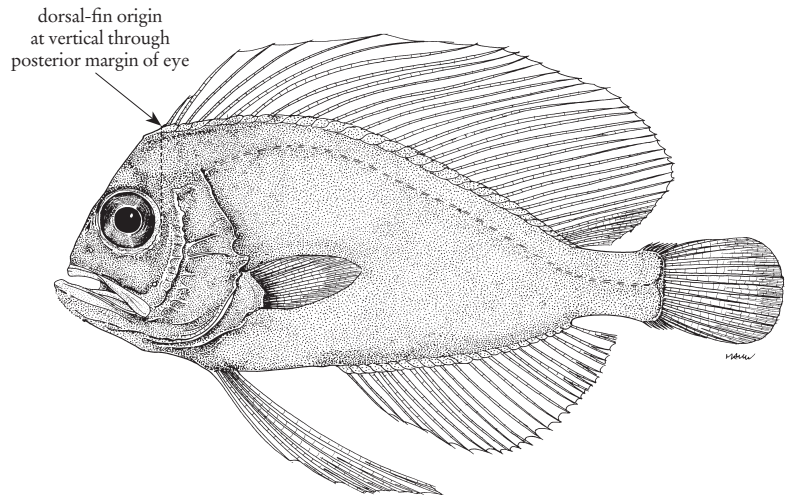
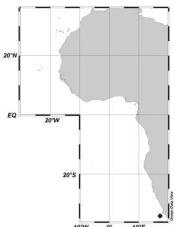
Fig. 3 *Caristius*

KEY TO THE SPECIES OF *CARISTIUS* OCCURRING IN THE AREA

- 1a.** Dorsal-fin origin at vertical through posterior margin of eye's orbit; eye diameter larger than caudal peduncle depth; anterior profile of head at an angle of 60-70° with body's midline . . . *Caristius litvinovi*
- 1b.** Dorsal-fin origin at vertical through anterior margin or middle of eye's orbit; eye diameter smaller than caudal peduncle depth; anterior profile of head at an angle of 90-70° with body's midline → 2

Caristius litvinovi Kukuev, Parin & Trunov, 2013

Other characters: no information.

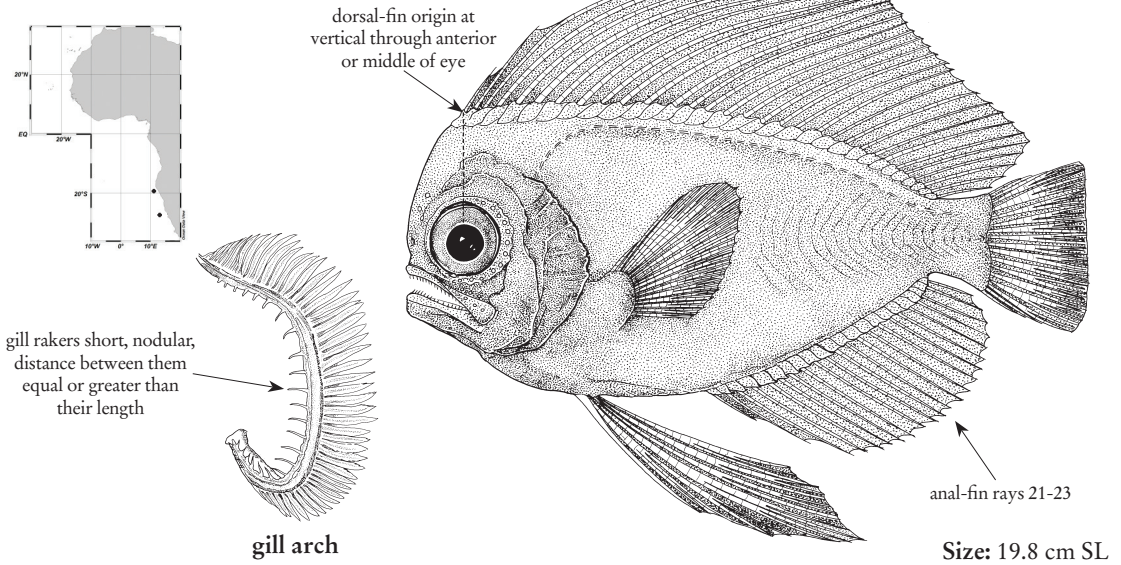


Size: 13.0 cm SL

- 2a. Gill rakers short, nodular, distance between them equal or greater than their length; dorsal-fin rays 35-37; anal-fin rays 21-23. *Caristius barsukovi*
- 2b. Gill rakers long, flattened or thin, distance between them smaller than their length; dorsal-fin rays 31-34; anal-fin rays 18-21. → 3

Caristius barsukovi Kukuev, Parin & Trunov, 2013

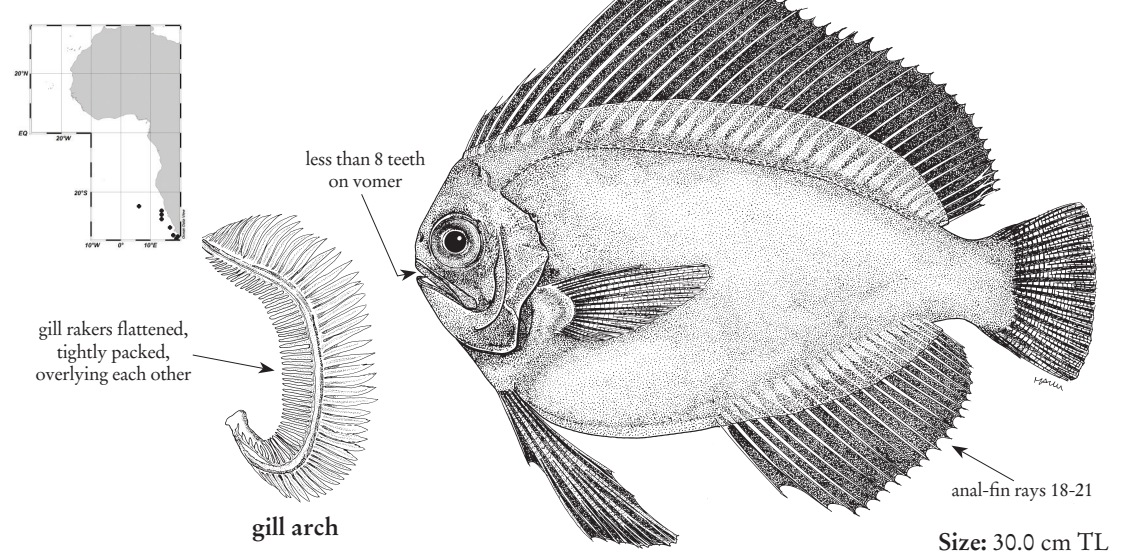
Other characters: no information.



- 3a. Gill rakers flattened, tightly packed, overlying each other (distance between them smaller than 1/3 of their length); jaw teeth strong and conical (throughout jaw); less than 8 teeth on vomer (usually 3-5); anterior profile of head steep, almost upright *Caristius fasciatus*

Caristius fasciatus (Borodin, 1930)

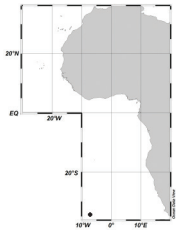
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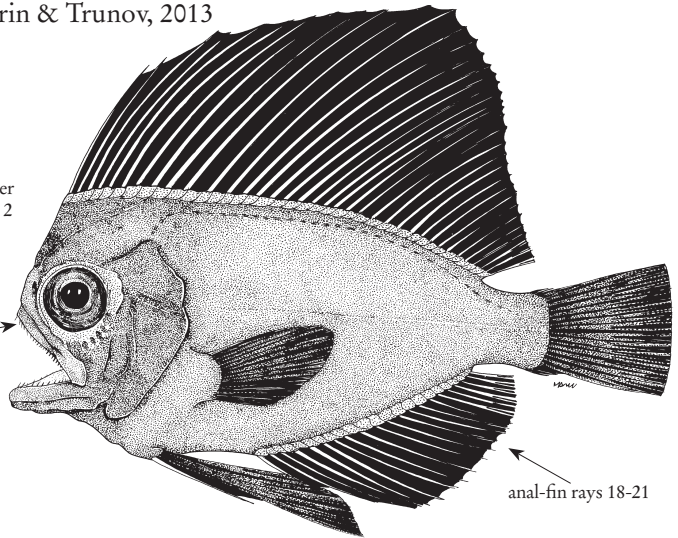
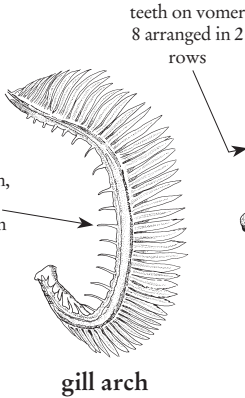
3b. Gill rakers thin, with space between them (distance between them equal to 1/2 of their length); jaw teeth hook-like, posterior teeth directed anteriorly; teeth on vomer 8, arranged in 2 rows; anterior profile of head at an angle of about 70° with body's midline. *Caristius walvisensis*

Caristius walvisensis Kukuev, Parin & Trunov, 2013

Other characters: no information.



gill rakers thin, with space between them



anal-fin rays 18-21

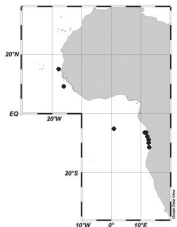
Size: 12.9 cm SL

KEY TO THE SPECIES OF *PARACARISTIUS* OCCURRING IN THE AREA

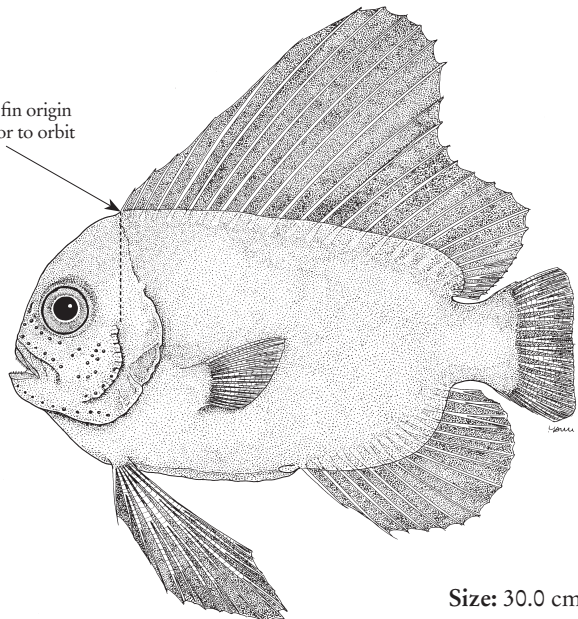
- 1a. Dorsal-fin rays 27-31; anal-fin rays 17-20; fingerlike papillae absent along dorsal margin of hyoid arch and at articulation of interhyal and posterior ceratohyal → 2
- 1b. Dorsal-fin rays 30-33; anal-fin rays 15-18; fingerlike papillae present along dorsal margin of hyoid arch and at articulation of interhyal and posterior ceratohyal → 3
- 2a. Dorsal-fin origin posterior to orbit; jaw teeth arranged in multiple rows. . . *Paracaristius maderensis*

Paracaristius maderensis (Maul, 1949)

Other characters: upper jaw length approximately 1/2 of head length, posterior margin extending nearly to midorbit.



dorsal-fin origin posterior to orbit

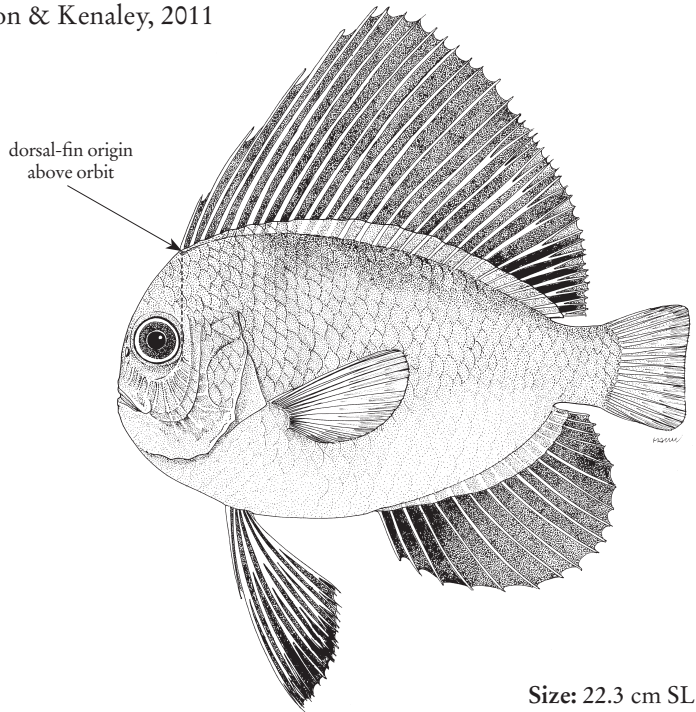
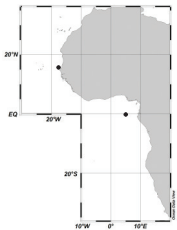


Size: 30.0 cm SL

2b. Dorsal-fin origin above orbit; jaw teeth arranged in a single row, except near symphyses
 *Paracaristius nudarcus*

Paracaristius nudarcus Stevenson & Kenaley, 2011

Other characters: upper jaw length generally less than 1/2 of head length; posterior margin of upper jaw extending to midorbit; dorsal fin heavily pigmented; caudal fin lightly pigmented, scales covering proximal 1/3 or more of rays; anal fin, pectoral fins, and pelvic fins elongate, delicate, black.

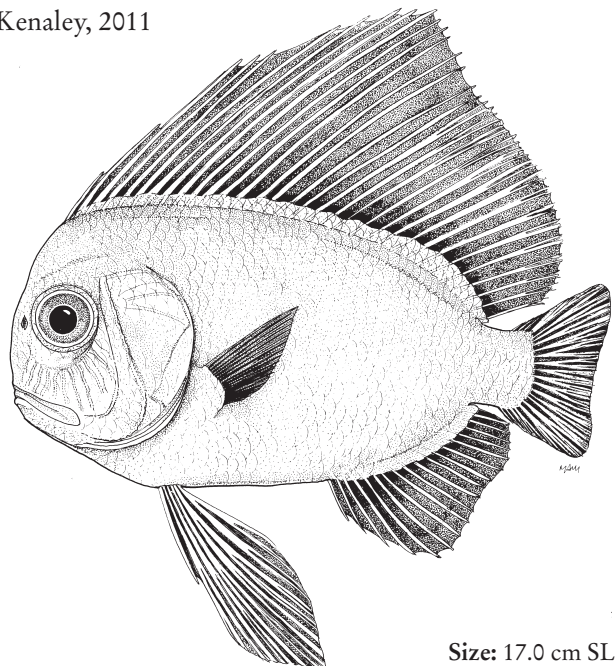
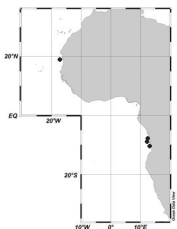


Size: 22.3 cm SL

3a. Body shape oval; maximum body depth $\geq 50\%$ Standard Length; caudal peduncle relatively short and deep (its depth greater than its length)
 *Paracaristius nemorosus*

Paracaristius nemorosus Stevenson & Kenaley, 2011

Other characters: upper jaw length approximately 1/2 of head length, posterior margin extending just beyond midorbit; dorsal fin heavily pigmented; caudal fin lightly pigmented, scales covering proximal 1/3 or more of rays; anal fin, pectoral fins, and pelvic fins elongate, delicate, black.

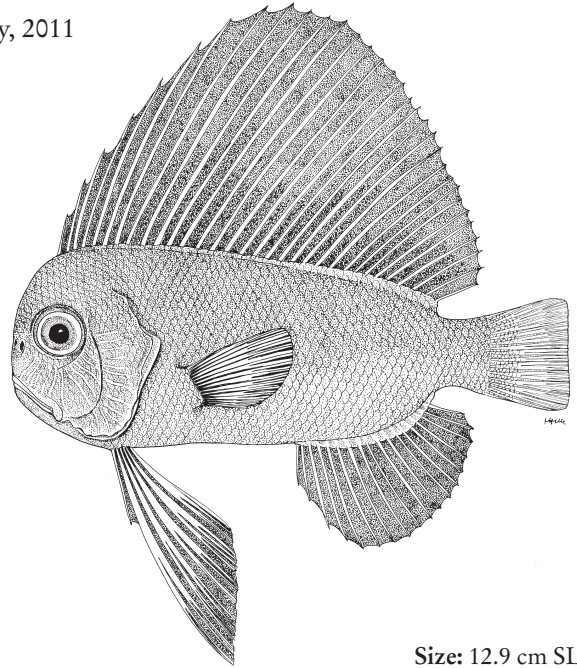
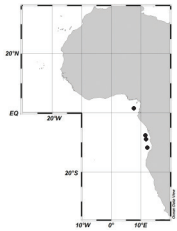


Size: 17.0 cm SL

3b. Body shape rectangular; maximum body depth $\leq 50\%$ Standard Length; caudal peduncle relatively long and narrow (its depth less than its length) *Paracaristius aquilus*

Paracaristius aquilus Stevenson & Kenaley, 2011

Other characters: upper jaw length usually greater than 1/2 of head length, posterior margin extending beyond midorbit; dorsal fin heavily pigmented; caudal fin lightly pigmented, scales covering proximal 1/3 or more of rays; anal fin, pectoral fins, and pelvic fins elongate, delicate, black.



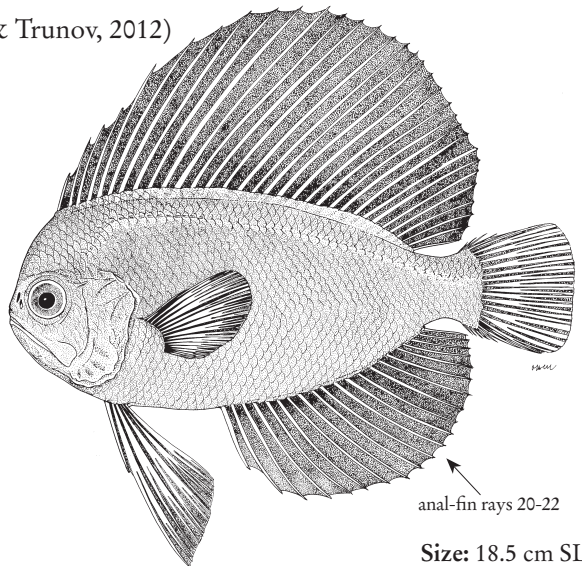
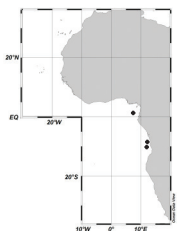
Size: 12.9 cm SL

KEY TO THE SPECIES OF *PLATYBERYX* OCCURRING IN THE AREA

- 1a. Dorsal-fin rays 31-35; anal-fin rays 20-22; vertebrae 36-39; upper-jaw teeth 12-35; lower-jaw teeth 11-26 *Platyberyx andriasbevi*
- 1b. Dorsal-fin rays 27-29; anal-fin rays 17-19; vertebrae 32-35; upper-jaw teeth 30-98; lower-jaw teeth 27-90 → 2

Platyberyx andriasbevi (Kukuev, Parin & Trunov, 2012)

Other characters: eye small, diameter 1/3 to 1/2 head length; posterior margin of upper jaw extending slightly beyond posterior margin of orbit; Lateral line originating at posterodorsal margin of opercle, arching posteriorly toward dorsal-fin base and extending to caudal fin, consisting of over 40 elongate, enlarged, porebearing scales

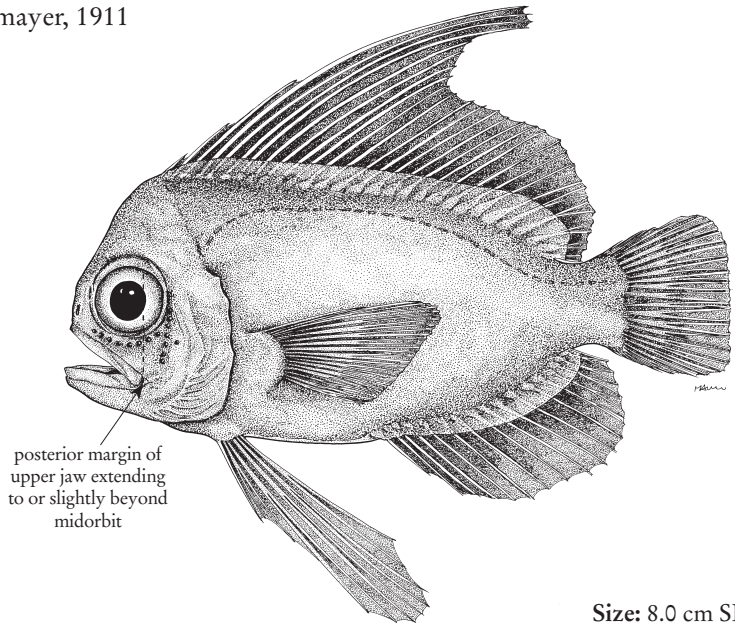
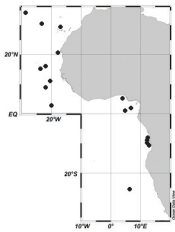


Size: 18.5 cm SL

2a. Posterior margin of upper jaw extending to or slightly beyond midorbit; body depth 52.3-63.6% Standard Length; head length 38.2-48.8% SL; pre-pectoral length 39.3-49.7% SL; bony-orbit width 44.9-61.5% head length *Platyberyx opalescens*

Platyberyx opalescens Zugmayer, 1911

Other characters: dorsal-fin rays 27-29; anal-fin rays 17-19; pectoral-fin rays 17-20; lateral line originating at posterodorsal margin of opercle, arching posteriorly toward dorsal-fin base and extending to caudal fin, consisting of 25-30 elongate, enlarged, pore-bearing scales

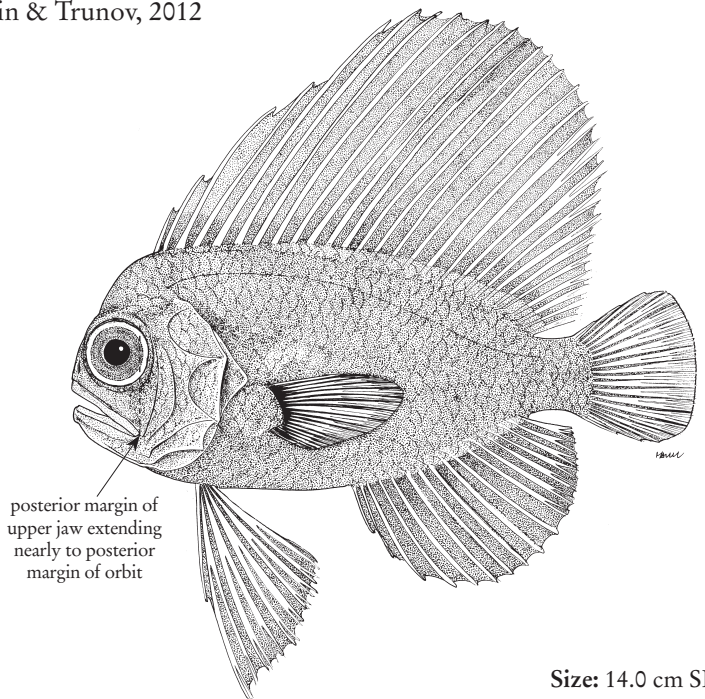
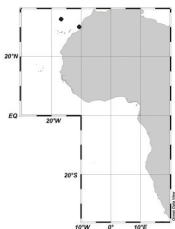


Size: 8.0 cm SL

2b. Posterior margin of upper jaw extending nearly to posterior margin of orbit; body depth 45.6-52.2% Standard Length; head length 30.4-33.9% SL; pre-pectoral length 34.2-35.3% SL; bony-orbit width 41.2-44.2% head length *Platyberyx maui*

Platyberyx maui Kukuev, Parin & Trunov, 2012

Other characters: dorsal-fin rays 28; anal-fin rays 17; pectoral-fin rays 17-18; lateral line originating at posterodorsal margin of opercle, arching posteriorly toward dorsal-fin base and extending to caudal fin, consisting of approximately 30 elongate, enlarged, pore-bearing scales



Size: 14.0 cm SL

CHIASMODONTIDAE

Swallowers

KEY TO THE GENERA OF CHIASMODONTIDAE OCCURRING IN THE AREA

1a. Head and body without photophores; belly distinctively distensible (Fig. 1a); premaxillary and dentary teeth arranged in 2 rows (lateral and mesial)(Fig. 1b) *Chiasmodon* (p. 284)

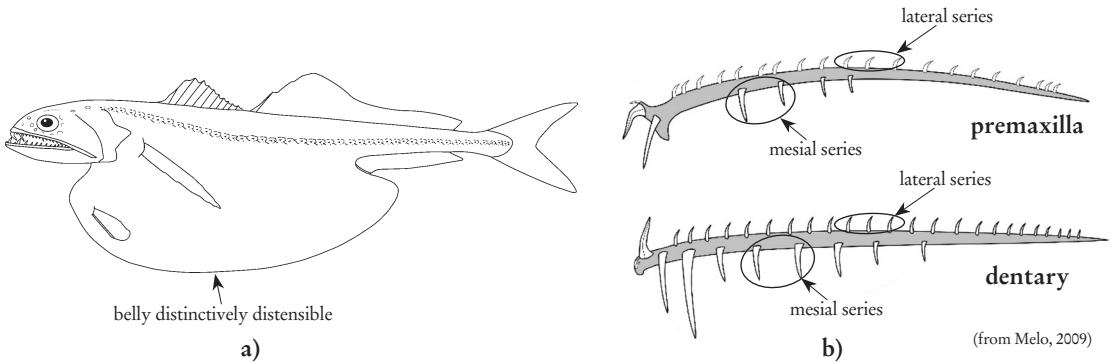


Fig. 1 *Chiasmodon*

1b. Head and body with photophores, aggregated in definite rows and patterns; belly moderately distensible (Fig. 2a); premaxillary teeth in 3 rows (lateral, middle and mesial)(Fig. 2b), and dentary in 2 rows (lateral and mesial) of 1-5 series of needle-like teeth (Fig. 2c) *Pseudoscopelus* (p. 285)

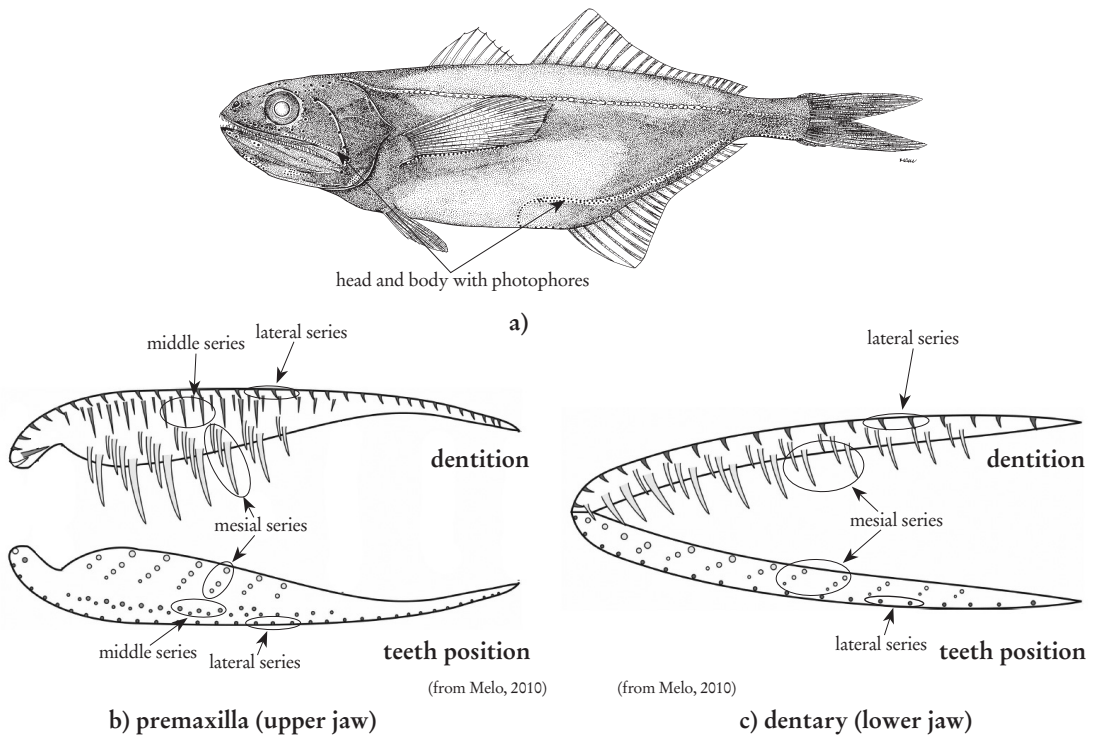


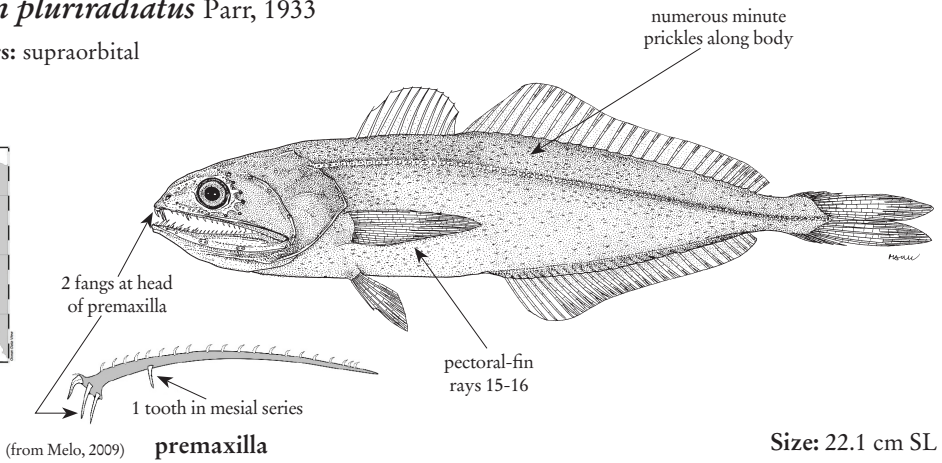
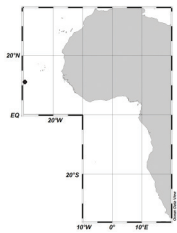
Fig. 2 *Pseudoscopelus*

KEY TO THE SPECIES OF *CHIASMODON* OCCURRING IN THE AREA

- 1a. Pectoral-fin rays 15-16; fangs at head of premaxilla 2; numerous minute dermal spinules along body present on both larvae and adults *Chiasmodon pluriradiatus*
- 1b. Pectoral-fin rays 12-14; fangs at head of premaxilla 1; dermal spinules along body absent in specimens larger than 4.8 cm Standard Length → 2

Chiasmodon pluriradiatus Parr, 1933

Other characters: supraorbital pores 8.

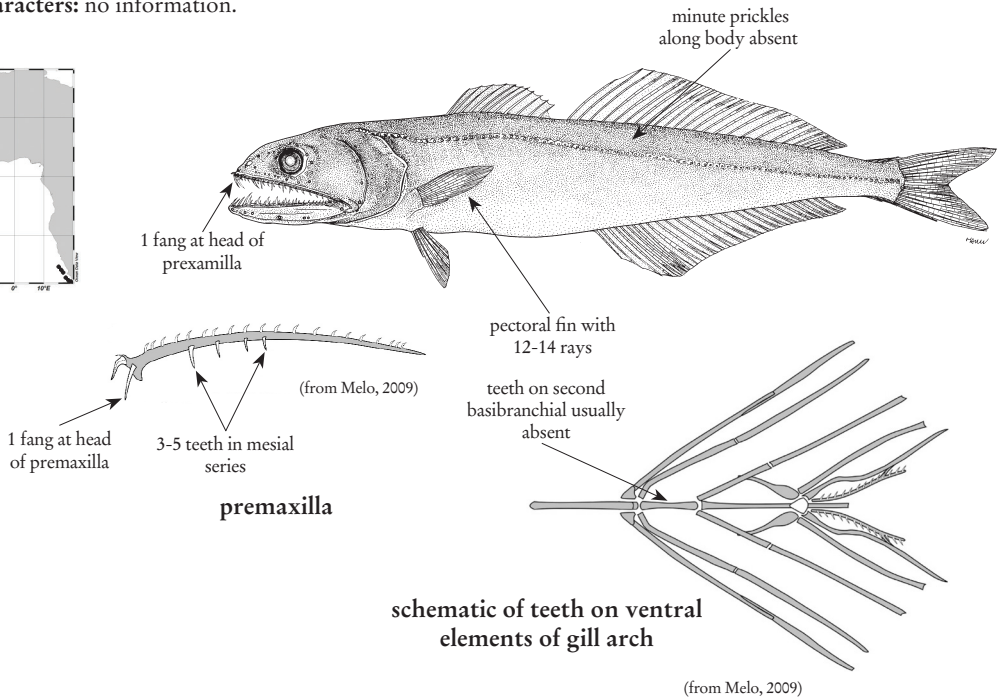
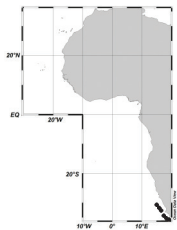


Size: 22.1 cm SL

- 2a. Teeth on second basibranchial usually absent (rarely 1-3 small teeth) . . . *Chiasmodon microcephalus*

Chiasmodon microcephalus Norman, 1929

Other characters: no information.



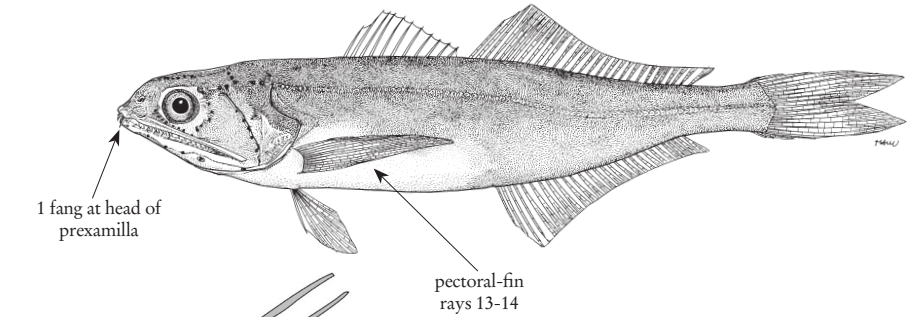
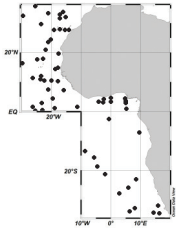
Size: 22.5 cm TL

2b. Teeth on second basibranchial always present, strong, 3-18 *Chiasmodon niger*

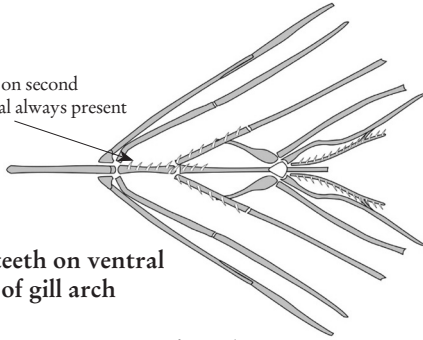
Chiasmodon niger Johnson, 1864

Black swallower

Other characters: no information.



teeth on second basibranchial always present

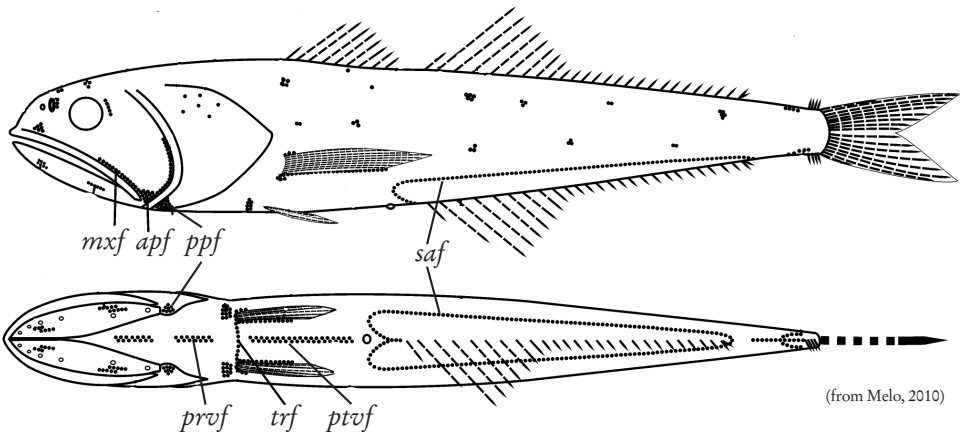


schematic of teeth on ventral elements of gill arch

(from Melo, 2009)

Size: 20.5 cm SL

GENUS *PSEUDOSCOPELUS*



(from Melo, 2010)

apf - anteropreopercular photophores mxp - maxillary photophores ppp - ventro-nasal photophores prvf - prepelvic-fin photophores
 ptvf - postpelvic-fin photophores saf - anal-fin photophores trf - transverse pelvic-fin photophores

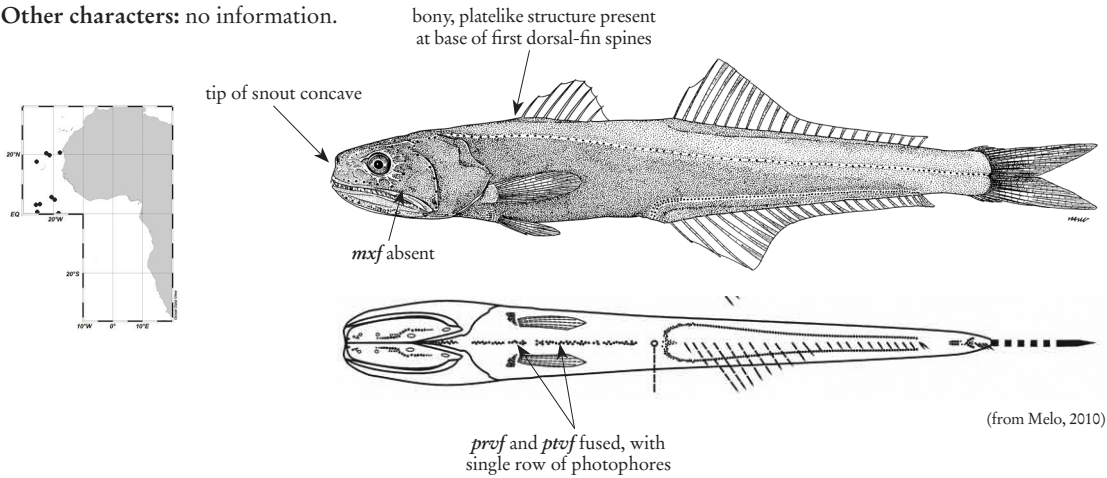
Schematic drawing showing photophore groups important for the identification of *Pseudoscopus* species occurring in the area

KEY TO THE SPECIES OF *PSEUDOSCOPELUS* OCCURRING IN THE AREA

- 1a.** Tip of snout concave; bony, platelike structure present at base of first dorsal-fin spines; *prvf* and *ptvf* fused, with single row of photophores; *mx**f* absent *Pseudoscopus scutatus*
- 1b.** Tip of snout convex; no bony, platelike structure at base of first dorsal-fin spines; *prvf* and *ptvf* separated; *mx**f* absent or present. → 2

Pseudoscopus scutatus Krefft, 1971

Other characters: no information.

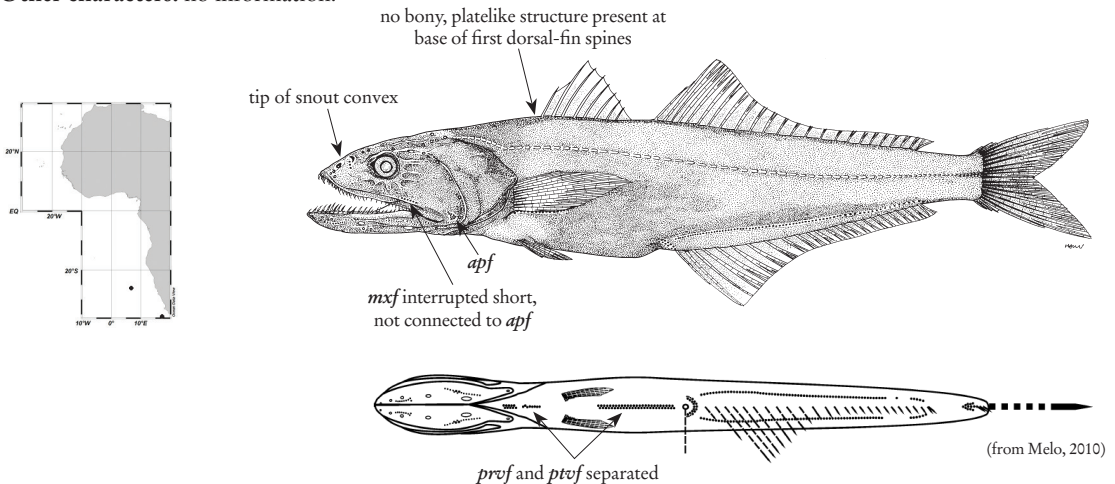


Size: 9.2 cm SL

- 2a.** Teeth on basihyal (the bone forming the skeleton of the tongue) present; teeth on second basihyal elongated and canine; *mx**f* interrupted short, not connected to *apf*; *trf* absent; *ppf* absent *Pseudoscopus australis*
- 2b.** Teeth on basihyal absent; teeth on second basihyal small and conical; *mx**f* absent or if present connected posteriorly to *apf*; *trf* present; *ppf* present → 3

Pseudoscopus australis Prokofiev & Kukuev, 2006

Other characters: no information.

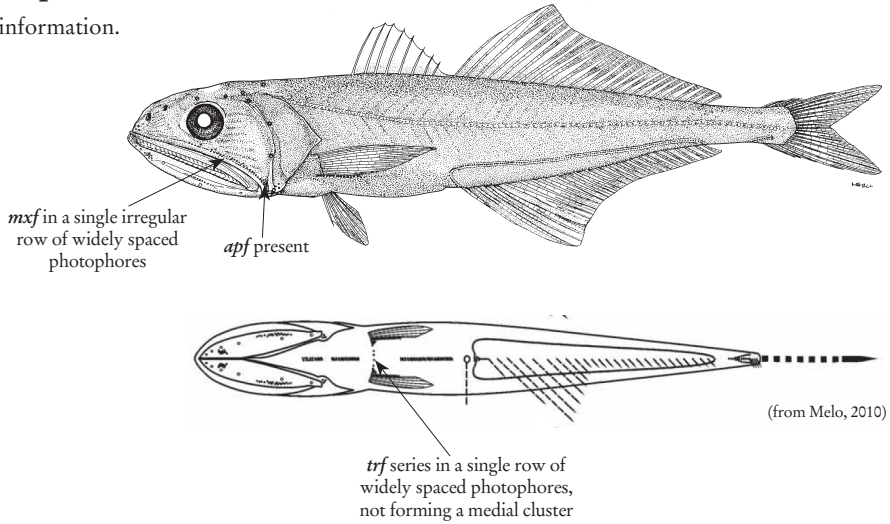
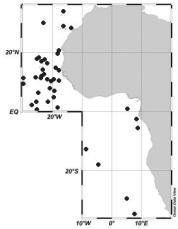


Size: 19.6 cm SL

3a. *trf* photophore series in a single, straight row of widely spaced photophores, not forming a medial cluster; *mx* in a single irregular row, photophores widely spaced; *apf* present and triangular *Pseudoscopelus altipinnis*
 3b. *trf* photophore series in a single row of closely spaced photophores, with a circular cluster in midline; *mx* in a single straight row, photophores closely spaced; *apf* absent → 4

Pseudoscopelus altipinnis Parr, 1933

Other characters: no information.



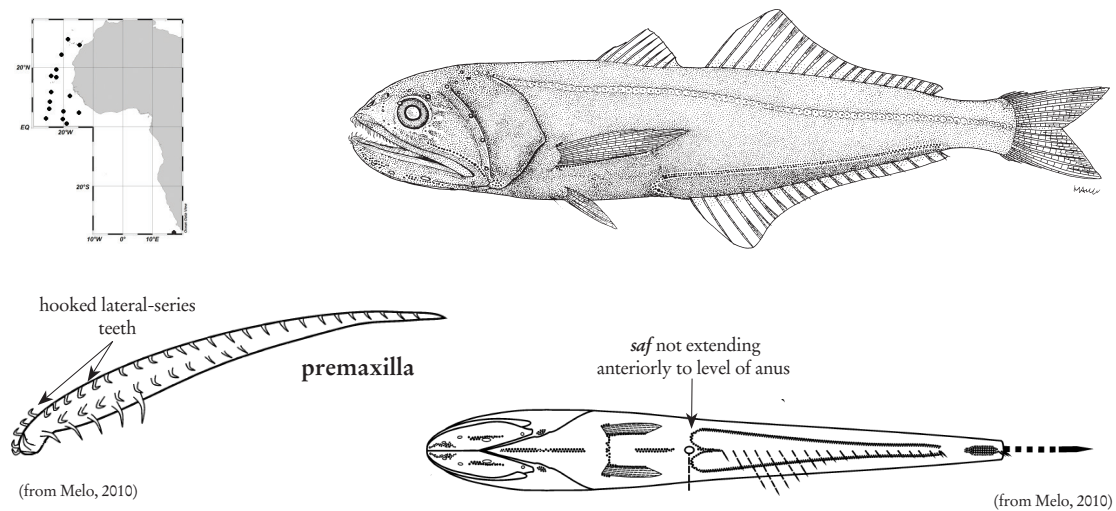
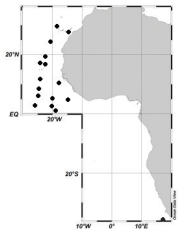
(from Melo, 2010)

Size: 18.8 cm SL

4a. Hooked teeth on lateral series of dentary and premaxilla present and flared outwards; *saf* not extending anteriorly to the level of anus *Pseudoscopelus obtusifrons*

Pseudoscopelus obtusifrons (Fowler, 1934)

Other characters: no information.



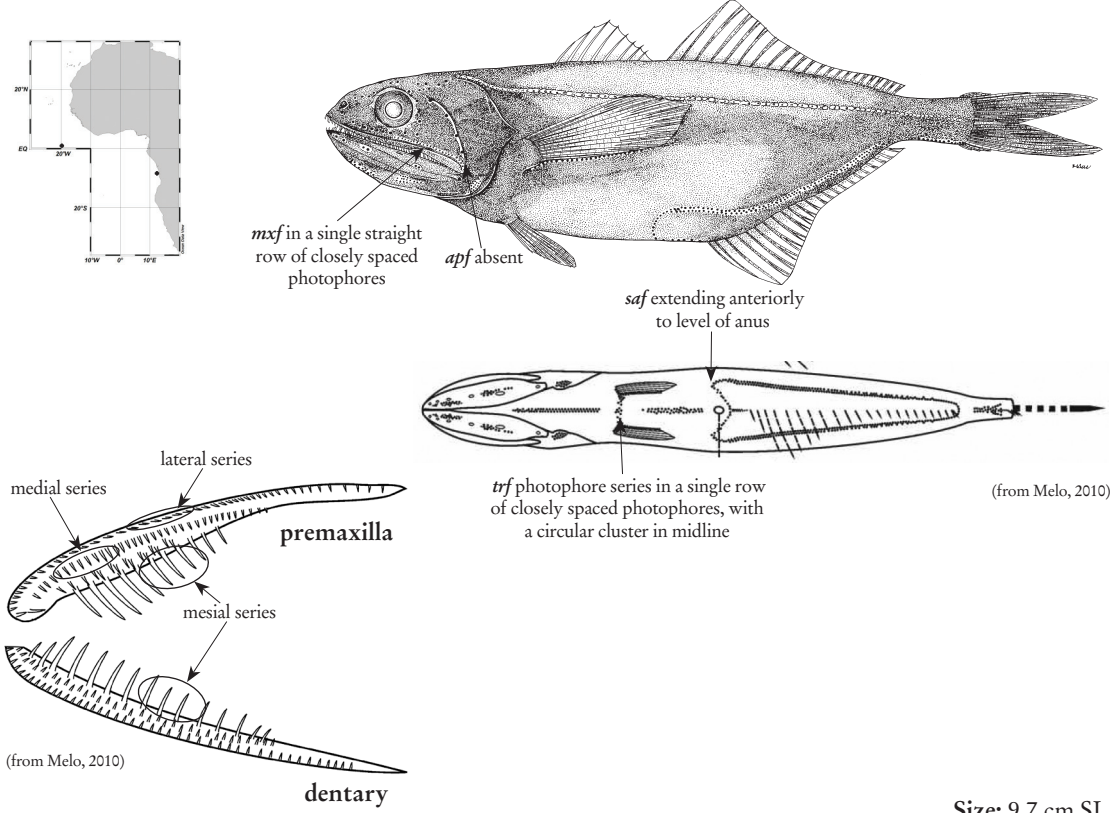
(from Melo, 2010)

Size: 14.4 cm SL

4b. Hooked teeth on lateral series absent; premaxillary and dentary teeth curved posteriorly, not flared outwards; *saf* extending anteriorly to the level of anus *Pseudoscopelus cordilluminatus*

Pseudoscopelus cordilluminatus Melo, 2010

Other characters: no information.



(from Melo, 2010)

Size: 9.7 cm SL

HOWELLIDAE

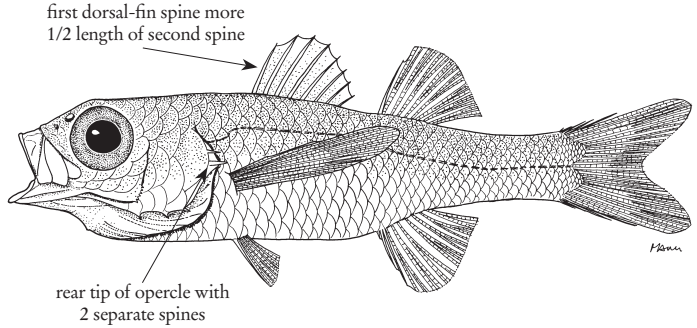
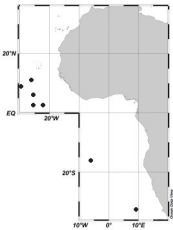
Pricklefishes

KEY TO THE GENERA, AND SPECIES OF MONOTYPIC GENERA OF HOWELLIDAE OCCURRING IN THE AREA

- 1a. First dorsal-fin spine less than 1/2 length of second spine. Rear tip of opercle with a cluster of 2 or more spines. Gill rakers on first arch 26-32. Lateral line interrupted *Howella* (p. 289)
- 1b. First dorsal-fin spine more 1/2 length of second spine. Rear tip of opercle with 2 separate spines. Gill rakers on first arch 23-29. Lateral line continuous or interrupted below second dorsal fin *Bathysphyraenops simplex*

Bathysphyraenops simplex (Parr, 1933)

Other characters: no information.



Size: 9.0 cm SL

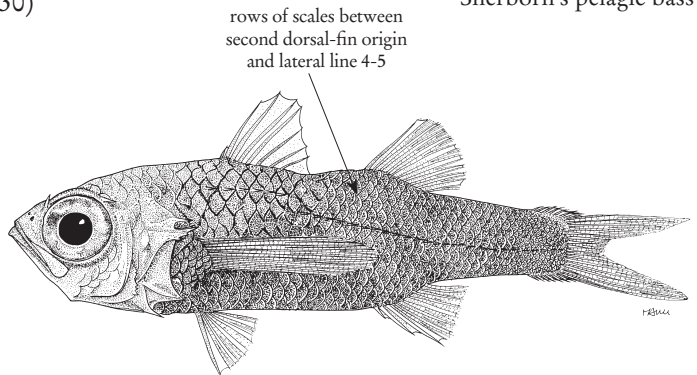
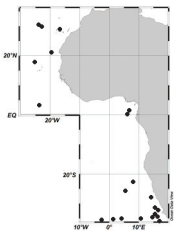
KEY TO THE SPECIES OF *HOWELLA* OCCURRING IN THE AREA

1a. Rows of scales between second dorsal-fin origin and lateral line 4-5; rear tip of opercle with a cluster of 3-8 spines plus 1 separated spine slightly above. Lateral line interrupted *Howella sherborni*

Howella sherborni (Norman, 1930)

Other characters: dorsal-fin rays 8-9; anal-fin rays 6-7; pectoral-fin rays 15-17; dark brown with silvery reflections.

Sherborn's pelagic bass



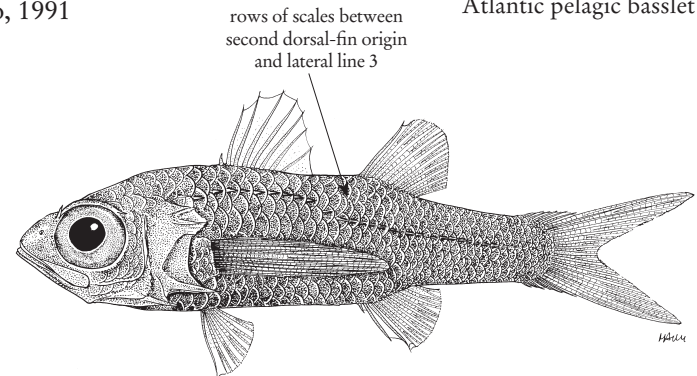
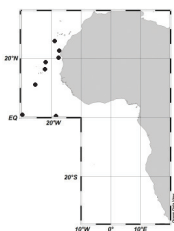
Size: 8.0 cm TL

1b. Rows of scales between second dorsal-fin origin and lateral line 3; rear end of opercle with a cluster of 2 spines. Lateral line divided into 3 segments *Howella atlantica*

Howella atlantica Post & Quéro, 1991

Other characters: dorsal-fin rays 9-10; anal-fin rays 7-8; pectoral-fin rays 14-16.

Atlantic pelagic basslet



Size: 8.0 cm TL

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TECHNICAL TERMS AND MEASUREMENTS

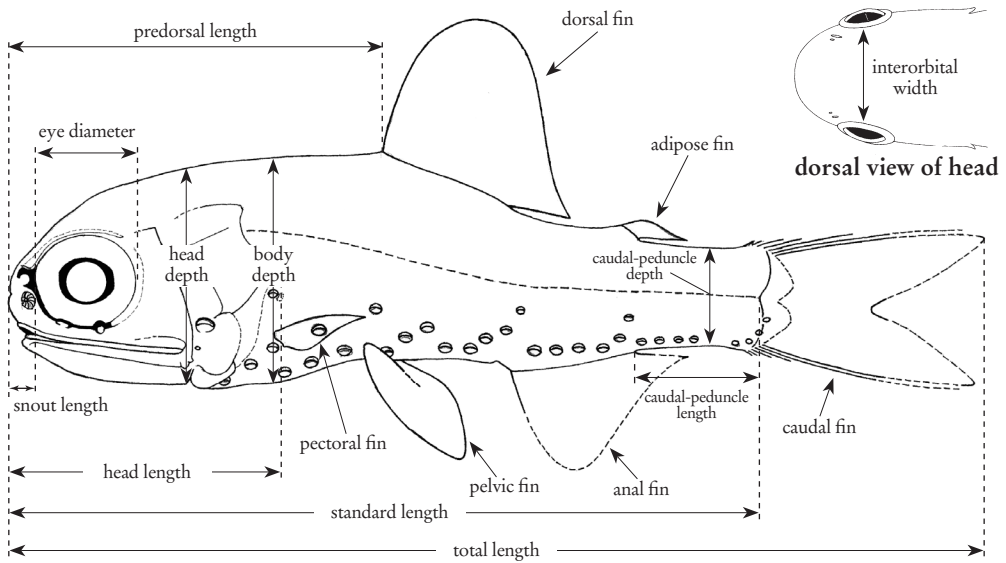


Fig. 1 Common external measurements and features

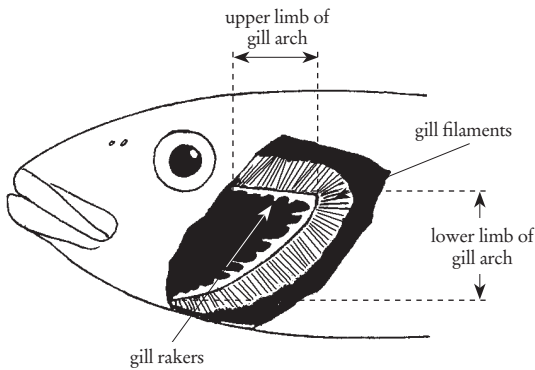


Fig. 2 Position of 1st left gill arch with gill cover removed

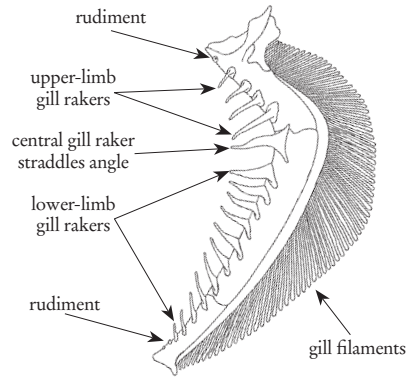


Fig. 3 Structures of 1st left gill arch

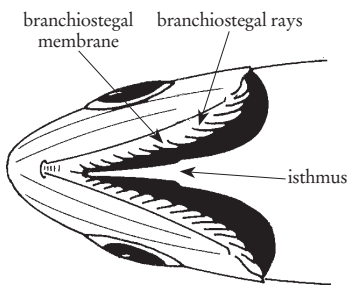


Fig. 4 Structures on ventral side of head

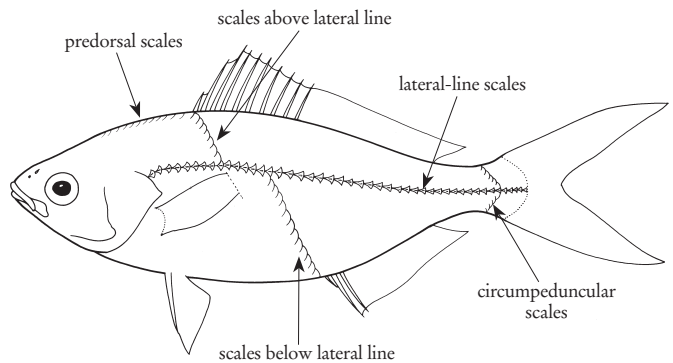


Fig. 5 Common scale counts

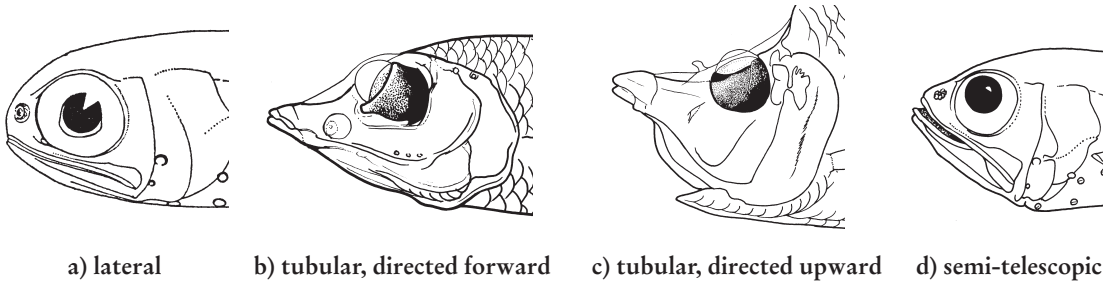


Fig. 6 Eye types

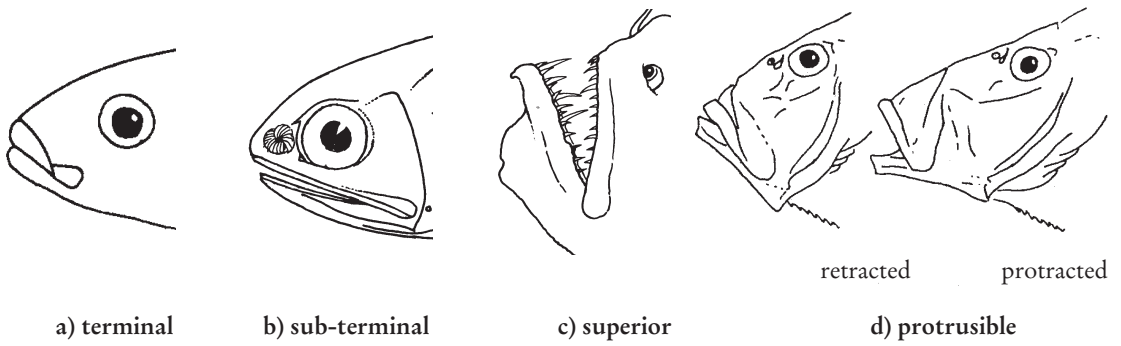
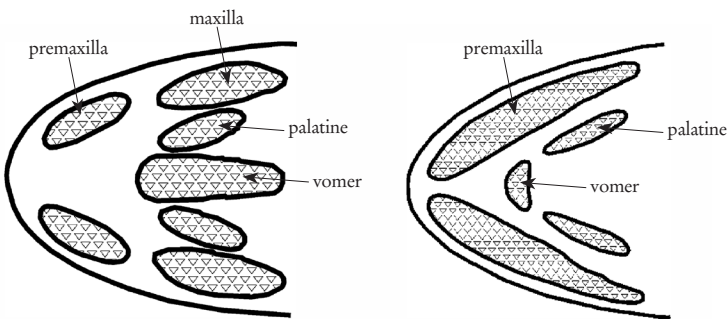
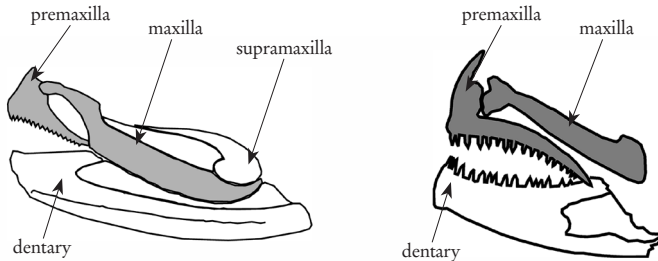


Fig. 7 Mouth position and protrusibility



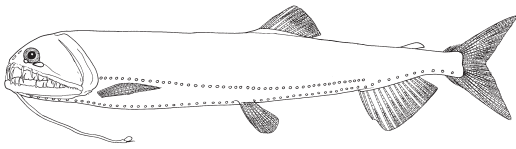
a) roof of mouth



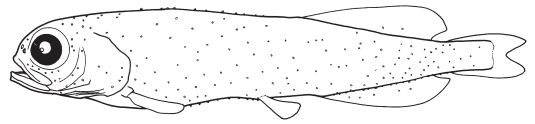
b) maxilla included in gape of mouth

c) maxilla excluded from gape of mouth

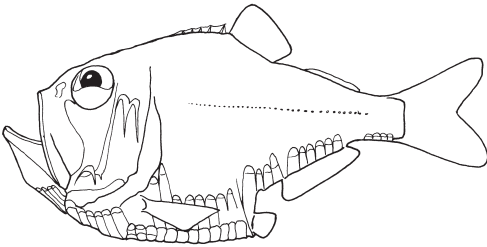
Fig. 8 Teeth-bearing bones in the roof of the mouth and upper jaw, and alternative positions of premaxilla and maxilla



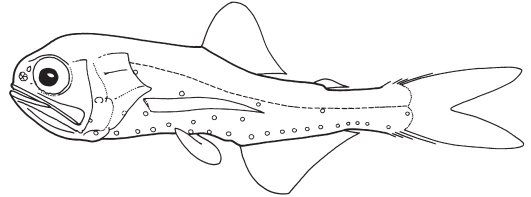
Stomiidae



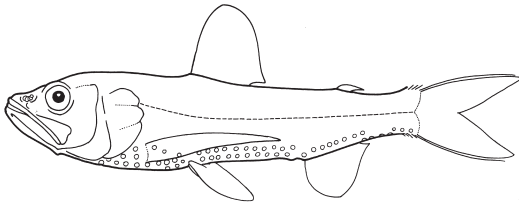
b) scattered along body flanks



Sternoptychidae



c) linear ventral series with lateral photophores perpendicular or oblique to this series



Neoscopelidae



d) isolated organs along ventral margin

a) two linear series on ventral half of trunk

Fig. 9 Patterns in photophore arrangement

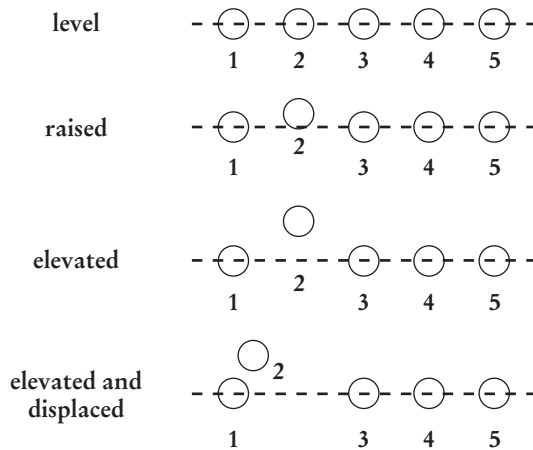


Fig. 10 Photophore position

GLOSSARY OF TECHNICAL TERMS

Abdomen - The belly; ventral area between breast and anus.

Abyssopelagic - Pelagic zone between the depths of 4 000 and 6 000 m (Fig. 1, p. xii).

Acute - Pointed or sharp.

Adipose eyelid - Transparent fleshy tissue covering part or all of the eye in some fishes.

Adipose fin - Small, fleshy fin without rays or spines on the dorsal midline between the dorsal and caudal fins of some fishes (Fig. 1, p. 311).

Anal fin - Unpaired median fin supported by spines and/or rays on the ventral midline posterior to anus (Fig. 1, p. 311).

Anterior - Pertaining to the front portion.

Anus - Posterior opening of the intestine through which wastes are excreted; vent.

Band - Usually refers to an oblique or irregular marking.

Bar - Elongate nearly straight vertical marking.

Barbel - Elongate fleshy tentacle-like sensory projection, usually about the mouth or head.

Base of fin - Part of the fin that attaches to the body.

Bathypelagic - Pelagic zone between the depths of about 1 000 and 4 000 m (Fig. 1, p. xii).

Bifid, bifurcate - Separated or divided into 2 branches (forked).

Body depth - In Myctophiformes, the vertical distance from the dorsal to the ventral margin of the body through the upper end of the pectoral-fin base (Fig. 1, p. 311). In other groups, this measurement can be expressed in a number of ways, the definition of which is given in the keys.

Branchiostegal membranes - Membranes on the ventral interior surface of the gill cover supported by branchiostegal rays.

Branchiostegal rays - Bony rays supporting the membranes inside the lower part of the gill cover (Fig. 4, p. 311).

Canine - Slender conical tooth, often enlarged and elongate.

Caudal fin - The tail fin (Fig. 1, p. 311).

Caudal peduncle - Posterior part of body between the rear parts of the dorsal and anal fins, and the caudal fin. **Caudal-peduncle depth** is measured as the least depth of the caudal peduncle; **caudal-peduncle length** is measured as the horizontal distance between verticals at the rear base of the anal fin and the caudal-fin base (Fig. 1, p. 311).

Cheek - Side of head below and slightly behind the eye.

Cleithral symphysis - The junction of the ventral and anterior ends of the cleithrum, the main L-shaped bone of the pectoral girdle.

Cleithrum - The major bone of the pectoral girdle, extending upward from the pectoral fin base and forming the rear margin of the gill cavity.

Compressed - Flattened laterally; a body shape much deeper than wide.

Cusp - A usually pointed large distal projection of the crown.

Cusplet - As with a cusp, but a small projection in association with a cusp.

Cycloid scale - Scales with smooth posterior margin, without spines on posterior margin.

Deciduous - Easily shed or rubbed off; refers to scales.

Dentary - The main tooth bearing bone of the lower jaw (Fig. 8, p. 312).

Denticle - Small tooth-like structures.

Depressed - Flattened from top to bottom; body shape much wider than deep.

Dermal - Pertaining to the skin.

Distal - Part farthest from the centre of the body.

Dorsal - Back or upper body.

Dorsal fin - Median fin supported by spines and/or rays; sometimes separated into 2 or more fins with the anteriormost fin designated the first (Fig. 1, p. 311).

Epibranchial - Main dorsal element of the gill arch.

Eye diameter - The horizontal distance across the midline of the pigmented region of the eye (Fig. 1, p. 311).

Fangs - A long sharp tooth situated in the frontal part of the upper jaw.

Finlets - Small separate dorsal and anal fins.

Forked - Branched; caudal fin shape with distinct upper and lower lobes and the posterior margin of each lobe relatively straight or gently curved.

Fusiform - Spindle-shaped; body shape that is cylindrical and tapering at both ends.

Gill - Organ for exchange of dissolved gasses between water and the blood stream; gill filaments and rakers are supported by a gill arch in fishes (Figs. 2 and 3, p. 311).

Gill arch - Bony angular skeleton that supports the gill filaments and gill rakers (Figs. 2 and 3, p. 311).

Gill filaments - Principal site of gas exchange in the gill (Figs. 2 and 3, p. 311).

Gill membrane - Membranes along the posterior and ventral margin of the gill cover.

Gill rakers - Bony projections along the front edge of the gill arch that help prevent food from escaping through the gill opening (Figs. 2 and 3, p. 311); gill-raker counts are typically taken on the outermost (first) gill arch and are often separated into upper limb and lower limb counts; if a raker straddles the angle of the arch, the count is included in the lower limb, unless otherwise specified (e.g. Myctophidae); rudiments are included in counts unless otherwise noted.

Gular - Behind the chin and between the sides of the lower jaw, also relating to the “throat” the ventral surface ahead of the pectoral insertion.

Head depth - The vertical distance between the dorsum to ventrum of the head measured at the vertical through the posterior edge of the maxilla (Fig. 1, p. 311).

Head length - The distance from the tip of the snout (or upper lip) to the most posterior point of the opercular margin (Fig. 1, p. 311).

Hyoid - Referring to the series of bones behind the gill cover that suspends the branchiostegal rays and connects to the gill arches.

Hypural - The bony structure (often fan-shaped) that chiefly is composed of the expanded, flattened and partially fused hemal spines (ventral extensions of the vertebrae), and that supports the caudal-fin rays in most bony fishes.

Illicium - Modified isolated first ray of the dorsal fin that forms the “fishing gear” (rod and lure) in anglerfishes.

Infraorbital - Another term for suborbitals (see lacrimal).

Insertion - The anterior or posterior point of attachment of a fin to the body.

Interorbital - The space on top of the head between the eyes.

Isthmus - The fleshy throat region, extending forward from ventral part of the chest and narrowing anteriorly, and externally separating the two gill chambers (Fig. 4, p. 311).

Jugular - Pertaining to the throat region; pelvic fins are jugular when positioned on the underside of the head in front of the pectoral fins.

Lacrimal - The most anterior or the series of 6 or fewer bones around the lower margin of the eye that are referred to as suborbital bones; the lacrimal is sometimes also referred to as preorbital.

Lanceolate - Spear- or lance-shaped.

Lateral - The side or toward the side.

Lateral line - A vibration sensory canal along the side of the body with a series of pores that communicate to the outside of the body, often through specialized pored lateral-line scales (Fig 5, p. 311).

Mandibular - Related to the lower jaw.

Maxilla - The bone in the upper jaw behind the premaxilla. In ancestral fishes the maxilla is the principal bone of the upper jaw that bears teeth; in derived fishes it generally does not bear teeth and serves more to support the premaxilla (Figs. 8a and 8b, p. 312).

Median - The middle or toward the midline.

Median fins - Fins that lie on the midline; the dorsal, anal, and caudal fins.

Melanophore - Cell carrying black or greyish pigments.

Membrane - A thin sheet of tissue; often refers to thin sheet of tissue between fin and branchiostegal rays.

Mesopelagic - Pelagic zone between the depths of about 200 and 1 000 m (Fig. 1, p. xii).

- Nape** - The dorsal part of the body just behind the occiput or hard dorsal region of the skull.
- Nostrils** - The external openings of the cavities of the nasal organs, or organs of smell.
- Nuchal** - Pertaining to the neck; the nape of the neck.
- Opercle** - The large posterior upper bone of the gill cover.
- Operculum** - The gill cover composed of the preopercle, opercle, interopercle, and subopercle.
- Orbital** - Referring to the eye, particularly the bones surrounding the eye.
- Origin** - The anterior point of attachment of fins to the body (anterior insertion).
- Otolith** - A small bone or earstone in the inner ear of fishes.
- Paired fin** - Fins found on both sides of the body; the pectoral and pelvic fins.
- Palate** - Roof of the mouth (Fig. 8a, p. 312).
- Palatine** - Paired bones on each side of the roof of mouth, behind and lateral to the vomer, often bearing teeth (Fig. 8a, p. 312).
- Papilla** - A small fleshy projection.
- Pectoral fins** - Paired fins on the sides behind the gill cover (Fig. 1, p. 311).
- Peduncle** - A stalk-like process (see caudal peduncle).
- Pelagic** - The division of the marine environment composed of all the ocean's water (Fig. 1, p. xii).
- Pelvic fins** - Paired fins in front of the anus (Fig. 1, p. 311), sometimes called the ventral fins. Ancestral fishes generally have the pelvic fins in the abdominal position while derived fishes generally have the pelvic fins in the thoracic or jugular position.
- Peritoneum** - A thin membrane that lines the body cavity, covers the heart, and forms the mesenteries.
- Photophore** - Light-emitting organ or well-defined luminous spot (Figs. 9 and 10, p. 313).
- Posterior** - Pertaining to the rear portion.
- Postorbital** - One or more of the suborbital bones, starting with the third suborbital bone and possibly referring also to the fourth, fifth and sixth suborbital bone (see lacrimal).
- Predorsal length** - Distance from the tip of the snout along the midline to a vertical line through the origin of the dorsal fin.
- Premaxilla** - Anterior bone in the upper jaw (see maxilla) (Figs. 8a and 8b, p. 312).
- Preopercle** - The upper anterior bone of the gill cover.
- Preorbital** - Referring to the region before the eye; a suborbital bone in front and below the eye.
- Procurrent caudal-fin rays** - Small rays at the insertions of the fin that do not reach the rear margin.
- Protrusible mouth** - A structural arrangement of the jaws that enables the animal to protrude (extend) or withdraw the mouth at will. When fully protruded, the cavity of the mouth is enlarged to form a funnel-like space facilitating the uptake of food (Fig. 7c, p. 312).
- Proximal** - Part nearest the centre of the body.
- Pyloric caeca** - Finger-like projections of the digestive tract near the juncture of the stomach and the small intestine.
- Ray** - Supporting element of fins. It is here used to designate exclusively, soft rays.
- Retrorse** - Bent or turned backward or downward.
- Rudimentary** - Poorly developed structures, such as small gill rakers at the ends of a gill arch, chin barbels, fins, photophores and teeth.
- Scute** - A modified scale that can be enlarged, hardened, ridged, keeled, or spiny.
- Serrate** - With saw-like teeth along a margin.
- Snout length** - Horizontal distance from the tip of the snout to the anterior margin of the pigmented region of the eye (Fig. 1, p. 311).
- Soft dorsal fin** - The portion of the dorsal fin supported by soft rays.
- Soft ray** - A fin support element that is composed of 2 halves (paired laterally), segmented, and usually flexible and branched. Rarely, soft rays can be pointed and stiff and appear to be a spine.
- Spatulate** - shovel-like; having a broad, flat and rounded shape.
- Spine** - A fin support element that is unpaired laterally, unsegmented, unbranched and usually stiff and pointed; also refers to slender sharply pointed bony processes not associated with fins.

Spinous dorsal fin - The anterior portion of the dorsal fin that is supported by spines.

Spinule - A small spine.

Standard length - The distance from the anterior-most point on the fish to the posterior end of the hypural; here also abbreviated as SL (Fig. 1, p. 311).

Stripe - Generally refers to a horizontal nearly straight side marking.

Suborbital bones - See lacrimal.

Superior - Above or on the upper surface; a mouth position with the snout behind the anterior opening of the mouth (Fig. 7b, p. 312).

Symphysis - The articulation between 2 bones; often refers to the anterior juncture between the 2 halves of either jaw.

Terminal - Pertaining to at the end, or situated at the end; a mouth position with the opening of the mouth even with the tip of the snout (Fig. 7a, p. 312).

Thoracic - Referring to the breast region; pelvic fins are thoracic in position when directly below the pectoral fins.

Tongue - Normally moveable organ on the floor of the mouth; sometimes with teeth or photophores (e.g. Neoscopelidae) on it.

Total length - The length from the tip of the snout to the tip of the tail; here also abbreviated as TL (Fig. 1, p. 311).

Truncate - Terminating abruptly in a square end; a caudal-fin shape with a vertically straight terminal border.

Tubular eyes - Elongate tube-shaped eyeballs, which are generally directed upwards or forward (Figs. 6b and 6c, p. 312).

Tusk - An elongated greatly enlarged tooth that projects when the mouth is closed.

Vent - See anus.

Ventral - The lower surface, or abdominal part of the body.

Ventral fins - See pelvic fins.

Vertebrae - Bones of the vertebral column or back bone; vertebral counts are often given as a formula; precaudal vertebrae + caudal vertebrae, where precaudal vertebrae typically have paired ventrolateral extensions that support ribs and caudal vertebrae have a single ventrally directed spine (haemal spine) and do not support ribs.

Villiform - Many small slender outgrowths, usually in a close-set patch or carpet; often refers to slender teeth forming velvety bands.

Vomer - An unpaired median bone on the roof of the mouth (Fig. 8a, p. 312).

Vomerine teeth - Teeth on the vomer (see above).

INDEX OF SCIENTIFIC NAMES

A

- Aethoprora* 173
Agrostichthys 225
Agrostichthys parkeri 225
Ablisaurus berryi 135
ALEPISAUROIDAE xiii, 129, 130
Alepisaurus brevirostris 130
Alepisaurus ferox 131
ALEPOCEPHALIDAE
. 2, 7, 41
ALEPOCEPHALIFORMES
. 2, 6, 7, 41
ANGUILLIFORMES 2, 19
Anoplogaster cornuta 247
ANOPLOGASTRIDAE
. xiii, 7, 247
ANOPTERIDAE 129, 131
Anopterus pharao 132
Anopterus vorax 131
Aphanopus carbo 268
Aphanopus intermedius 268
Aphanopus mikhailini 267, 268
Arctozenus risso 142
ARGENTINIFORMES xii
Argyripnus atlanticus 70
Argyropelecus 68, 69, 71
Argyropelecus aculeatus 73
Argyropelecus affinis 72
Argyropelecus gigas 72
Argyropelecus hemigymnus 71
Argyropelecus olfersi 73
Argyropelecus sladeni 74
Aristostomias 80, 84
Aristostomias grimaldii 85
Aristostomias lunifer 84
Aristostomias polydactylus 84
Aristostomias tittmanni 85
Aristostomias xenostoma 85
Astronesthes 53, 77, 79, 86
Astronesthes atlanticus 88
Astronesthes boulengeri 86, 88, 90
Astronesthes caulophorus 87
Astronesthes decoratus 93
Astronesthes gemmifer 86
Astronesthes gudrunae 92
Astronesthes haplophos 93
Astronesthes illuminatus 90
Astronesthes indicus 88
Astronesthes karsteni 91
Astronesthes krefftii 89
Astronesthes leucopogon 86, 91
Astronesthes macropogon 91
Astronesthes micropogon 90
Astronesthes neopogon 86
Astronesthes niger 86, 92
Astronesthes oligoa 92
Astronesthes richardsoni 87
Astronesthes tanibe 89
Astronesthes zharovi 88, 89
AULOPIFORMES xii, 4-6, 129
Avocettina 22, 23
Avocettina acuticeps 23
Avocettina infans 23
B
Bajacalifornia 7, 41, 42
Bajacalifornia arcylepis 43
Bajacalifornia calcarata 42
Bajacalifornia megalops 43
Barbantus curvifrons 45
Bathophilus 81, 93
Bathophilus ater 95
Bathophilus brevis 93
Bathophilus digitatus 96
Bathophilus irregularis 96
Bathophilus longipinnis 95
Bathophilus nigerrimus 94
Bathophilus pawneeii 94
Bathophilus schizochirus 95
Bathophilus vaillanti 94
Bathylagichthys 30, 31
Bathylagichthys greyae 32
Bathylagichthys kobylianskyi 32
Bathylagichthys longipinnis 31
Bathylagichthys problematicus 32
BATHYLAGIDAE xii, 5, 29, 30
Bathylagoides argyrogaster 30
Bathylagus 30, 31, 33
Bathylagus andriashevi 33
Bathylagus antarcticus 33
Bathylagus euryops 33
Bathylagus niger 33
Bathylagus tenuis 33
Bathylachnops brachyrhynchus
. 29, 38
Bathysphyraenops simplex
. 288, 289
Benthalbella infans 152
Bentosema 162, 169
Bentosema fibulatum 170
Bentosema glaciale 169
Bentosema suborbitale 169
BERYCIFORMES xii, 9, 235
Bolinichthys 167, 170
Bolinichthys distofax 171
Bolinichthys indicus 171
Bolinichthys photothorax 171
Bolinichthys supralateralis 170
Bonapartia pedaliota 2, 56
Borostomias 79, 96
Borostomias antarcticus 97
Borostomias elucens 96
Borostomias mononema 97
Brama 271
Brama brama 271, 272
Brama caribbea 272
Brama dussumieri 272
BRAMIDAE 11, 269, 270
Bregmaceros atlanticus 230
Bregmaceros nectabanus 229
BREGMACEROTIDAE 7, 229
C
CARISTIIDAE 11, 269, 276
Caristius 277
Caristius barsukovi 278
Caristius fasciatus 278
Caristius litvinovi 277
Caristius walvisensis 279
Centrobranchus nigroocellatus 160
CENTROLOPHIDAE
. 10, 253-255
Centrolophus niger 255
Ceratias holboelli 232
Ceratias tentaculatus 233
Ceratias uranoscopus 232
CERATIIDAE 8, 231
Ceratoscopelus 166, 172
Ceratoscopelus maderensis 172
Ceratoscopelus warmingii 172
Chauliodus 77, 78, 97
Chauliodus danae 98
Chauliodus minimus 97
Chauliodus schmidtii 98
Chauliodus sloani 98

- Chiasmodon* 283, 284
Chiasmodon microcephalus 284
Chiasmodon niger 285
Chiasmodon pluriradiatus 284
 CHIASMODONTIDAE
 xiii, 11, 269, 283
Chirostomias pliopterus 78, 80
Coccorella 5
Coccorella atlantica 132, 133
Cryptopsaras couesii 231
Ctenoscopelus phengodes 163
Cubiceps 262, 263
Cubiceps baxteri 264
Cubiceps caeruleus 264
Cubiceps capensis 265
Cubiceps gracilis 263
Cubiceps paradoxus 265
Cubiceps pauciradiatus 263
Cyclothone xii, 56, 57
Cyclothone acclinidens 60
Cyclothone alba 57, 58
Cyclothone braueri 58
Cyclothone livida 60
Cyclothone microdon 58
Cyclothone obscura 2, 56, 57
Cyclothone pallida 59
Cyclothone parapallida 60
Cyclothone pseudopallida 59
Cyema atrum 27
 CYEMATIDAE 1, 27
- D**
- Dalatias licha* 14
 DALATIIDAE 13, 14
Dasyscopelus 163, 207
Dasyscopelus asper 209
Dasyscopelus obtusirostris 210
Dasyscopelus selenops 207
Dasyscopelus spinosus 208
 DERICHTHYIDAE 19, 20
Derichthys 19
Derichthys serpentinus 19, 20
Desmodema polystictum 226
Diaphus 164, 173
Diaphus (A.) adenomus 173
Diaphus (A.) bertelseni 182
Diaphus (A.) diadematus 183
Diaphus (A.) dumerilii 179
Diaphus (A.) effulgens 184
Diaphus (A.) fragilis 185
Diaphus (A.) garmani 179, 180
Diaphus (A.) lucidus 185
Diaphus (A.) luetkeni 182
Diaphus (A.) metopoclampus
 183, 184
Diaphus (A.) nielseni 180
Diaphus (A.) ostenfeldi 184
Diaphus (A.) perspicillatus 185
Diaphus (A.) problematicus 179
Diaphus (A.) signatus 180
Diaphus (A.) splendidus 183
Diaphus (A.) taaningi 181
Diaphus (A.) termophilus 182
Diaphus (A.) vanhoeffeni 173
Diaphus (D.) anderseni 175
Diaphus (D.) brachycephalus 174
Diaphus (D.) holti 177
Diaphus (D.) hudsoni 178
Diaphus (D.) meadi 178
Diaphus (D.) mollis 176, 177
Diaphus (D.) parri 177
Diaphus (D.) rafinesquii 176
Diaphus (D.) richardsoni 174, 175
Diaphus (D.) subtilis 175
Diaphus vanhoeffeni 173
Diogenichthys 162, 186
Diogenichthys atlanticus 186
Diogenichthys panurgus 186
Diplophos taenia 55
Diplospinus 9
Diplospinus multistriatus 258
Diretmichthys parini 248
 DIRETMIDAE 8, 247, 248
Diretmoides pauciradiatus 249
Diretmus argenteus 248
Dolicholagus longirostris 30
Dolichopteroides binocularis 39
Dolichopteryx 39
Dolichopteryx longipes 39
Dolichopteryx rostrata 39
Dolichosudis fuliginosa 140
- E**
- Echiostoma barbatum* 83
Electrona 161, 187
Electrona carlsbergi 187
Electrona risso 187
 ETMOPTERIDAE 13, 17
Etmopterus pusillus 17
Eumecichthys fiski 223
Euprotomicroides zantedeschia 14
Euprotomicrus bispinatus 15
- F**
- Flagellostomias boureei* 81
- G**
- GADIFORMES** 7, 229
 GEMPYLIDAE 9, 253-255, 257
Gempylus serpens 260
Gigantura chuni 134
- EURYPHARYNGIDAE** xiii, 1, 27
Eurypharynx pelecanaoides 27
Eustomias 80, 81, 99
Eustomias achirus 100
Eustomias aequatorialis 100
Eustomias arborifer 107
Eustomias bigelowi 104
Eustomias bimargaritatus
 106, 107
Eustomias braueri 111
Eustomias brevibarbatatus 102
Eustomias bulbornatus 110
Eustomias dendriticus 102
Eustomias enbarbatatus 110
Eustomias filifer 101
Eustomias fissibarbis 103
Eustomias furcifer 111
Eustomias grandibulbus 107, 108
Eustomias insularum 100
Eustomias intermedius 101
Eustomias kreffti 107, 108
Eustomias lanceolatus 103
Eustomias lipochirus 99
Eustomias longibarba 106, 109
Eustomias macronema 104
Eustomias macrurus 112
Eustomias melanonema 108
Eustomias melanostigma 109
Eustomias monoclonoides 103
Eustomias obscurus 105
Eustomias patulus 110
Eustomias satterleei 105
Eustomias schmidti 104
Eustomias simplex 106
Eustomias spherulifer 109
Eustomias tenisoni 111
Eustomias tetranema 101
Eustomias trewavasae 106
Eustomias triramis 105
Evermannella 5, 132, 133
Evermannella balbo 133
Evermannella melanoderma 133
 EVERMANNELLIDAE
 xiii, 5, 129, 130, 132

- Gigantura indica* 134
GIGANTURIDAE. xiii, 4, 129, 134
Gonichthys 160, 161, 188
Gonichthys barnesi. 188
Gonichthys cocco 188
Gonostoma 57, 61
Gonostoma atlanticum 61
Gonostoma denudatum. 61
GONOSTOMATIDAE 54, 55
Grammatostomias 112
Grammatostomias circularis. 112
Grammatostomias dentatus. 82, 112
Grammatostomias flagellibarba 113
Gymnoscopelus 168, 189
Gymnoscopelus braueri 164
Gymnoscopelus (G.) bolini 189
Gymnoscopelus (G.) braueri. 189
Gymnoscopelus (N.) piabilis. 189
- H**
- Heterophotus ophistoma* 78
Heteroscymnoides marleyi 15
Hierops 213
Hintonia candens. 167
Holtbyrnia 47
Holtbyrnia anomala 46, 48
Holtbyrnia cyanocephala 49
Holtbyrnia innesi. 49
Holtbyrnia laticauda 50
Holtbyrnia macrops 50
Howella. 288, 289
Howella atlantica 289
Howella sberborni 289
HOWELLIDAE 11, 269, 288
Hygophum 162, 163, 190
Hygophum benoiti 190
Hygophum hanseni 190
Hygophum hygomii 190
Hygophum macrochir 192
Hygophum proximum 191, 192
Hygophum reinhardtii 191
Hygophum taaningi 192
- I**
- Ichthyococcus* 63-65
Ichthyococcus australis 65
Ichthyococcus ovatus 65
Ichthyococcus polli 66
- Idiacanthus* 79, 113
Idiacanthus atlanticus 113
Idiacanthus fasciola 113
Isistius 16
Isistius brasiliensis 14, 16
Isistius plutodus 16
- L**
- Labichthys* 22
Labichthys carinatus 22
Lagiacrusichthys macropinna 152
LAMNIFORMES 1, 13
Lampadena 165, 193
Lampadena anomala 165, 193
Lampadena chavesi 165, 193, 194
Lampadena dea 194
Lampadena luminosa 193
Lampadena notialis. 196
Lampadena pontifex 195
Lampadena speculigera 195
Lampadena urophaos atlantica 194, 195
Lampanyctodes hectoris 164
Lampanyctus 167, 196
Lampanyctus achirus 198, 199
Lampanyctus alatus. 200
Lampanyctus ater 198
Lampanyctus australis 200, 201
Lampanyctus crocodilus 201
Lampanyctus cuprarius 197, 198
Lampanyctus festivus. 204
Lampanyctus intricarius 202
Lampanyctus isaaci 197
Lampanyctus lepidolychnus. 202
Lampanyctus lineatus 197
Lampanyctus macdonaldi 196
Lampanyctus nobilis 203
Lampanyctus photonotus 201
Lampanyctus pusillus. 200
Lampanyctus tenuiformis 203, 204
Lampanyctus turneri 199
Lampanyctus vadulus 203
Lampanyctus wisneri 199
Lampichthys procerus 168, 219
LAMPRIIFORMES. 5, 221
Lepidocybium flavobrunneum 259
Lepidophanes 167, 204
- Lepidophanes gaussi* 204
Lepidophanes guentheri 205
Leptostomias 82, 83, 114
Leptostomias bilobatus. 115
Leptostomias gladiator. 114, 116
Leptostomias gracilis 114
Leptostomias haplocaulus 114
Leptostomias longibarba 114, 115
Leptostomias macropogon. 115
Lestidiops 140-142
Lestidiops affinis. 142
Lestidiops cadenati 145
Lestidiops distans 144
Lestidiops jayakari 143
Lestidiops mirabilis 143
Lestidiops pseudosphyraenoides 143
Lestidiops similis. 144
Lestidiops sphyrenoides 144
Lestidium atlanticum. 141
Lestrolepis intermedia 139
Leucobrotula adipata. 251
Lobianchia 164, 205
Lobianchia dofleini 205
Lobianchia gemellarii 206
LOPHIIFORMES 8, 231
LOPHOTIDAE 221, 223
Lophotus 223
Lophotus capellei 224
Lophotus guentheri. 224
Lophotus lacepede. 223
Loweina 160, 161, 206
Loweina interrupta 207
Loweina rara. 206
Luciosudis normani 135
- M**
- Macroparalepis*. 140, 141, 145
Macroparalepis affinis 146
Macroparalepis brevis 145
Macroparalepis longilateralis 146
Macroparalepis macrogeneion 146
Macroparalepis nigra 145
Magnisudis 142, 147
Magnisudis atlantica 147
Magnisudis prionosa 147
Malacosteus. 80, 116
Malacosteus australis 116
Malacosteus niger 116
Manducus maderensis 56

- Margrethia* 56, 61
Margrethia obtusirostra 61
Margrethia valentinae 62
Maulisia 47, 50
Maulisia argipalla 46, 51
Maulisia mauii 50, 51
Maulisia microlepis 46, 50
Maurolicus 68, 70, 74
Maurolicus amethystinopunctatus
. 75
Maurolicus muelleri 74
Maurolicus walvisensis 75
Maurolicus weitzmani 74
Melamphaes 236
Melamphaes eulepis 236
Melamphaes falsidicus 242
MELAMPHAIDAE xii, 9, 235
MELANOCETIDAE
. xiii, 8, 231, 233
Melanocetus johnsonii 233, 234
Melanocetus murrayi 234
Melanolagus bericoides 31
MELANONIDAE 7, 229, 230
Melanonus gracilis 230
Melanonus zugmayeri 230
Melanostomias 78, 84, 117
Melanostomias bartonbeani 119
Melanostomias biseriatus 120
Melanostomias macrophotus
. 117, 118
Melanostomias melanopogon
. 119, 120
Melanostomias melanops 118
Melanostomias niger 117
Melanostomias paucilatermatus
. 119
Melanostomias tentaculatus 117
Melanostomias valdiviae 118
Mentodus 47, 48
Mentodus facilis 45, 46
Mentodus mesalirus 46
Metelectrona ventralis 161
Microstoma 6
Microstoma microstoma 34
MICROSTOMATIDAE
. xiii, 4-6, 29, 33
Monacoa grimaldii 37
MYCTOPHIDAE
. xi, xiii, 3, 155, 157, 158
MYCTOPHIFORMES xii, 3, 155
Myctophum 163, 207
Myctophum affine 210
Myctophum nitidulum 209
Myctophum punctatum 208
N
Nansenia 5, 34
Nansenia atlantica 35
Nansenia groenlandica 34
Nansenia longicauda 36
Nansenia megalopa 36
Nansenia oblita 29, 35
Nansenia pelagica 35
Nansenia tenera 36
Nasolychnus 189
Nealotus tripes 260
NEMICHTHYIDAE
. xii, 2, 19, 22
Nemichthys 22, 24
Nemichthys curvirostris 24
Nemichthys scolopaceus 24
Neocaristius heemstrai 276
Neonesthes 78, 120
Neonesthes capensis 120
Neonesthes microcephalus 121
NEOSCOPELIDAE 3, 155, 156
Neoscopelus macrolepidotus
. 156
Neoscopelus n. sp. 157
Nesiarchus nasutus 261
Nessorhamphus 19-21
Nessorhamphus danae 21
Nessorhamphus ingolfianus 21
NOMEIDAE 10, 254, 261
Nomeus gronovii 262
Normichthys 48, 51
Normichthys operosus 51
Normichthys yahganorum 52
Notolychnus valdiviae 159
Notoscopelus 168, 211
Notoscopelus (N.) caudispinosus
. 211
Notoscopelus (N.) elongatus 212
Notoscopelus (N.) kroeyerii 211
Notoscopelus (N.) resplendens
. 212
Notoscopelus (P.) bolini 212
NOTOSUDIDAE 130, 135
O
Odontostomias 84, 121
Odontostomias masticopogon
. 121
Odontostomias micropogon 121
Odontostomops normalops 132
OMOSUDIDAE xiii, 6, 130, 138
Omosudis lowii 138
OPHIDIIFORMES 8, 251
OPISTHOPROCTIDAE
. xiii, 4, 29, 37
Opisthoproctus soleatus 37
Opostomias micripnus 81
OSMERIFORMES
. xii, 4-6, 29
P
Pachystomias microdon 81
Parabrotula plagiophthalma 251
PARABROTULIDAE 8, 251
Paracaristius 276, 279
Paracaristius aquilus 281
Paracaristius maderensis 279
Paracaristius nemorosus 280
Paracaristius nudarcus 280
Paradiplospinus 9
Paradiplospinus gracilis 258
PARALEPIDIDAE 6, 130, 139
Paralepis 141, 142, 147
Paralepis brevirostris 147
Paralepis coregonoides 148
Paralepis elongata 148
Pareiophus 211
PERCIFORMES 11, 269
Persarsia kopua 47
PHOSICHTHYIDAE 54, 63
Phosichthys argenteus 64
Photonectes 82, 122
Photonectes braueri 123
Photonectes caeruleus 124
Photonectes dinema 123
Photonectes leucospilus 123
Photonectes margarita 122
Photonectes mirabilis 124
Photonectes parvimanus 122
Photonectes phyllopogon 124
Photostomias 79, 80, 125
Photostomias atrox 125
Photostomias goodyeari 125
Photostomias guernei 125
Photostylus pycnopterus 42
Platyberyx 276, 277, 281
Platyberyx andriashevi 281
Platyberyx mauii 282
Platyberyx opalescens 282

- Platytroctes apus* 45
PLATYTROCTIDAE
 2, 6, 41, 44, 45
Pollichthys maui 64
Polyipnus xiii
Polyipnus polli 69
Polymetme 64, 66
Polymetme corythaeola 66
Polymetme thaeocoryla 66
Porichthys xiii
Poromitra 235, 242
Poromitra atlantica 244
Poromitra capito 242
Poromitra coronata 244
Poromitra crassiceps 243
Poromitra megalops 243
Poromitra nigriceps 244
Promethichthys prometheus 260
Protomyctophum 161, 213
Protomyctophum (H.) arcticum
 213
Protomyctophum (H.) parallelum
 213
Protomyctophum (H.) subparallelum
 214
Protomyctophum (P.) andriashevi
 214
Protomyctophum (P.) luciferum
 215
Protomyctophum (P.) normani
 215
Psenes 261, 262, 265
Psenes arafurensis 266
Psenes cyanophrys 265, 266
Psenes maculatus 266
Pseudocarcharias kamoharai 13
PSEUDOCARCHARIIDAE 13
Pseudoscopelus 283, 286
Pseudoscopelus altipinnis 287
Pseudoscopelus australis 286
Pseudoscopelus cordilluminatus
 288
Pseudoscopelus obtusifrons 287
Pseudoscopelus scutatus 286
Pteraclis 270, 273
Pteraclis carolinus 273
Pteraclis velifera 273
Pterycombus 270, 274
Pterycombus brama 274
Pterycombus petersii 274
- R**
RADIICEPHALIDAE 222
Radiicephalus 222
Radiicephalus elongatus 222
REGALECIDAE 222, 225
Regalecus glesne 225
Rhadimesthes decimus 78, 79
Rhynchohyalus natalensis 38
Rosenblattichthys hubbsi 151, 152
Rouleina 41, 43
Rouleina attrita 43
Rouleina maderensis 44
Ruwettus pretiosus 259
- S**
SACCOPHARYNGIFORMES
 1, 27
Saccopharynx 27
Sagamichthys schnakenbecki 47
Schedophilus 255
Schedophilus huttoni 255, 256
Schedophilus maculatus 256
Schedophilus ovalis 256
Schedophilus pemarco 257
Schedophilus velaini 257
SCOMBRIFORMES 9–11, 253
SCOMBROLABRACIDAE
 11, 254
Scombrolabrax heterolepis 254
SCOPELARCHIDAE
 xiii, 4, 129, 151
Scopelarchoides danae 151
Scopelarchus 151, 153
Scopelarchus analis 153
Scopelarchus guentheri 153
Scopelarchus michaelarsari 153
Scopelengys tristis 3, 156
Scopeloberyx 236, 245
Scopeloberyx opisthopterus 245
Scopeloberyx robustus 245
Scopeloberyx rubriventer 245
Scopelogadus 235, 246
Scopelogadus beanii 246
Scopelogadus mizolepis 246
Scopelopsis multipunctatus 158
Scopelosaurus 135, 136
Scopelosaurus ahlstromi 136
Scopelosaurus argenteus 137
Scopelosaurus craddocki 137
Scopelosaurus hamiltoni 138
- Scopelosaurus herwigii* 136
Scopelosaurus lepidus 138
Scopelosaurus meadi 136
Scopelosaurus smithii 137
Searsia koefoedi 46
SERRIVOMERIDAE 2, 20, 25
Serrivomer 25
Serrivomer beanii 26
Serrivomer lanceolatoides 25
Serrivomer schmidtii 26
Sigmops 57, 62
Sigmops bathyphilus 62
Sigmops elongatus 62
Sio nordenskjoeldii 235
Solivomer 156
SQUALIFORMES 1, 13
Squaliolus laticaudus 15
Stemonidium hypomelas 25
Stemonosudis 140, 148
Stemonosudis gracilis 149
Stemonosudis intermedia 149
Stemonosudis siliquiventer 148
STEPHANOBERYCIFORMES
 xii
STERNOPTYCHIDAE
 xiii, 53, 68, 69
Sternoptyx 68, 69, 75
Sternoptyx diaphana 76
Sternoptyx pseudobscura 75
Sternoptyx pseudodiaphana 76
Stomias 78, 126
Stomias affinis 127
Stomias boa boa 127
Stomias brevibarbatu 127
Stomias lampropeltis 126
Stomias longibarbatu 126
STOMIIDAE xiii, 53, 77
STOMIIFORMES xii, 2, 53
STYLEPHORIDAE xiii, 221
STYLEPHORIFORMES 3, 221
Stylephorus chordatus 221
Sudis 139, 149
Sudis atrox 149
Sudis hyalina 150
Symbolophorus 162, 163, 215
Symbolophorus barnardi 218
Symbolophorus boops 216, 217
Symbolophorus evermanni 216
Symbolophorus kreffti 217
Symbolophorus rufinus 216
Symbolophorus veranyi 218

T

Taaningichthys . . . 158, 165, 219
Taaningichthys bathyphilus. 219
Taaningichthys minimus. . . 220
Taaningichthys paurolychnus. .
 3, 158, 219
Taractes 271, 275
Taractes asper 275
Taractes rubescens. 275
Taractichthys. 270
Taractichthys longipinnis . . 271
 TETRAGONURIDAE.
 10, 253, 254, 267
Tetragonurus atlanticus . . . 267
Tetragonurus cuvieri 267
Thunnus obesus 253
Thyrsites atun 261
Thysanactis dentex 82
 TRACHICHTHYIFORMES . . .
 7, 8, 247

TRACHIPTERIDAE. . . 222, 226
Trachipterus 226, 227
Trachipterus jacksonensis . . 227
Trachipterus trachypterus . . 227
 TRICHIURIDAE
 9, 253-255, 267
Trigonolampa miriceps. . . . 83
Tripnoturus nigrescens 167
Triplophos hemingi 55
U
Uncisudis 141, 150
Uncisudis longirostra. 150
Uncisudis quadrimaculata . 150
V
Valenciennellus tripunctulatus 70
Vinciguerria 63, 64, 67
Vinciguerria attenuata. . . . 67
Vinciguerria nimbaria 67

Vinciguerria poweriae 67

W

Winteria telescopa. 29, 38

X

Xenodermichthys copei 42
Xenophthalmichthys 4
Xenophthalmichthys danae. . .
 29, 33, 34

Y

Yarella blackfordi 64

Z

Zu. 226, 228
Zu cristatus 228
Zu elongatus 228

INDEX OF FAO COMMON ENGLISH NAMES

A

Andersen's lanternfish 175
 Andriashev's lanternfish 214
 Anglerfishes and allies 231
 Anomalous lanternfish 193
 Arctic lanternfish 213
 Arrowmark lanternfish 180
 Arrowtail 230
 Atlantic barracudina 141
 Atlantic blackcap lanternfish 198
 Atlantic fanfish 274
 Atlantic fangjaw 61
 Atlantic lanternfish 186
 Atlantic pearlside 74
 Atlantic pelagic basslet 289
 Atlantic pomfret 272
 Atlantic sabretooth 133
 Atlantic tail-light lanternfish 195
 Austral lanternfish 201
 Avocet snipe eel 23

B

Balbo sabretooth 133
 Banded driftfish 266
 Barbate dragonfish 110
 Barebelly lanternfish 207
 Barenose lanternfish 171
 Barnard's lanternfish 218
 Barnes' lanternfish 188
 Barracudinas 129, 139
 Barreleyes 29
 Barreleyes (spookfishes) 37
 Barrellfish 255
 Bean's sawtooth eel 26
 Benoit's lanternfish 190
 Benttooth bristlemouth 60
 Bertelsen's lanternfish 182
 Bigeye cigarfish 263
 Bigeye searsid 50
 Bigeye smooth-head 43
 Bigeye squaretail 267
 Bigeye tuna 253
 Bighead portholefish 61
 Bighead searsid 48
 Bigscale deepsea smelt 31
 Big-scale pomfret 271
 Bigscales 235
 Binocular fish 38
 Blackbelly spoonbill eel 21
 Blackchins 155
 Black fathead 264

Blackfin waryfish 138
 Blackflash ribbonfish 227
 Black gemfish 261
 Blackhead lanternfish 168
 Black scabbardfish 268
 Black seadevils 233
 Black serrivomerid eel 25
 Black snaggletooth 88
 Black snake mackerel 260
 Black swallower 285
 Blue fathead 264
 Bluehead tubeshoulder 49
 Bluntnose lanternfish 184
 Bluntnout lanternfish 210
 Bluntnout smooth-head 42
 Boa dragonfish 127
 Bobtail and Pelican eels 27
 Bobtail eel 27
 Boulenger's snaggletooth 90
 Brauer's lanternfish 189
 Bright lanternfish 163
 Bristlemouth 58
 Bristlemouths 54
 Bronze sawtooth eel 25
 Broomfin dragonfish 82
 Brown slickhead 42
 Bulbless dragonfish 124

C

Cape fathead 265
 Caribbean pomfret 272
 Carlsberg's lanternfish 187
 Chaves' lanternfish 194
 Cocco's lanternfish 188
 Codlets 229
 Cods and Allies 229
 Common Fangtooth 247
 Cookie cutter shark 16
 Crested bandfish 224
 Crested bigscale 243
 Crested oarfish 223
 Crestfishes 221, 223
 Cripplefin lanternfish 199
 Crocodile lanternfish 201
 Crocodile shark 13
 Crown lanternfish 183

D

Daggertooth 132

Daggertoosts 129, 131
 Damsel lanternfish 215
 Dana pearleye 151
 Dana viperfish 98
 Deepsea dragonfish 106
 Deepsea smelts 29, 30
 Deepwater lanternfish 219
 Diaphanous hatchet fish 76
 Dimple lanternfish 169
 Doflein's lanternfish 205
 Dogfish sharks 13
 Dotback lanternfish 201
 Dragonfishes 77
 Dragonfishes and relatives 53
 Driftfish 263
 Driftfishes 261
 Duckbill barracudina 147
 Duckbill oceanic eel 21
 Dumeril's lanternfish 179
 Dusky lanternfish 198

E

Eels 19
 Elongated bristlemouth fish 62
 Escolar 259
 Escolars 257
 Evermann's lanternfish 216

F

False cusk 251
 False oblique hatchetfish 76
 Fanfare lanternfish 212
 Fanfish 273
 Fangtoosts 247
 Festive lanternfish 204
 Firebrow lanternfish 173
 Firefly lanternfish 192
 Flabby lanternfish 175
 Flaccid lanternfish 161
 Flatface lanternfish 185
 Fragile lanternfish 185
 Freckled driftfish 266
 Frostfishes 267

G

Garman's lanternfish 180
 Garrick 59
 Gauss' lanternfish 204
 Gemellaro's lanternfish 206

Glacier lanternfish 169
 Glasshead barreleye 38
 Goddess lanternfish 194
 Grand lanternfish 189
 Grey's deepsea smelt 32
 Günther's boafish 127
 Günther's lanternfish 205

H

Hairtails 267
 Hakes. 229
 Half-naked hatchetfish 71
 Hammerjaws 129, 138
 Hansen's lanternfish 190
 Hatchetfish 72
 Hatchetfishes 68
 Headlight lanternfish 184
 Hector's lanternfish 164
 Hidden bristlemouth 57
 Highlight hatchetfish 75
 Holt's lanternfish 177
 Horned lanternfish 183
 Hubbs' pearleye 152
 Hudson's lanternfish 178
 Humpback anglerfish 233
 Hygom's lanternfish 191

I

Imperial blackfish 256
 Intermediate scabbardfish 268
 Intricate lanternfish 202
 Isaacs' lanternfish 197

K

King of herrings 225
 Kitefin shark 14
 Kitefin sharks 14
 Koefoed's searsid 46
 Krefft's lanternfish 217
 Kroyer's deep-sea angler fish 232
 Krøyer's lanternfish 211

L

Lancet fishes 129
 Lancetfishes 130
 Lanternfishes xi, 155, 157
 Lantern sharks 17
 Largefin lanternfish 192
 Largescaled blackchin 156
 Legless searsid 45
 Lesser bream 272

Lightfishes 63
 Lighthouse fishes 63
 Longbarb scaly dragonfish 126
 Longfin barracudina 146
 Longfin cigarfish 265
 Longfin escolar 254
 Longneck eels 20
 Longnose pigmy shark 15
 Longsnout blacksmelt 30
 Long snouted lancetfish 131
 Longtail blackcap lanternfish 197
 Longwing spinyfin 249
 Luminous lanternfish 193
 Lunar lanternfish 207
 Lütken's lanternfish 182

M

MacDonald's lanternfish 196
 Madeiran lanternfish 172
 Madeiran smooth-head 44
 Manefishes 276
 Man-of-war fish 262
 Man-of-war fishes 261
 Maul's searsid 51
 Mead's lanternfish 178
 Mediterranean dealfish 227
 Medusafishes 255
 Mermaid lanternfish 202
 Metallic lanternfish 210
 Midas lanternfish 167
 Mikhailin's scabbardfish 268
 Mirrorbelly 37
 Mirror lanternfish 195
 Multipore searsid 51
 Multispotted lanternfish 158
 Murray's abyssal anglerfish 234

N

Nacreous lanternfish 203
 Naked lanternfish 219
 Network slickhead 43
 New Zealand ruffe 256
 Norman's lanternfish 215
 Notal lanternfish 196

O

Oarfishes 221, 225
 Oceanic lightfish 67
 Oilfish 259
 Oilfishes 257
 Omosudid 138
 Ostenfeld's lanternfish 184

P

Pacific hatchet fish 72
 Pacific hatchetfish 72, 73
 Palebelly searsid 45
 Palegold searsid 51
 Pale threadtail snipe eel 24
 Parallel lanternfish 213
 Parin's spinyfish 248
 Parr's lanternfish 177
 Patchwork lanternfish 212
 Pawnee dragonfish 94
 Pearleyes 129, 151
 Pearlyspotted lanternfish 209
 Pelagic butterfish 256
 Pelagic cod 230
 Pelagic cods 230
 Pelican eel 27
 Pelican eels 27
 Pemarco blackfish 257
 Pencilsmelts 29, 33
 Perch-like fishes 269
 Pigmy lanternfish 200
 Pigmy shark 15
 Pomfret 275
 Pomfrets 270
 Power's deep-water bristle-mouth fish 67
 Pricklefishes 288
 Prickly fanfish 274
 Prickly lanternfish 209
 Priestly lanternfish 195
 Problematic lanternfish 179
 Proud dragonfish 100

R

Rafinesque's lanternfish 176
 Rare lanternfish 206
 Rascal lanternfish 186
 Reinhardt's lanternfish 191
 Ribbonfishes 221, 226
 Richardson's lanternfish 175
 Richardson's snaggletooth 87
 Risso's lanternfish 187
 Roudi escolar 260
 Rough pomfret 275
 Roundnose lanternfish 160
 Rudderfish 255
 Ruffs 255
 Rufous lanternfish 216

S

Sabertooth fishes 129, 132
 Sawtooth eels 25
 Scabbardfishes 267
 Scaleless black dragonfish . . . 119
 Scaleless dragonfish 94
 Scalloped ribbonfish 228
 Schmidt's dragonfish 104
 Schnakenbeck's searsid 47
 Sherborn's pelagic bass 289
 Shortgut fintail snipe eel 22
 Shorthead lanternfish 174
 Short snouted lancetfish 130
 Sickle snaggletooth 97
 Silver deepsea smelt 30
 Silver driftfish 266
 Silver spinyfin 248
 Silvery lightfish 74
 Sladen's hatchet fish 74
 Slender argentine 34
 Slender bristlemouth 59
 Slender escolar 258
 Slender lanternfish 204
 Slender snaggletooth 79
 Slender snipe eel 24
 Slickheads 41
 Slickheads and Tubeshoulders . . 41
 Sloane's viperfish 98
 Slopewater lanternfish 181
 Smalleye squaretail 267
 Smallscale codlet 229
 Smallscaled blackchin 157
 Smallscale searsid 50
 Smalltooth dragonfish 81
 Smoothcheek lanternfish 171
 Smooth lanternshark 17
 Snaggletooth 97

Snake mackerel 260
 Snake mackerels 257
 Snipe eels xii, 22
 Snoek 261
 Soft lanternfish 177
 Softskin smooth-head 43
 Sombre blackchin 156
 Southern barracudina 147
 Southern blacktip lanternfish . . . 189
 Southern fintail snipe eel 23
 Southern ocean daggertooth 131
 Southern seadevil 233
 Southern stoplight loosejaw 116
 Spangled tubeshoulder 47
 Spark anglemouth 62
 Spined pigmy shark 15
 Spinetail lanternfish 211
 Spinycheek lanternfish 170
 Spinyfins 247, 248
 Spiny lanternfish 208
 Spotfin lanternfish 217
 Spotlight lanternfish 185
 Spotted fanfish 273
 Spotted lanternfish 208
 Spurcheek lanternfish 171
 Squaretails 267
 Starry smooth-head 42
 Stoplight loosejaw 116
 Streamer fish 225
 Striped escolar 258
 Stubby lanternfish 170
 Subparallel lanternfish 214
 Swallows 283

T

Taillight shark 14
 Tan bristlemouth 59
 Tãning's lanternfish 192

Tapertail 222
 Taper-tail ribbonfish 228
 Tapertails 221
 Teardrop tubeshoulder 49
 Telescope fishes 129, 134
 Topside lanternfish 159
 Triplewart seadevil 231
 Tube-eye 221
 Tube-eyes 221
 Tubeshoulders 44
 Tunas 253
 Tusked tubeshoulder 50
 Twinray dragonfish 105

U

Undistinguished sabretooth 132
 Unicorn crestfish 223
 Unicornfish 224

V

Vagabond lanternfish 167
 Valdivia black dragon fish 118
 VanHöffen's lanternfish 173
 Veiled anglemouth 58
 Vérany's lanternfish 218
 Violet warehou 257

W

Waistcoat lanternfish 220
 Warming's lanternfish 172
 Warmwater lanternfish 182
 Waryfish 137
 Waryfishes 129, 135
 Winged lanternfish 200
 Wisner's lanternfish 199

Z

Zugmayer's pearleye 152

This identification guide includes 552 species of mesopelagic fishes (i.e. those fishes residing primarily between 200-1000 m depth during daytime) that are known to occur in the central and south east Atlantic Ocean. Fully illustrated dichotomous keys to all taxa are provided. Species are treated in detail, with accounts including the scientific name, FAO common name in English (where available), other useful characters, size, a distribution map, and one or more illustrations. To facilitate even further the identification of the taxa, captions and arrows are added to help users quickly locate their key morphological features. The guide is intended for both specialists, and non-specialists who have a working knowledge of ichthyology.

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