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Deep-water bony fishes collected by the B/O Miguel Oliver on the shelf edge of Pacific Central America: an annotated, illustrated and DNA-barcoded checklist

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Abstract

An annotated and photographically illustrated checklist with DNA barcodes of the species of bony fishes collected during a month-long research cruise of the Spanish Research vessel B/O Miguel Oliver is presented. The vessel made trawls on the continental shelf of the Pacific coast of Central America, in November-December 2010, at depths of 108–1625 m. This list, based on 707 specimens (of a total of 876 specimens collected during the whole expedition), includes 129 species belonging to 15 orders, 61 families, and 97 genera. New information is presented on the geographical distributions of more than a third of those species, with 29 species (22.4%) representing new records from Central American waters and 17 species (13.2%) having expanded latitudinal ranges. Data on capture depths demonstrate increased depth ranges due to new minimum and/or maximum known depths for 31 species, i.e. 24% of those captured. Tissue samples from frozen specimens were used to obtain DNA barcodes of 682 (96.5%) individuals belonging to 118 species (91.4% of those recorded here), which have been made publically available in Genbank. Those data include barcodes for 84 species (65.1% of the total collected, and 77.1% of those for which barcodes were obtained) and 30 genera (30.9% of those collected) for which no species barcodes have been previously published. Barcodes of 54 species represent the first genetic sequences of any type published for those species. The abundance of new data indicate that there is still much to learn about the composition and geographical and depth distributions of the fish fauna of the shelf edge and continental slope of this region.

Key words: Deep sea, ichthyofauna, diversity, new records, tropical eastern Pacific

Introduction

Between 2007 and 2011 a series of research cruises were made by the Spanish research vessel B/O Miguel Oliver (Figure 1) along the continental shelves and slopes of the Pacific coast of Central and South America. Those cruises, aimed at assessing both the biodiversity of benthic organisms and fishery resources by deploying bottom trawls at depths down to ~1600 m, began with expeditions to Peru, Patagonia and the Pacific coast of Panama. There were further cruises to those three areas as well as to Ecuador in 2008 and 2009, and El Salvador in 2010. The last 2010 cruise sampled the outer edge of the continental shelf and the continental slope of Pacific Central America, between Panama and Guatemala, at depths of 108–1625 m. One of us (DRR) was invited to participate in this cruise and decided to acquire fish specimens and photographs thereof for scientific study. A companion cruise with similar objectives was made on the Caribbean shelf of Central America, between Panama and Belize in early 2011.

The bony fishes collected during the 2010 expedition on the Pacific side of Central America were recently reviewed by us, providing the basis for the annotated and photographically illustrated checklist presented here. In addition to increasing knowledge of the deep-water fish fauna of the tropical eastern Pacific, we hope that this work will serve as an educational tool to deep-sea fish researchers and to the interested public-at-large, and will act as a guide to the pertinent (taxonomic and ecologic) literature and to the numerous name changes and additions of species since the most recent comprehensive works on the deep-water fish fauna of that region were published (see Fischer *et al.* 1995, De La Cruz-Agüero *et al.* 1997, Chirichigno & Velez 1998, Nakaya *et al.* 2009).

Materials and methods

Sampling effort and study site. Samples were collected on board of the Spanish research vessel, B/O Miguel Oliver (Fig 1) operated by the Spanish Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente (MAPAMA; http://www.mapama.gob.es). The B/O Miguel Oliver is a 70 m long, 2495 gross tons, stern trawler that began operation in 2007. It ships a crew of 45 personnel, and can accommodate up to 22 scientists.

FIGURE 1. The Research Vessel B/O Miguel Oliver; photo MAPAMA.

Sampling was done using a Lofoten bottom trawl equipped with a pair of 1,300 kg oval steel doors, each attached to the net by a 100 m long warp. The trawl itself was 32 m long, with a mouth opening 23 m wide and 3.5 m high when fully deployed on the bottom, and had a cod-end mesh of 35 mm. Rubber rollers along the bottom of the mouth of the net reduced its contact with the substratum. The ship's side-scan sonar was used to locate a suitable area of relatively level, unobstructed bottom prior to each trawl. Bottom times for trawls were typically 30 mins, at speeds of ~3–3.5 knots. A total of 107 localities were sampled between southeastern Panama (7.4138º N, -78.1242º W) and southwestern Guatemala (13.7593º N, -91.8780º W), between November 7 and December 10, 2010, at depths ranging from 108 to 1625 m (Fig. 2; Table 1).

FIGURE 2. Location of trawl stations made by the B/O Miguel Oliver during late 2010; black stars indicate trawls from which fish specimens discussed here were retained; white stars indicate trawls from which no specimens were kept. Base map: Google Earth.

TABLE 1. Trawl stations (numbered from 1 to 107) of the research vessel B/O Miguel Oliver on the Pacific coast of Central America in November-December 2010. SN = Station number; DR = Depth range (m). Stations with data in bold yielded specimens discussed herein.

SN	Date	Coordinates		DR
		Initial	Final	
001	**12-11-2010**	**7.4138º, -78.1242º**	**7.4322º, -78.1452º**	**165–183**
002	**12-11-2010**	**7.3435º, -78.1125º**	**7.3578º, -78.1360º**	**407–412**
003	**12-11-2010**	**7.6230º, -78.6715º**	**7.6232º, -78.6997º**	**116–118**
004	**12-11-2010**	**7.6268º, -78.6933º**	**7.6268º, -78.6653º**	**115–116**
005	**12-11-2010**	**7.5713º, -78.7945º**	**7.5742º, -78.8043º**	**430–500**
006	**13-11-2010**	**7.7080º, -78.9635º**	**7.6978º, -78.9373º**	**109**
007	**13-11-2010**	**7.6327º, -79.1225º**	**7.6337º, -79.1445º**	**470–478**
008	13-11-2010	7.5478º, -79.2138º	7.5518º, -79.1867º	757–781
009	13-11-2010	7.5120º, -79.2107º	7.5118º, -79.2353º	987–1013
010	13-11-2010	7.5155º, -79.1968º	7.5152º, -79.1715º	1020–1024
011	14-11-2010	7.3935º, -79.4890º	7.3795º, -79.5103º	1292
012	14-11-2010	7.3950º, -79.5390º	7.3777º, -79.5590º	1021–1025
013	14-11-2010	7.4322º, -79.5612º	7.4448º, -79.5367º	711–733
014	14-11-2010	7.5432º, -79.4480º	7.5437º, -79.4202º	432–435
015	**14-11-2010**	**7.8482º, -79.6457º**	**7.8697º, -79.6283º**	**113–114**
016	15-11-2010	7.2443º, -79.6677º	7.2558º, -79.6460º	1446–1454

.....continued on the next page

TABLE 1. (Continued)

SN	Date	Coordinates		DR
		Initial	Final	
017	15-11-2010	7.2712º, -79.6645º	7.2602º, -79.6878º	1072–1141
018	15-11-2010	7.3492º, -79.6677º	7.3675º, -79.6487º	720–733
019	15-11-2010	7.3857º, -79.7310º	7.3728º, -79.7548º	480–485
020	15-11-2010	7.4480º, -79.8400º	7.4632º, -79.8172º	108–109
021	**16-11-2010**	**7.1622º, -80.1342º**	**7.1695º, -80.1152º**	**764–987**
022	16-11-2010	7.1893º, -80.1697º	7.1747º, -80.1922º	416–454
023	16-11-2010	7.2467º, -80.2307º	7.2492º, -80.2560º	103–108
024	17-11-2010	7.0298º, -80.9660º	7.0275º, -80.9407º	1364–1464
025	**17-11-2010**	**7.0890º, -80.9212º**	**7.0912º, -80.9468º**	**1101–1113**
026	**17-11-2010**	**7.1473º, -81.1248º**	**7.1558º, -81.1498º**	**929–954**
027	17-11-2010	7.2192º, -81.0955º	7.2248º, -81.1217º	134–138
028	**18-11-2010**	**6.9033º, -81.3120º**	**6.9190º, -81.2940º**	**1467–1472**
029	**18-11-2010**	**7.0802º, -81.3682º**	**7.0820º, -81.3958º**	**1113–1126**
030	**18-11-2010**	**7.0945º, -81.4622º**	**7.0840º, -81.4372º**	**864-1026**
031	**18-11-2010**	**7.1637º, -81.4083º**	**7.1632º, -81.4353º**	**611-617**
032	**18-11-2010**	**7.2542º, -81.3957º**	**7.2542º, -81.4240º**	**108**
033	**19-11-2010**	**7.0105º, -81.7333º**	**7.9872º, -81.7472º**	**716-842**
034	**19-11-2010**	**6.9502º, -81.7455º**	**6.9332º, -81.7663º**	**1033-1214**
035	19-11-2010	7.0707º, -81.7105º	7.0638º, -81.6843º	671-677
036	**19-11-2010**	**7.1817º, -81.6668º**	**7.1832º, -81.7018º**	**138-143**
037	**20-11-2010**	**7.5852º, -82.0828º**	**7.6118º, -82.0848º**	**453-456**
038	**20-11-2010**	**7.7235º, -82.0570º**	**7.7143º, -82.0838º**	**144-154**
039	**20-11-2010**	**7.7427º, -82.4213º**	**7.7185º, -82.4075º**	**237-243**
040	**20-11-2010**	**7.6408º, -82.4512º**	**7.6680º, -82.4510º**	**977-1185**
041	**21-11-2010**	**8.0327º, -82.5642º**	**8.0042º, -82.5678º**	**115-152**
042	**21-11-2010**	**7.9820º, -82.7405º**	**7.9955º, -82.7632º**	**1115-1119**
043	**21-11-2010**	**7.9455º, -82.8083º**	**7.9693º, -82.8190º**	**860-951**
044	**21-11-2010**	**7.8910º, -82.8422º**	**7.8777º, -82.8652º**	**1093-1302**
045	22-11-2010	8.2675º, -83.1892º	8.2662º, -83.1633º	1362-1376
046	**22-11-2010**	**8.2318º, -83.1762º**	**8.2247º, -83.1500º**	**1157-1260**
047	**22-11-2010**	**8.3060º, -83.1608º**	**8.3053º, -83.1587º**	**416-421**
048	**22-11-2010**	**8.3107º, -83.1228º**	**8.3243º, -83.1483º**	**128-143**
049	**23-11-2010**	**8.4503º, -83.7362º**	**8.4640º, -83.7612º**	**128-136**
050	23-11-2010	8.8020º, -84.0280º	8.8310º, -84.0325º	119-125
051	**23-11-2010**	**8.7722º, -84.0987º**	**8.7843º, -84.0738º**	**359-477**
052	**23-11-2010**	**8.7675º, -84.2622º**	**8.7430º, -84.2745º**	**836-1030**
053	**24-11-2010**	**9.0260º, -84.5930º**	**9.0127º, -84.5703º**	**1359-1443**
054	24-11-2010	9.0813º, -84.5750º	9.0958º, -84.5972º	1188-1257
055	**24-11-2010**	**9.1472º, -84.5613º**	**9.1345º, -84.5382º**	**902-924**
056	**24-11-2010**	**9.2018º, -84.4948º**	**9.1920º, -84.5203º**	**656-668**
057	**24-11-2010**	**9.2403º, -84.5700º**	**9.2342º, -84.5975º**	**134-162**

.....continued on the next page

TABLE 1. (Continued)

SN	Date	Coordinates		DR
		Initial	Final	
058	**25-11-2010**	**9.3918º, -85.1712º**	**9.3773º, -85.1935º**	**1181-1270**
059	**25-11-2010**	**9.4280º, -85.1613º**	**9.4258º, -85.1880º**	**841-920**
060	**25-11-2010**	**9.4500º, -85.1500º**	**9.4468º, -85.1792º**	**516-672**
061	**25-11-2010**	**9.5070º, -85.1503º**	**9.5128º, -85.1772º**	**137-140**
062	**25-11-2010**	**9.3670º, -85.4537º**	**9.3507º, -85.4355º**	**1414-1457**
063	**3-12-2010**	**9.7298º, -85.8315º**	**9.7427º, -85.8502º**	**1530-1625**
064	**3-12-2010**	**9.6805º, -85.7273º**	**9.6997º, -85.7215º**	**950-1105**
065	**3-12-2010**	**9.6650º, -85.7318º**	**9.6468º, -85.7453º**	**1178-1310**
066	**3-12-2010**	**9.7878º, -85.6773º**	**9.8125º, -85.6983º**	**127-128**
067	**4-12-2010**	**9.9925º, -85.9738º**	**9.9925º, -85.9738º**	**936**
068	**4-12-2010**	**10.1498º, -85.9432º**	**10.1498º, -85.9432º**	**145**
069	**4-12-2010**	**10.6927º, -86.5030º**	**10.6693º, -86.4860º**	**470-490**
070	**4-12-2010**	**10.6843º, -86.4147º**	**10.7045º, -86.4373º**	**237-243**
071	**5-12-2010**	**10.6875º, -86.5522º**	**10.7050º, -86.5743º**	**827-965**
072	**5-12-2010**	**10.4913º, -86.4583º**	**10.4702º, -86.4518º**	**1212-1330**
073	**5-12-2010**	**11.0842º, -86.7460º**	**11.0583º, -86.7375º**	**153-176**
074	**6-12-2010**	**11.0700º, -86.8317º**	**11.5375º, -86.8165º**	**417-422**
075	**6-12-2010**	**11.0173º, -86.8652º**	**10.9923º, -86.8507º**	**784-844**
076	**6-12-2010**	**10.8393º, -86.7483º**	**10.8477º, -86.7220º**	**926-1145**
077	**7-12-2010**	**11.4332º, -87.4430º**	**11.3997º, -87.4217º**	**1320-1370**
078	**7-12-2010**	**11.4257º, -87.4013º**	**11.4105º, -87.3782º**	**1076-1087**
079	7-12-2010	11.4467º, -87.2937º	11.3948º, -87.2735º	825-842
080	**7-12-2010**	**11.4812º, -87.2493º**	**11.4988º, -87.2703º**	**460-479**
081	**7-12-2010**	**11.7030º, -87.0635º**	**11.7212º, -87.0863º**	**122-124**
082	**8-12-2010**	**11.7275º, -87.6672º**	**11.7417º, -87.6890º**	**1471-1527**
083	**8-12-2010**	**11.8460º, -87.7090º**	**11.8715º, -87.7063º**	**965-1116**
084	8-12-2010	11.9095º, -87.6427º	11.8912º, -87.6198º	404-510
085	**8-12-2010**	**11.9318º, -87.5585º**	**11.9095º, -87.5410º**	**181-186**
086	**9-12-2010**	**12.1210º, -88.2688º**	**12.1453º, -88.2797º**	**1353-1389**
087	**9-12-2010**	**12.1712º, -88.2493º**	**12.1792º, -88.2745º**	**1100-1223**
088	**9-12-2010**	**12.2013º, -88.1990º**	**12.2273º, -88.1885º**	**570-767**
089	9-12-2010	12.2278º, -88.1718º	12.2013º, -88.1620º	450-542
090	9-12-2010	12.2900º, -88.0747º	12.3158º, -88.0852º	129-131
091	**10-12-2010**	**12.7440º, -88.9943º**	**12.7478º, -89.0233º**	**105-107**
092	10-12-2010	13.0198º, -89.4582º	13.0027º, -89.4362º	103-104
093	10-12-2010	12.8307º, -89.5342º	12.8407º, -89.5588º	401-405
094	**11-12-2010**	**12.8877º, -90.1585º**	**12.8897º, -90.1323º**	**1368-1406**
095	11-12-2010	12.9578º, -90.2545º	12.9717º, -90.2792º	787-856
096	11-12-2010	12.9610º, -90.3173º	12.9808º, -90.3303º	1100-1129
097	11-12-2010	13.0417º, -90.2222º	13.0508º, -90.2375º	407-411
098	**11-12-2010**	**13.3133º, -90.0032º**	**13.3273º, -90.0173º**	**111-114**

.....continued on the next page

TABLE 1. (Continued)

SN	Date	Coordinates		DR
		Initial	Final	
099	**12-12-2010**	**13.0830º, -90.6020º**	**13.1008º, -90.6215º**	**1054-1188**
100	**12-12-2010**	**13.1135º, -90.5943º**	**13.1270º, -90.5715º**	**697-798**
101	**12-12-2010**	**13.1793º, -90.5318º**	**13.2017º, -90.5205º**	**346-399**
102	**12-12-2010**	**13.2927º, -90.4045º**	**13.3213º, -90.4013º**	**149-165**
103	**13-12-2010**	**13.7140º, -91.8352º**	**13.7187º, -91.8647º**	**117-120**
104	13-12-2010	13.5465º, -91.3480º	13.5313º, -91.3232º	114-116
105	13-12-2010	13.4770º, -91.3972º	13.4905º, -91.4220º	137
106	13-12-2010	13.6578º, -91.2283º	13.6667º, -91.2565º	57
107	14-12-2010	13.7593º, -91.8780º	13.7642º, -91.9058º	109-112

Specimens were selected by DRR in an attempt to obtain relatively undamaged individuals representative of species caught during the cruise, rather than a representative sample of each trawl's catch. Hence only a few specimens of common species were retained from a few trawls, even when they were present in many more trawls. No specimens were retained from 32 trawls. A pdf of a PowerPoint presentation made at the end of the cruise (by IJFN) that provides information about the ship and summarizes cruise activities and results is available at http://hdl.handle.net/10508/1555. This pdf provides more information about catches, particularly of common species.

The fishes retained as specimens by DRR were photographed by him and then frozen in the ship's cold room. Small fishes were photographed in a 30 cm long, 25 cm high and 5 cm wide aquarium full of water that contained an angled glass plate to hold the fish suspended ~horizontally in midwater. Larger fishes were photographed in air laid out on a foam rubber (yoga-mat) background glued to a rigid plywood base. When needed, insect pins were used to hold fins erect against that background. Due to time limitations photo specimens were not measured, or individually tagged or kept separate from other specimens retained from the same trawl.

At the end of the cruise the frozen specimens were stored in freezers at the Naos Laboratory of the Smithsonian Tropical Research Institute (STRI) in Panama. Subsequently a group of technicians and ichthyologists from the Smithsonian National Museum of Natural History in Washington, DC (formerly United States National Museum; USNM) went to Panama, defrosted, photographed, and tissue-sampled most of these specimens, which were then preserved in formalin. Several months later the formalized specimens were shipped to that museum and accessioned into its collection.

Analysis and presentation of data. The checklist is arranged phylogenetically at the ordinal and familial levels following Eschmeyer & Fong (2017). Genera and species within families are arranged in alphabetical order. Number of families (F), genera (G) and species (S) are indicated in each more inclusive group (Order and Families), when appropriate. Popular, technical and/or vernacular names, in English (En) and Spanish (Sp), are included for each family following Robertson & Allen (2015) and Nelson *et al.* (2016).

A considerable number of comprehensive taxonomic papers and guides were helpful in the identification of the specimens in the laboratory (e.g. Fitch & Lavenberg 1968, Eschmeyer *et al.* 1983, Cohen *et al.* 1990, Allen & Robertson 1994, Bussing & López 1994, Fisher *et al.* 1995, Nielsen *et al.* 1999, Nayaka *et al.* 2009, Robertson & Allen 2015). In addition to these general works, other more circumscribed taxonomic publications were employed.

For each species listed below the following information is provided: valid scientific name with author(s) and year of description, following Eschmeyer *et al.* (2017), except when noted; popular, technical and/or vernacular names in English (En) and Spanish (Sp), when available, following Page *et al.* (2013), Robertson & Allen (2015) and Froese & Pauly (2016); collection data (localities—MOP stations—see Table 1; and depth range); voucher specimens (number of specimens examined, with their catalog numbers); current known distribution; literature used in its identification; and other pertinent information (e.g. substantial range extensions in the"Remarks" section for different species). When it was possible to identify the USNM catalog number of the photographed specimen of any species that number is given in the figure legend, together with the length of the specimen (determined from inspection of the thawed-fish photographs, each of which was taken with the specimen positioned above a 20-cm ruler).

The "Literature" section also includes other references arbitrarily considered by us to have taxonomic or distributional value and not mere usage of the specific names herein treated. In addition, for most species taken on the cruise, photographs of the fresh specimens as well as DNA barcodes (see below) are provided.

DNA barcoding. DNA was extracted using an Autogen Prep 965 pheno-chloroform automated extractor. The target 652 base pair (bp) region of the 5' end of the cytochrome oxidase subunit 1 gene (COI) was amplified using primers FISHCO1LBC and FISHCO1HBC and PCR and sequencing conditions following Baldwin *et al.* (2011). Electropherograms were processed using Sequencher 5.0.1 (gene codes). Only trimmed fragments greater than 500 bp in length and with overall "confidence" above 90% (as calculated by Sequencher) were used to construct the final sequences. Passing sequences were visually examined for errors. Barcode sequences are deposited in Genbank with the accession numbers MF956433 - MF957114 (see Table 3). Detailed specimen information and associated photographs are available in the public project "Fish of the 2010 Miguel Oliver Pacific Cruise" in the Barcode of Life Database (BOLD; www.boldsystems.org).

Results and discussion

A total of 876 specimens of bony fishes collected on the 2010 Miguel Oliver cruise along the Pacific coast of Central America were accessioned into the USNM. That collection also included elasmobranchs, chimaeras and cyclostomes as well as the bony fishes treated here. Fifteen orders, 61 families, 97 genera and 129 species of bony fishes are listed herein (Table 2). Perciformes (33 species), Lophiiformes (13), Scorpaeniformes (12), Anguilliformes (11) and Gadiformes (11) were the most speciose orders, accounting for 62.0% of the total number of species recorded. Ophidiidae (9 species), Zoarcidae (9), Macrouridae (8), Alepocephalidae (6) and Ogcocephalidae (6) were the most speciose families, accounting for 29.5% of the total number of species recorded. Thirty-two families (52.4% of the total number of families recorded) were represented by a single species. Twenty-nine species (22.5%), in 16 families, are added to the Central American Pacific ichthyofauna. Seventeen species (13.3%), in 13 families (21.3%), showed expanded latitudinal (geographical) ranges, and 31 species (24 %), in 23 (37.7%) families, showed expanded depth ranges. The DNA barcodes that resulted from this collection (those of 682 individuals) include barcodes from 118 species belonging to 95 genera and 61 families of bony fishes (Table 3). These include members of some genera that could not be identified to species. Those DNA barcodes represent the first flagged barcodes in Genbank for 84 species and the first for 30 genera. In addition the barcodes of 54 of those 84 species are the first genetic sequences of any type published for those species in Genbank (Table 3).

Our analysis of this collection of fishes clearly demonstrates how little is known about the species diversity, geographic distributions, and depth ranges of the deep-water fish fauna inhabitating the edge of the continental shelf and continental slope of the tropical eastern Pacific. In addition, the results of the DNA barcoding not only show how few species from this area have genetic information available, but also how few members of many genera have genetic samples available for public use. A similar level of new knowledge can be expected when the specimens of elasmobranchs, chimaeras and cyclostomes collected during the same cruise are fully analyzed. The description of two new species of elasmobranchs (see Vásquez *et al.* 2015 and Concha *et al.* 2016), based in whole or part on specimens collected during the present cruise, clearly indicates that this will be the case. To date only one new species of a genus not previously recorded in the eastern Pacific has been added to the regional bony-fish fauna (Angulo *et al.* 2016). However, the DNA barcode data also point to taxonomic issues that need resolution in a variety of genera, including *Bathypterois*, *Bollmannia*, *Melamphaes, Notacanthus, Paraliparis, Synodus*, and some Zoarcids (i.e. *Lycodapus*, *Lycenchelys*, *Lycodes, Ophthalmolycus* and *Pachycara*).

Continued ocean exploration of the fish fauna of this area involving a broader range of collection methods is needed. Sampling with, for example, more maneuverable, smaller-mesh bottom trawls, mid-water trawls, and long-lines is likely to yield much new information on other members of the fish fauna of the tropical eastern Pacific that were not susceptible to capture by the large, coarse-mesh bottom trawl used by the B/O Miguel Oliver in 2010. A return of a ship like the B/O Miguel Oliver to the eastern Pacific would greatly benefit knowledge of the deepwater fish fauna of the tropical west coast of the Americas.

TABLE 2. Number of families (F), genera (G) and species (Sp), by order, of bony fishes collected by the research vessel B/O Miguel Oliver on the Pacific coast of Central America in November-December 2010. NR = number of species representing new records for the study area; RE = number of species with extended geographical ranges; NDR = number of species with extended depth ranges; No = total number of individuals examined for this study.

Order	F	G	Sp	NR	RE	NDR	No
Notacanthiformes	2	2	4	4	2	3	22
Anguilliformes	7	9	11	1	1	4	62
Osmeriformes	4	10	10	7	2	1	63
Stomiiformes	3	3	3	0	0	0	23
Aulopiformes	5	5	7	2	0	1	36
Myctophiformes	2	3	3	0	0	1	17
Gadiformes	4	6	11	3	2	6	73
Ophidiiformes	1	8	9	4	4	5	67
Lophiiformes	6	7	13	4	3	5	66
Stephanoberyciformes	1	2	3	1	0	0	12
Beryciformes	2	2	2	0	0	0	10
Scorpaeniformes	6	7	12	2	2	2	57
Perciformes	14	27	33	1	1	2	163
Pleuronectiformes	3	5	7	0	0	1	35
Tetraodontiformes	1	1	1	0	0	0	1
Total	**61**	**97**	**129**	**29**	**17**	**31**	**707**

TABLE 3. Specimens barcoded as part of this study. The status column indicates the significance of the new sequence (1=first barcode-flagged sequence for this species; 2=first barcode-flagged sequence and first public sequence for this species; 3= first barcode-flagged sequence for this genus; 4 = first barcode-flagged sequence and first public sequence of this genus). An asterisk in the Voucher Number column indicates that only a tissue sample of this specimen is cataloged at the USNM, not the physical specimen.

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Alepocephalus tenebrosus		MOP033-12	USNM 422642	MF956437
Alepocephalus tenebrosus		MOP098-12	USNM 422463	MF956439
Alepocephalus tenebrosus		MOP099-12	USNM 422398	MF956442
Alepocephalus tenebrosus		MOP187-12	USNM 422396	MF956443
Alepocephalus tenebrosus		MOP195-12	USNM 422612	MF956445
Alepocephalus tenebrosus		MOP196-12	USNM 422457	MF956446
Alepocephalus tenebrosus		MOP344-12	USNM 421560	MF956438
Alepocephalus tenebrosus		MOP345-12	USNM 422529	MF956433
Alepocephalus tenebrosus		MOP380-12	USNM 421555	MF956441
Alepocephalus tenebrosus		MOP393-12	USNM 422556	MF956435
Alepocephalus tenebrosus		MOP417-12	USNM 421518	MF956449
Alepocephalus tenebrosus		MOP418-12	USNM 421451	MF956447
Alepocephalus tenebrosus		MOP443-12	USNM 422619	MF956448
Alepocephalus tenebrosus		MOP518-12	USNM 421282	MF956450
Alepocephalus tenebrosus		MOP519-12	USNM 421280	MF956451
Alepocephalus tenebrosus		MOP637-12	USNM 421573	MF956444

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Alepocephalus tenebrosus		MOP729-12	USNM 422616	MF956440
Alepocephalus tenebrosus		MOP770-12	USNM 421471	MF956434
Alepocephalus tenebrosus		MOP813-12	USNM 421242	MF956436
Anoplogaster cornuta		MOP350-12	USNM 422533	MF956455
Anoplogaster cornuta		MOP503-12	USNM 421537	MF956454
Anoplogaster cornuta		MOP545-12	USNM 421295	MF956453
Anoplogaster cornuta		MOP581-12	USNM 422626	MF956452
Argentina aliceae	4	MOP094-12	USNM 422405	MF956457
Argentina aliceae	4	MOP309-12	USNM 422575	MF956460
Argentina aliceae	4	MOP310-12	USNM 422548	MF956459
Argentina aliceae	4	MOP695-12	USNM 421411	MF956461
Argentina aliceae	4	MOP696-12	USNM 421424	MF956456
Argentina aliceae	4	MOP787-12	USNM 421222	MF956458
Ariosoma prorigerum	2	MOP263-12	USNM 422481	MF956468
Ariosoma prorigerum	2	MOP264-12	USNM 422480	MF956463
Ariosoma prorigerum	2	MOP342-12	USNM 423213	MF956462
Ariosoma prorigerum	2	MOP574-12	USNM 421209	MF956467
Ariosoma prorigerum	2	MOP575-12	USNM 421208	MF956465
Ariosoma prorigerum	2	MOP718-12	USNM 422482	MF956466
Ariosoma prorigerum	2	MOP806-12	USNM 421362	MF956469
Ariosoma prorigerum	2	MOP818-12	USNM 423212	MF956464
Avocettina bowersii	2	MOP476-12	USNM 421196	MF956472
Avocettina bowersii	2	MOP524-12	USNM 421290	MF956470
Avocettina bowersii	2	MOP645-12	USNM 421195	MF956471
Bajacalifornia burragei		MOP034-12	USNM 422437	MF956473
Bajacalifornia burragei		MOP766-12	USNM 421485	MF956474
Baldwinella eos	4	MOP013-12	USNM 422436	MF956475
Baldwinella eos	4	MOP014-12	USNM 422325	MF956477
Baldwinella eos	4	MOP015-12	USNM 422333	MF956476
Baldwinella eos	4	MOP284-12	USNM 421225	MF956478
Baldwinella eos	4	MOP325-12	USNM 422589	MF956480
Baldwinella eos	4	MOP326-12	USNM 422558	MF956479
Balistes polylepis		MOP238-12	USNM 421241	MF956481
Barbantus curvifrons	3	MOP517-12	USNM 421294	MF956483
Barbantus curvifrons	3	MOP704-12	USNM 422531	MF956482
Bathypterois atricolor	3	MOP077-12	USNM 422418	MF956489
Bathypterois atricolor	3	MOP078-12	USNM 422395	MF956490
Bathypterois atricolor	3	MOP178-12	USNM 422427	MF956488
Bathypterois atricolor	3	MOP428-12	USNM 421538	MF956485
Bathypterois atricolor	3	MOP617-12	USNM 423598	MF956487
Bathypterois atricolor	3	MOP764-12	USNM 421469	MF956486

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Bathypterois sp.		MOP101-12	USNM 422410	MF956484
Bathypterois ventralis	3	MOP398-12	USNM 422561	MF956496
Bathypterois ventralis	3	MOP399-12	USNM 422569	MF956499
Bathypterois ventralis	3	MOP429-12	USNM 421536	MF956493
Bathypterois ventralis	3	MOP466-12	USNM 421506	MF956501
Bathypterois ventralis	3	MOP467-12	USNM 421529	MF956497
Bathypterois ventralis	3	MOP468-12	USNM 421531	MF956495
Bathypterois ventralis	3	MOP521-12	USNM 421343	MF956500
Bathypterois ventralis	3	MOP522-12	USNM 421304	MF956494
Bathypterois ventralis	3	MOP546-12	USNM 421286	MF956491
Bathypterois ventralis	3	MOP742-12	USNM 422503	MF956498
Bathypterois ventralis	3	MOP765-12	USNM 421484	MF956492
Bathytroctes microlepis	3	MOP601-12	USNM 421563	MF956503
Bathytroctes microlepis	3	MOP778-12	USNM 421350	MF956502
Bellator loxias	3	MOP217-12	USNM 422360	MF956504
Bellator loxias	3	MOP218-12	USNM 421214	MF956506
Bellator loxias	3	MOP219-12	USNM 421274	MF956505
Bentartia pusillum		MOP044-12	USNM 435808	MF956509
Bentartia pusillum		MOP045-12	USNM 435800	MF956510
Bentartia pusillum		MOP106-12	USNM 422425	MF956511
Bentartia pusillum		MOP117-12	USNM 423184	MF956512
Bentartia pusillum		MOP379-12	USNM 422560	MF956513
Bentartia pusillum		MOP407-12	USNM 423199	MF956508
Bentartia pusillum		MOP489-12	USNM 435805	MF956516
Bentartia pusillum		MOP584-12	USNM 435791	MF956507
Bentartia pusillum		MOP591-12	USNM 421466	MF956515
Bentartia pusillum		MOP674-12	USNM 423210	MF956514
Benthosema panamense	1	MOP388-12	USNM 422523	MF956521
Benthosema panamense	1	MOP389-12	USNM 422541	MF956518
Benthosema panamense	1	MOP390-12	USNM 422484	MF956522
Benthosema panamense	1	MOP492-12	USNM 421449	MF956525
Benthosema panamense	1	MOP493-12	USNM 421453	MF956517
Benthosema panamense	1	MOP494-12	USNM 421450	MF956519
Benthosema panamense	1	MOP641-12	USNM 421419	MF956523
Benthosema panamense	1	MOP756-12	USNM 422486	MF956520
Benthosema panamense	1	MOP758-12	USNM 422536	MF956524
Bollmannia sp.	3	MOP084-12	USNM 422322	MF956536
Bollmannia sp.	3	MOP087-12	USNM 422381	MF956526
Bollmannia sp.	3	MOP278-12	USNM 422339	MF956529
Bollmannia sp.	3	MOP619-12	USNM 421381	MF956528
Bollmannia sp1	3	MOP085-12	USNM 422310	MF956535

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Bollmannia sp1	3	MOP088-12	USNM 422401	MF956527
Bollmannia sp1	3	MOP691-12	USNM 421428	MF956537
Bollmannia sp1	3	MOP693-12	USNM 421397	MF956531
Bollmannia sp2	3	MOP086-12	USNM 422308	MF956534
Bollmannia sp2	3	MOP660-12	USNM 421387	MF956532
Bollmannia sp2	3	MOP661-12	USNM 421403	MF956533
Bollmannia sp2	3	MOP692-12	USNM 421380	MF956530
Bothrocara molle		MOP063-12	USNM 422430	MF956540
Bothrocara molle		MOP064-12	USNM 422331	MF956539
Bothrocara molle		MOP107-12	USNM 422424	MF956538
Bothrocara molle		MOP198-12	USNM 423188	MF956545
Bothrocara molle		MOP346-12	USNM 422570	MF956542
Bothrocara molle		MOP378-12	USNM 422584	MF956544
Bothrocara molle		MOP408-12	USNM 423200	MF956541
Bothrocara molle		MOP490-12	USNM 423202	MF956543
Bregmaceros bathymaster	2	MOP156-12	USNM 422379	MF956547
Bregmaceros bathymaster	2	MOP157-12	USNM 422387	MF956548
Bregmaceros bathymaster	2	MOP676-12	USNM 421278	MF956546
Bregmaceros bathymaster	2	MOP677-12	USNM 421377	MF956550
Bregmaceros bathymaster	2	MOP678-12	USNM 421416	MF956549
Caulolatilus affinis		MOP710-12	USNM 422632	MF956552
Caulolatilus affinis		MOP747-12	USNM 422646	MF956551
Caulophryne pelagica	3	MOP605-12	USNM 422598	MF956553
Cherublemma emmelas	4	MOP136-12	USNM 422407	MF956561
Cherublemma emmelas	4	MOP137-12	USNM 422374	MF956564
Cherublemma emmelas	4	MOP337-12	USNM 422581	MF956562
Cherublemma emmelas	4	MOP338-12	USNM 422549	MF956565
Cherublemma emmelas	4	MOP339-12	USNM 422557	MF956560
Cherublemma emmelas	4	MOP384-12	USNM 422567	MF956563
Cherublemma emmelas	4	MOP385-12	USNM 422544	MF956555
Cherublemma emmelas	4	MOP555-12	USNM 421337	MF956558
Cherublemma emmelas	4	MOP671-12	USNM 421565	MF956556
Cherublemma emmelas	4	MOP672-12	USNM 421429	MF956557
Cherublemma emmelas	4	MOP673-12	USNM 421492	MF956559
Cherublemma emmelas	4	MOP803-12	USNM 421218	MF956554
Chiasmodon subniger	4	MOP141-12	USNM 435803	MF956566
Chiasmodon subniger	4	MOP709-12	USNM 422491	MF956568
Chiasmodon subniger	4	MOP768-12	USNM 435801	MF956567
Chlorophthalmus mento		MOP783-12	USNM 421332	MF956569
Citharichthys platophrys		MOP299-12	USNM 422576	MF956572
Citharichthys platophrys		MOP538-12	USNM 421298	MF956571

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Citharichthys platophrys		MOP539-12	USNM 421283	MF956570
Coelorinchus canus	2	MOP553-12	USNM 421292	MF956576
Coelorinchus canus	2	MOP554-12	USNM 421291	MF956573
Coelorinchus canus	2	MOP751-12	USNM 422487	MF956574
Coelorinchus canus	2	MOP752-12	USNM 422495	MF956575
Coryphaenoides anguliceps	2	MOP039-12	USNM 422467	MF956581
Coryphaenoides anguliceps	2	MOP040-12	USNM 422447	MF956578
Coryphaenoides anguliceps	2	MOP171-12	USNM 422610	MF956579
Coryphaenoides anguliceps	2	MOP175-12	USNM 422456	MF956582
Coryphaenoides anguliceps	2	MOP396-12	USNM 422648	MF956584
Coryphaenoides anguliceps	2	MOP400-12	USNM 423198	MF956577
Coryphaenoides anguliceps	2	MOP430-12	USNM 422620	MF956580
Coryphaenoides anguliceps	2	MOP431-12	USNM 421564	MF956583
Coryphaenoides capito	2	MOP162-12	USNM 422370	MF956588
Coryphaenoides capito	2	MOP253-12	USNM 421235	MF956586
Coryphaenoides capito	2	MOP254-12	USNM 421273	MF956587
Coryphaenoides capito	2	MOP257-12	USNM 421312	MF956595
Coryphaenoides capito	2	MOP258-12	USNM 422355	MF956585
Coryphaenoides capito	2	MOP412-12	USNM 421461	MF956592
Coryphaenoides capito	2	MOP413-12	USNM 421456	MF956593
Coryphaenoides capito	2	MOP469-12	USNM 421480	MF956589
Coryphaenoides capito	2	MOP470-12	USNM 421444	MF956590
Coryphaenoides capito	2	MOP471-12	USNM 421460	MF956591
Coryphaenoides capito	2	MOP571-12	USNM 421341	MF956594
Coryphaenoides carminifer	2	MOP038-12	USNM 422441	MF956601
Coryphaenoides carminifer	2	MOP067-12	USNM 422446	MF956603
Coryphaenoides carminifer	2	MOP174-12	USNM 422433	MF956599
Coryphaenoides carminifer	2	MOP177-12	USNM 422419	MF956600
Coryphaenoides carminifer	2	MOP432-12	USNM 422649	MF956597
Coryphaenoides carminifer	2	MOP433-12	USNM 421475	MF956598
Coryphaenoides carminifer	2	MOP434-12	USNM 421557	MF956604
Coryphaenoides carminifer	2	MOP610-12	USNM 421432	MF956596
Coryphaenoides carminifer	2	MOP722-12	USNM 422634	MF956605
Coryphaenoides carminifer	2	MOP723-12	USNM 422555	MF956602
Cubiceps pauciradiatus	1	MOP243-12	USNM 422357	MF956608
Cubiceps pauciradiatus	1	MOP505-12	USNM 421513	MF956610
Cubiceps pauciradiatus	1	MOP633-12	USNM 421436	MF956609
Cubiceps pauciradiatus	1	MOP634-12	USNM 421415	MF956606
Cubiceps pauciradiatus	1	MOP738-12	USNM 422496	MF956607
Cynoscion nannus	2	MOP150-12	USNM 422364	MF956614
Cynoscion nannus	2	MOP151-12	USNM 422404	MF956613

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Cynoscion nannus	2	MOP152-12	USNM 422403	MF956612
Cynoscion nannus	2	MOP295-12	USNM 421314	MF956620
Cynoscion nannus	2	MOP495-12	USNM 421517	MF956615
Cynoscion nannus	2	MOP496-12	USNM 421498	MF956616
Cynoscion nannus	2	MOP497-12	USNM 421499	MF956621
Cynoscion nannus	2	MOP498-12	USNM 421500	MF956627
Cynoscion nannus	2	MOP499-12	USNM 421446	MF956622
Cynoscion nannus	2	MOP527-12	USNM 421462	MF956631
Cynoscion nannus	2	MOP528-12	USNM 421483	MF956629
Cynoscion nannus	2	MOP529-12	USNM 421455	MF956634
Cynoscion nannus	2	MOP542-12	USNM 421285	MF956617
Cynoscion nannus	2	MOP543-12	USNM 421288	MF956611
Cynoscion nannus	2	MOP544-12	USNM 421303	MF956632
Cynoscion nannus	2	MOP664-12	USNM 421400	MF956623
Cynoscion nannus	2	MOP665-12	USNM 421409	MF956624
Cynoscion nannus	2	MOP666-12	USNM 421437	MF956626
Cynoscion nannus	2	MOP680-12	USNM 422586	MF956633
Cynoscion nannus	2	MOP681-12	USNM 421420	MF956635
Cynoscion nannus	2	MOP688-12	USNM 421568	MF956618
Cynoscion nannus	2	MOP689-12	USNM 421569	MF956619
Cynoscion nannus	2	MOP745-12	USNM 422513	MF956637
Cynoscion nannus	2	MOP746-12	USNM 422521	MF956636
Cynoscion nannus	2	MOP810-12	USNM 421255	MF956625
Cynoscion nannus	2	MOP811-12	USNM 421221	MF956628
Cynoscion nannus	2	MOP812-12	USNM 421251	MF956630
Decapterus macrosoma		MOP304-12	USNM 421558	MF956638
Decapterus macrosoma		MOP785-12	USNM 421355	MF956639
Decodon melasma	3	MOP305-12	USNM 422622	MF956642
Decodon melasma	3	MOP324-12	USNM 422591	MF956641
Decodon melasma	3	MOP687-12	USNM 421393	MF956643
Decodon melasma	3	MOP711-12	USNM 422522	MF956640
Dibranchus erinaceus	4	MOP334-12	USNM 422525	MF956648
Dibranchus erinaceus	4	MOP335-12	USNM 422554	MF956647
Dibranchus erinaceus	4	MOP336-12	USNM 422572	MF956646
Dibranchus erinaceus	4	MOP686-12	USNM 421396	MF956645
Dibranchus erinaceus	4	MOP801-12	USNM 421226	MF956644
Dibranchus erinaceus	4	MOP804-12	USNM 421253	MF956650
Dibranchus erinaceus	4	MOP805-12	USNM 421256	MF956649
Dibranchus hystrix	4	MOP186-12	USNM 422413	MF956652
Dibranchus hystrix	4	MOP561-12	USNM 422601	MF956654
Dibranchus hystrix	4	MOP586-12	USNM 421279	MF956651

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Dibranchus hystrix	4	MOP734-12	USNM 422606	MF956655
Dibranchus hystrix	4	MOP735-12	USNM 421467	MF956653
Dibranchus nudivomer	4	MOP363-12	USNM 422534	MF956658
Dibranchus nudivomer	4	MOP364-12	USNM 422578	MF956656
Dibranchus nudivomer	4	MOP733-12	USNM 422524	MF956657
Dibranchus spinosus	4	MOP104-12	USNM 422385	MF956661
Dibranchus spinosus	4	MOP506-12	USNM 421349	MF956665
Dibranchus spinosus	4	MOP507-12	USNM 421340	MF956666
Dibranchus spinosus	4	MOP585-12	USNM 422595	MF956659
Dibranchus spinosus	4	MOP602-12	USNM 422625	MF956660
Dibranchus spinosus	4	MOP684-12	USNM 421395	MF956663
Dibranchus spinosus	4	MOP685-12	USNM 421386	MF956664
Dibranchus spinosus	4	MOP720-12	USNM 422618	MF956662
Dibranchus spinosus	4	MOP732-12	USNM 421470	MF956667
Dibranchus velutinus	4	MOP125-12	USNM 422459	MF956671
Dibranchus velutinus	4	MOP126-12	USNM 422409	MF956669
Dibranchus velutinus	4	MOP127-12	USNM 422391	MF956673
Dibranchus velutinus	4	MOP159-12	USNM 422453	MF956672
Dibranchus velutinus	4	MOP160-12	USNM 422420	MF956668
Dibranchus velutinus	4	MOP161-12	USNM 422363	MF956674
Dibranchus velutinus	4	MOP453-12	USNM 421509	MF956670
Dicrolene filamentosa	4	MOP074-12	USNM 422442	MF956679
Dicrolene filamentosa	4	MOP111-12	USNM 422406	MF956680
Dicrolene filamentosa	4	MOP272-12	USNM 422643	MF956685
Dicrolene filamentosa	4	MOP409-12	USNM 421523	MF956689
Dicrolene filamentosa	4	MOP419-12	USNM 421497	MF956688
Dicrolene filamentosa	4	MOP439-12	USNM 421533	MF956691
Dicrolene filamentosa	4	MOP440-12	USNM 421526	MF956690
Dicrolene filamentosa	4	MOP472-12	USNM 421495	MF956675
Dicrolene filamentosa	4	MOP473-12	USNM 421520	MF956687
Dicrolene filamentosa	4	MOP474-12	USNM 421496	MF956686
Dicrolene filamentosa	4	MOP548-12	USNM 421482	MF956684
Dicrolene filamentosa	4	MOP582-12	USNM 421488	MF956683
Dicrolene filamentosa	4	MOP607-12	USNM 422588	MF956682
Dicrolene filamentosa	4	MOP611-12	USNM 421561	MF956681
Dicrolene filamentosa	4	MOP743-12	USNM 422494	MF956678
Dicrolene filamentosa	4	MOP763-12	USNM 422613	MF956677
Dicrolene filamentosa	4	MOP772-12	USNM 421477	MF956676
Diplectrum euryplectrum	2	MOP227-12	USNM 421315	MF956692
Diplectrum euryplectrum	2	MOP228-12	USNM 421266	MF956693
Engyophrys sanctilaurentii	4	MOP237-12	USNM 421316	MF956696

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Engyophrys sanctilaurentii	4	MOP316-12	USNM 422537	MF956695
Engyophrys sanctilaurentii	4	MOP317-12	USNM 422515	MF956694
Fowlerichthys avalonis	3	MOP286-12	USNM 422343	MF956697
Gymnothorax equatorialis	2	MOP052-12	USNM 421373	MF956698
Gymnothorax phalarus	2	MOP698-12	USNM 421374	MF956699
Halosaurus attenuatus	4	MOP367-12	USNM 422539	MF956703
Halosaurus attenuatus	4	MOP368-12	USNM 421547	MF956701
Halosaurus attenuatus	4	MOP510-12	USNM 421271	MF956702
Halosaurus attenuatus	4	MOP511-12	USNM 421258	MF956700
Halosaurus radiatus	4	MOP259-12	USNM 421311	MF956706
Halosaurus radiatus	4	MOP260-12	USNM 421310	MF956709
Halosaurus radiatus	4	MOP261-12	USNM 421275	MF956708
Halosaurus radiatus	4	MOP483-12	USNM 421521	MF956707
Halosaurus radiatus	4	MOP484-12	USNM 421516	MF956710
Halosaurus radiatus	4	MOP485-12	USNM 421379	MF956705
Halosaurus radiatus	4	MOP775-12	USNM 421534	MF956704
Hemanthias signifer		MOP012-12	USNM 422478	MF956714
Hemanthias signifer		MOP223-12	USNM 422359	MF956717
Hemanthias signifer		MOP224-12	USNM 421237	MF956711
Hemanthias signifer		MOP225-12	USNM 422361	MF956719
Hemanthias signifer		MOP226-12	USNM 421252	MF956718
Hemanthias signifer		MOP306-12	USNM 422573	MF956713
Hemanthias signifer		MOP307-12	USNM 422535	MF956712
Hemanthias signifer		MOP327-12	USNM 422633	MF956715
Hemanthias signifer		MOP328-12	USNM 421551	MF956716
Hippoglossina bollmani	2	MOP019-12	USNM 422468	MF956724
Hippoglossina bollmani	2	MOP234-12	USNM 421327	MF956722
Hippoglossina bollmani	2	MOP235-12	USNM 421239	MF956721
Hippoglossina bollmani	2	MOP236-12	USNM 421313	MF956720
Hippoglossina bollmani	2	MOP296-12	USNM 421351	MF956726
Hippoglossina bollmani	2	MOP536-12	USNM 421489	MF956723
Hippoglossina bollmani	2	MOP537-12	USNM 421339	MF956725
Hippoglossina tetrophthalma	2	MOP534-12	USNM 422637	MF956728
Hippoglossina tetrophthalma	2	MOP535-12	USNM 422597	MF956727
Hoplostethus mento	2	MOP239-12	USNM 421306	MF956730
Hoplostethus mento	2	MOP240-12	USNM 421317	MF956729
Hoplostethus mento	2	MOP241-12	USNM 421260	MF956733
Hoplostethus mento	2	MOP569-12	USNM 421268	MF956732
Hoplostethus mento	2	MOP570-12	USNM 421284	MF956731
Hyporthodus niphobles	1	MOP046-12	USNM 423181	MF956734
Hyporthodus niphobles	1	MOP048-12	USNM 422641	MF956735

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Ilyophis sp.		MOP731-12	USNM 421372	MF956736
Kathetostoma averruncus		MOP022-12	USNM 422305	MF956740
Kathetostoma averruncus		MOP203-12	USNM 421261	MF956742
Kathetostoma averruncus		MOP204-12	USNM 421220	MF956739
Kathetostoma averruncus		MOP279-12	USNM 421231	MF956738
Kathetostoma averruncus		MOP280-12	USNM 421232	MF956743
Kathetostoma averruncus		MOP281-12	USNM 421228	MF956737
Kathetostoma averruncus		MOP784-12	USNM 421335	MF956741
Lampanyctus parvicauda	1	MOP035-12	USNM 422304	MF956744
Lamprogrammus niger	3	MOP115-12	USNM 422477	MF956745
Lamprogrammus niger	3	MOP347-12	USNM 422593	MF956746
Lamprogrammus niger	3	MOP706-12	USNM 435786	MF956747
Lestidiops neles	2	MOP245-12	USNM 421259	MF956748
Leuroglossus urotranus	2	MOP249-12	USNM 421262	MF956749
Lophiodes caulinaris		MOP090-12	USNM 422366	MF956754
Lophiodes caulinaris		MOP091-12	USNM 422412	MF956752
Lophiodes caulinaris		MOP092-12	USNM 422388	MF956753
Lophiodes caulinaris		MOP205-12	USNM 421345	MF956755
Lophiodes caulinaris		MOP206-12	USNM 421346	MF956750
Lophiodes caulinaris		MOP786-12	USNM 421347	MF956751
Lophiodes spilurus		MOP550-12	USNM 421230	MF956761
Lophiodes spilurus		MOP551-12	USNM 421281	MF956760
Lophiodes spilurus		MOP552-12	USNM 421229	MF956759
Lophiodes spilurus		MOP632-12	USNM 421427	MF956757
Lophiodes spilurus		MOP759-12	USNM 422527	MF956758
Lophiodes spilurus		MOP802-12	USNM 421348	MF956756
Luciobrotula sp.	3	MOP383-12	USNM 422550	MF956762
Luciobrotula sp.	3	MOP488-12	USNM 421528	MF956765
Luciobrotula sp.	3	MOP705-12	USNM 421491	MF956763
Luciobrotula sp.	3	MOP782-12	USNM 421356	MF956764
Luciobrotula sp.	3	MOP814-12	USNM 421217	MF956766
Lycenchelys sp.		MOP376-12	USNM 422609	MF956769
Lycenchelys sp.		MOP441-12	USNM 421515	MF956767
Lycenchelys sp.		MOP730-12	USNM 422617	MF956768
Lycodapus sp.		MOP075-12	USNM 422332	MF956771
Lycodapus sp.		MOP643-12	USNM 421188	MF956770
Lycodes sp.		MOP381-12	USNM 421556	MF956773
Lycodes sp.		MOP382-12	USNM 422538	MF956772
Macrouridae		MOP721-12	USNM 440227*	MF956774
Melamphaes sp.		MOP037-12	USNM 422342	MF956777
Melamphaes sp.		MOP167-12	USNM 422386	MF956780

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Melamphaes sp.		MOP168-12	USNM 422390	MF956782
Melamphaes sp.		MOP250-12	USNM 422348	MF956778
Melamphaes sp.		MOP251-12	USNM 421265	MF956776
Melamphaes sp.		MOP454-12	USNM 421505	MF956785
Melamphaes sp.		MOP455-12	USNM 421504	MF956775
Melamphaes sp.		MOP456-12	USNM 421503	MF956784
Melamphaes sp.		MOP523-12	USNM 421267	MF956783
Melamphaes sp.		MOP635-12	USNM 421421	MF956781
Melamphaes sp.		MOP776-12	USNM 422532	MF956779
Melanocetus johnsonii		MOP030-12	USNM 422319	MF956787
Melanocetus johnsonii		MOP105-12	USNM 422465	MF956786
Melanocetus johnsonii		MOP403-12	USNM 423214	MF956788
Melanocetus johnsonii		MOP404-12	USNM 423215	MF956789
Melanocetus johnsonii		MOP405-12	USNM 423216	MF956790
Melanocetus johnsonii		MOP423-12	USNM 421459	MF956791
Melanocetus johnsonii		MOP424-12	USNM 421457	MF956792
Melanocetus johnsonii		MOP598-12	USNM 422628	MF956793
Melanocetus johnsonii		MOP618-12	USNM 421406	MF956794
Melanocetus johnsonii		MOP739-12	USNM 440228*	MF956795
Merluccius angustimanus	1	MOP027-12	USNM 422438	MF956798
Merluccius angustimanus	1	MOP028-12	USNM 422470	MF956797
Merluccius angustimanus	1	MOP029-12	USNM 422450	MF956802
Merluccius angustimanus	1	MOP486-12	USNM 421524	MF956799
Merluccius angustimanus	1	MOP640-12	USNM 422587	MF956800
Merluccius angustimanus	1	MOP748-12	USNM 422528	MF956796
Merluccius angustimanus	1	MOP749-12	USNM 421468	MF956804
Merluccius angustimanus	1	MOP750-12	USNM 422498	MF956803
Merluccius angustimanus	1	MOP800-12	USNM 421331	MF956801
Monolene asaedae	4	MOP020-12	USNM 422328	MF956805
Monolene asaedae	4	MOP021-12	USNM 422323	MF956812
Monolene asaedae	4	MOP753-12	USNM 422501	MF956811
Monolene asaedae	4	MOP754-12	USNM 421486	MF956808
Monolene asaedae	4	MOP755-12	USNM 422493	MF956807
Monolene asaedae	4	MOP760-12	USNM 422488	MF956810
Monolene asaedae	4	MOP761-12	USNM 422516	MF956809
Monolene asaedae	4	MOP762-12	USNM 422490	MF956806
Monolene maculipinna	4	MOP297-12	USNM 422356	MF956814
Monolene maculipinna	4	MOP298-12	USNM 422351	MF956813
Monolene maculipinna	4	MOP313-12	USNM 421550	MF956815
Monolene maculipinna	4	MOP314-12	USNM 422517	MF956816
Monolene maculipinna	4	MOP315-12	USNM 422565	MF956817

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Monomitopus malispinosus	4	MOP247-12	USNM 421240	MF956825
Monomitopus malispinosus	4	MOP248-12	USNM 421249	MF956826
Monomitopus malispinosus	4	MOP475-12	USNM 421441	MF956829
Monomitopus malispinosus	4	MOP487-12	USNM 421530	MF956823
Monomitopus malispinosus	4	MOP576-12	USNM 421464	MF956822
Monomitopus malispinosus	4	MOP577-12	USNM 422624	MF956828
Monomitopus malispinosus	4	MOP578-12	USNM 421300	MF956820
Monomitopus malispinosus	4	MOP609-12	USNM 435794	MF956824
Monomitopus malispinosus	4	MOP715-12	USNM 422552	MF956821
Monomitopus malispinosus	4	MOP716-12	USNM 422509	MF956819
Monomitopus malispinosus	4	MOP717-12	USNM 422492	MF956827
Monomitopus sp.	3	MOP773-12	USNM 422497	MF956818
Nemichthys scolopaceus		MOP080-12	USNM 421357	MF956833
Nemichthys scolopaceus		MOP108-12	USNM 421358	MF956831
Nemichthys scolopaceus		MOP129-12	USNM 421185	MF956840
Nemichthys scolopaceus		MOP130-12	USNM 421180	MF956841
Nemichthys scolopaceus		MOP131-12	USNM 421184	MF956842
Nemichthys scolopaceus		MOP170-12	USNM 421183	MF956843
Nemichthys scolopaceus		MOP197-12	USNM 421191	MF956838
Nemichthys scolopaceus		MOP255-12	USNM 421179	MF956830
Nemichthys scolopaceus		MOP256-12	USNM 421182	MF956832
Nemichthys scolopaceus		MOP374-12	USNM 421186	MF956836
Nemichthys scolopaceus		MOP375-12	USNM 421189	MF956835
Nemichthys scolopaceus		MOP479-12	USNM 421187	MF956839
Nemichthys scolopaceus		MOP562-12	USNM 421181	MF956834
Nemichthys scolopaceus		MOP644-12	USNM 421388	MF956837
Neobythites stelliferoides	2	MOP024-12	USNM 422341	MF956846
Neobythites stelliferoides	2	MOP025-12	USNM 422448	MF956847
Neobythites stelliferoides	2	MOP026-12	USNM 422312	MF956848
Neobythites stelliferoides	2	MOP629-12	USNM 421439	MF956849
Neobythites stelliferoides	2	MOP630-12	USNM 421392	MF956844
Neobythites stelliferoides	2	MOP631-12	USNM 421399	MF956845
Nezumia convergens	2	MOP068-12	USNM 422302	MF956856
Nezumia convergens	2	MOP176-12	USNM 422400	MF956850
Nezumia convergens	2	MOP391-12	USNM 421546	MF956854
Nezumia convergens	2	MOP392-12	USNM 422577	MF956855
Nezumia convergens	2	MOP557-12	USNM 421344	MF956851
Nezumia convergens	2	MOP657-12	USNM 421572	MF956852
Nezumia convergens	2	MOP659-12	USNM 421402	MF956853
Nezumia latirostrata	2	MOP573-12	USNM 421481	MF956858
Nezumia latirostrata	2	MOP708-12	USNM 422545	MF956859

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Nezumia latirostrata	2	MOP781-12	USNM 421257	MF956857
Nezumia liolepis	1	MOP138-12	USNM 422421	MF956874
Nezumia liolepis	1	MOP139-12	USNM 422462	MF956871
Nezumia liolepis	1	MOP163-12	USNM 422375	MF956870
Nezumia liolepis	1	MOP164-12	USNM 422383	MF956869
Nezumia liolepis	1	MOP172-12	USNM 422460	MF956865
Nezumia liolepis	1	MOP173-12	USNM 422458	MF956864
Nezumia liolepis	1	MOP394-12	USNM 422590	MF956867
Nezumia liolepis	1	MOP401-12	USNM 421474	MF956872
Nezumia liolepis	1	MOP402-12	USNM 422568	MF956868
Nezumia liolepis	1	MOP411-12	USNM 421476	MF956863
Nezumia liolepis	1	MOP416-12	USNM 421544	MF956866
Nezumia liolepis	1	MOP457-12	USNM 421508	MF956873
Nezumia liolepis	1	MOP458-12	USNM 421440	MF956861
Nezumia liolepis	1	MOP459-12	USNM 422582	MF956862
Nezumia liolepis	1	MOP460-12	USNM 421458	MF956860
Nezumia stelgidolepis	1	MOP165-12	USNM 422368	MF956879
Nezumia stelgidolepis	1	MOP252-12	USNM 421238	MF956875
Nezumia stelgidolepis	1	MOP572-12	USNM 421297	MF956877
Nezumia stelgidolepis	1	MOP703-12	USNM 421490	MF956878
Nezumia stelgidolepis	1	MOP780-12	USNM 421330	MF956876
Notacanthus cf. chemnitzii		MOP414-12	USNM 421522	MF956880
Notacanthus cf. chemnitzii		MOP589-12	USNM 422600	MF956882
Notacanthus cf. chemnitzii		MOP590-12	USNM 421354	MF956881
Notacanthus spinosus	2	MOP112-12	USNM 422417	MF956890
Notacanthus spinosus	2	MOP113-12	USNM 422423	MF956888
Notacanthus spinosus	2	MOP114-12	USNM 422461	MF956889
Notacanthus spinosus	2	MOP246-12	USNM 421321	MF956886
Notacanthus spinosus	2	MOP377-12	USNM 421559	MF956887
Notacanthus spinosus	2	MOP415-12	USNM 421532	MF956883
Notacanthus spinosus	2	MOP525-12	USNM 423204	MF956891
Notacanthus spinosus	2	MOP771-12	USNM 421487	MF956884
Notacanthus spinosus	2	MOP779-12	USNM 422583	MF956885
Oneirodes luetkeni	1	MOP072-12	USNM 422335	MF956896
Oneirodes luetkeni	1	MOP166-12	USNM 422393	MF956895
Oneirodes luetkeni	1	MOP269-12	USNM 421353	MF956897
Oneirodes luetkeni	1	MOP270-12	USNM 421223	MF956892
Oneirodes luetkeni	1	MOP351-12	USNM 422511	MF956894
Oneirodes luetkeni	1	MOP420-12	USNM 421514	MF956893
Oneirodes rosenblatti	2	MOP451-12	USNM 423219	MF956898
Ophichthus frontalis	2	MOP333-12	USNM 422483	MF956899

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Ophichthus remiger	2	MOP719-12	USNM 421369	MF956901
Ophichthus remiger	2	MOP797-12	USNM 421371	MF956902
Ophichthus remiger	2	MOP798-12	USNM 421370	MF956903
Ophichthus remiger	2	MOP799-12	USNM 421210	MF956900
Ophidiiformes		MOP707-12	USNM 440226*	MF956904
Ophthalmolycus sp.		MOP109-12	USNM 422428	MF956911
Ophthalmolycus sp.		MOP110-12	USNM 422452	MF956910
Ophthalmolycus sp.		MOP116-12	USNM 422367	MF956905
Ophthalmolycus sp.		MOP274-12	USNM 421318	MF956907
Ophthalmolycus sp.		MOP275-12	USNM 421307	MF956908
Ophthalmolycus sp.		MOP276-12	USNM 421309	MF956909
Ophthalmolycus sp.		MOP446-12	USNM 421542	MF956906
Ophthalmolycus sp.		MOP526-12	USNM 421473	MF956912
Otophidium indefatigabile	4	MOP491-12	USNM 421519	MF956913
Otophidium indefatigabile	4	MOP540-12	USNM 421302	MF956914
Otophidium indefatigabile	4	MOP541-12	USNM 421299	MF956915
Otophidium indefatigabile	4	MOP712-12	USNM 422512	MF956916
Pachycara sp.		MOP194-12	USNM 422432	MF956919
Pachycara sp.		MOP592-12	USNM 421417	MF956917
Pachycara sp.		MOP593-12	USNM 421562	MF956920
Pachycara sp.		MOP724-12	USNM 422599	MF956918
Paraliparis sp.		MOP041-12	USNM 422607	MF956922
Paraliparis sp.		MOP042-12	USNM 422316	MF956923
Paraliparis sp.		MOP061-12	USNM 422466	MF956925
Paraliparis sp.		MOP103-12	USNM 422426	MF956927
Paraliparis sp.		MOP188-12	USNM 422454	MF956929
Paraliparis sp.		MOP189-12	USNM 422455	MF956930
Paraliparis sp.		MOP273-12	USNM 421269	MF956928
Paraliparis sp.		MOP372-12	USNM 422585	MF956924
Paraliparis sp.		MOP373-12	USNM 421548	MF956926
Paraliparis sp.		MOP445-12	USNM 422592	MF956921
Peprilus medius	1	MOP220-12	USNM 421322	MF956934
Peprilus medius	1	MOP221-12	USNM 422337	MF956933
Peprilus medius	1	MOP222-12	USNM 422358	MF956932
Peprilus medius	1	MOP794-12	USNM 421325	MF956935
Peprilus medius	1	MOP796-12	USNM 421328	MF956931
Peprilus snyderi	2	MOP016-12	USNM 422315	MF956937
Peprilus snyderi	2	MOP017-12	USNM 422330	MF956938
Peprilus snyderi	2	MOP018-12	USNM 422303	MF956939
Peprilus snyderi	2	MOP795-12	USNM 421333	MF956936
Peristedion barbiger	2	MOP001-12	USNM 422320	MF956941

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Peristedion barbiger	2	MOP002-12	USNM 422314	MF956943
Peristedion barbiger	2	MOP003-12	USNM 422329	MF956945
Peristedion barbiger	2	MOP214-12	USNM 421319	MF956940
Peristedion barbiger	2	MOP215-12	USNM 421211	MF956946
Peristedion barbiger	2	MOP792-12	USNM 421334	MF956944
Peristedion barbiger	2	MOP793-12	USNM 421212	MF956942
Physiculus nematopus	2	MOP330-12	USNM 422543	MF956951
Physiculus nematopus	2	MOP331-12	USNM 422571	MF956950
Physiculus nematopus	2	MOP332-12	USNM 422559	MF956948
Physiculus nematopus	2	MOP533-12	USNM 421305	MF956947
Physiculus nematopus	2	MOP697-12	USNM 421413	MF956949
Platytroctes apus	3	MOP062-12	USNM 422451	MF956953
Platytroctes apus	3	MOP066-12	USNM 422449	MF956955
Platytroctes apus	3	MOP370-12	USNM 422500	MF956954
Platytroctes apus	3	MOP558-12	USNM 421296	MF956952
Platytroctes apus	3	MOP559-12	USNM 422630	MF956956
Pomadasys branickii	1	MOP233-12	USNM 422650	MF956957
Pontinus furcirhinus	1	MOP321-12	USNM 422640	MF956973
Pontinus sierra	2	MOP004-12	USNM 422471	MF956975
Pontinus sierra	2	MOP005-12	USNM 422474	MF956976
Pontinus sierra	2	MOP006-12	USNM 422473	MF956974
Pontinus sierra	2	MOP008-12	USNM 422443	MF956982
Pontinus sierra	2	MOP290-12	USNM 422336	MF956978
Pontinus sierra	2	MOP291-12	USNM 422349	MF956981
Pontinus sierra	2	MOP292-12	USNM 422350	MF956979
Pontinus sierra	2	MOP318-12	USNM 422611	MF956980
Pontinus sierra	2	MOP319-12	USNM 422580	MF956984
Pontinus sierra	2	MOP320-12	USNM 421552	MF956977
Pontinus sierra	2	MOP622-12	USNM 421376	MF956983
Pontinus sp.		MOP007-12	USNM 422440	MF956972
Pontinus sp.		MOP009-12	USNM 422306	MF956971
Pontinus sp.		MOP010-12	USNM 422327	MF956970
Pontinus sp.		MOP011-12	USNM 422309	MF956969
Pontinus sp.		MOP140-12	USNM 422382	MF956968
Pontinus sp.		MOP147-12	USNM 422389	MF956967
Pontinus sp.		MOP149-12	USNM 422369	MF956965
Pontinus sp.		MOP229-12	USNM 421247	MF956961
Pontinus sp.		MOP230-12	USNM 421323	MF956960
Pontinus sp.		MOP231-12	USNM 422340	MF956958
Pontinus sp.		MOP232-12	USNM 421270	MF956959
Pontinus sp.		MOP667-12	USNM 421398	MF956962

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Pontinus sp.		MOP668-12	USNM 421430	MF956963
Pontinus sp.		MOP669-12	USNM 421384	MF956964
Pontinus sp.		MOP148-12	USNM 422414	MF956966
Porogadus sp.	3	MOP438-12	USNM 421448	MF956987
Porogadus sp.	3	MOP512-12	USNM 435796	MF956986
Porogadus sp.	3	MOP599-12	USNM 421549	MF956985
Poromitra crassiceps		MOP070-12	USNM 422334	MF956988
Poromitra crassiceps		MOP071-12	USNM 422301	MF956989
Prionotus ruscarius	1	MOP216-12	USNM 422300	MF956993
Prionotus ruscarius	1	MOP282-12	USNM 421224	MF956991
Prionotus ruscarius	1	MOP283-12	USNM 421264	MF956990
Prionotus ruscarius	1	MOP791-12	USNM 421213	MF956992
Prionotus stephanophrys		MOP211-12	USNM 421216	MF956994
Prionotus stephanophrys		MOP212-12	USNM 422347	MF956997
Prionotus stephanophrys		MOP213-12	USNM 421234	MF956996
Prionotus stephanophrys		MOP807-12	USNM 421215	MF956995
Prionotus stephanophrys		MOP809-12	USNM 421243	MF956998
Psenes cyanophrys		MOP700-12	USNM 421567	MF956999
Psenes sio	2	MOP036-12	USNM 422472	MF957013
Psenes sio	2	MOP132-12	USNM 422378	MF957008
Psenes sio	2	MOP133-12	USNM 422411	MF957006
Psenes sio	2	MOP134-12	USNM 422377	MF957005
Psenes sio	2	MOP200-12	USNM 422373	MF957001
Psenes sio	2	MOP386-12	USNM 422526	MF957007
Psenes sio	2	MOP387-12	USNM 422547	MF957002
Psenes sio	2	MOP588-12	USNM 421342	MF957000
Psenes sio	2	MOP646-12	USNM 421375	MF957009
Psenes sio	2	MOP647-12	USNM 421382	MF957004
Psenes sio	2	MOP648-12	USNM 421410	MF957003
Psenes sio	2	MOP654-12	USNM 421570	MF957010
Psenes sio	2	MOP655-12	USNM 421434	MF957011
Psenes sio	2	MOP656-12	USNM 421405	MF957012
Pseudoscopelus lavenbergi	4	MOP369-12	USNM 422507	MF957014
Psychrolutes sio	2	MOP271-12	USNM 422353	MF957015
Psychrolutes sio	2	MOP371-12	USNM 422651	MF957016
Psychrolutes sio	2	MOP410-12	USNM 422603	MF957017
Psychrolutes sio	2	MOP504-12	USNM 421511	MF957018
Psychrolutes sio	2	MOP587-12	USNM 423597	MF957019
Rouleina attrita	3	MOP059-12	USNM 422434	MF957020
Scopelarchoides nicholsi	3	MOP365-12	USNM 422520	MF957021
Scopelarchoides nicholsi	3	MOP682-12	USNM 421401	MF957022

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Scopelarchoides nicholsi	3	MOP725-12	USNM 422485	MF957023
Scopelengys tristis	3	MOP142-12	USNM 435799	MF957025
Scopelengys tristis	3	MOP169-12	USNM 435797	MF957024
Scopelengys tristis	3	MOP463-12	USNM 421443	MF957028
Scopelengys tristis	3	MOP464-12	USNM 421512	MF957029
Scopelengys tristis	3	MOP465-12	USNM 421447	MF957026
Scopelengys tristis	3	MOP642-12	USNM 421425	MF957027
Sebastolobus altivelis		MOP452-12	USNM 423201	MF957030
Selene brevoortii		MOP146-12	USNM 422365	MF957031
Selene brevoortii		MOP663-12	USNM 421378	MF957032
Selene peruviana	1	MOP145-12	USNM 422399	MF957034
Selene peruviana	1	MOP679-12	USNM 421404	MF957033
Serranus aequidens	1	MOP287-12	USNM 421248	MF957038
Serranus aequidens	1	MOP288-12	USNM 421277	MF957035
Serranus aequidens	1	MOP289-12	USNM 422346	MF957037
Serranus aequidens	1	MOP308-12	USNM 422566	MF957036
Serrivomer sector		MOP032-12	USNM 421364	MF957046
Serrivomer sector		MOP190-12	USNM 421363	MF957041
Serrivomer sector		MOP192-12	USNM 421198	MF957040
Serrivomer sector		MOP360-12	USNM 421199	MF957039
Serrivomer sector		MOP436-12	USNM 421197	MF957043
Serrivomer sector		MOP480-12	USNM 421200	MF957045
Serrivomer sector		MOP563-12	USNM 421287	MF957042
Serrivomer sector		MOP564-12	USNM 421201	MF957044
Serrivomer sector		MOP608-12	USNM 421336	MF957047
Sternoptyx diaphana		MOP352-12	USNM 422506	MF957052
Sternoptyx diaphana		MOP450-12	USNM 421510	MF957049
Sternoptyx diaphana		MOP701-12	USNM 422505	MF957048
Sternoptyx diaphana		MOP702-12	USNM 422542	MF957051
Sternoptyx diaphana		MOP815-12	USNM 421254	MF957050
Stomias atriventer		MOP073-12	USNM 435793	MF957059
Stomias atriventer		MOP100-12	USNM 435787	MF957058
Stomias atriventer		MOP158-12	USNM 435792	MF957054
Stomias atriventer		MOP242-12	USNM 435789	MF957057
Stomias atriventer		MOP366-12	USNM 421554	MF957063
Stomias atriventer		MOP461-12	USNM 421535	MF957053
Stomias atriventer		MOP462-12	USNM 421527	MF957064
Stomias atriventer		MOP508-12	USNM 435790	MF957061
Stomias atriventer		MOP509-12	USNM 435788	MF957060
Stomias atriventer		MOP579-12	USNM 421465	MF957056
Stomias atriventer		MOP580-12	USNM 422629	MF957055

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Stomias atriventer		MOP638-12	USNM 435798	MF957065
Stomias atriventer		MOP769-12	USNM 422614	MF957062
Symphurus leei	2	MOP500-12	USNM 421454	MF957070
Symphurus leei	2	MOP501-12	USNM 421507	MF957069
Symphurus leei	2	MOP626-12	USNM 421245	MF957067
Symphurus leei	2	MOP627-12	USNM 421442	MF957066
Symphurus leei	2	MOP628-12	USNM 421418	MF957068
Synchiropus atrilabiatus	1	MOP311-12	USNM 422564	MF957072
Synchiropus atrilabiatus	1	MOP312-12	USNM 422551	MF957071
Synodus evermanni	2	MOP208-12	USNM 422338	MF957076
Synodus evermanni	2	MOP209-12	USNM 421246	MF957074
Synodus evermanni	2	MOP210-12	USNM 421320	MF957075
Synodus evermanni	2	MOP788-12	USNM 421250	MF957073
Synodus evermanni	2	MOP790-12	USNM 421329	MF957077
Talismania bifurcata		MOP606-12	USNM 421553	MF957078
Trichiurus nitens	2	MOP049-12	USNM 422445	MF957079
Trichiurus nitens	2	MOP050-12	USNM 422317	MF957086
Trichiurus nitens	2	MOP051-12	USNM 422326	MF957087
Trichiurus nitens	2	MOP153-12	USNM 422372	MF957080
Trichiurus nitens	2	MOP154-12	USNM 422380	MF957081
Trichiurus nitens	2	MOP155-12	USNM 422376	MF957082
Trichiurus nitens	2	MOP623-12	USNM 421433	MF957083
Trichiurus nitens	2	MOP624-12	USNM 421407	MF957084
Trichiurus nitens	2	MOP625-12	USNM 421385	MF957085
Umbrina bussingi	1	MOP530-12	USNM 422631	MF957090
Umbrina bussingi	1	MOP531-12	USNM 421289	MF957088
Umbrina bussingi	1	MOP532-12	USNM 421301	MF957089
Venefica sp.	3	MOP435-12	USNM 421203	MF957091
Venefica tentaculata	4	MOP081-12	USNM 421365	MF957092
Venefica tentaculata	4	MOP082-12	USNM 421366	MF957098
Venefica tentaculata	4	MOP191-12	USNM 421367	MF957096
Venefica tentaculata	4	MOP353-12	USNM 423194	MF957099
Venefica tentaculata	4	MOP354-12	USNM 421202	MF957097
Venefica tentaculata	4	MOP594-12	USNM 422623	MF957093
Venefica tentaculata	4	MOP595-12	USNM 421204	MF957094
Venefica tentaculata	4	MOP675-12	USNM 421368	MF957095
Xenomystax atrarius	4	MOP244-12	USNM 421360	MF957105
Xenomystax atrarius	4	MOP262-12	USNM 421361	MF957100
Xenomystax atrarius	4	MOP340-12	USNM 421206	MF957102
Xenomystax atrarius	4	MOP341-12	USNM 421207	MF957101
Xenomystax atrarius	4	MOP567-12	USNM 421359	MF957103

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TABLE 3. (Continued)

	Status	BOLD Process ID	NMNH Voucher Number	Genbank Accession No.
Xenomystax atrarius	4	MOP568-12	USNM 421205	MF957104
Yarrella argenteola	4	MOP481-12	USNM 421493	MF957109
Yarrella argenteola	4	MOP482-12	USNM 421494	MF957108
Yarrella argenteola	4	MOP652-12	USNM 421422	MF957107
Yarrella argenteola	4	MOP653-12	USNM 421423	MF957106
Zalieutes elater	3	MOP201-12	USNM 422354	MF957111
Zalieutes elater	3	MOP202-12	USNM 421227	MF957112
Zalieutes elater	3	MOP294-12	USNM 422352	MF957113
Zalieutes elater	3	MOP322-12	USNM 422510	MF957114
Zalieutes elater	3	MOP323-12	USNM 422502	MF957110

Annotated and illustrated catalog

NOTACANTHIFORMES
2 F, 2 G, 4 S.

Halosauridae
Halosaurs (En); Halosauro (Sp). 1 G, 2 S.

(1) ***Halosaurus attenuatus*** **Garman, 1899**. Attenuated halosaur (En); Halosauro atenuado (Sp)

MOP stations. 2; 028 and 029; **Depth range**: 1113–1472 m; **USNM voucher specimens**: 4; 421258, 421271, 421547 and 422539.

Distribution. Eastern Pacific (Gulf of California, Gulf of Panama and Galapagos Islands) and eastern Atlantic (Gulf of Guinea), occurring at depths between 1113 and 2500 m (see Remarks).

Literature. Garman (1899: 296), McDowell (1973: 57), Sulak (1977a: 11; 1990: 130; 1995: 1174), Castro-Aguirre & Balart (1996: 69) and McCosker & Rosenblatt (2010: 188).

Remarks. These specimens represent the first documented record of the species in lower Central American waters (Sulak 1977a, Bussing & López 1994, 2009, 2011). Previous records of this species in eastern Pacific waters were from the Gulf of California (Castro-Aguirre & Balart 1996) and the Galápagos Islands (Garman 1899, McCosker & Rosenblatt 2010). In addition, specimens collected at 1113 m represent a new upper limit to its known depth range (Sulak 1977a; Froese & Pauly 2016).

FIGURE 3. *Halosaurus attenuatus*. Top: entire specimen; Bottom: detail of head; USNM 421271, 280 mm. TL.

(2) ***Halosaurus radiatus*** **Garman, 1899**. Eastern Pacific halosaur (En); Halosauro del Pacífico oriental, Anguila radiante (Sp)

MOP stations. 2; 004 and 075; **Depth range**: 115–844 m; **USNM voucher specimens**: 6; 421275, 421310, 421311, 421379, 421477 and 421516.

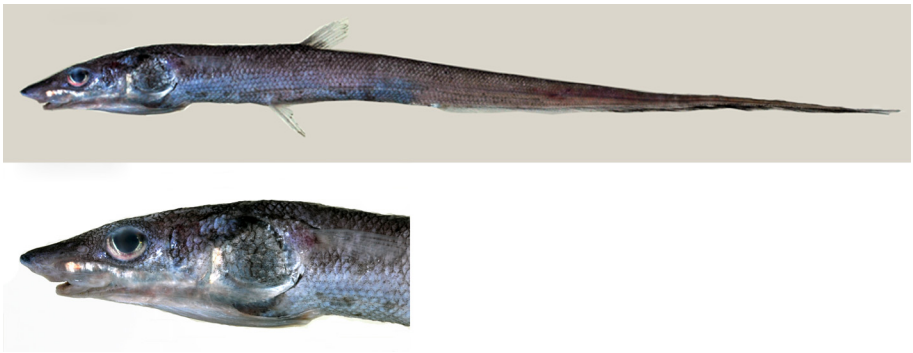

FIGURE 4. *Halosaurus radiatus*. Top: Entire specimen; Bottom Detail of head; USNM 421379, 250 mm. TL.

Distribution. Eastern Pacific (from Costa Rica to Chile), occurring at depths between 115 and 935 m (see Remarks).

Literature. Garman (1899: 298), Bussing (1965: 212), McDowell (1973: 56), Pequeño & Revuelta (1980: 892), Pequeño (1989: 27), Chirichigno & Vélez (1998: 172), Pequeño (2000: 62), and Yabe (2009a: 74).

Remarks. USNM 421275, 421310 and 421311 specimens represent the first documented record of the species in Costa Rican waters (Bussing & López 1994, 2009, 2011), and a northern extension of about 800 km in this species known distribution (Garman 1899, Pequeño 1989, Chirichigno & Vélez 1998, Yabe 2009a). The northernmost documented record for this species in eastern Pacific waters was previously in the Gulf of Panama (Garman 1899). In addition, specimens collected at 115 m represent a new maximum depth record for the species (Garman 1899, Bussing 1965, Yabe 2009a, Froese & Pauly 2016).

Notacanthidae

Spiny eels (En); Anguilas espinosas (Sp). 1 G, 2 S.

(3) ***Notacanthus spinosus*** **Garman, 1899**. Eastern Pacific spiny eel (En); Anguila espinosa del Pacífico Oriental (Sp)

MOP stations. 5; 003, 029, 078, 083, and 094; **Depth range**: 116–1527 m; **USNM voucher specimens**: 9; 421321, 421532, 421559, 422417, 422423, 422461, 422532, 423204 and 435801.

Distribution. Eastern Pacific (from El Salvador to Peru), occurring at depths between 116 and 1527 m (see Remarks).

Literature. Garman (1899: 301), McDowell (1973: 190), Chirichigno & Vélez (1998: 172), Yabe (2009b: 75), Mundy *et al.* (2011: 269) and Kanehira *et al.* (2012: 2).

Remarks. USNM 421354, 421522, 421532, 422417, 422423, 422461, 422600 and 423204 specimens represent the first documented record of the species in upper Central American waters (Bussing & López 1994, 2009, 2011; Yabe 2009b), and a northern range extension of about 1400 km in the species' known distribution (Garman 1899, Chirichigno & Vélez 1998, Yabe 2009b). Previously the northernmost documented record for this species in eastern Pacific waters was in the Gulf of Panama (Garman 1899). In addition, specimens collected at 1527 m represent a new minimum depth record for the species (Yabe 2009b, Froese & Pauly 2016).

FIGURE 5. *Notacanthus spinosus*. Top: entire specimen; Bottom: detail of head.

(4) ***Notacanthus* cf. *chemnitzii* Bloch 1788**. Snubnosed spiny eel (En).

MOP stations. 2; 082 and 087; **Depth range**: 1100–1527 m; **USNM voucher specimens**: 3; 421354, 421522 and 422600.

Distribution. Circumglobal, occurring at depths between 125 and 3285 m. In the eastern Pacific this species has been previously recorded in Canada, the Gulf of California, Mexico, and Chile

Literature. Bloch (1788: 278), McDowell (1973: 191), Nakamura *et al.* (1986: 62), Whitehead *et al.* (1986: 600), Lea & Rosenblatt (1987: 51), Matarese *et al.* (1989: 34), Paxton *et al.* (1989: 150), Pequeño (1989: 27), McAllister (1990: 45), McEachran & Fechhelm (1998: 217), Paepke (1999: 106), Trunov (1999: 461), Mecklenburg *et al.* (2002: 119), Hutchins (2001: 18), Moore *et al.* (2003: 172), Mundy *et al.* (2011: 269) and Parin *et al.* (2014: 46).

Remarks. These specimens represent the first documented record of the species in Central American waters (Lea & Rosenblatt 1987, Pequeño 1989, Bussing & López 1994, 2009, 2011). However, Mundy *et al.* (2011) and David G. Smith (pers. comm.) have indicated that *N. chemnitzii* likely represents a species complex in need of further investigation. The type locality is Iceland.

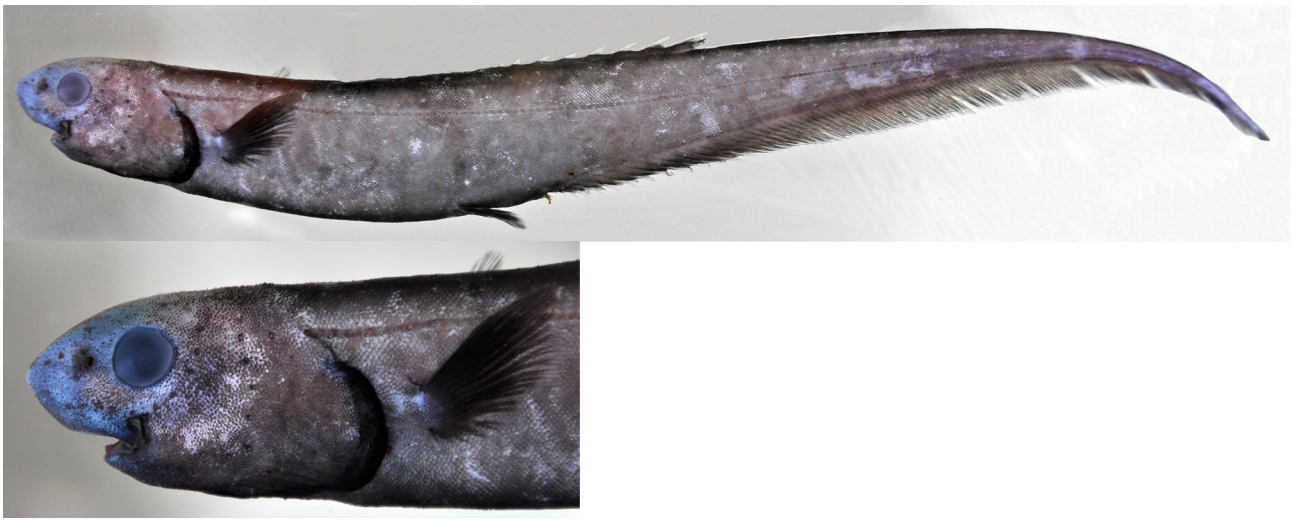

FIGURE 6. *Notacanthus* cf. *chemnitzii.* Top: entire specimen; Bottom: detail of head; USNM 421532, 255 mm. TL.

ANGUILLIFORMES
7 F, 9 G, 11 S.

Muraenidae
Moray eels (En); Anguilas morena (Sp). 1 G, 2 S.

(5) ***Gymnothorax equatorialis*** **(Hildebrand, 1946).** Equatorial moray, Spotted-tail moray, Spotted moray (En); Morena cola pintada, Morena del Ecuador (Sp)

FIGURE 7. *Gymnothorax equatorialis;* USNM 421373, 435 mm. TL.

MOP stations. 1; 036; **Depth range**: 138–143 m; **USNM voucher specimens**: 1; 421373.

Distribution. Eastern Pacific (from the Gulf of California to Peru), occurring at depths between 5 and 143 m.

Literature. Hildebrand (1946: 134), Allen & Robertson (1994: 46), Bussing & López (1994: 40; 2009: 443), Smith (1994: 23), McCosker & Rosenblatt (1995: 1310), Charter & Moser (1996: 88), De La Cruz Agüero *et al.* (1997: 226), Chirichigno & Vélez (1998: 130), Bearez (1996: 733), Bussing (1998: 444), Thomson *et al.* (2000: 44), Böhlke (2001: 3), Böhlke & Smith (2002: 108), Rodríguez-Romero *et al.* (2008: 1770), Smith (2012: 14), Del Moral-Flores *et al.* (2013: 190), Gómez *et al.* (2014: 392), Fuentes *et al.* (2015: 614) and Robertson & Allen (2015: 338).

(6) ***Gymnothorax phalarus*** **Bussing, 1998**. Small-spotted moray (En); Morena cola pintada falsa (Sp)

FIGURE 8. *Gymnothorax phalarus;* USNM 421374, 230 mm. TL.

MOP stations. 1; 003; **Depth range**: 116–118 m; **USNM voucher specimens**: 1; 421374.

Distribution. Eastern Pacific (from the mouth of the Gulf of California to Peru), occurring at depths between 23 and 339 m.

Literature. Bussing (1998: 439; 2009: 443), Böhlke (2001: 5), Böhlke & Smith (2002: 137), McCosker (2009a: 76), Smith (2012: 23), Gómez *et al.* (2014: 394), Fuentes *et al.* (2015: 611) and Robertson & Allen (2015: 2552).

Congridae

Conger eels, Garden eels (En); Congrios, Anguilas de jardín (Sp). 2 G, 2 S.

(7) ***Japonoconger proriger* (Gilbert, 1891).** Slope conger (En); Congrio del talud (Sp)

FIGURE 9. *Japonoconger proriger*. Top: Entire specimen; Bottom: Detail of head.

MOP stations. 5; 003, 031, 059, 060 and 075; **Depth range**: 118–920 m; **USNM voucher specimens**: 8; 421208, 421209, 421362, 422480, 422481, 422482, 423212, and 423213.

Distribution. Eastern Pacific (from the Gulf of Tehuantepec to Peru), occurring at depths between 55 and 920 m (see Remarks).

Literature. Gilbert (1891a: 350), Peden (1972:1), Cervigón *et al.* (1980: 317), Raju (1985: 1), Bussing & López (1994: 38; 2009: 444), Smith (1994: 6, 1995: 1026), Grove & Lavenberg (1997: 180), Chirichigno & Vélez (1998: 131), McCosker (2009e: 84), McCosker & Rosenblatt (2010: 189) and Robertson & Allen (2015: 446).

Remarks. Valid as *Ariosoma prorigerum* (Gilbert, 1891) in Eschmeyer *et al.* (2017), but provisionally placed in *Japonoconger* Asano, 1958, based on a personal communication of David G. Smith to DRR in 2016, until a detailed taxonomic study of the genus is carried out. Specimens collected at 920 m represent a new minimum depth record for the species (Robertson & Allen 2015, Froese & Pauly 2016).

(8) ***Xenomystax atrarius* Gilbert, 1891**. Deepwater conger (En); Congrio de aguas profundas, Congrio de altura (Sp)

FIGURE 10. *Xenomystax atrarius*. Top: Entire specimen; Bottom: Detail of head.

MOP stations. 3; 003, 060 and 075; **Depth range**: 116–844 m; **USNM voucher specimens**: 6; 421205, 421206, 421207, 421359, 421360 and 421361.

Distribution. Eastern Pacific (from British Columbia, Canada, to Chile), occurring at depths between 116 and 1050 m (see Remarks).

Literature. Gilbert (1891a: 348), Bussing (1965: 211), Peden (1972: 1), De Lachica-Bonilla & Castro-Aguirre (1973: 1), Seigel (1987: 57), Pequeño (1989: 25), Smith (1989a: 559, 1994: 12, 1995: 1026), McAllister (1990: 49), Castro-Aguirre & Balart (1996: 69), Charter (1996a: 100), Sielfeld & Vargas (1996: 4), Bussing & López (2009: 444), McCosker (2009e: 86), Del Moral-Flores *et al.* (2013: 191), Hanke & Roias (2013: 210) and Hanke *et al.* (2014: 63).

Remarks. Specimens collected at 116 m represent a new maximum depth record for the species (McCosker 2009, Froese & Pauly 2016).

Synaphobranchidae

Cutthroat eels, Deep sea eels (En); Anguilas garganta cortada, Anguilas branquias bajas, Anguilas de aguas profundas (Sp). 1 G, 1 S.

(9) ***Ilyophis brunneus* Gilbert, 1891**. Muddy arrowtooth eel (En); Anguila fangosa dientes de flecha (Sp)

MOP stations. 1; 025; **Depth range**: 1101–1113 m; **USNM voucher specimens**: 1; 421372.

Distribution. Circumtropical, except the northeast Pacific, occurring at depths between 450 and 3120 m. In the eastern Pacific this species has been previously recorded only in the Galápagos Islands and Peru (see Remarks).

FIGURE 11. *Ilyophis brunneus*. Top: entire specimen; Bottom: detail of head; USNM 421372, 420 mm. TL

Literature. Gilbert (1891a: 352), Blache *et al.* (1973: 253), Masuda *et al.* (1984: 26), Okamura & Kitajima (1984: 83), Okamura & Machida (1987: 109), Scott & Scott (1988: 88), Robins & Robins (1989: 235), Paulin *et al.*

(1989: 71), McAllister (1990: 47), Smith & Castle (1990: 195), Smith (1994: 37, 1999a: 1661, 2003: 723), Shinohara *et al.* (1996: 157), Arruda (1997: 59), Sulak & Shcherbachev (1997: 1161), McEachran & Fechhelm (1998: 247), Chen & Mok (1999: 60), Karmovskaya & Parin (1999: 316), Nakabo (2000: 212; 2002: 212), Chen & Mok (2001: 79), Shinohara *et al.* (2001: 292), Moore *et al.* (2003: 173), Shinohara *et al.* (2005: 400), Melo (2007: 315), McCosker (2009b: 77) and Melo *et al.* (2009: 13).

Remarks. This specimen represents the first documented record of the genus in lower Central American waters (Sulak & Shcherbachev 1997; Bussing & López 1994, 2009, 2011; McCosker 2009b) and a northeastern range extension of about 1400 km in the species' known distribution (Gilbert 1891a, Sulak & Shcherbachev 1997, McCosker 2009b). The previous northernmost record for this genus in eastern Pacific waters, represented by the species *I. brunneus* and *I. arx* Robins, 1976, was in the Galápagos Islands (Gilbert 1891, Sulak & Shcherbachev 1997).

Ophichthidae

Snake eels, Finless eels, Ridgefin eels, Worm eels, Sailfin eels, Sand eels, Spoon-nose eels, Viper eels (En); Tiesos, Anguilas Culebra, Serpentones (Sp). 1 G, 2 S.

(10) ***Ophichthus frontalis* Garman, 1899**. Deathbanded snake-eel (En); Tieso funebre, Tieso mortuorio (Sp)

MOP stations. 1; 004; **Depth range**: 115–116 m; **USNM voucher specimens**: 1; 422483.

Distribution. Eastern Pacific (two allopatric populations: (1) central Gulf of California and (2) from Costa Rica to Ecuador), occurring at depths between 35 and 760 m.

Literature. Garman (1899: 309), McCosker (1977: 81), Smith (1994: 34), McCosker & Rosenblatt (1995: 1338), McCosker & Rosenblatt (1998: 404), Chirichigno & Vélez (1998: 124), Tang & Zhang (2002: 855), Bussing & López (2009: 444), Del Moral-Flores *et al.* (2013: 190), Gómez *et al.* (2014: 392), Murase *et al.* (2014: 1403) and Robertson & Allen (2015: 403).

FIGURE 12. *Ophichthys frontalis*. Top: entire specimen; Bottom: detail of head; USNM 422483, 400 mm. TL.

(11) ***Ophichthus remiger*** **(Valenciennes, 1837).** Punctuated snake-eel, Common snake eel (En); Tieso punteado, Tieso común, Anguila punto blanco (Sp)

MOP stations. 3; 004, 007 and 081; **Depth range**: 115–478 m; **USNM voucher specimens**: 5; 421210, 421369, 421370, 421371 and 421571.

FIGURE 13. *Ophichthus remiger*. Top: entire specimen; Bottom: detail of head.

Distribution. Eastern Pacific (from Nicaragua to Chile), occurring at depths between 0 and 478 m (see Remarks).

Literature. McCosker (1977: 81), Pequeño (1989: 25), Bauchot *et al.* (1993: 111), McCosker & Rosenblatt (1995: 1338), Bearez (1996: 733), Chirichigno & Vélez (1998: 120), Tang & Zhang (2002: 855), Bussing & López (2009: 445), McCosker (2009c: 78), Murase et al (2014: 1403), Fuentes *et al.* (2015: 614) and Robertson & Allen (2015: 405).

Remarks. Specimens collected at 478 m represent a new minimum depth record for the species (Bussing & López 2009, McCosker 2009c, Froese & Pauly 2016).

Nemichthyidae

Snipe eels (En); Anguilas tijera (Sp). 2 G, 2 S.

(12) ***Avocettina bowersii*** **(Garman, 1899).** Smalleye snipe eel (En); Anguila tijera de ojo pequeño (Sp)

FIGURE 14. *Avocettina bowersii.* Top: entire specimen; Bottom: detail of head; USNM 421290, 420 mm. TL.

MOP stations. 4; 067, 076, 078 and 083; **Depth range**: 926–1145 m; **USNM voucher specimens**: 6; 421192, 421193, 421194, 421195, 421196 and 421290.

Distribution. Eastern Pacific (from California, United States of America (USA), to Chile), occurring at depths between 0 and 4000 m.

Literature. Garman (1899: 323), Robison (1972: 451), Pequeño (1989: 25), Smith & Nielsen (1989: 448), Castro-Aguirre & Balart (1996: 69), Charter (1996b: 122), De La Cruz Agüero *et al.* (1997: 239), Chirichigno & Vélez (1998: 126), Mecklenburg *et al.* (2002: 125), Rodríguez-Romero *et al.* (2008: 1770), McCosker (2009d: 80), Mundy (2005: 137), Reyes-Bonilla *et al.* (2011: 6), Hanke & Roias (2013: 210) and Cruz-Mena & Angulo (2016: 1).

(13) ***Nemichthys scolopaceus*** **Richardson, 1848.** Slender snipe eel (En); Anguila tijera esbelta (Sp)

MOP stations. 8; 001, 029, 065, 067, 071, 075, 078 and 088; **Depth range**: 165–1310 m; **USNM voucher specimens**: 15; 421179, 421180, 421181, 421182, 421183, 421184, 421185, 421186, 421187, 421189, 421190, 421191, 421357, 421358 and 421388.

Distribution. Worldwide, occurring at depths between 0 and 2500 m. In the eastern Pacific this species has been recorded from Alaska, USA, to Chile.

Literature. Richardson (1848: 25), Bussing (1965: 212), Fitch & Lavenberg (1968: 62), Robison (1972: 451), Larsen (1973: 231), Uyeno *et al.* (1983: 102), Masuda *et al.* (1984: 22), Nielsen (1986: 553), Pequeño (1989: 25), Smith & Nielsen (1989: 454), McAllister (1990: 47), Bossé (1991: 115), Bearez (1996: 733), Castro-Aguirre & Balart (1996: 69), Charter (1996b: 122), Shinohara *et al.* (1996: 158), De La Cruz Agüero *et al.* (1997: 239), Nakabo (2000: 237; 2002: 237), Hutchins (2001: 18), Mecklenburg *et al.* (2002: 126), Moore *et al.* (2003: 174), Smith (2003: 742), Mundy (2005: 138), Shinohara *et al.* (2005: 401), McCosker (2009d: 81), Reyes-Bonilla *et al.* (2011: 6), Hanke & Roias (2013: 210), Larson *et al.* (2013: 29), Hanke *et al.* (2014: 63), Parin *et al.* (2014: 49), Wirtz *et al.* (2014: 3) and Cruz-Mena & Angulo (2016: 1).

FIGURE 15. *Nemichthys scolopaceus.* Top: entire specimen; Bottom: detail of head.

Serrivomeridae

Sawtooth eels (En); Anguilas dientes de sierra (Sp). 1 G, 1 S.

(14) ***Serrivomer sector*** **Garman, 1899.** Sawtooth eel (En); Anguila dientes de sierra (Sp)

MOP stations. 6; 030, 044, 067, 073, 077 and 086; **Depth range**: 153–1389 m; **USNM voucher specimens**: 9; 421197, 421198, 421199, 421200, 421201, 421287, 421336, 421363 and 421364.

Distribution. Indo-west (Seychelles, Japan, and New Caledonia), central (Hawaiian Islands) and eastern Pacific (from San Francisco, California, USA, to Chile), occurring at depths between 0 and 3243 m.

Literature. Garman (1899: 320), Bauchot (1959: 134), Bussing (1965: 212), Robison (1972: 448), Pequeño

(1989: 25), Smith (1994: 37, 1999b: 1692), Castro-Aguirre & Balart (1996: 69), Charter (1996c: 131), Shinohara *et al.* (1996: 158), Nakabo (2000: 238; 2002: 235), Mundy (2005: 144), Shao *et al.* (2008: 239), McCosker (2009g: 88) Reyes-Bonilla *et al.* (2011: 6) and Fricke *et al.* (2011: 354).

FIGURE 16. *Serrivomer sector.* Top: entire specimen; Bottom: detail of head; USNM 421199, 495 mm. TL.

Nettastomatidae
Duckbill eels (En); Anguilas pico de pato, Serpentinas (Sp). 1 G, 1 S.

(15) ***Venefica tentaculata*** **Garman, 1899**. Duckbill eel (En); Anguila pico de pato (Sp)

MOP stations. 5; 001, 002, 046, 082 and 086; **Depth range**: 183–1527 m; **USNM voucher specimens**: 9; 421202, 421203, 421204, 421365, 421366, 421367, 421368, 422623 and 423194.

Distribution. Western (off Honshu and the sea of Okhotsk, Japan) and eastern (from British Columbia, Canada, to Peru) Pacific, occurring at depths between 183 and 1790 m (see Remarks).

Literature. Garman (1899: 319), Amaoka *et al.* (1983: 67), Masuda *et al.* (1984), Smith (1989b: 610), Charter (1996d: 135), Shinohara *et al.* (1996: 158), Nakabo (2000: 239), Mundy (2005: 144), McCosker (2009f: 88), Hanke & Roias (2013: 210), Hanke *et al.* (2014: 63) and Parin *et al.* (2014: 50).

Remarks. Specimens collected at 183 m represent a new maximum depth record for the species (Masuda *et al.* 1984, McCosker 2009f, and Froese & Pauly 2016).

FIGURE 17. *Venefica tentaculata.* Top: entire specimen; Bottom: detail of head; USNM 421366, 630 mm. TL.

OSMERIFORMES
4 F, 10 G, 10 S.

Argentinidae
Argentines, Herring smelts (En); Argentinas, Pejerreyes (Sp). 1 G, 1 S.

(16) ***Argentina aliceae*** **Cohen & Atsaides, 1969.** Alice's argentine (En); Argentina de Alicia (Sp)

MOP stations. 4; 003, 005, 006 and 048; **Depth range**: 109–500 m; **USNM voucher specimens**: 9; 421222, 421411, 421424, 421438, 422384, 422392, 422405, 422548 and 422575.

Distribution. Eastern Pacific (from Nicaragua to Peru), occurring at depths between 71 and 500 m (see Remarks).

FIGURE 18. *Argentina aliceae.* Top: entire specimen; Bottom: detail of head.

Literature. Cohen & Atsaides (1969: 19), Nielsen (1974: 12), Böhlke (1984: 22), Ibarra & Stewart (1987: 11), Bussing & López (1994: 54, 2009: 446), Schneider (1995: 858), Bearez (1996: 734), Castro-Aguirre & Balart (1996: 69), Chirichigno & Vélez (1998: 168), Kobyliansky (2004: 607), Bussing & López (2009: 446), Shinohara (2009: 94), McCosker & Rosenblatt (2010: 189) and Robertson & Allen (2015: 599).

Remarks. Specimens collected at 500 m represent a new minimum depth record for the species (Cohen & Atsaides 1969, Bussing & López 2009, Froese & Pauly 2016, Robertson & Allen 2015).

Bathylagidae

Deep-sea smelts (En); Esperlanes, Capellanes (Sp). 1 G, 1 S.

(17) ***Leuroglossus urotranus*** **Bussing, 1965.** Tropical eastern Pacific smoothtongue (En); Lengualisa del Pacífico tropical oriental (Sp)

MOP stations. 1; 003; **Depth range**: 105–107 m; **USNM voucher specimens**: 1; 421262.

Distribution. Eastern Pacific (from Panama to Chile), occurring at depths between 105 and 2830 m (see Remarks).

Literature. Bussing (1965: 194) and Pequeño (1989: 29).

Remarks. This specimen represents the first documented record of the species in lower Central American waters (Bussing 1965, Bussing & López 1994, 2009, 2011) and a northern range extension of about 1200 km in the species' known distribution (Bussing 1965). The previous northernmost documented record for this species in eastern Pacific waters was in the Gulf of Guayaquil (Bussing 1965). In addition, this specimen represents a new upper depth record for the species (Bussing 1965).

Alepocephalidae

Slickheads (En); Cabezas lisas (Sp). 6 G, 6 S.

(18) ***Alepocephalus tenebrosus*** **Gilbert, 1892**. California slickhead (En); Cabeza lisa californiana (Sp)

MOP stations. 14; 004, 025, 026, 029, 034, 059, 064, 065, 073, 077, 078, 083, 086 and 087; **Depth range**: 115–1389 m; **USNM voucher specimens**: 18; 421242, 421280, 421282, 421451, 421471, 421518, 421555, 421560, 421573, 422396, 422398, 422463, 422529, 422556, 422612, 422616, 422619 and 422642.

Distribution. North and eastern Pacific (from the Bering Sea to Chile), occurring at depths between 46 and 5500 m.

FIGURE 19. *Alepocephalus tenebrosus.* Top: entire specimen; Bottom: detail of head.

Literature. Gilbert (1892: 545), Böhlke (1953: 13), Fitch & Lavenberg (1968: 17), Eschmeyer *et al.* (1983: 89), Matarese *et al.* (1989: 76), Sazonov *et al.* (1993: 43), Ambrose (1996a: 224), Castro-Aguirre & Balart (1996: 69), Mecklenburg *et al.* (2002: 167), Grinols, & Heyamoto (2011: 1151), Reyes-Bonilla *et al.* (2011: 6) and Maslenikov *et al.* (2013: 6).

Remarks. These specimens represent the first documented record of the species in Central American waters (Eschmeyer *et al.* 1983; Bussing & López 1994, 2009, 2011; Ambrose 1996; Froese & Pauly 2016).

(19) ***Bajacalifornia burragei*** **Townsend & Nichols, 1925**. Sharpchin slickhead (En); Cabeza lisa de barbilla afilada (Sp)

MOP stations. 2; 077 and 094; **Depth range**: 1320–1406m; **USNM voucher specimens**: 2; 421485 and 422437.

Distribution. Western Indian (Red Sea) and western (South China Sea) and eastern Pacific (from the Gulf of California to Chile), occurring at depths between 865 and 1406 m (see Remarks).

Literature. Townsend & Nichols (1925: 8), Fowler (1956: 22), Robison (1972: 451), Markle & Krefft (1985: 348), Pequeño (1989: 33), Miya & Markle (1993: 744), Ambrose (1996a: 224), Castro-Aguirre & Balart (1996: 69), Chirichigno & Vélez (1998: 180), Yeh *et al.* (2006: 265), Sazonov & Williams (2001: S11) and Reyes-Bonilla *et al.* (2011: 6).

Remarks. These specimens represent the first documented record of the species in Central American waters (Fowler 1956; Bussing & López 1994, 2009, 2011; Froese & Pauly 2016) and a new maximum depth record for the species (Townsend & Nichols 1925, Fowler 1956, Froese & Pauly 2016).

FIGURE 20. *Bajacalifornia burragei.* Top: entire specimen; Bottom: detail of head; USNM 422437, 170 mm.SL.

(20) ***Bathytroctes microlepis*** **Günther, 1878.** Smallscale smooth-head (En); Cabeza lisa de escama pequeña (Sp)

MOP stations. 1; 063; **Depth range**: 1530–1625 m; **USNM voucher specimens**: 2; 421350 and 421563.

Distribution. Circumglobal, occurring at depths between 1097 and 4900 m. In the eastern Pacific this species has been previously recorded only in Peru and Chile (see Remarks).

Literature. Günther (1878: 249), Markle & Quèro (1984: 228), Markle & Sazonov (1990: 246), Arruda (1997: 26), McEachran & Fechhelm (1998: 388), Porteiro *et al.* (1999: 27), Sazonov (1999: 737), Sazonov & Williams (2001: S32) and Moore *et al.* (2003: 179).

Remarks. These specimens represent the first documented record of the species in Central American waters (Markle & Quèro 1984; Bussing & López 1994, 2009, 2011; Froese & Pauly 2016) and a northern range extension of about 1500 km in the species' known distribution (Markle & Quèro 1984, Froese & Pauly 2016). The previous northernmost record for this species in eastern Pacific waters was off Peru (Markle & Quèro 1984, Froese & Pauly 2016).

FIGURE 21. *Bathytroctes microlepis.* Top: entire specimen; Bottom: detail of head.

(21) ***Leptoderma ospesca*** **Angulo, Baldwin & Robertson, 2016.** East Pacific smooth-head (En); Cabeza lisa del Pacífico Oriental (Sp)

MOP stations. 1; 094; **Depth range**: 1368–1406 m; **USNM voucher specimens**: 1; 421478 (Holotype).

Distribution. Eastern Pacific (known only from El Salvador), occurring at depths between 1368 and 1406 m.

Literature. Angulo *et al.* (2016: 493).

FIGURE 22. *Leptoderma ospesca.* Top: entire specimen; Bottom: detail of head; USNM 421478, 195 mm. SL.

(22) ***Rouleina attrita*** **(Vaillant, 1888).** Softskin smooth-head (En); Cabeza lisa de piel suave (Sp)

MOP stations. 1; 042; **Depth range**: 1115–1119 m **USNM voucher specimens**: 1; 422434.

Distribution. Circumglobal, occurring at depths between 450 and 2300 m. In the eastern Pacific this species has been previously recorded off the states of Alaska, Washington and Oregon, USA, Peru and Chile.

Literature. Vaillant (1888: 158), Paxton *et al.* (1989: 210), Markle & Sazonov (1990: 261), Arruda (1997: 28), Pequeño (1997: 80), McEachran & Fechhelm (1998: 398), Kenaley *et al.* (2006: 200), Zeballos (2009: 115), Møller *et al.* (2010:25) and Parin *et al.* (2014: 112).

Remarks. This specimen represents the first documented record of the species in lower Central American waters (Markle & Sazonov 1990; Bussing & López 1994, 2011; Zeballos 2009; Froese & Pauly 2016).

(23) ***Talismania bifurcata*** **(Parr, 1951).** Threadfin slickhead (En); Cabeza lisa de aletas filamentosas (Sp)

MOP stations. 2; 030 and 087; **Depth range**: 864–1223 m; **USNM voucher specimens**: 2; 421479 and 421553.

Distribution. Western (New South Wales, Australia) and eastern Pacific (from British Columbia, Canada, to Chile), occurring at depths between 300 and 2000 m.

Literature. Parr (1951: 10), Bussing (1965: 192), Paxton *et al.* (1989: 211), McAllister (1990: 73), Ambrose (1996a: 224), Castro-Aguirre & Balart (1996: 69), Pequeño (1997: 80), Hutchins (2001: 19), Zeballos (2009: 117), Grinols & Heyamoto (2011: 1151) and Reyes-Bonilla *et al.* (2011: 6).

Remarks. Specimen USNM 421479 represents the first documented record of the species in middle Central American waters (Parr 1951; Bussing & López 1994, 2009, 2011; Zeballos 2009; Froese & Pauly 2016).

FIGURE 23. *Talismania bifurcata.* Top: entire specimen; Bottom: detail of head; USNM 421479, 245 mm. SL.

Platytroctidae
Tubeshoulders, Searsids (En); Hombros luminosos (Sp). 2 G, 2 S.

(24) ***Barbantus curvifrons*** **(Roule & Angel, 1931).** Palebelly searsid (En); Hombro luminoso de vientre claro (Sp)

MOP stations. 2; 001 and 083; **Depth range**: 165–1116 m; **USNM voucher specimens**: 2; 421294 and 422531.

Distribution. Circumtropical, occurring at depths between 0 and 4500 m. In the eastern Pacific this species has been recorded from the Gulf of California to Chile.

Literature. Roule & Angel (1931: 6), Matsui & Rosenblatt (1987: 108), Pequeño (1989: 33), Castro-Aguirre & Balart (1996: 70), McEachran & Fechhelm (1998: 404), Sazonov & Merrett (2001: S38), Moore *et al.* (2003: 180) and Møller *et al.* (2010: 25).

FIGURE 24. *Barbantus curvifrons;* USNM 421294, 104 mm. SL.

Remarks. These specimens represent the first documented record of the species in Central American waters (Roule & Angel 1931; Bussing & López 1994, 2009, 2011; Froese & Pauly 2016).

(25) ***Platytroctes apus*** **Günther, 1878**. Legless searsid (En); Hombro luminoso sin pies (Sp)

MOP stations. 3; 001, 029 and 042; **Depth range**: 165–1126 m; **USNM voucher specimens**: 6; 421296, 421391, 422449, 422451, 422500 and 422630.

Distribution. Circumglobal, occurring at depths between 385 and 5393 m. In the eastern Pacific this species has been recorded from Panama to Chile.

Literature. Günther (1878: 249), Rohr (1968: 624), Paxton *et al.* (1989: 213), Pequeño (1989: 34), Matsui &

Rosenblatt (1987: 104), Pakhorukov (1999: 656), Hutchins (2001: 19), Romero (2009a: 105), Møller *et al.* (2010: 26) and Fricke *et al.* (2011: 356).

FIGURE 25. *Platytroctes apus.* Top: entire specimen; Bottom: detail of head; USNM 422500, 141 mm. SL.

STOMIIFORMES
3 F, 3 G, 3 S.

Sternoptychidae
Marine hatchetfishes (En); Peces hacha marinos (Sp). 1 G, 1 S.

26) ***Sternoptyx diaphana* Hermann, 1781.** Diaphanous hatchet fish (En); Pez hacha transparente (Sp)

MOP stations. 4; 001, 046, 058 and 059; **Depth range**: 183–1270 m; **USNM voucher specimens**: 5; 421254, 421510, 422505, 422506 and 422542.

Distribution. Circumtropical, occurring at depths between 400 and 3676 m. In the eastern Pacific this species has been recorded from southern California, USA, to Chile.

Literature. Hermann (1781: 33), Bussing (1965: 197), Baird (1971: 75), Matarese *et al.* (1989: 103), Paxton *et al.* (1989: 193), Pequeño (1989: 31), Scott & Scott (1988: 172), McAllister (1990: 90), Shinohara *et al.* (1996: 161), Arruda (1997: 34), De La Cruz Agüero *et al.* (1997: 291), Santos *et al.* (1997: 33), McEachran & Fechhelm (1998: 437), Porteiro *et al.* (1999: 29), Hutchins (2001: 19), Shinohara *et al.* (2001: 297), Nakabo (2002: 314), Moore *et al.* (2003: 184), Mundy (2005: 170), Castellanos-Galindo *et al.* (2006b: 251), Fricke *et al.* (2011: 357), Reyes-Bonilla *et al.* (2011: 6) and Parin *et al.* (2014: 146).

FIGURE 26. *Sternoptyx diaphana;* USNM 422505, 40 mm. SL.

Phosichthyidae
Lightfishes (En); Peces linterna, Linternas (Sp). 1 G, 1 S.

(27) ***Yarrella argenteola*** **(Garman, 1899).** Panamanian lightfish (En); Linterna panameña (Sp)

MOP stations. 2; 004 and 037; **Depth range**: 115–456 m; **USNM voucher specimens**: 4; 421422, 421423, 421493 and 421494.

Distribution. Eastern Pacific (from the Gulf of Panama to northern Peru), occurring at depths between 384 and 1400 m.

Literature. Garman (1899: 244), Bussing (1965: 197), Castro-Aguirre & Balart (1996: 70), Castellanos-Galindo *et al.* (2006b: 251) and Vélez (2009a: 124).

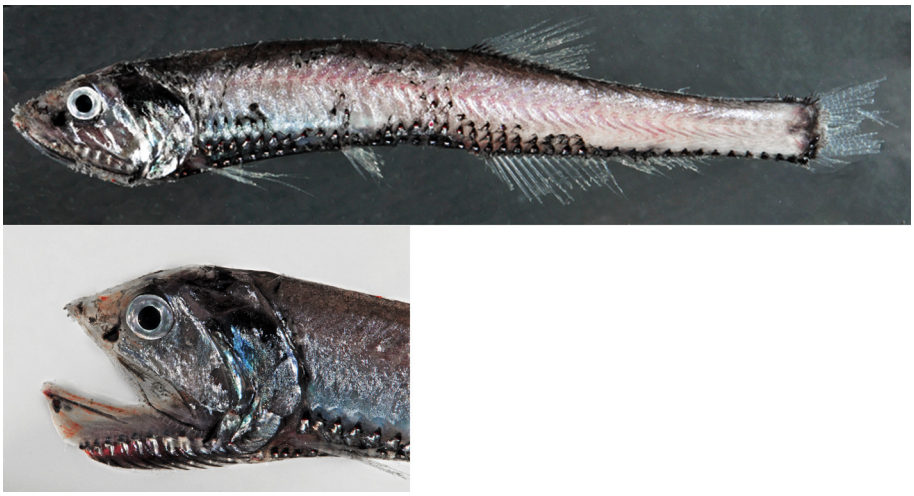

FIGURE 27. *Yarrella argenteola.* Top: entire specimen; Bottom: detail of head.

Stomiidae
Barbeled dragonfishes (En); Peces demonio, Peces dragón con barbillas (Sp). 1 G, 1 S.

(28) ***Stomias atriventer* Garman, 1899**. Black-belly dragonfish (En); Pez dragón de vientre oscuro (Sp)

MOP stations. 10; 001, 003, 004, 028, 029, 034, 044, 067, 071 and 078; **Depth range**: 115–1472 m; **USNM voucher specimens**: 14; 421465, 421527, 421535, 421554, 422504, 422614, 422629, 435787, 435788, 435789, 435790, 435792, 435793 and 435798.

Distribution. Eastern Pacific (from southern California to Chile, including the Galapagos Islands), occurring at depths between 100 and 1500 m.

Literature. Garman (1899: 277), (Gibbs 1969: 3), Robison (1972: 451), Pequeño (1989: 31), Castro-Aguirre & Balart (1996: 70), Moser (1996a: 301), Rodríguez-Romero *et al.* (2008: 1771), Vélez (2009b: 130) and Reyes-Bonilla *et al.* (2011: 7).

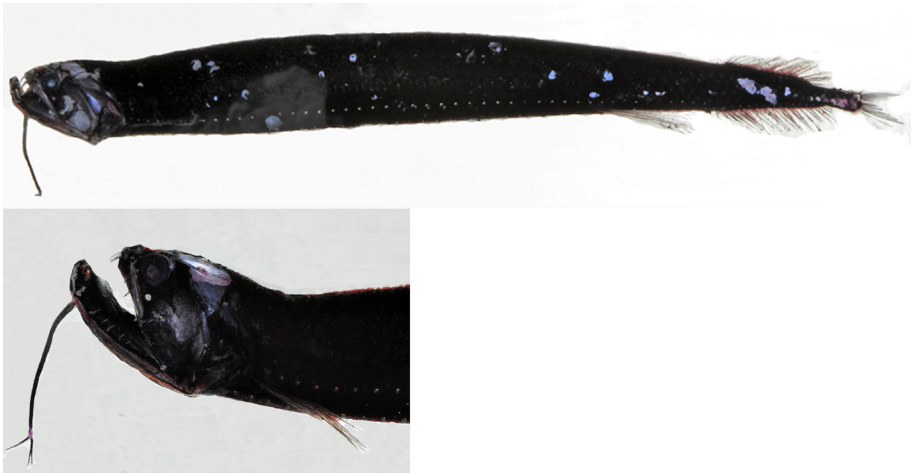

FIGURE 28. *Stomias atriventer.* Top: entire specimen; Bottom: detail of head; USNM 435798, 215 mm. SL.

AULOPIFORMES

5 F, 5 G, 7 S.

Chlorophthalmidae

Greeneyes (En); Ojiverdes (Sp). 1 G, 1 S.

(29) ***Chlorophthalmus mento* Garman, 1899.** Robust greeneye (En); Ojiverde robusto (Sp)

FIGURE 29. *Chlorophthalmus mento.* Top: entire specimen; Bottom: detail of head; USNM 421332, 166 mm. SL.

MOP stations. 1; 033; **Depth range**: ok m; **USNM voucher specimens**: 1; 421332.

Distribution. Eastern Pacific (from Mexico to Peru, including the Cocos and Galapagos Islands), occurring at depths between 17 and 1260 m.

Literature. Garman (1899: 253), Bussing & López (1994: 54, 2005: 44; 2009: 447), Sulak (1995: 1005), Castellanos-Galindo *et al.* (2006b: 252), Sato (2009b: 135), McCosker & Rosenblatt (2010: 189) and Robertson & Allen (2015: 5404).

Ipnopidae

Deepsea tripod fishes, Spider fishes (En); Peces trípode, Peces araña (Sp). 1 G, 3 S.

(30) ***Bathypterois atricolor* Alcock, 1896.** Attenuated spider fish (En); Pez araña atenuado (Sp)

MOP stations. 5; 001, 053, 073, 086 and 094; **Depth range**: 153–1443 m; **USNM voucher specimens**: 7; 421469, 421538, 422395, 422418, 422427, 422431 and 423598.

Distribution. Circumglobal, excluding the western Atlantic, occurring at depths between 250 and 5150 m. In the eastern Pacific this species has been recorded from the Gulf of California to central Chile.

Literature. Alcock (1896: 306), Sulak (1977b: 87), Pequeño (1989: 34), Adam *et al.* (1998: 9), Nakabo (2000: 360), Shinohara *et al.* (2001: 300), Mundy (2005: 195), Castellanos-Galindo *et al.* (2006b: 252), Shao *et al.* (2008:241) and McCosker & Rosenblatt (2010: 189).

Remarks. According to Sulak´s (1977b) key, *B. atricolor* and *B. ventralis* can be separated by the number of lower pectoral fin rays (9–11 vs. 12–14, respectively); however, other "diagnostic" characters listed by this author (i.e. numbers of lateral line scales and vertebrae, shape of subcaudal notch) overlap between the species, making their separation difficult. COI sequences for specimens identified as *B. atricolor* and *B. ventralis* based on number of lower pectoral-fin rays form a single genetic lineage (Figure 31). Further studies are necessary to resolve the taxonomy of these species. USNM 421469 and 421538 specimens represent the first documented record of *B. atricolor* in upper Central American waters (Sulak 1977; Bussing & López 1994, 2009, 2011; Froese & Pauly 2016).

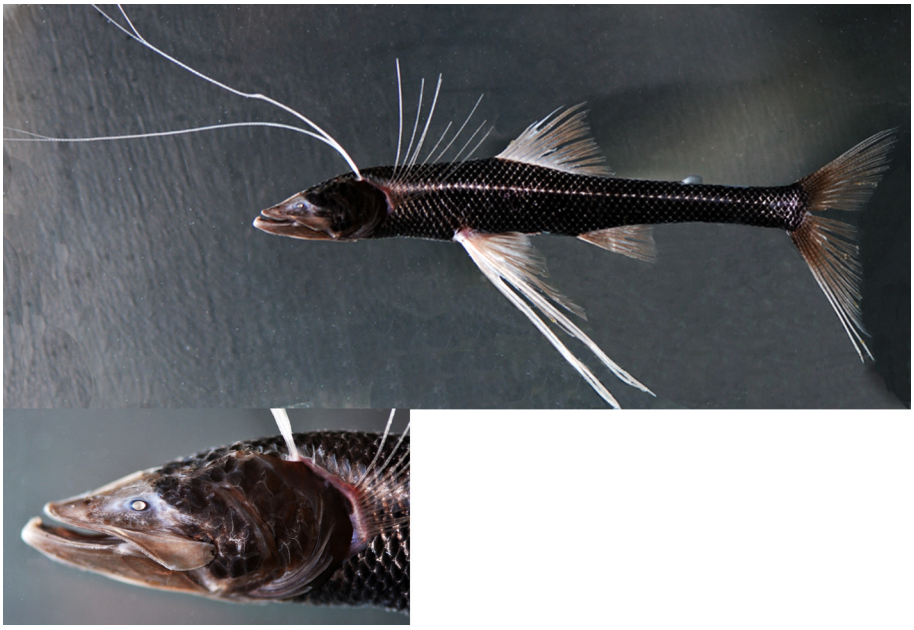

FIGURE 30. *Bathypterois atricolor.* Top: entire specimen; Bottom: detail of head; USNM 421538, 132 mm. SL.

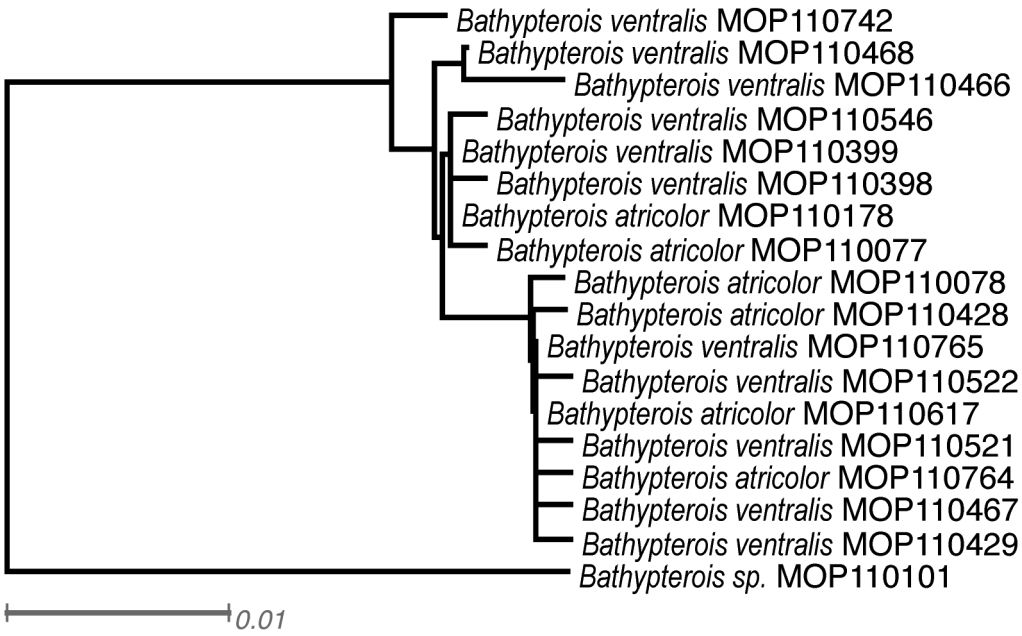

FIGURE 31. Neighbor-joining tree based on raw sequence divergence of *Bathypterois* specimens. Sequence divergence among specimens of *B. ventralis* and *B. atricolor* is less than 1.25%. Scale bar is equivalent to 1% raw sequence divergence.

(31) ***Bathypterois* sp.**

MOP stations. 1; 078; **Depth range**: 1320–1370 m; **USNM voucher specimens**: 1; 422410.

Remarks. The COI sequence for a specimen identified only to the genus *Bathypterois* differs by about 4% from COI sequences of the *B. atricolor*/*ventralis* lineage (Figure 31).

(32) ***Bathypterois ventralis* Garman, 1899.** Ventrad spiderfish (En); Pez araña (Sp)

MOP stations. 9; 005, 055, 067, 078, 083, 086, 094, 096 and 099; **Depth range**: 165–1406 m; **USNM voucher specimens**: 16; 421272, 421276, 421286, 421304, 421343, 421484, 421506, 421529, 421531, 421536, 422345, 422402, 422415, 422503, 422561 and 422569.

Distribution. Indo-Pacific, occurring at depths between 165 and 1735 m (see Remarks). In the eastern Pacific this species has been recorded from the Gulf of California to central Chile.

Literature. Garman (1899: 256), Sato (2009c: 137), Sulak (1977b: 87), Pequeño (1997: 81), Hutchins (2001: 21), Castellanos-Galindo *et al.* (2006b: 252) and Angulo *et al.* (2015: 546).

Remarks. USNM 421272, 421276, 421484, 421536, 422345, 422561 and 422569 represent the first documented record of the species in upper Central American waters (Sulak 1977; Bussing & López 1994, 2009, 2011; Angulo *et al.* 2015; Froese & Pauly 2016). In addition, specimens collected at 165 m represent a new minimum depth record for the species (Castellanos-Galindo *et al.* 2006b, Angulo *et al.* 2015, Froese & Pauly 2016). See also Figure 31 and remarks about *B. atricola* and *Bathypterois* sp.

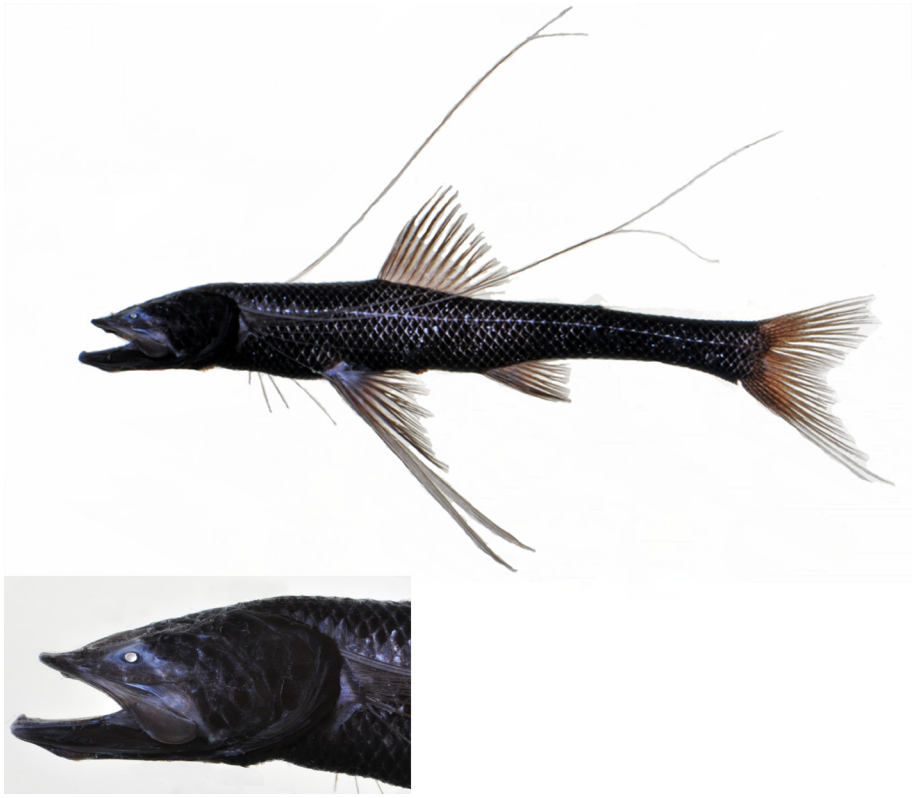

FIGURE 32. *Bathypterois ventralis.* Top: entire specimen; Bottom: detail of head; USNM 422503, 125 mm. SL.

Scopelarchidae
Pearleyes (En); Ojos de perla (Sp). 1 G, 1 S.

(33) ***Scopelarchoides nicholsi* Parr, 1929**. Nichols's pearl eye (En); Ojo de perla de Nichols (Sp)

MOP stations. 3; 029, 040 and 052; **Depth range**: 836–1185 m; **USNM voucher specimens**: 3; 421401, 422485 and 422520.

Distribution. Eastern Pacific (from Baja California, Mexico, to Chile) and western central Atlantic (Cuba), occurring at depths between 94 and 3294 m.

Literature. Parr (1929: 16), Bussing (1965: 211), Watson & Sandknop (1996a: 332), Johnson (1974: 136; 1982:165), Pequeño (1989: 34), Sato (2009d: 139) and Davis (2015: 67).

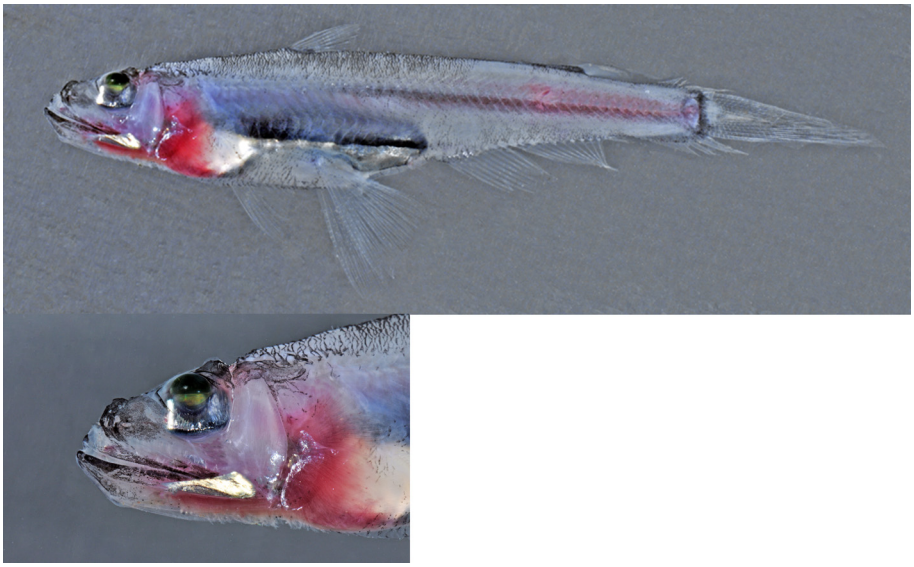

FIGURE 33. *Scopelarchoides nicholsi.* Top: entire specimen; Bottom: detail of head; USNM 422485, 105 mm. SL.

Synodontidae
Lizardfishes (En); Garrobos (Sp). 1 G, 1 S.

(34) ***Synodus evermanni* Jordan & Bollman, 1890.** Sharpnose lizardfish, Spotted lizardfish, Inotted lizardfish (En); Lagarto cadena, Garrobo, Lagarto camotillo (Sp)

MOP stations. 2; 005 and 015; **Depth range**: 109–114 m; **USNM voucher specimens**: 7; 421246, 421250, 421308, 421320, 421324, 421329 and 422338.

Distribution. Eastern Pacific (from central Baja California, México, to Peru), occurring at depths between 25 and 300 m.

Literature. Allen & Robertson (1994: 72), Bussing & López (1994: 54; 2009: 446), Bussing & Lavenberg (1995a: 1626), Bearez (1996: 734), Stevens & Moser (1996a: 348), De La Cruz Agüero *et al.* (1997: 298), Chirichigno & Vélez (1998: 171), Castellanos-Galindo *et al.* (2006b: 25), Rodríguez-Romero *et al.* (2008: 1770), Sato (2009a: 134), Del Moral-Flores *et al.* (2013: 192), Fuentes *et al.* (2015: 615) and Robertson & Allen (2015: 621).

Remarks. The seven specimens collected and sequenced form two genetic lineages based on their DNA barcodes, which differ by 10.0–10.2%. An individual of each lineage was present in Trawl 15, indicating they likely are not allopatric

FIGURE 34. *Synodus evermanni.*

Paralepididae
Barracudinas (En); Barracudinas (Sp). 1 G, 1 S.

(35) ***Lestidiops neles*** **(Harry, 1953).** Tropical eastern Pacific barracudina (En); Barracudina del Pacífico Tropical Oriental (Sp)

MOP stations. 1; 003; **Depth range**: 116–118 m; **USNM voucher specimens**: 1; 421259.

Distribution. Eastern Pacific (from the vicinity of Cabo San Lucas, Baja California, México, to the Gulf of Panama), occurring at depths between 22 and 384 m.

Literature. Harry (1953: 199), Ambrose (1996b: 352) and Castellanos-Galindo *et al.* (2006b: 254).

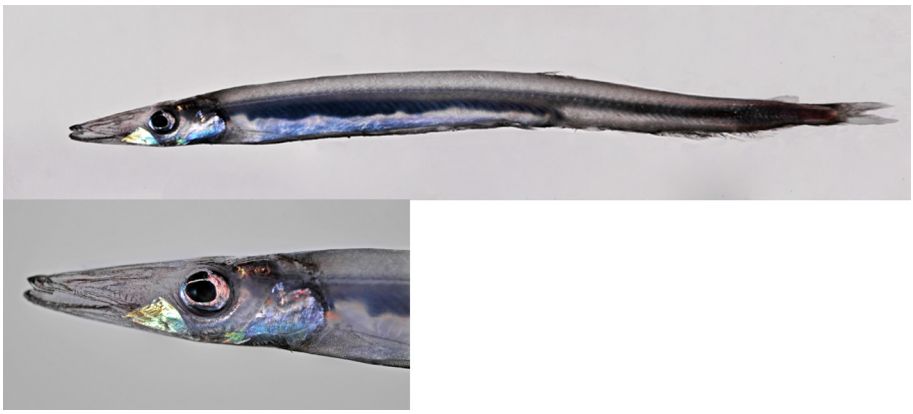

FIGURE 35. *Lestidiops neles.* Top: entire specimen; Bottom: detail of head; USNM 421259, 157 mm. SL.

MYCTOPHIFORMES
2 F, 3 G, 3 S.

Neoscopelidae
Blackchins, Neoscopelids (En); Linternillas, Barbillas oscuras (Sp). 1 G, 1 S.

(36) ***Scopelengys tristis*** **Alcock, 1890**. Pacific blackchin (En); Barbilla negra del Pacífico (Sp)

MOP stations. 4; 067, 071, 076 and 100; **Depth range**: 697–1145 m; **USNM voucher specimens**: 6; 421425, 421443, 421447, 421512, 435797 and 435799.

Distribution. Cosmopolitan, occurring at depths between 400 and 1830 m.

Literature. Alcock (1890: 303), Bussing (1965: 200), Fitch & Lavenberg (1968: 42), Robison (1972: 451), Nielsen (1974: 40), Menon & Rama-Rao (1975: 35), Butler & Ahlstrom (1976: 143), Pequeño (1989: 38), Becker & Shcherbachev (1990: 845), Bala11 & Fedorov (1996: 345), Castro-Aguirre & Balart (1996: 70), Moser (1996b: 383), Nakabo (2000: 377; 2002: 377), Mecklenburg *et al.* (2002: 243), Menezes *et al.* (2003: 52), Castellanos-Galindo *et al.* (2006b: 254), Romero (2009b: 143), Reyes-Bonilla *et al.* (2011: 7) and Parin *et al.* (2014: 154).

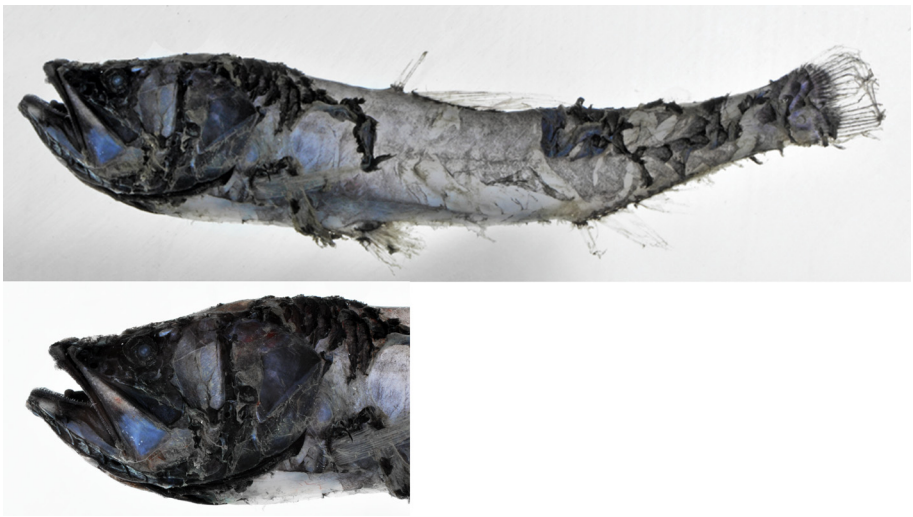

FIGURE 36. *Scopelengys tristis.* Top: entire specimen; Bottom: detail of head; USNM 421425, 115 mm. SL.

Myctophidae

Lanternfishes, Myctophids (En); Peces linterna, Linternillas, Mictófidos (Sp). 2 G, 2 S.

(37) ***Benthosema panamense*** **(Tåning, 1932).** Panama lanternfish (En); Pez linterna de Panamá (Sp)

MOP stations. 4; 039, 047, 074 and 103; **Depth range**: 117–422 m; **USNM voucher specimens**: 10; 421419, 421449, 421450, 421453, 422484, 422486, 422499, 422523, 422536 and 422541.

Distribution. Eastern Pacific (from the Gulf of California to northern Peru), occurring at depths between 13 and 600 m.

Literature. Tåning (1932: 129), Robison (1972: 448), Nafpaktitis (1973: 10), Nielsen (1974: 40), Paxton (1979: 6), Paxton *et al.* (1995: 315), Castro-Aguirre & Balart (1996: 70), Moser & Ahlstrom (1996: 389), De La Cruz Agüero *et al.* (1997: 229), Chirichigno & Vélez (1998: 165), Castellanos-Galindo *et al.* (2006b: 254), Romero (2009c: 144), Del Moral-Flores *et al.* (2013: 192) and Santana-Iturríos *et al.* (2013: 387).

(38) ***Lampanyctus parvicauda*** **Parr, 1931.** Slimtail lampfish (En); Pez linterna de cola delgada (Sp)

MOP stations. 1; 077; **Depth range**: 1320–1370 m; **USNM voucher specimens**: 1; 422304.

Distribution. Eastern Pacific (from the Gulf of California to Peru), occurring at depths between 9 and 1370 m (see Remarks).

Literature. Parr (1931: 26), Bussing (1965: 207), Robison (1972: 451), Paxton (1979: 14), Pequeño (1989: 38), Paxton *et al.* (1995: 315), Castro-Aguirre & Balart (1996: 70), Moser & Ahlstrom (1996: 389), Mundy (2005: 225), Castellanos-Galindo *et al.* (2006b: 255) and Romero (2009c: 149).

Remarks. This specimen represents a new maximum depth record for the species (Castellanos-Galindo *et al.* 2006b, Romero 2009c, Froese & Pauly 2016).

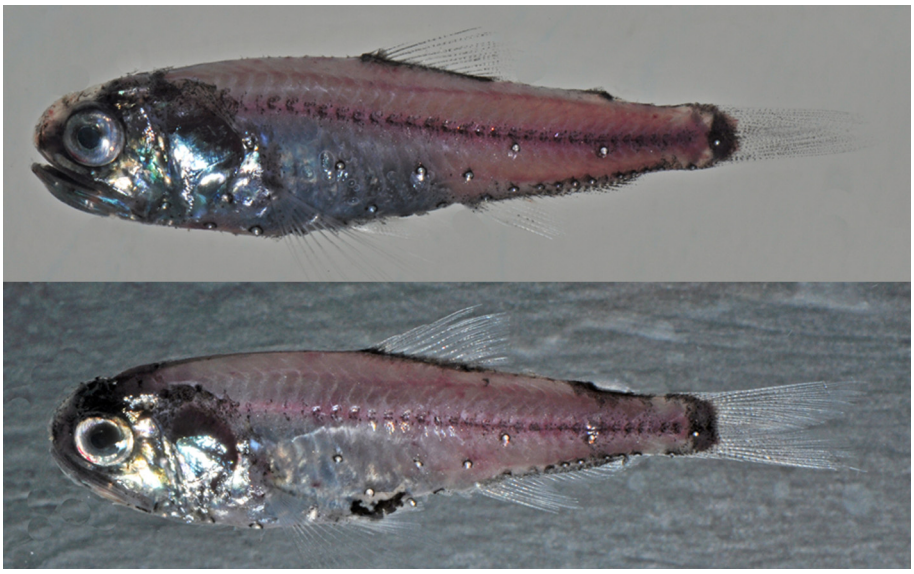

FIGURE 37. *Benthosema panamense.* Top & Bottom: two entire specimens.

GADIFORMES

4 F, 6 G, 11 S.

Bregmacerotidae

Codlets, Codlings (En); Bacaletes (Sp). 1 G, 1 S.

(39) ***Bregmaceros bathymaster*** **Jordan & Bollman, 1890.** East Pacific codlet (En); Bacalete del Pacífico oriental (Sp)

FIGURE 38. *Bregmaceros bathymaster.*

MOP stations. 2; 085 and 102; **Depth range**: okm; **USNM voucher specimens**: 5; 421278, 421377, 421416, 422379 and 422387.

Distribution. Eastern Pacific (from the Gulf of California to Peru, including all oceanic islands), occurring at depths between 0 and 1246 m.

Literature. Jordan & Bollman (1890: 173), Böhlke (1953: 56), D'Ancona & Cavinato (1965: 43), Robison (1972: 451), Masuda *et al.* (1986: 393), Bussing & López (1994: 72; 2009: 449), Bearez (1996: 734), Castro-Aguirre & Balart (1996: 70), Stevens & Moser (1996b: 477), De La Cruz Agüero *et al.* (1997: 75), Grove & Lavenberg (1997: 207), Chirichigno & Vélez (1998: 232), Castellanos-Galindo *et al.* (2006a: 195), Endo (2009a: 158), Del Moral-Flores *et al.* (2013: 192) and Robertson & Allen (2015: 1702).

Macrouridae
Grenadiers, Rattails (En); Granaderos, Colas de rata (Sp). 3 G, 8 S.

(40) ***Caelorinchus canus* (Garman, 1899).** Clearsnout grenadier (En); Granadero cano, Granadero de hocico claro (Sp)

MOP stations. 1; 057; **Depth range**: 134–162 m; **USNM voucher specimens**: 2; 421291 and 421292.

Distribution. Eastern Pacific (from Costa Rica to northern Peru, including the Galápagos Islands), occurring at depths between 70 and 460 m.

Literature. Garman (1899: 217), Cohen *et al.* (1990: 150), Iwamoto & Schneider (1995: 1246), Bearez (1996: 734), Chirichigno & Vélez (1998: 235), Iwamoto & McCosker (2001: 27), Castellanos-Galindo *et al.* (2006b: 195), Iwamoto (2009: 159) and McCosker & Rosenblatt (2010: 189).

FIGURE 39. *Caelorinchus canus.* Top: entire specimen; Bottom: detail of head

(41) ***Coryphaenoides anguliceps* (Garman, 1899).** Loosescale grenadier (En); Granadero anguloso (Sp)

MOP stations. 3; 073, 086 and 099; **Depth range**: 153–1389 m; **USNM voucher specimens**: 5; 421564, 422456, 422610, 422620 and 423198.

Distribution. Eastern Pacific (from the Gulf of California-northern Peru, including the Cocos and Galapagos Islands), occurring at depths between 700 and 2400 m.

Literature. Garman (1899: 212), Iwamoto & Sazonov (1988: 45), Cohen *et al.* (1990: 203), Iwamoto & Schneider (1995: 1258), Ambrose (1996c: 483), Castro-Aguirre & Balart (1996: 70), McMillan (1999: 488), Iwamoto & McCosker (2001: 27), Iwamoto (2009: 161) and McCosker & Rosenblatt (2010: 189).

FIGURE 40. *Coryphaenoides anguliceps.* Top: entire specimen; Bottom: detail of head; USNM 421564, 63 mm. Head Length.

(42) ***Coryphaenoides capito*** **(Garman, 1899).** Bighead grenadier (En); Granadero cabezón (Sp)

MOP stations. 5; 003, 067, 071, 075 and 087; **Depth range**: 116–1223 m; **USNM voucher specimens**: 12; 421235, 421273, 421312, 421341, 421444, 421456, 421460, 421461, 421480, 422355 and 422370.

Distribution. Eastern Pacific (from the Gulf of California to northern Peru), occurring at depths between 300 and 1223 m (see Remarks).

Literature. Garman (1899: 200), Iwamoto & Sazonov (1988: 62), Iwamoto & Schneider (1995: 1262), Chirichigno & Vélez (1998: 236), Castellanos-Galindo *et al.* (2006a: 196) and Iwamoto (2009: 165).

Remarks. Specimens collected at 1223 m represent a new maximum depth record for the species (Castellanos-Galindo *et al.* 2006a, Iwamoto 2009, Froese & Pauly 2016).

FIGURE 41. *Coryphaenoides capito.* Top: entire specimen; Bottom: detail of head; USNM 421456, 46 mm. Head Length.

(43) ***Coryphaenoides carminifer*** **(Garman, 1899).** Carmine grenadier (En); Granadero carmenífero (Sp)

MOP stations. 6; 001, 040, 043, 073, 077 and 086; **Depth range**: 183–1389 m; **USNM voucher specimens**: 10; 421432, 421475, 421557, 422419, 422433, 422441, 422446, 422555, 422634 and 422649.

Distribution. Eastern Pacific (from Nicaragua to northern Peru, including the Cocos Island), occurring at depths between 183 and 1870 m (see Remarks).

Literature. Garman (1899: 204), Iwamoto & Sazonov (1988: 42), Pequeño (1989: 45, 1997: 81), Cohen *et al.* (1990: 206) and Iwamoto & Schneider (1995: 1263), Castellanos-Galindo *et al.* (2006a: 196) and Iwamoto (2009: 166).

Remarks. USNM 421475, 421557, 422419, 422433, 422441 and 422649 specimens represent the first documented record of the species in middle Central American waters (Garman 1899; Iwamoto & Sazonov 1988; Bussing & López 1994, 2009, 2011; Yabe 2009b), and a northwestern range extension of about 1000 km in the species' known distribution (Garman 1899, Iwamoto & Sazonov 1988, Iwamoto 2009). The previous northernmost documented record for this species in eastern Pacific waters was in the Gulf of Panama (Garman 1899). In addition, specimens collected at 183 m represent a new minimum depth record for the species (Castellanos-Galindo *et al.* 2006a, Iwamoto 2009, Froese & Pauly 2016).

FIGURE 42. *Coryphaenoides carminifer.* Top: entire specimen; Bottom: detail of head**;** USNM 422649, 70 mm. Head Length.

(44) ***Nezumia convergens*** **(Garman, 1899).** Peruvian grenadier (En); Granadero peruano (Sp)

FIGURE 43. *Nezumia convergens.* Top: entire specimen; Bottom: detail of head**;** USNM 422577, 36 mm. Head Length.

MOP stations. 4; 001, 064, 072 and 073; **Depth range**: 153–1330 m; **USNM voucher specimens**: 9; 421338, 421344, 421402, 421435, 421546, 421572, 422302, 422400 and 422577.

Distribution. Eastern Pacific (from the Gulf of California to southern Chile, including the Cocos and Galápagos Islands), occurring at depths between 153 and 1870 m (see Remarks).

Literature. Garman (1899: 210), Iwamoto (1979: 171, 2009: 168), Cohen *et al.* (1990: 270), Iwamoto & Schneider (1995: 1264), Ambrose (1996c: 483), Castro-Aguirre & Balart (1996: 70), Pequeño (1997: 82), Chirichigno & Vélez (1998: 237), Iwamoto & McCosker (2001: 27), Wilson (2001: 32), Castellanos-Galindo *et al.* (2006a: 196) and McCosker & Rosenblatt (2010:189).

Remarks. Specimens collected at 153 m represent a new minimum depth record for the species (Castellanos-Galindo *et al.* 2006a, Iwamoto 2009, Froese & Pauly 2016).

(45) ***Nezumia latirostrata*** **(Garman, 1899).** Broadsnout grenadier (En); Granadero hocicón (Sp)

MOP stations. 3; 001, 003 and 033; **Depth range**: 116–842 m; **USNM voucher specimens**: 3; 421257, 421481 and 422545.

Distribution. Eastern Pacific (from Panama to northern Peru), occurring at depths between 116 and 1865 m (see Remarks).

Literature. Garman (1899: 211), Iwamoto (1979:168, 2009: 169), Cohen *et al.* (1990: 272), Iwamoto & Schneider (1995: 1259), Chirichigno & Vélez (1998: 238) and Castellanos-Galindo *et al.* (2006a: 196).

Remarks. Specimens collected at 116 m represent a new minimum depth record for the species (Castellanos-Galindo *et al.* 2006a, Iwamoto 2009, Froese & Pauly 2016).

(46) ***Nezumia liolepis*** **(Gilbert, 1890).** Smooth grenadier (En); Granadero liso (Sp)

FIGURE 44. *Nezumia liolepis.* Top: entire specimen; Bottom: detail of head; USNM 422462, 65 mm. Head Length.

MOP stations. 6; 064, 067, 071, 073, 099 and 100; **Depth range**: 153–1223 m; **USNM voucher specimens**: 13; 421440, 421458, 421474, 421476, 421544, 422375, 422421, 422458, 422460, 422462, 422568, 422582 and 422590.

Distribution. Eastern Pacific (from north California, USA, to Costa Rica), occurring at depths between 153 and 1660 m (see Remarks).

Literature. Gilbert (1890: 117), Iwamoto & Stein (1974: 46), Iwamoto (1979: 157), Cohen *et al.* (1990: 274),

Iwamoto & Schneider (1995: 1265), Ambrose (1996c: 483), Castro-Aguirre & Balart (1996: 70), Hoff (1999: 115), Hoff *et al.* (2000: 662) and Rodríguez-Romero *et al.* (2008: 1771).

Remarks. These specimens represent the first documented record of the species in Central American waters (Iwamoto 1979; Cohen *et al.* 1990; Bussing & López 1994, 2009, 2011) and a southeastern range extension of about 1600 km in the species' known distribution (Iwamoto 1979, Cohen *et al.* 1990). The previous southernmost documented record for this species in eastern Pacific waters was off Guerrero, México (Cohen *et al.* 1990). In addition, specimens collected at 153 m represent a new minimum depth record for the species (Cohen *et al.* 1990, Froese & Pauly 2016).

(47) ***Nezumia stelgidolepis*** **(Gilbert, 1890).** California grenadier (En); Granadero californiano (Sp)

MOP stations. 4; 003, 033, 071 and 075; **Depth range**: 116–965 m; **USNM voucher specimens**: 5; 421238, 421297, 421330, 421490 and 422368.

Distribution. Eastern Pacific (from British Columbia, Canada, to southern Peru, including the Galapagos Islands), occurring at depths between 116 and 965 m (see Remarks).

Literature. Gilbert (1890: 116), Fitch & Lavenberg (1968: 73), Iwamoto & Stein (1974: 47), Iwamoto (1979: 160, 2009: 172), Pequeño (1989: 46), McAllister (1990: 123), Cohen *et al.* (1990: 286), Iwamoto & Schneider (1995: 1260), Ambrose (1996c: 483), Chirichigno & Vélez (1998: 237), Hoff *et al.* (2000: 662), Iwamoto & McCosker (2001: 27), Castellanos-Galindo *et al.* (2006a: 196), Rodríguez-Romero *et al.* (2008: 1771) and McCosker & Rosenblatt (2010: 189).

Remarks. Specimens collected at 165 and 965 m represent new minimum and maximum depth records for the species (Cohen *et al.* 1990, Castellanos-Galindo *et al.* 2006a, Iwamoto 2009, Froese & Pauly 2016).

Moridae

Morid cods, Moras (En); Moras, Carboneros (Sp). 1 G, 1 S.

(48) ***Physiculus nematopus*** **Gilbert, 1890**. Charcoal mora (En); Mora carbon, Mora de fango, Carbonero de fango (Sp)

FIGURE 45. *Physiculus nematopus.*

MOP stations. 3; 003, 004 and 040; **Depth range**: 115–1185 m; **USNM voucher specimens**: 5; 421305, 421413, 422543, 422559 and 422571.

Distribution. Eastern Pacific (from Central Baja California, USA, to Peru, including the Galápagos Islands), occurring at depths between 0 and 1272 m.

Literature. Gilbert (1890: 114), Böhlke (1953: 55), Matarese *et al.* (1989: 183), Paulin (1989: 119), Cohen *et al.* (1990: 370), Bussing & López (1994: 72), Paulin (1995: 1286), Bearez (1996: 734), Ambrose (1996d: 500), Castro-Aguirre & Balart (1996: 70), Grove & Lavenberg (1997: 204), McCosker *et al.* (1997: 25), Chirichigno & Vélez (1998: 239), Castellanos-Galindo *et al.* (2006a: 196), Rodríguez-Romero *et al.* (2008: 1771), Endo (2009b: 179), McCosker & Rosenblatt (2010: 189), López-Martínez *et al.* (2012: 351), Del Moral-Flores *et al.* (2013: 193) and Robertson & Allen (2015: 564).

Merlucciidae
Merluccid hakes (En); Merluzas (Sp). 1 G, 1 S.

(49) ***Merluccius angustimanus* Garman, 1899**. Panama hake (En); Merluza panameña (Sp)

MOP stations. 5; 004, 007, 047, 061 and 068; **Depth range**: 115–478 m; **USNM voucher specimens**: 9; 421331, 421468, 421524, 422438, 422450, 422470, 422498, 422528 and 422587.

Distribution. Eastern Pacific (from southern California, USA, to the Ensenada de Tumaco, Colombia), occurring at depths between 80 and 523 m.

Literature. Garman (1899: 183), Robison (1972: 451), Cohen *et al.* (1990: 331), Bussing & López (1994: 72; 2009: 449), Balart *et al.* (1995: 82), Inada (1995: 1272), Ambrose (1996e: 508), Castro-Aguirre & Balart (1996: 70), Grant & Leslie (2001: 700), Lloris *et al.* (2005: 19), Castellanos-Galindo *et al.* (2006a: 196), Rodríguez-Romero *et al.* (2008: 1771), López-Martínez *et al.* (2012: 351), Del Moral-Flores *et al.* (2013: 193) and Robertson & Allen (2015: 2596).

FIGURE 46. *Merluccius angustimanus.* Top: entire specimen; Bottom: detail of head; USNM 422587, 168 mm. SL.

OPHIDIIFORMES
1 F, 7 G, 8 S.

Ophidiidae
Cusk-eels, Brotulas (En); Brotulas, Congriperlas (Sp). 7 G, 8 S.

(50) ***Cherublemma emmelas* (Gilbert 1890).** Black brotula (En); Brotula negra (Sp)

MOP stations. 4; 007, 060, 070 and 074; **Depth range**: 243–672 m; **USNM voucher specimens**: 12; 421218, 421337, 421429, 421492, 421565, 422374, 422407, 422544, 422549, 422557, 422567 and 422581.

Distribution. Eastern Pacific (from Baja California, Mexico, including the Gulf of California, to northern Chile), occurring at depths between 102 and 1010 m.

Literature. Gilbert (1890: 110), Böhlke (1953: 102), Pequeño (1989: 48), Castro-Aguirre *et al.* (1993: 80), Bussing & López (1994: 76; 2009: 449), Lea (1995: 1343), De La Cruz Agüero *et al.* (1997: 244), Ambrose (1996f: 513), Chirichigno & Vélez (1998: 224), Nielsen *et al.* (1999: 29), Castellanos-Galindo *et al.* (2006a: 197), Aguirre-Villaseñor & Castillo-Velázquez (2011: 713), López-Martínez *et al.* (2012: 351), and Robertson & Allen (2015: 5406).

FIGURE 47. *Cherublemma emmelas.* Top: entire adult specimen; Center: detail of head of adult; Bottom: entire juvenile specimen.

(51) ***Dicrolene filamentosa*** **Garman, 1899.** Deepwater thread brotula, Filamentous brotula (En); Brotula filamentosa (Sp)

FIGURE 48. *Dicrolene filamentosa.* Top: entire specimen; Bottom: detail of head.

MOP stations. 17; 001, 002, 004, 005, 030, 043, 053, 055, 063, 067, 077, 078, 086, 087, 094, 096 and 099; **Depth range**: 115–1625 m; **USNM voucher specimens**: 23; 421233, 421414, 421445, 421477, 421482, 421488, 421495,

421496, 421497, 421520, 421523, 421526, 421533, 421561, 421566, 422406, 422442, 422494, 422588, 422613, 422643, 435796 and 435802.

Distribution. Eastern Pacific (from southern Mexico to central Peru), occurring at depths between 780 and 1865 m.

Literature. Garman (1899: 149), Bearez (1996: 734), Ambrose (1996f: 513), Castro-Aguirre & Balart (1996: 70), Chirichigno & Vélez (1998: 231), Nielsen *et al.* (1999: 62), Castellanos-Galindo *et al.* (2006a: 197) and Nielsen & Nishioka (2009: 187).

(52) ***Lamprogrammus cf. niger*** **Alcock, 1891.** Paperbone brotula, Black cusk-eel (En); Brotula oscura, Brotula caverna (Sp)

FIGURE 49. *Lamprogrammus cf. niger.* Top: entire specimen; Bottom: detail of head; USNM 435786, 270 mm. TL.

MOP stations. 3; 001, 026 and 078; **Depth range**: 165–1087 m; **USNM voucher specimens**: 3; 422477, 422593 and 435786.

Distribution. Circumtropical, sometimes found in subtropical areas, occurring at depths between 165 and 2615 m (see Remarks). In the eastern Pacific this species has been recorded previously only from Ecuador to northern Peru.

Literature. Alcock (1891: 33), Menon and Rama-Rao (1970: 377), Cohen & Nielsen (1978: 34), Nielsen (1990: 564), Cohen *et al.* (1991), Cohen & Rohr (1993: 472), Ambrose (1996f: 513), Castro-Aguirre & Balart (1996: 70), McEachran & Fechhelm (1998: 715), Nielsen *et al.* (1999: 72), Hutchins (2001: 23), Moore *et al.* (2003: 207), Mundy (2005: 244), Castellanos-Galindo *et al.* (2006a: 198), Garrido-Linares & Acero (2006: 292), Nielsen & Nishioka (2009: 190) and Reyes-Bonilla *et al.* (2011: 7).

Remarks. These specimens were tentatively identified by us as *Lamprogrammus cf. niger* as they share with this species the following combination of distinctive characters, sensu Cohen & Rohr (1993) and Nielsen *et al.* (1999): body depth 13.10–16.00% of SL; maxillary sheathed posterodorsally; opercular spine slender, flexible and sharp-pointed; and posterior margin of opercle smooth to weakly fimbriate. However, our specimens differ from *L. niger*, sensu stricto, by having fewer dorsal-fin (100–101, vs. 108–112) and anal-fin (79–81, vs. 85–90) elements, counts not reported until now in other *Lamprogrammus* species (Cohen *et al.* 1991, Cohen & Rohr 1993, Nielsen *et al.* 1999). Further, three specimens tentatively identified as *Lamprogrammus cf. niger,* deposited at the UCR (Velero 19073; two specimens) and FMNH (113549; one specimen), also have low dorsal- and anal-fin counts, and have a small median basibranchial tooth patch. This tooth patch is absent in *L. niger* according to Cohen & Rohr (1993), and was not observed in our specimens. COI sequences for our specimens and one specimen identified as *L. niger* from the Eastern North Pacific that is available in BOLD (UW150575) are less than 1% divergent and about 10% divergent to two other available species of the genus [i.e. *L. brunswigi* (Brauer 1906) and *L. exutus* Nybelin & Poll 1958].

Based on the above, and assuming intraspecific variation, our specimens represent the first documented record of the *L. niger* in Central American waters (Bussing & López 1994, 2009, 2011; Nielsen & Nishioka 2009) and a

northwest range extension of about 1400 km in the species' known distribution (Nielsen & Nishioka 2009). The previous northernmost record for *L. niger* in the eastern Pacific was off Ecuador (Nielsen & Nishioka 2009). In addition, specimens collected at 165 m will represent a new minimum depth record for the species (Nielsen 1990, Nielsen & Nishioka 2009, Froese & Pauly 2016). More detailed studies are suggested to validate the species assignation of these Eastern Pacific specimens.

(53) ***Luciobrotula coheni* Nielsen, 2009.** Cohen's brotula (En); Brotula de Cohen (Sp)

MOP stations. 5; 001, 004, 033, 056 and 059; **Depth range**: 115–920 m; **USNM voucher specimens**: 5; 421217, 421356, 421491, 421528 and 422550.

Distribution. Eastern Pacific (from Costa Rica to Peru), occurring at depths between 115 and 975 m (see Remarks).

Literature. Nielsen (2009: 151).

Remarks. USNM 421217 and 422550 specimens represent the first documented record of the species in Costa Rican waters (Bussing & López 1994, 2009, 2011; Nielsen 2009) and a northwestern range extension of about 600 km in the species' known distribution (Nielsen (2009). The previous northernmost record for this species in the eastern Pacific was off Panama (see Nielsen 2009). In addition, specimens collected at 115 m represent a new minimum depth record for the species (Nielsen 2009, Froese & Pauly 2016).

FIGURE 50. *Luciobrotula coheni.* Top: entire specimen; Bottom: detail of head; USNM 422550, 100 mm. SL.

(54) ***Monomitopus malispinosus* (Garman, 1899)**

FIGURE 51. *Monomitopus malispinosus.* Top: entire specimen; Bottom: detail of head.

MOP stations. 4; 003, 004, 043 and 067; **Depth range**: 116–951 m; **USNM voucher specimens**: 11; 421240, 421249, 421300, 421441, 421464, 421530, 422492, 422509, 422552, 422624 and 435794.

Distribution. Eastern Pacific (from Costa Rica to northern Peru, including the Galápagos Islands), occurring at depths between 840 and 1865 m (see Remarks).

Literature. Garman (1899: 158), Nielsen *et al.* (1999: 78), Castellanos-Galindo *et al.* (2006a: 198), Nielsen & Nishioka (2009: 195) and McCosker & Rosenblatt (2010: 190).

Remarks. USNM 421441 specimen represent the first documented record of the species in Costa Rican waters (Bussing & López 1994, 2009, 2011; Nielsen & Nishioka 2009) and a northwestern range extension of about 600 km in the species' known distribution (Garman 1899, Castellanos-Galindo *et al.* 2006, Nielsen & Nishioka 2009). The previous northernmost documented record for this species in the eastern Pacific was from the Gulf of Panama (Garman 1899). In addition, specimens collected at 116 m represent a new minimum depth record for the species (Nielsen *et al.* 1999, Nielsen & Nishioka 2009, Froese & Pauly 2016).

(55) ***Monomitopus torvus*** **Garman, 1899.** Congrio cara con hueco (Sp)

MOP stations. 1; 004; **Depth range**: 115–116 m; **USNM voucher specimens**: 1; 422497.

Distribution. Eastern Pacific (from the Gulf of Panama to nothern Peru), occurring at depths between 115 and 1260 m (see Remarks).

Literature. Garman (1899:157), Carter & Cohen (1985: 87), Pequeño (1989: 48), Nielsen *et al.* (1999: 78), Castellanos-Galindo *et al.* (2006a: 198) and Nielsen & Nishioka (2009: 196).

Remarks. This specimen represents the first documented record of the species in Panamanian waters (Nielsen *et al.* 1999, Nielsen & Nishioka 2009) and a northern range extension of about 150 km in the species' known distribution (Garman 1899, Castellanos-Galindo *et al.* 2006a, Nielsen & Nishioka 2009). The previous northernmost documented record for this species in the eastern Pacific was from north Colombia (Castellanos-Galindo *et al.* 2006a, Nielsen & Nishioka 2009). In addition, specimens collected at 115 m represents a new minimum depth record for the species (Nielsen *et al.* 1999, Nielsen & Nishioka 2009, Froese & Pauly 2016).

(56) ***Neobythites stelliferoides*** **Gilbert, 1890.** Thread brotula (En); Brótula de hebra (Sp)

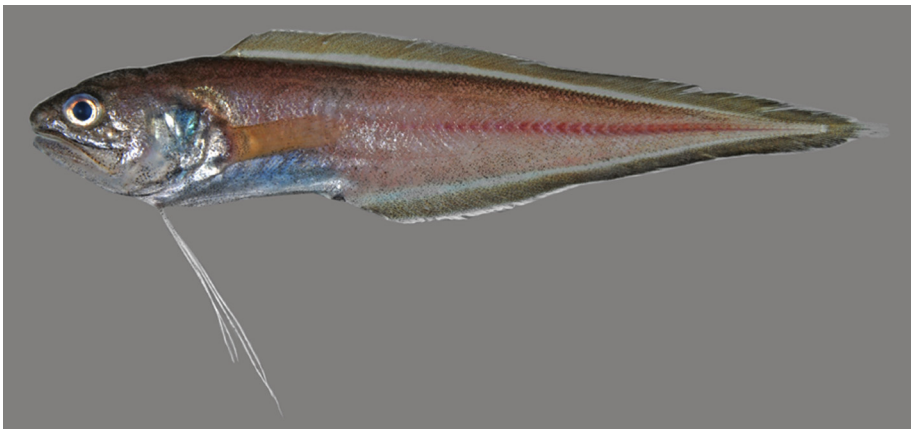

FIGURE 52. *Neobythites stelliferoides.*

MOP stations. 2; 038 and 068; **Depth range**: 144–154 m; **USNM voucher specimens**: 6; 421392, 421399, 421439, 422312, 422341 and 422448.

Distribution. Eastern Pacific (from southern Baja California Sur, Mexico, including the Gulf of California to northern Peru), occurring at depths between 85 and 516 m.

Literature. Gilbert (1890: 112), Bussing & López (1994: 76; 2009: 449), Balart *et al.* (1995: 82), Castro-Aguirre & Balart (1996: 70), Nielsen *et al.* (1999: 83), Nielsen (2002: 88), Castellanos-Galindo *et al.* (2006a: 198), Nielsen & Nishioka (2009: 197), Del Moral-Flores *et al.* (2013: 193) and Robertson & Allen (2015: 709).

(57) ***Otophidium indefatigabile*** **Jordan & Bollman 1890.** Barred cusk-eel, Big-headed cusk-eel, Panamic cusk-eel (En); Congriperla cabezona, Congriperla listada, Congriperla mancha café (Sp)

MOP stations. 3; 032, 074 and 098; **Depth range**: 108–422 m; **USNM voucher specimens**: 4; 421299, 421302, 422512 and 421519.

Distribution. Eastern Pacific (from Baja California and the Gulf of California, Mexico, to Panama, including the Galápagos Islands), occurring at depths between 5 and 422 m (see Remarks).

Literature. Jordan & Bollman (1890: 172), Grove & Lavenberg (1997: 213), Nielsen *et al.* (1999: 43), Castellanos-Galindo *et al.* (2006a: 198), McCosker & Rosenblatt (2010: 190) and Robertson & Allen (2015: 705).

Remarks. Specimens collected at 422 m represent a new maximum depth record for the species (Nielsen *et al.* 1999, Castellanos-Galindo *et al.* 2006a, Robertson & Allen 2015, Froese & Pauly 2016).

FIGURE 53. *Otophidium indefatigabile.* Top: entire specimen; Bottom: detail of head.

(58) ***Porogadus*** **sp.**

MOP stations. 3; 028, 063 and 086; **Depth range**: 1353–1625 m; **USNM voucher specimens**: 2; 421448, 421549 and 435796.

Literature. Nielsen *et al.* (1999: 49).

FIGURE 54. *Porogadus* sp. Top: entire specimen; Bottom: detail of head.

Remarks. As noted by Nielsen *et al.* (1999), no formal review of *Porogadus* Goode & Bean 1885 has been published up to this point. Moreover, an identification key currently is available only for Western Atlantic species (Carter & Sulak 1984). The taxonomy of the genus is complicated and the validity of several forms is questionable given the absence of sound diagnostic characters. Accordingly, we were not able to make a specific identification

of these specimens. However, based on the fact that our specimens have very weak head spines (cf Nielsen *et al.* (1999)) and considering the collection sites and the absence of genetic structure (based on COI sequences), they possibly correspond to one of the following three species: *Porogadus atripectus* Garman 1899, *P. catena* (Goode & Bean 1885) or *P. longiceps* Garman 1899.

LOPHIIFORMES

6 F, 7 G, 13 S.

Lophiidae

Goosefishes, Anglerfishes (En); Rapes, Peces pescadores (Sp). 1 G, 2 S.

(59) ***Lophiodes caulinaris* (Garman, 1899).** Pacific anglerfish, spottedtail angler (En); Rape de rabo manchado (Sp)

MOP stations. 3; 006, 015 and 048; **Depth range**: 109–143 m; **USNM voucher specimens**: 6; 421345, 421346, 421347, 422366, 422388 and 422412.

Distribution. Eastern Pacific (from southern California, USA, to Peru, including the Cocos and Malpelo Islands), occurring at depths between 15 and 380 m.

Literature. Garman (1899: 79), Caruso (1981: 535), Lea *et al.* (1984: 250), Allen & Robertson (1994: 81), Bussing & López (1994: 68, 2005: 44; 2009: 448), Balart *et al.* (1995: 82), Caruso (1995: 1229), Bearez (1996: 734), Castro-Aguirre & Balart (1996: 71), Watson (1996a: 553), De La Cruz Agüero *et al.* (1997: 210), Grove & Lavenberg (1997: 230), Chirichigno & Vélez (1998: 222), Castellanos-Galindo *et al.* (2006a: 199), Rodríguez-Romero *et al.* (2008: 1772), Hooker (2009a: 204), López-Martínez *et al.* (2012: 352), Del Moral-Flores *et al.* (2013: 193), Fuentes *et al.* (2015: 615) and Robertson & Allen (2015: 761).

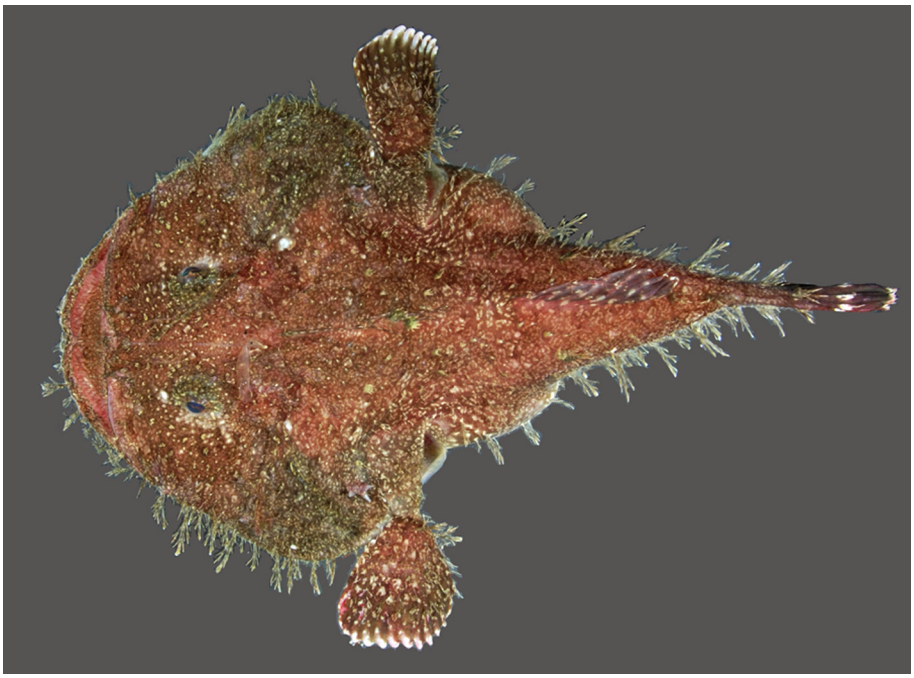

FIGURE 55. *Lophiodes caulinaris*. Dorsal view.

(60) ***Lophiodes spilurus* (Garman, 1899).** Threadfin angler (En); Rape de rabo delgado (Sp)

MOP stations. 4; 007, 038, 039 and 057; **Depth range**: 144–478 m; **USNM voucher specimens**: 6; 421229, 421230, 421281, 421348, 421427 and 422527.

Distribution. Eastern Pacific (from southern California, USA, to Chile, including the Cocos and Galápagos Islands), occurring at depths between 80 and 850 m.

Literature. Garman (1899: 77), Caruso (1981: 536), Lea *et al.* (1984: 250), Pequeño (1989: 43), van der Heiden & González (1990: 147), Bussing & López (1994: 68, 2005: 44; 2009: 448), Balart *et al.* (1995: 82), Caruso (1995: 1230), Bearez (1996: 734), Castro-Aguirre & Balart (1996: 71), Watson (1996a: 553), De La Cruz Agüero *et al.* (1997: 211), Grove & Lavenberg (1997: 231), Chirichigno & Vélez (1998: 222), Castellanos-Galindo *et al.* (2006a: 199), Cortés & Blum (2008: 194), Rodríguez-Romero *et al.* (2008: 1772), Hooker (2009a: 205), López-Martínez *et al.* (2012: 352), Del Moral-Flores *et al.* (2013: 193), Fuentes *et al.* (2015: 615), and Robertson & Allen (2015: 2598).

FIGURE 56. *Lophiodes spilurus*. Top: dorsal view; Bottom: detail of head, lateral view.

Antennariidae

Frogfishes (En); Pejes sapo, Ranisapos, Zanahorias (Sp). 1 G, 1 S.

(61) ***Fowlerichthys avalonis*** **(Jordan & Starks, 1907).** Roughbar frogfish (En); Ranisapo ocelado (Sp)

MOP stations. 1; 049; **Depth range**: 128–136 m; **USNM voucher specimens**: 1; 422343.

Distribution. Eastern Pacific (from southern California to Peru, including the Cocos and Galápagos Islands), occurring at depths between 0 and 300 m.

Literature. Jordan & Starks (1907: 76), Böhlke (1953: 147), Eschmeyer *et al.* (1983: 112), Pietsch (1984: 36), Pietsch & Grobecker (1987: 125), Allen & Robertson (1994: 82), Bussing & López (1994: 68; 2009: 449), Schneider & Lavenberg (1995: 856), Bearez (1996: 734), Watson (1996: 359), De La Cruz Agüero *et al.* (1997: 52), Grove & Lavenberg (1997: 234), Watson (1998: 219), Chirichigno & Vélez (1998: 221), Thomson *et al.* (2000: 55), Castellanos-Galindo *et al.* (2006a: 199), Rodríguez-Romero *et al.* (2008: 1772), Hooker (2009b: 206), McCosker & Rosenblatt (2010: 190), López-Martínez *et al.* (2012: 352), Del Moral-Flores *et al.* (2013: 193), Murase *et al.* (2014: 1405) and Robertson & Allen (2015: 767).

FIGURE 57. *Fowlerichthys avalonis;* USNM 422343, 80 mm. SL.

Ogcocephalidae
Batfishes (En); Peces murcielago (Sp). 2 G, 6 S.

(62) ***Dibranchus erinaceus*** **(Garman, 1899).**

MOP stations. 4; 007, 031, 052 and 060; **Depth range**: 470–1030 m; **USNM voucher specimens**: 7; 421226, 421253, 421256, 421396, 422525, 422554 and 422572.

Distribution. Eastern Pacific (from Costa Rica to Panama, and the Cocos and Galápagos Islands), occurring at depths between 470 and 1150 m (see Remarks).

Literature. Garman (1899: 103), Bradbury (1962: 3; 1967: 414; 1999: 290; 2003: 3), Bradbury *et al.* (1999: 81), Castellanos-Galindo *et al.* (2006a: 200), Ho *et al.* (2009: 394) and McCosker & Rosenblatt (2010: 190).

FIGURE 58. *Dibranchus erinaceus.* Dorsal view; USNM , 80 mm. SL.

Remarks. USNM 421396, 422525, 422554 and 422572 specimens represent the first documented record of the species in Costa Rican waters (Bussing & López 1994, 2009, 2011; Bradbury 1999) and a northwestern range

extension of about 520 km in the species' known distribution (Garman 1899, Bradbury 1999). The previous northernmost documented record for this species in the eastern Pacific was from off the Peninsula de Azuero, Panama (Garman 1899, Bradbury 1999). In addition, specimens collected at 470 m represent a new minimum depth record for the species (Bradbury 1999, Froese & Pauly 2016).

(63) ***Dibranchus hystrix*** **Garman, 1899**

MOP stations. 3; 062, 073 and 082; **Depth range**: 153–1527 m; **USNM voucher specimens**: 5; 421279, 421467, 422413, 422601 and 422606.

Distribution. Eastern Pacific (from the mouth of Gulf of California, Mexico, to Peru, including the Cocos and Galápagos Islands) and South China Sea, occurring at depths between 153 and 2323 m (see Remarks).

Literature. Garman (1899: 92), Bradbury (1962: 2; 1999: 280), Castro-Aguirre & Balart (1996: 71), Bradbury *et al.* (1999: 86), Bradbury (2003: 3), Castellanos-Galindo *et al.* (2006a: 200), Shimazaki (2009a: 208) and McCosker & Rosenblatt (2010: 190).

Remarks. Specimens collected at 153 m represent a new minimum depth record for the species (Bradbury 1999, Shimazaki 2009a, Froese & Pauly 2016).

FIGURE 59. *Dibranchus hystrix.* Top: dorsal view; Bottom: ventral view.

(64) ***Dibranchus nudivomer*** **(Garman, 1899)**

MOP stations. 2; 025 and 029; **Depth range**: 1101–1314 m; **USNM voucher specimens**: 3; 422524, 422534 and 422578.

Distribution. Eastern Pacific (from southern Baja California, Mexico to Peru), occurring at depths between 605 and 1457 m.

Literature. Garman (1899: 99), Bradbury (1962: 2; 1967: 414; 1999: 292; 2003: 4), Castro-Aguirre & Moncayo-López (1976: 307), Balart *et al.* (1995: 82), Castro-Aguirre & Balart (1996: 71), Castellanos-Galindo *et al.* (2006a: 200) and Shimazaki (2009a: 209).

FIGURE 60. *Dibranchus nudivomer.* Top: dorsal view; Bottom: ventral view; USNM 422534, 113 mm. SL.

(65) ***Dibranchus spinosus*** **(Garman, 1899)**

MOP stations. 7; 025, 028, 040, 052, 063, 078 and 082; **Depth range**: 836–1625 m; **USNM voucher specimens**: 9; 421340, 421349, 421386, 421395, 421470, 422385, 422595, 422618 and 422625.

Distribution. Eastern Pacific (from the mouth of Gulf of California, Mexico, to off the southern tip of Peru) occurring at depths between 366 and 2324 m.

Literature. Garman (1899: 104), Bradbury (1962: 4; 1967: 414; 1999: 289; 2003: 4), Bussing (1965: 222), Bearez (1996: 734), Pequeño (1997: 82), Shimazaki (2009a: 211), Castellanos-Galindo *et al.* (2006a: 200) and Ho *et al.* (2009: 394).

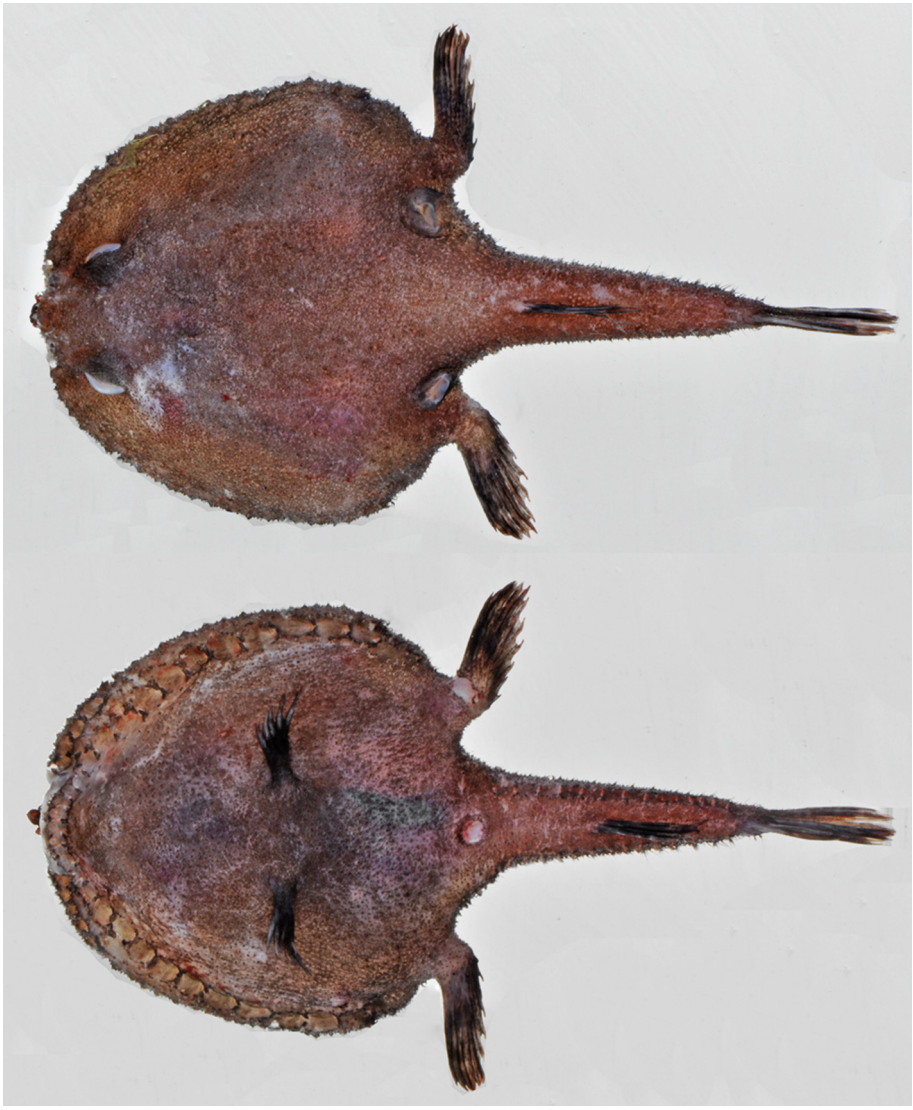

FIGURE 61. *Dibranchus spinosus.* Top: dorsal view; Bottom: ventral view; USNM 422625, 140 mm. SL.

(66) ***Dibranchus velutinus*** **Bradbury, 1999**

MOP stations. 3; 067, 071 and 088; **Depth range**: 570–965 m; **USNM voucher specimens**: 7; 421509, 422363, 422391, 422409, 422420, 422453 and 422459.

Distribution. Eastern Pacific (from Nicaragua to Peru), occurring at depths between 450 and 965 m (see Remarks).

Literature. Bradbury (1999: 285).

Remarks. These specimens represent the first documented record of the species in Central American waters (Bussing & López 1994, 2009, 2011; Bradbury 1999) and a northern range extension of about 2000 km in the species' known distribution (Bradbury 1999). The previous northernmost documented record for this species in the eastern Pacific was from northern Peru (Bradbury 1999). In addition, specimens collected at 965 m represent a new maximum depth record for the species (Bradbury 1999, Froese & Pauly 2016).

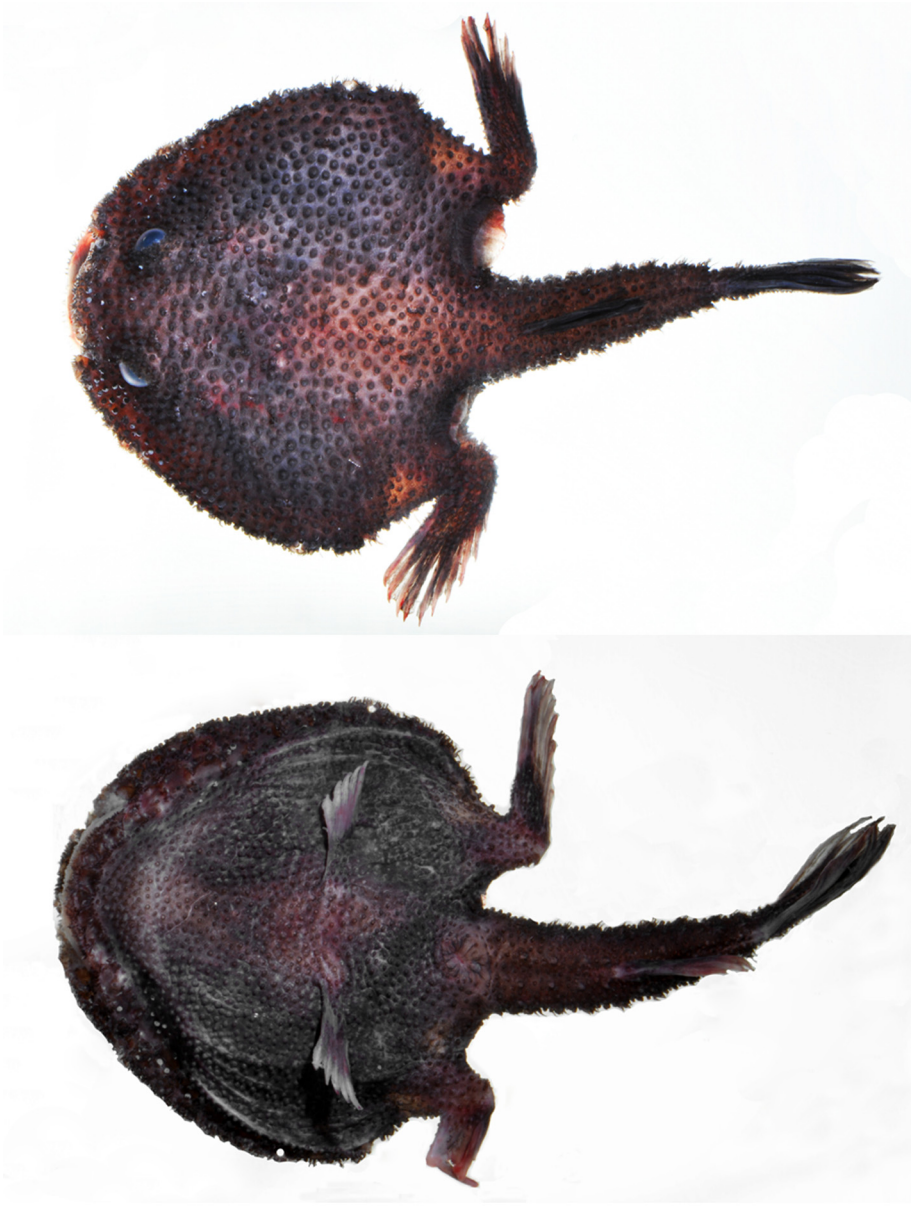

FIGURE 62. *Dibranchus velutinus.* Top: dorsal view; Bottom: ventral view; USNM 422363, 60 mm. SL.

(67) ***Zalieutes elater*** **(Jordan & Gilbert, 1882)**. Roundel batfish (En); Murcielago biocelado (Sp)

MOP stations. 3; 004, 015 and 049; **Depth range**: 113–136 m; **USNM voucher specimens**: 6; 421219, 421227, 422352, 422354, 422502 and 422510.

Distribution. Eastern Pacific (from California, USA, to Peru, Including the Cocos Island), occurring at depths between 18 and 160 m.

Literature. Jordan & Gilbert (1882: 365), Bradbury (1967: 417; 2003: 11), Eschmeyer *et al.* (1983: 112), Allen & Robertson (1994: 84), Bussing & López (1994: 68), Bearez (1996: 734), Watson (1996c: 563), De La Cruz Agüero *et al.* (1997: 241), Chirichigno & Vélez (1998: 222), Bussing & López (2005: 48; 2009: 449), Castellanos-Galindo *et al.* (2006a: 200), Cortés & Blum (2008: 194), Rodríguez-Romero *et al.* (2008: 1772), Shimazaki (2009a: 212), Del Moral-Flores *et al.* (2013: 194) and Robertson & Allen (2015: 779).

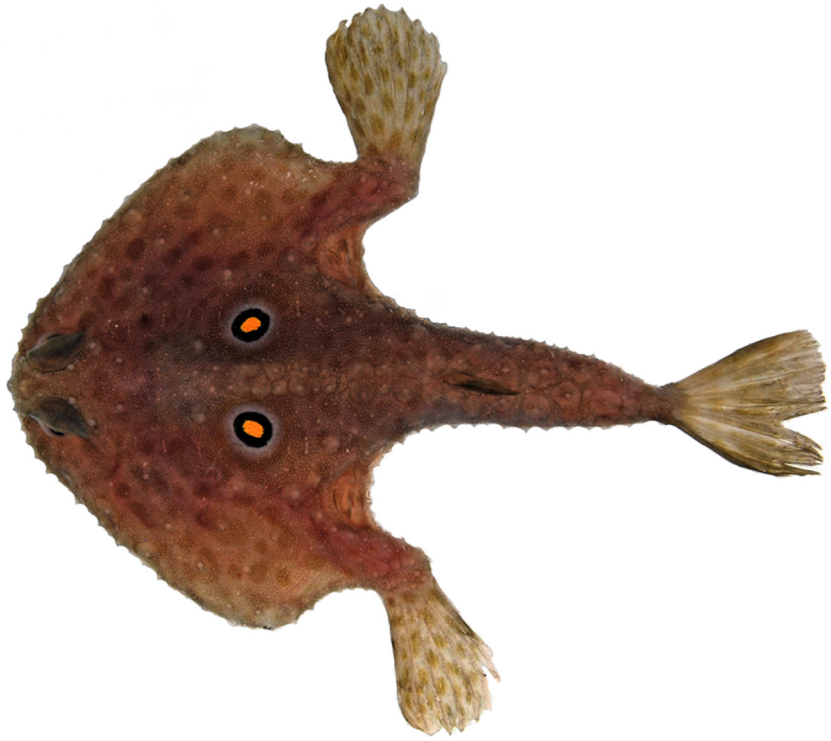

FIGURE 63. *Zalieutes elater.* Dorsal view.

Caulophrynidae
Fanfins, Anglerfishes (En); Peces pescadores (Sp). 1 G, 1 S.

(68) ***Caulophryne pelagica*** **(Brauer, 1902)**

MOP stations. 1; 030; **Depth range**: 864–1026 m; **USNM voucher specimens**: 1; 422598.

Distribution. Circumglobal, known from widely scattered records across the Indo-Pacific, with a single record from the Atlantic (Cape Verde Islands), occurring at depths between 500 and 3500 m. In the eastern Pacific this species has been recorded in the Guadalupe Island, México, the Gulf of Panama and off Peru.

Literature. Brauer (1902: 295), Pietsch (1979:14; 2009a: 213; 2009d: 445), Stewart & Pietsch (1998: 5), Nakabo (2000: 467; 2002: 467), Mundy (2005: 269), Castellanos-Galindo *et al.* (2006a: 200) and Reyes-Bonilla *et al.* (2011: 7).

Melanocetidae
Black seadevils (En); Peces pescadores, Demonios de mar (Sp). 1 G, 1 S.

(69) ***Melanocetus johnsoni*** **Günther, 1864.** Humpback anglerfish, Blackdevil (En); Rape jorobado, Diablo negro (Sp)

MOP stations. 6; 053, 077, 078, 082, 086 and 099; **Depth range**: 1054–1527 m; **USNM voucher specimens**: 8; 421406, 421457, 421459, 422319, 422465, 422628, 423214 and 423215.

Distribution. Circumglobal in tropical through cold temperate seas, occurring at depths between 100 and 4500 m. In the eastern Pacific this species has been recorded from off Canada, USA, México, Panama, Colombia, Peru and Chile.

Literature. Günther (1864: 302), Fitch & Lavenberg (1968: 127), Bussing (1965: 222), Paxton *et al.* (1989: 287), Pequeño (1989: 43), Paulin *et al.* (1989: 140), McAllister (1990: 232), Castro-Aguirre & Balart (1996: 71), Watson (1996d: 571), Santos *et al.* (1997: 64), Arruda (1997: 126), Stewart & Pietsch (1998: 5), McEachran & Fechhelm (1998: 865), Fricke (1999: 110), Tru11 (1999: 464), Nakabo (2000: 474; 2002: 474), Anderson & Leslie (2001:4), Moore *et al.* (2003: 214), Menezes *et al.* (2003: 65), Mundy (2005: 269), Castellanos-Galindo *et al.* (2006a: 201), Pietsch (2009b: 214; 2009d: 361), Møller *et al.* (2010: 45) and Parin *et al.* (2014: 186).

Remarks. These specimens represent the first documented record of the species in upper Central American waters (Bussing & López 1994, 2009, 2011; Pietsch 2009b, 2009d; Froese & Pauly 2016).

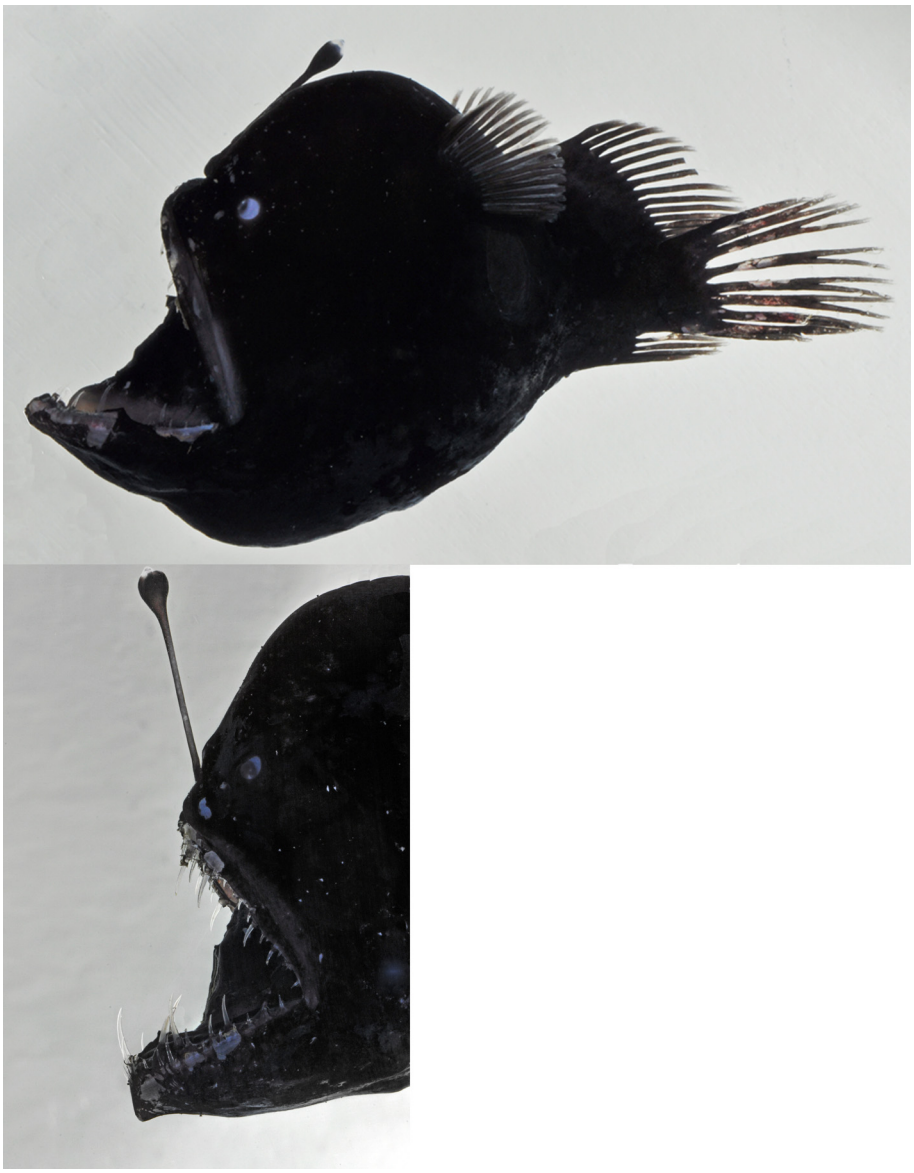

FIGURE 64. *Melanocetus johnsoni.* Top: entire specimen; USNM 421406, 50 mm. SL; Bottom: detail of head; USNM 423216, 60 mm. SL.

Oneirodidae

Dreamers (En); Peces pescadores, Soñadores (Sp). 1 G, 2 S.

(70) ***Oneirodes luetkeni* (Regan, 1925).** Lütken's dreamer (En); Soñador de Lütken (Sp)

MOP stations. 5; 001, 046, 071, 087 and 096; **Depth range**: 165–1157 m; **USNM voucher specimens**: 6; 421223, 421353, 421514, 422335, 422393 and 422511.

Distribution. Eastern Pacific (from the Gulf of California, Mexico, to Peru), occurring at depths between 165 and 1750 m (see Remarks).

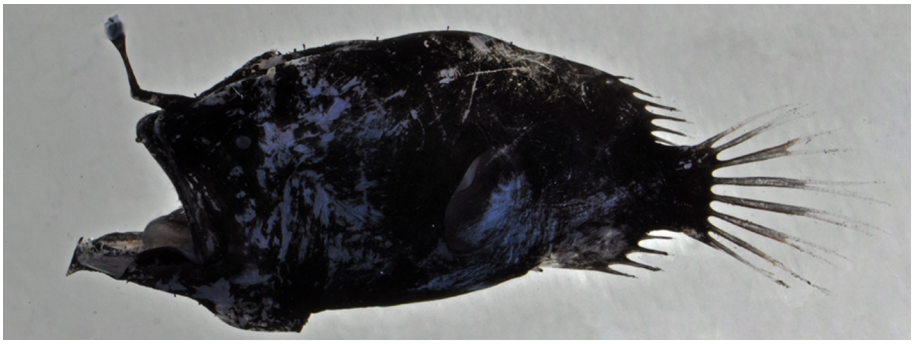

FIGURE 65. *Oneirodes luetkeni;* USNM 421514, 50 mm. SL.

Literature. Regan (1925: 562), Nielsen (1974: 94), Orr (1991: 1026), Castro-Aguirre & Balart (1996: 71), Castellanos-Galindo *et al.* (2006a: 202) and Pietsch (2009c: 224; 2009d: 397).

Remarks. Specimens collected at 165 m represent a new minimum depth record for the species (Castellanos-Galindo *et al.* 2006a; Pietsch 2009c, 2009d; Froese & Pauly 2016).

(71) ***Oneirodes rosenblatti*** **Pietsch, 1974**. Rosenblatt's dreamer (En); Soñador de Rosenblatt (Sp)

MOP stations. 1; 058; **Depth range**: 1181–1270 m; **USNM voucher specimens**: 1; 423219.

Distribution. Eastern Pacific (from off Costa Rica to Chile), occurring at depths between 750 and 3000 m (see Remarks).

Literature. Pietsch (1974: 41; 2009c: 226; 2009d: 399), Orr (1991: 1027) and Castellanos-Galindo *et al.* (2006a: 202).

Remarks. This specimen represents the first documented record of the species in Costa Rican waters (Bussing & López 1994, 2009, 2011; Pietsch 2009d) and a northwestern range extension of about 700 km in the species' known distribution (Pietsch 2009d). The previous northernmost documented record for this species in the eastern Pacific was from the Gulf of Panama (Castellanos-Galindo *et al.* 2006a, Pietsch 2009d).

STEPHANOBERYCIFORMES

1 F, 2 G, 3 S.

Melamphaidae

Bigscale fishes (En); Peces de escama grande (Sp). 2 G, 3 S.

(72) ***Melamphaes*** **sp.1**

MOP stations. 4; 067, 071, 075 and 083; **Depth range**: 784–1116 m; **USNM voucher specimens**: 8; 421265, 421267, 421503, 421504, 421505, 422348, 422386 and 422390.

Literature. Kotlyar (1996: 272).

Remarks. We were not able to make a specific identification of these specimens; however, despite the apparent absence of external diagnostical features between them, two different forms (*Melamphaes* sp.1 and *Melamphaes* sp.2) are herein listed based on molecular differences (2.67–2.99% divergence in COI sequences).

(73) ***Melamphaes*** **sp.2**

MOP stations. 1; 077; **Depth range**: 1320–1370 m; **USNM voucher specimens**: 2; 422342 and 422532.

Literature. Kotlyar (1996: 272).

Remarks. see remarks about *Melamphaes* sp 1.

FIGURE 66. *Melamphaes* sp. 2.

(74) ***Poromitra crassiceps* (Günther, 1878).** Crested bigscale (En); Escama-grande crestado (Sp)

MOP stations. 1; 001; **Depth range**: 165–183 m; **USNM voucher specimens**: 2; 422301 and 422334.

Distribution. Possibly circumglobal in tropical through cold temperate seas, occurring at depths between 164 and 2370 m. In the eastern Pacific this species has been recorded from off Canada, USA, including Alaska, México, including the Gulf of California, and Chile.

Literature. Chapman (1939: 535), Bussing (1965: 213), Fitch & Lavenberg (1968: 93), Robison (1972: 451), Castro-Aguirre & Balart (1996: 71), Sandknop & Watson (1996: 692), Pequeño (2000: 69), Mecklenburg *et al.* (2002: 319) and Kotlyar (2008: 490).

Remarks. Valid, in the eastern Pacific as *Poromitra rugosa* (Chapman, 1939) following Kotlyar (2008) and Eschmeyer *et al.* (2017), but listed here as *P. crassiceps* (Günther, 1878; restricted to the Atlantic Ocean by the latter authors), following Bussing (1965), Fitch & Lavenberg (1968), Robison (1972), Castro-Aguirre & Balart (1996), Sandknop & Watson (1996), Pequeño (2000) and Mecklenburg *et al.* (2002). This decision was made due to a lack of significant differences in morphometric and meristic characters between the present specimens and Atlantic specimens of *P. crassiceps* examined by the senior author. Additionally, COI sequences for both eastern Pacific (present study) and eastern Atlantic populations available in BOLD (BOLD process ID ME-7222 and ME-7812) are not significantly different (typically less than 1.5% difference). This combination of morphological and genetic data suggests the existence of a single lineage comprising both "species." The USNM 422301 and 422334 specimens represent the first documented record of *P. crassiceps* (or *P. rugosa*) in Central American waters (Bussing & López 1994, 2009, 2011; Kotlyar 2008; Froese & Pauly 2016).

FIGURE 67. *Poromitra crassiceps*.

BERYCIFORMES
2 F, 2 G, 2 S.

Trachichthyidae
Roughies, Slimy heads (En); Relojes (Sp). 1 G, 1 S.

(75) ***Hoplostethus mento* Garman, 1899.** Slimy head (En); Cabeza viscosa (Sp)

MOP stations. 1; 003; **Depth range**: 116–118 m; **USNM voucher specimens**: 5; 421260, 421268, 421284, 421306 and 421317.

Distribution. Eastern Pacific (Costa Rica to Chile), occurring at depths between 300 and 1350 m.

Literature. Garman (1899: 58), Bussing (1965: 214), Kotlyar (1986: 136; 1996:171), Pequeño (1989: 53), Iwasaki (2009b: 236), Angulo (2014: 1) and Robertson & Allen (2015: 5310).

FIGURE 68. *Hoplostethus mento.*

Anoplogastridae

Fangtooths. (En); Colmilludos (Sp). 1 G, 1 S.

(76) ***Anoplogaster cornuta* (Valenciennes, 1833).** Common fangtooth (En); Pez abisal con colmillos (Sp)

FIGURE 69. *Anoplogaster cornuta.* Top: entire specimen; Bottom: detail of head; USNM 421537, 105 mm. SL.

MOP stations. 5; 002, 003, 005, 028 and 046; **Depth range**: 116–1472 m; **USNM voucher specimens**: 5; 421295, 421537, 422533, 422546 and 422626.

Distribution. Circumglobal, occurring at depths between 75 and 5000 m. In the eastern Pacific this species has been previously recorded from off Alaska, USA, to Chile.

Literature. Valenciennes (1833b: 470), Bussing (1965: 213), Fitch & Lavenberg (1968: 94), Bauchot (1970: 10), Uyeno *et al.* (1983:271), Masuda *et al.* (1984: 109), Nakamura *et al.* (1986: 166), Whitehead *et al.* (1986: 767), Scott & Scott (1988: 324), Matarese *et al.* (1989: 250), Paulin *et al.* (1989: 154), Pequeño (1989: 53), Castro-Aguirre & Balart (1996: 71), Kotlyar (1996: 238), Shinohara *et al.* (1996: 174), Watson (1996e: 683), Arruda (1997: 78), Santos *et al.* (1997: 71), McEachran & Fechhelm (1998: 998), Porteiro *et al.* (1999: 41), Konishi (1999: 33), Nakabo (2000: 504; 2002: 504), Mecklenburg *et al.* (2002: 32), Menezes *et al.* (2003: 69), Moore *et al.* (2003: 220), Mundy (2005: 303), Iwasaki (2009a: 235), Møller *et al.* (2010: 49), Fricke *et al.* (2011: 372), Reyes-Bonilla *et al.* (2011: 8), Maslenikov *et al.* (2013: 8) and Parin *et al.* (2014: 202).

SCORPAENIFORMES

6 F, 7 G, 12 S.

Sebastidae

Scorpionfishes (En); Peces roca; Chancharros (Sp). 1 G, 1 S.

(77) ***Sebastolobus alascanus*** **Bean, 1890.** Shortspine thornyhead (En); Chancharro alacrán (Sp)

MOP stations. 1; 058; **Depth range**: 1181–1270 m; **USNM voucher specimens**: 1; 423201.

Distribution. North Pacific (from the sea of Okhotsk north to the Navarin Canyon in the Bering Sea and from Stalemate Bank and Ulm Plateau in the Aleutian Islands southeast to Cedros Island, Baja California, Mexico; also reported from Japan); vagrants to Costa Rica; occurring at depths between 17 and 1600 m.

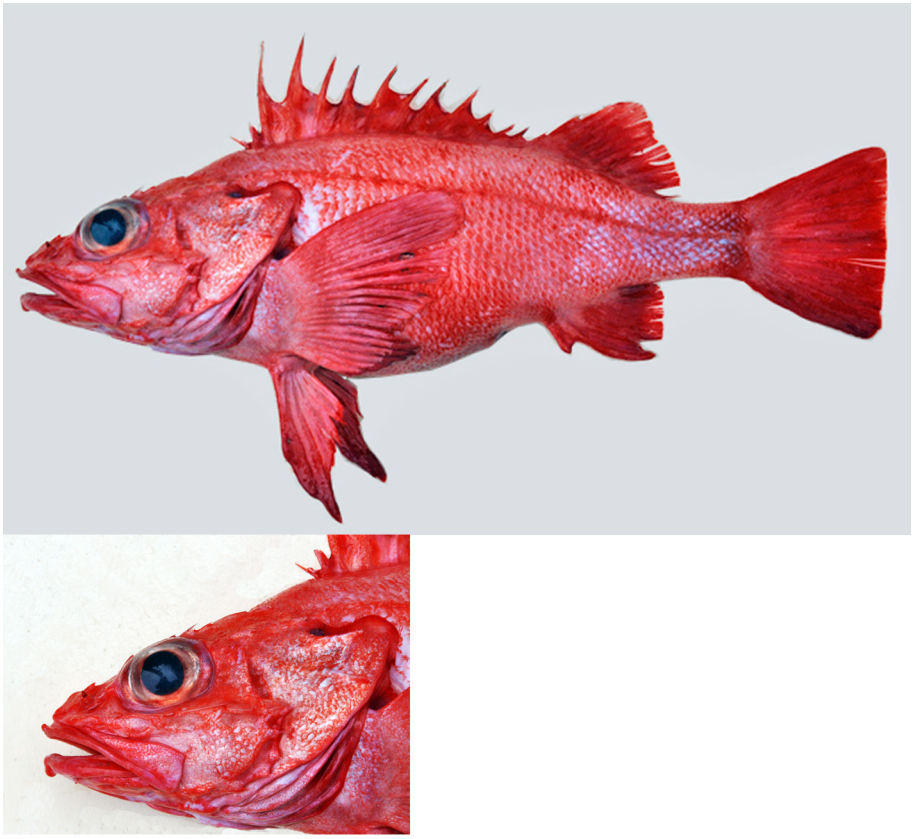

FIGURE 70. *Sebastolobus alascanus.* Top: entire specimen; Bottom: detail of head; USNM 423201, 280 mm. SL.

Literature. Bean (1890: 44), Eschmeyer *et al.* (1983: 152), Amaoka *et al.* (1983: 279), Masuda *et al.* (1984: 316), McAllister (1990: 184), Orr *et al.* (2000: 20), Nakabo (2000: 570, 2002: 570), Love *et al.* (2002: 115), Mecklenburg *et al.* (2002: 347), Fedorov *et al.* (2003: 60), Parin *et al.* (2014: 223) and Robertson & Allen (2015: 5437)

Remarks. This specimen represents the first documented record of the genus and the species in Central American waters (Bussing & López 1994, 2009, 2011; Orr *et al.* 2000; Love *et al.* 2002; Froese & Pauly 2016) and a southeastern range extension of about 2900 km in the species' known distribution (Orr *et al.* 2000, Love *et al.* 2002). The previous southernmost documented record for this genus and species in the eastern Pacific was from off Baja California, Mexico (Orr *et al.* 2000, Love *et al.* 2002).

Scorpaenidae

Scorpionfishes (En); Peces escorpion, Peces piedra (Sp). 1 G, 3 S.

(78) ***Pontinus furcirhinus*** **Garman, 1899.** Red scorpionfish (En); Rascacio richichi, Lapón rojo, Pez escorpión rojo (Sp)

MOP stations. 1; 004; **Depth range**: 115–116 m; **USNM voucher specimens**: 1; 422640.

Distribution. Eastern Pacific (from southern Baja California, Mexico, to Peru, including the Cocos, Malpelo and Galápagos Islands) occurring at depths between 50 and 390 m.

Literature. Garman (1899: 51), Poss (1995: 1547), Bussing & López (1994: 82; 2009: 452), Bearez (1996: 735), Moser (1996c: 738), Grove & Lavenberg (1997: 295), Chirichigno & Vélez (1998: 272), Rodríguez-Romero *et al.* (2008: 1773), Imamura (2009: 240), López-Martínez *et al.* (2012: 352), Del Moral-Flores *et al.* (2013: 195), Gómez *et al.* (2014: 394) and Robertson & Allen (2015: 1007).

FIGURE 71. *Pontinus furcirhinus;* USNM 422640, 215 mm. SL.

(79) ***Pontinus sierra*** **(Gilbert, 1890).** Speckled scorpionfish (En); Lapón manchado (Sp)

MOP stations. 4; 004, 038, 049 and 068; **Depth range**: 115–154 m; **USNM voucher specimens**: 11; 421376, 421552, 422336, 422349, 422350, 422443, 422471, 422473, 422474, 422580 and 422611.

Distribution. Eastern Pacific (from Baja California, Mexico, to Peru), occurring at depths between 48 and 351 m.

Literature. Gilbert (1890: 82), Bussing & López (1994: 82; 2009: 452), Poss (1995: 1547), Bearez (1996: 735), Castro-Aguirre & Balart (1996: 71), Moser (1996c: 738), Grove & Lavenberg (1997: 295), Chirichigno & Vélez (1998: 271), Pedraza *et al.* (2002: 69), Rodríguez-Romero *et al.* (2008: 1773), Imamura (2009: 241),

Palacios-Salgado & Ramirez-Valdez (2011: 93), Del Moral-Flores *et al.* (2013: 195) and Robertson & Allen (2015: 4432).

FIGURE 72. *Pontinus sierra.* Top: adult; Bottom: juvenile.

(80) ***Pontinus* sp.** Rosy scorpionfish (En); Puñal rosado (Sp)

MOP stations. 5; 015, 068, 081, 101 and 102; **Depth range**: 113–399 m; **USNM voucher specimens**: 15; 421247, 421270, 421323, 421384, 421398, 421430, 422306, 422309, 422327, 422340, 422369, 422382, 422389, 422414 and 422440.

FIGURE 73. *Pontinus* sp.

Distribution. Eastern Pacific (from southern Baja and the mouth of the Gulf of California to northern Peru), occurring at depths between 50 and 399 m (see Remarks).

Literature. Robertson & Allen (2015: 1011, as *Pontinus* sp. A).

Remarks. This appears to be an undescribed species currently under investigation by the authors. Specimens collected at 399 m represent a new maximum depth record for the species (Robertson & Allen 2015).

Triglidae

Gurnards, Searobins (En); Cabros, Malarmados, Rubios, Cabrillas (Sp). 2 G, 3 S.

(81) ***Bellator loxias* (Jordan, 1897).** Barred searobin, Chevron searobin (En); Vaca angelita (Sp)

MOP stations. 1; 015; **Depth range**: 113–114 m; **USNM voucher specimens**: 3; 421214, 421274 and 422360.

Distribution. Eastern Pacific (southern Baja California, Mexico, including the Gulf of California and the Revillagigedos Islands to Isla San Lorenzo, Callao, Peru, including the Cocos and Galápagos Islands), occurring at depths between 20 and 191 m.

Literature. Jordan (1897: 452), Garman (1899: 108), Gruchy (1970: 526), Chirichigno (1974: 207), Miller & Richards (1991a: 645, 1991b: 761), Bussing & López (1994: 86; 2009: 452), Castro-Aguirre *et al.* (1993:89), Bussing (1995: 1644), Richards (1996: 798), Bearez (1996: 735), Grove & Lavenberg (1997: 299), Chirichigno & Vélez (1998: 264), Rodríguez-Romero *et al.* (2008: 1773), Del Moral-Flores *et al.* (2013: 196) and Robertson & Allen (2015: 1050).

FIGURE 74. *Bellator loxias.*

(82) ***Prionotus ruscarius* Gilbert & Starks, 1904.** Common searobin, Rough searobin (En); Cabro áspero, Rubio gallineta, Vaca rasposa (Sp)

MOP stations. 3; 006, 015 and 049; **Depth range**: 109–136 m; **USNM voucher specimens**: 4; 421213, 421224, 421264 and 422300.

Distribution. Eastern Pacific (from southern Baja California, Mexico, including the Gulf of California to Chile), occurring at depths between 4 and 136 m (see Remarks).

Literature. Gilbert & Starks (1904: 165), Böhlke (1953: 125), Pequeño (1989: 57), Miller & Richards (1991b: 760), Castro-Aguirre *et al.* (1993: 88), Bussing & López (1994: 86; 2009: 453), Balart *et al.* (1995: 82), Bussing (1995: 1645), Bearez (1996: 735), Richards (1996: 797), De La Cruz Agüero *et al.* (1997: 300), Chirichigno & Vélez (1998: 265), Castro-Aguirre *et al.* (1999: 246), Lucano-Ramírez *et al.* (2005: 1), Raymundo-Huizar *et al.* (2008: 7), Rodríguez-Romero *et al.* (2008: 1773), López-Martínez *et al.* (2012: 352), Del Moral-Flores *et al.* (2013: 196), Murase et al (2014: 1405), Fuentes *et al.* (2015: 615) and Robertson & Allen (2015: 1058).

Remarks. Specimens collected at 136 m represent a new maximum depth record for the species (Bussing & López 1994, Robertson & Allen 2015).

FIGURE 75. *Prionotus ruscarius.* Top: lateral view; Bottom: dorsal view.

(83) ***Prionotus stephanophrys*** **Lockington, 1881.** Lumptail searobin, Blackfin searobin (En); Vaca voladora (Sp)

MOP stations. 2; 015 and 091; **Depth range**: 105–114 m; **USNM voucher specimens**: 6; 421215, 421216, 421234, 421243, 421244 and 422347.

Distribution. Eastern Pacific (from off Washington, USA to Chile, but rare north of Baja California, Mexico, including the Malpelo and Galápagos Islands), occurring at depths between 2 and 255 m.

Literature. Lockington (1881: 529), Eschmeyer *et al.* (1983: 154), Pequeño (1989: 57), Miller & Richards (1991: 760), Schmitter-Soto & Castro-Aguirre (1996: 23; 2015: 213), Castro-Aguirre *et al.* (1993: 89), Allen & Robertson (1994: 103), Bussing & López (1994: 84; 2009: 453), Bussing (1995: 1644), Bearez (1996: 735), Franke & Acero (1996: 766), Richards (1996: 797), De La Cruz Agüero *et al.* (1997: 300), De la Cruz-Agüero & Cota-Gómez (1998: 357), Richards & McCosker (1998: 940), Chirichigno & Vélez (1998: 264), Castro-Aguirre *et al.* (1999: 245), Lea & Rosenblatt (2000: 121), Rodríguez-Romero *et al.* (2008: 1773), Kawai (2009a: 247), McCosker & Rosenblatt (2010: 191), López-Martínez *et al.* (2012: 352), Del Moral-Flores *et al.* (2013: 196), Gómez *et al.* (2014: 394), Murase et al (2014: 1405), Fuentes *et al.* (2015: 615) and Robertson & Allen (2015: 1059).

FIGURE 76. *Prionotus stephanophrys.*

Peristediidae
Armored Sea-Robins, Armored-Gurnards (En); Peces Cocodrilos, Malarmados, Cabros, Caballitas (Sp). 1 G, 1 S.

(84) ***Peristedion barbiger* Garman, 1899.** Barbel's crocodile, Bearded armored-searobin (En); Pez cocodrilo, caballito moro (Sp)

MOP stations. 3; 006, 015 and 068; **Depth range**: 109–145 m; **USNM voucher specimens**: 7; 421211, 421212, 421319, 421334, 422314, 422320 and 422329.

Distribution. Eastern Pacific (from Costa Rica to northern Peru), occurring at depths between 50 and 295 m.

Literature. Garman (1899: 110), Bussing & López (1994: 70; 2009: 452), Richards (1996: 798), Richards & McCosker (1998: 941), Chirichigno & Vélez (1998: 263), Kawai (2008: 24; 2009b: 248), Bussing (2010: 1149), Tenda & Kawai (2012: 135) and Robertson & Allen (2015: 2635).

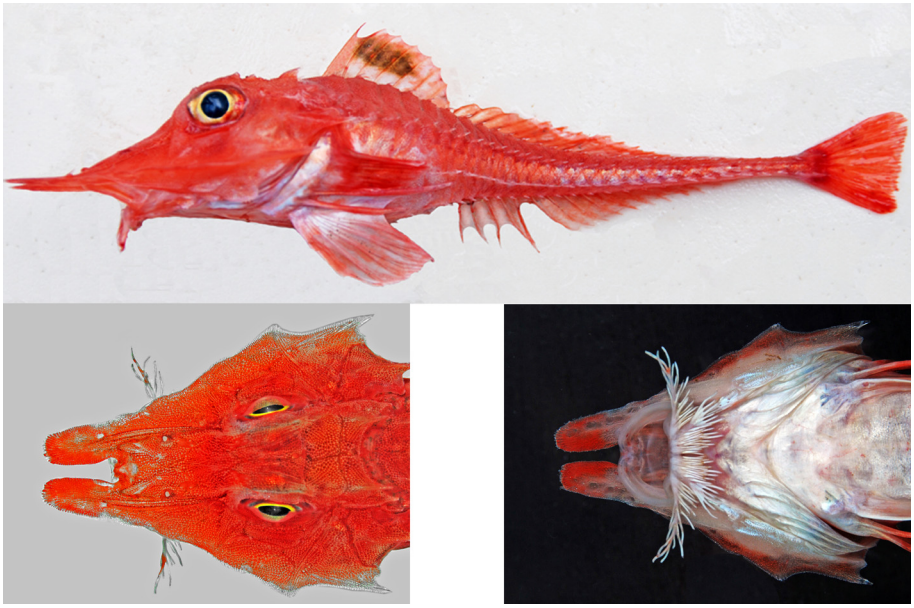

FIGURE 77. *Peristedion barbiger.* Top: lateral view; Lower left: dorsal view of head; Lower right: ventral view of head.

Psychrolutidae
Fathead sculpins (En); Cabezas gordas (Sp). 1 G, 1 S.

(85) ***Psychrolutes cf. sio*** **Nelson, 1980.** South American sculpin (En); Pez chancho (Sp)

MOP stations. 6; 028, 029, 030, 082, 087 and 096; **Depth range**: 864–1527 m; **USNM voucher specimens**: 6; 421511, 422353, 422602, 422603, 422651 and 423597.

Distribution. Eastern Pacific (from off El Salvador, to Chile), occurring at depths between 768 and 1527 m (see Remarks).

Literature. Nelson (1980: 444; 1995: 69), Pequeño (1989: 57), Fricke (1990: 407) and Yabe (2009c: 250).

Remarks. These specimens were tentatively identified by us as *Psychrolutes cf. sio* because they shared with this species the following combination of distinctive characters, sensu Nelson 1980: jaws equal; cirri on head and scattered; lateral line pores in small tubes; length of two inner pelvic-fin rays about equal, outer only slightly shorter; and dorsal-fin elements VIII, 17–18. Our specimens, however, differ from *P. sio*, sensu stricto, by having a shallower body (20.29–24.41% of SL, vs. 28.2–33.2% of SL); a shorter eye diameter (5.17–6.68% of SL, vs. 7.90–9.90% of SL); a shorter pectoral fin (22.17–25.76% of SL, vs. 28.20–28.30% of SL); a shorter pelvic fin (7.12–8.53% of SL, vs. 14.10–14.40% of SL); a greater inter-pelvic distance (3.12–5.11% of SL, vs. 2.70–2.40% of SL); fewer anal-fin elements (12–13, vs. 14); and a different coloration pattern (greyish with small pale spots, vs. uniformly brown). COI sequences for our specimens of *P. cf. sio* and five specimens of *P. macrocephalus* (Gilchrist 1904) from South Africa and available in BOLD (ADC11_160.4 #1 to #5) are less than 2% divergent.

Assuming these differences represent intraspecific variation in *P. sio*, our specimens represent the first documented record of the species in Central American waters (Bussing & López 1994, 2009, 2011; Nelson 1980,1995; Yabe 2009) and a northward range extension of about 2100 km in the species' known distribution (Nelson 1980, Yabe 2009). The previous northernmost documented record for this species in the eastern Pacific was from northern Peru (Nelson 1980, Yabe 2009). In addition, specimens collected at 1527 m represent a new maximum depth record for the species (Nelson 1980, Froese & Pauly 2016).

FIGURE 78. *Psychrolutes cf. sio.* Top: entire specimen; Bottom: detail of head; USNM 422603, 205 mm. SL.

Liparidae

Snailfishes (En); Peces babosos (Sp). 1 G, 3 S.

(86) ***Paraliparis*** **sp.1**

MOP stations. 4; 029, 062, 073 and 077; **Depth range**: 153–1457 m; **USNM voucher specimens**: 5; 421548, 422455, 422585, 422607 and 422647.

Literature. Stein (1978: 37), Andriashev (1986: 1) and Stein & Chernova (2002: 153).

Remarks. We were not able to make a specific identification of these specimens; however, despite the

apparent absence of external diagnostical features between them, three different forms (*Paraliparis* sp.1, *Paraliparis* sp.2 and *Pachycara* sp. 3) are herein listed based on molecular differences (2.52–3.66% divergence in COI sequences).

FIGURE 79. *Paraliparis* sp.1. Top: entire specimen; Bottom: detail of head; USNM 422647, 305 mm. SL.

(87) ***Paraliparis* sp.2**

MOP stations. 5; 042, 073, 078, 086 and 096; **Depth range**: 153–1353 m; **USNM voucher specimens**: 6; 421269, 422426, 422429, 422454, 422466 and 422592.

Literature. Stein (1978: 37), Andriashev (1986: 1) and Stein & Chernova (2002: 153).

Remarks. See Remarks about *Paraliparis* sp 1.

FIGURE 80. *Paraliparis* sp.2. Top: entire specimen; Bottom: detail of head; USNM 422426, 190 mm. SL.

(88) ***Paraliparis* sp.3**

MOP stations. 1; 077; **Depth range**: 1320–1370 m; **USNM voucher specimens**: 1; 422316.

Literature. Stein (1978: 37), Andriashev (1986: 1) and Stein & Chernova (2002: 153).

Remarks. See remarks about *Paraliparis* sp 1.

PERCIFORMES

14 F, 25 G, 32 S.

Serranidae

Sea basses (En); Meros, Cabrillas (Sp). 4 G, 4 S.

(89) ***Baldwinella eos* Gilbert, 1890**. Bigeye bass (En); Serrano ojón (Sp)

MOP stations. 3; 004, 049 and 068; **Depth range**: 115–145 m; **USNM voucher specimens**: 7; 421225, 422325, 422333, 422344, 422436, 422558 and 422589.

Distribution. Eastern Pacific (from Baja California, Mexico, including the Gulf of California, to Peru, including the Cocos Island) and western Atlantic (from the Gulf of Mexico to Suriname), occurring at depths between 80 and 325 m.

Literature. Gilbert (1890: 62), Uyeno *et al.* (1983: 313), Baldwin (1990: 92), Bussing & López (1994: 96; 2009: 454), Balart *et al.* (1995: 81), Heemstra (1995: 1572), Castro-Aguirre & Balart (1996: 71), Watson (1996f: 878), Grove & Lavenberg (1997: 338), Anderson & Baldwin (2000: 379), Rodríguez-Romero *et al.* (2008: 1774), Romero & Vélez (2009a: 261), Palacios-Salgado & Ramirez-Valdez (2011: 93), Anderson & Heemstra (2012: 112), Del Moral-Flores *et al.* (2013: 197) and Robertson & Allen (2015: 1107).

FIGURE 81. *Baldwinella eos.*

(90) ***Hemanthias signifer* (Garman, 1899)**. Damsel bass (En); Cabrilla doncella (Sp)

MOP stations. 4; 001, 004, 015 and 068; **Depth range**: 113–183 m; **USNM voucher specimens**: 6; 421237, 421551, 422478, 422535, 422573 and 422633.

Distribution. Eastern Pacific (from southern California, USA, including the Gulf of California, to northern Peru, including the Malpelo Island), occurring at depths between 23 and 265 m.

Literature. Garman (1899: 48), Eschmeyer *et al.* (1983: 199), Baldwin (1990: 936), Allen & Robertson (1994: 110), Bussing & López (1994: 96; 2009: 454), Heemstra (1995: 1572), Bearez (1996: 736), Castro-Aguirre & Balart (1996: 71), Watson (1996f: 878), De La Cruz Agüero *et al.* (1997: 287), Chirichigno & Vélez (1998: 353), Anderson & Baldwin (2000: 379), Thomson *et al.* (2000: 77), Romero & Vélez (2009a: 258), Anderson & Heemstra (2012: 56), López-Martínez *et al.* (2012: 352), Del Moral-Flores *et al.* (2013: 196) and Robertson & Allen (2015: 1105).

FIGURE 82. *Hemanthias signifer.*

(91) ***Hyporthodus niphobles* (Gilbert & Starks, 1897).** Star-studded grouper (En); Mero gris, Mero manchado (Sp)

MOP stations. 2; 036 and 066; **Depth range**: 127–143 m; **USNM voucher specimens**: 3; 422476, 422641 and 423181.

Distribution. Eastern Pacific (from southern California, USA, including the Gulf of California, to northern Peru), occurring at depths between 1 and 450 m.

Literature. Gilbert & Starks (1897: 442), Heemstra & Randall (1993: 203), Allen & Robertson (1994: 109), Bussing & López (1994: 92; 2009: 454), Heemstra (1995: 1576), Bearez (1996: 736), Watson (1996f: 878), De La Cruz Agüero *et al.* (1997: 285), Grove & Lavenberg (1997: 323), Chirichigno & Vélez (1998: 354), Smith-Vaniz *et al.* (1999: 211), Lea & Rosenblatt (2000: 121), Thomson *et al.* (2000: 83), Craig & Hastings (2007: 17), Romero & Vélez (2009a: 257), McCosker & Rosenblatt (2010: 191), Craig *et al.* (2011: 278), Del Moral-Flores *et al.* (2013: 196), Murase *et al.* (2014: 1405) and Robertson & Allen (2015: 1127).

FIGURE 83. *Hyporthodus niphobles,* USNM 423181, 265 mm. SL.

(92) ***Serranus aequidens* Gilbert, 1890.** Deepwater serrano (En); Serrano de aguas profundas (Sp)

MOP stations. 2; 001 and 049; **Depth range**: 128–183 m; **USNM voucher specimens**: 4; 421248, 421277, 422346 and 422566.

FIGURE 84. *Serranus aequidens.* Top: adult; Bottom: Juvenile.

Distribution. Eastern Pacific (from southern California, USA, to the western Gulf of California and central Mexico to western Panama, including the Cocos and Galápagos Islands), occurring at depths between 75 and 265 m.

Literature. Gilbert (1890: 61), Castro-Aguirre *et al.* (1993: 83), Bussing & López (1994: 94; 2009: 454), Balart *et al.* (1995: 82), Heemstra (1995: 1572), Castro-Aguirre & Balart (1996: 71), Pondella (1999: 130), Thomson *et al.* (2000:74), Rodríguez-Romero *et al.* (2008: 1774), McCosker & Rosenblatt (2010: 191), Del Moral-Flores *et al.* (2013: 197) and Robertson & Allen (2015: 2582).

Malacanthidae

Tilefishes (En); Matajuelos, Blanquillos (Sp). 1 G, 1 S.

(93) ***Caulolatilus affinis* Gill, 1865.** Bighead tilefish (En); Blanquillo cabezón, Pierna (Sp)

MOP stations. 2; 032 and 061; **Depth range**: 108–140 m; **USNM voucher specimens**: 2; 422632 and 422646.

Distribution. Eastern Pacific (from California, USA, including the Gulf of California and the Revillagigedos Islands, to northern Peru including the Cocos, Malpelo and Galápagos Islands), occurring at depths between 30 and 200 m.

Literature. Gill (1865: 68), Dooley (1978: 25), Allen & Robertson (1994: 124), Bussing & López (1994: 98; 2009: 455), Schneider & Krupp (1995: 1266), Bearez (1996: 736), Franke & Acero (1996: 766), Moser (1996d: 990), De La Cruz Agüero *et al.* (1997: 221), Grove & Lavenberg (1997: 350), Elorduy-Garay & Ruiz-Cordova (1998: 259), Chirichigno & Vélez (1998: 335), Thomson *et al.* (2000: 114), Walker *et al.* 2002:139), Rodríguez-Romero *et al.* (2008: 1774), Romero & Vélez (2009b: 264), McCosker & Rosenblatt (2010: 191), Reyes-Bonilla *et al.* (2011: 9), López-Martínez *et al.* (2012: 353), Del Moral-Flores *et al.* (2013: 198), Lea & Feeney (2013: 1), Gómez *et al.* (2014: 394) and Robertson & Allen (2015: 1218).

FIGURE 85. *Caulolatilus affinis;* USNM 422632, 190 mm. SL.

Carangidae

Jacks, Pompanos (En); Jureles, Caballas, Palometas (Sp). 2 G, 3 S.

(94) ***Decapterus macrosoma* Bleeker, 1851**. Shortfin scad (En); Macarela alicorta, Caballa fina (Sp)

MOP stations. 2; 005 and 006; **Depth range**: 109–500 m; **USNM voucher specimens**: 2; 421355 and 421558.

Distribution. Eastern (from southern Baja California, Mexico, including the Gulf of California to Chile, including the Galápagos Islands), Central (Hawai) and Indo-West Pacific (from East Africa, including the Red Sea, to Malaysia, Indonesia, the Arafura Sea, northern Line Islands (Kiribati) and Gambier Islands, north to southern Japan, south to Port Hedland (Western Australia), New South Wales (Australia), New Caledonia and Tonga), occurring at depths between 12 and 170 m.

Literature. Bleeker (1851: 358), Allen & Swainston (1988: 72), Pequeño (1989: 60), Randall *et al.* (1990: 163), Kuiter (1993: 179), Allen & Robertson (1994: 126), Bussing & López (1994: 104), Goren & Dor (1994: 34), Suzuki & Hosokawa (1994: 4), Smith-Vaniz (1995: 940), Watson et al (1996: 917), Bearez (1996: 736), Allen (1997: 114), De La Cruz Agüero *et al.* (1997: 84), Grove & Lavenberg (1997: 376), Chirichigno & Vélez (1998: 274), Nakabo (2000: 796; 2002: 796), Mundy (2005: 368), Randall (2007: 233), McCosker & Rosenblatt (2010: 192), Psomadakis *et al.* (2015: 223) and Robertson & Allen (2015: 1257).

Remarks. The specimens of this shallow water pelagic species (see Bussing & López (1994), Mundy (2005), Robertson & Allen (2015) and Froese & Pauly (2016), most likely were caught in shallow water during deployment or retrieval of the net. Hence we do not record an increase in maximum depth for this species.

FIGURE 86. *Decapterus macrosoma.* Top: entire specimen; Bottom: detail of head.

(95) ***Selene brevoortii*** **(Gill, 1863).** Hairfin lookdown, Mexican lookdown, Pacific lookdown (En); Jorobado antena, Palometa jorobada, Jorobado mexicano (Sp)

MOP stations. 2; 081, 102; **Depth range**: 124–165 m; **USNM voucher specimens**: 2; 421378 and 422365.

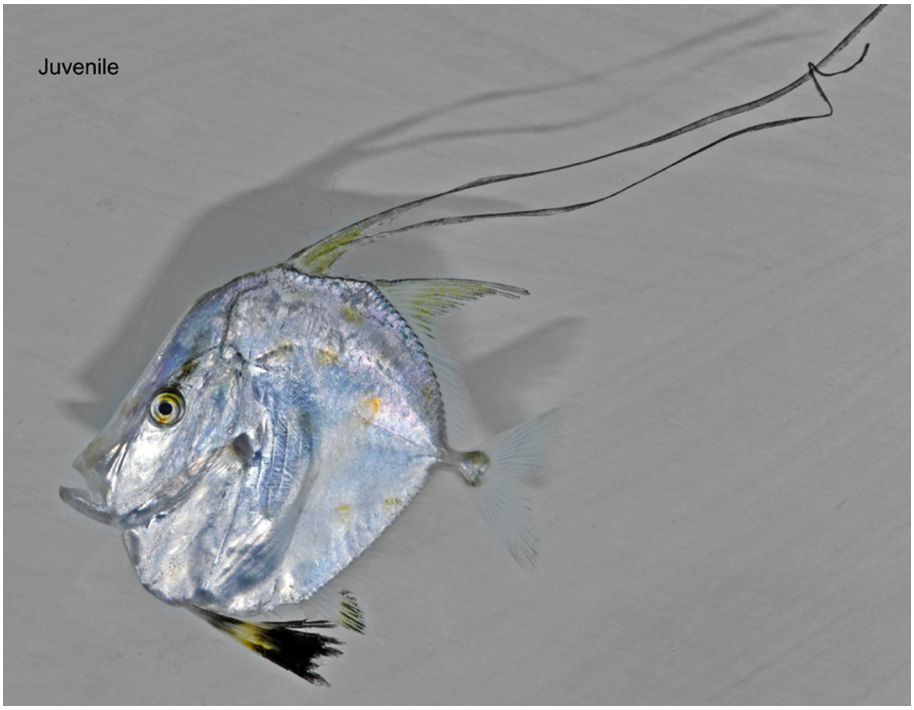

FIGURE 87. *Selene brevoortii;* USNM 421378, 39 mm. SL.

Distribution. Eastern Pacific: From southern California, USA, including the Gulf of California, to Chile), occurring at depths between 1 and 50 m.

Literature. Gill (1863: 83), Pequeño (1989: 61), Allen & Robertson (1994: 128), Bussing & López (1994: 100; 2009: 456), Lea & Walker (1995: 90), Smith-Vaniz (1995: 940), Bearez (1996: 736), Watson et al (1996: 917), De La Cruz Agüero *et al.* (1997: 91), Chirichigno & Vélez (1998: 282), Castro-Aguirre *et al.* (1999: 285), Lea & Rosenblatt (2000: 122), Thomson *et al.* (2000: 289), Reed *et al.* (2001: 468), Del Moral-Flores *et al.* (2013: 198), Murase et al (2014: 1406), Fuentes *et al.* (2015: 616) and Robertson & Allen (2015: 1267).

Remarks. The specimens of this shallow water pelagic species (see Bussing & López (1994), Mundy (2005), Robertson & Allen (2015) and Froese & Pauly (2016), most likely were caught in shallow water during deployment or retrieval of the net. Hence we do not record an increase in maximum depth for this species.

(96) ***Selene peruviana*** **(Guichenot, 1866).** Peruvian moonfish, Pacific moonfish (En); Jorobado papelillo (Sp)

MOP stations. 2; 085 and 102; **Depth range**: 149–186 m; **USNM voucher specimens**: 2; 421404 and 422399.

Distribution. Eastern Pacific (from southern California, USA to Chile, including the Galápagos Islands), occurring at depths between 0 and 50 m.

Literature. Guichenot (1866: 38), Eschmeyer *et al.* (1983: 209), Pequeño (1989: 61), Allen & Robertson (1994: 128), Bussing & López (1994: 100; 2009: 456), Smith-Vaniz (1995: 940), Bearez (1996: 736), Watson et al (1996: 917), De La Cruz Agüero *et al.* (1997: 91), Grove & Lavenberg (1997: 369), Chirichigno & Vélez (1998: 282), Castro-Aguirre *et al.* (1999: 284), Reed *et al.* (2001: 468), Rodríguez-Romero *et al.* (2008: 1775), McCosker & Rosenblatt (2010: 192), Del Moral-Flores *et al.* (2013: 198), Murase *et al.* (2014: 1406), Fuentes *et al.* (2015: 616) and Robertson & Allen (2015: 1269).

Remarks. The specimens of this shallow water pelagic species (see Bussing & López (1994), Mundy (2005), Robertson & Allen (2015) and Froese & Pauly (2016), most likely were caught in shallow water during deployment or retrieval of the net. Hence we do not record an increase in maximum depth for this species.

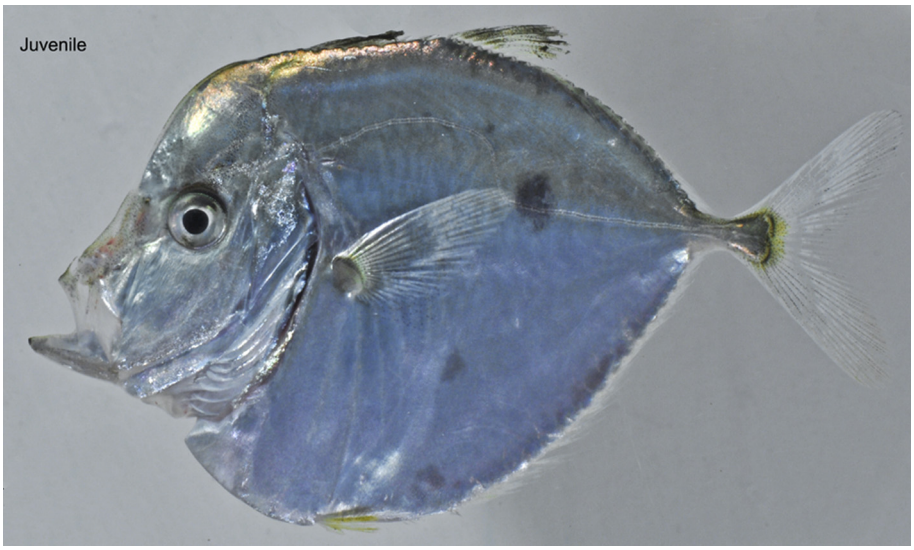

FIGURE 88. *Selene peruviana;* USNM 422399, 41 mm. SL.

Haemulidae

Grunts (En); Roncadores (Sp). 1 G, 1 S.

(97) ***Pomadasys branickii*** **(Steindachner, 1879).** Sand grunt (En); Roncacho arenero (Sp)

MOP stations. 1; 015; **Depth range**: 113–114 m; **USNM voucher specimens**: 1; 422650.

Distribution. Eastern Pacific (from southern Baja California, Mexico, including the Gulf of California, to Peru), occurring at depths between 0 and 165 m.

Literature. Steindachner (1879: 33), Bussing (1993: 245), Allen & Robertson (1994: 15), Bussing & López (1994: 107; 2009: 458), Bearez (1996: 737), McKay & Schneider (1995: 1140), Chirichigno & Vélez (1998: 376), Castro-Aguirre *et al.* (1999: 342), Rodríguez-Romero *et al.* (2008: 1775), Tavera *et al.* (2012: 6), Angulo *et al.* (2013: 1002), Del Moral-Flores *et al.* (2013: 200), Murase et al (2014: 1406), Fuentes *et al.* (2015: 616) and Robertson & Allen (2015: 1382).

FIGURE 89. *Pomadasys branickii;* USNM 422650, 230 mm SL.

Sciaenidae
Drums, Croakers (En); Corvinas (Sp). 2 G, 2 S.

(98) ***Cynoscion nannus*** **Castro-Aguirre & Arvizu-Martinez, 1976.** Dwarf weakfish (En); Corvina de profundidad, Corvinata enana (Sp)

MOP stations. 10; 003, 041, 049, 061, 074, 081, 085, 091, 098 and 102; **Depth range**: 105–1185 m; **USNM voucher specimens**: 26; 421251, 421255, 421285, 421288, 421303, 421314, 421400, 421409, 421420, 421437, 421446, 421455, 421462, 421483, 421498, 421499, 421500, 421517, 421568, 421569, 422364, 422403, 422513, 422521, 422586 and 422627.

FIGURE 90. *Cynoscion nannus.* Top: entire specimen; Bottom: detail of head.

Distribution. Eastern Pacific (from the Gulf of Mexico to Panama), occurring at depths between 100 and 815 m.

Literature. Castro-Aguirre & Arvizu-Martínez (1976: 323), Castro-Aguirre (1991: 80), Bussing & López (1994: 128), Chao (1995: 1436), Castro-Aguirre & Balart (1996: 71), De La Cruz Agüero *et al.* (1997: 266), Béarez (2001: 61), Chao (2002: 11), Guzmán (2011: 173), Fuentes *et al.* (2015: 616) and Robertson & Allen (2015: 1521).

(99) ***Umbrina bussingi*** **López, 1980**. Big eye drum, Big eye croaker, Bussing's drum (En); Polla ojona, Verrugato prieto, Corvina de Bussing (Sp)

MOP stations. 1; 041; **Depth range**: 115–152 m; **USNM voucher specimens**: 3; 421289, 421301 and 422631.

Distribution. Eastern Pacific (from southern Baja California, Mexico, to Colombia), occurring at depths between 30 and 185 m.

Literature. López (1980: 203), Walker & Radford (1992: 575), Bussing & López (1994: 130; 2009: 458), Chao (1995: 1443), De La Cruz Agüero *et al.* (1997: 270), Béarez (2001: 61), Rodríguez-Romero *et al.* (2008: 1776) and Robertson & Allen (2015: 1487).

FIGURE 91. *Umbrina bussingi.*

Labridae

Wrasses (En); Damiselas, Señoritas, Viejas (Sp). 1 G, 1 S.

(100) ***Decodon melasma*** **Gomon, 1974.** Black-spot wrasse, Blotched hogfish (En); Viejita manchada (Sp)

MOP stations. 4; 001, 003, 004, and 032; **Depth range**: 108–183 m; **USNM voucher specimens**: 4; 421393, 422522, 422591 and 422622.

FIGURE 92. *Decodon melasma.*

Distribution. Eastern Pacific (from southern California, USA, including the Gulf of California, to northern Peru, including the Cocos and Galápagos Islands), occurring at depths between 40 and 220m.

Literature. Gomon (1974: 207), Bussing (1987: 95), Allen & Robertson (1994: 198), Bussing & López (1994: 116; 2009: 462), Bearez (1996: 738), Watson (1996g: 1090), Gomon (1995: 1203), Gomon (1997: 819), De La Cruz Agüero *et al.* (1997: 197), Chirichigno & Vélez (1998: 330), Parenti & Randall (2000: 17), Lea & Rosenblatt (2000: 125), Thomson *et al.* (2000: 172), Allen & Groce (2001:131), Baldwin & McCosker (2001: 91), Rodríguez-Romero *et al.* (2008: 1776), McCosker & Rosenblatt (2010: 193), Del Moral-Flores *et al.* (2013: 202) and Robertson & Allen (2015: 1646).

Zoarcidae

Eelpouts (En); Viruelas (Sp). 7 G, 9 S.

(101) ***Bentartia pusillum*** **(Bean 1890).** Alaska eelpout (En); Viruela de Alaska (Sp)

MOP stations. 6; 002, 029, 077, 078, 082 and 099; **Depth range**: 407–1527 m; **USNM voucher specimens**: 10; 421466, 422425, 422560, 423184, 423199, 423210, 435791, 435800, 435805 and 435808.

Distribution. North and eastern Pacific (from the eastern Bering Sea to off southern British Columbia and the Gulf of Panama), occurring at depths between 221 and 2189 m.

Literature. Bean (1890: 39), McAllister (1990: 157), Anderson (1994: 116; 2006: 3), Springer & Anderson (1997: 21), Mecklenburg *et al.* (2002: 730), Anderson *et al.* (2009: 186) and (Balushkin *et al.* 2011: 1026).

Remarks. These specimens represent the first documented record of the species in Central American waters (Bussing & López 1994, 2009, 2011; Anderson 1994; Anderson *et al.* 2009) and a southeast range extension of about 6800 km in the species' known distribution (Anderson 1994, Anderson *et al.* 2009). The southernmost documented record for this species in the eastern Pacific prior to our collection was off British Columbia, Canada (Bean 1890, Anderson 1994, Anderson *et al.* 2009).

FIGURE 93. *Bentartia pusillum;* USNM 423210, 160 mm. TL.

(102) ***Bothrocara molle*** **Bean 1890.** Soft eelpout (En); Viruela suave (Sp)

MOP stations. 6; 026, 029, 042, 065, 078 and 099; **Depth range**: 929–1310 m; **USNM voucher specimens**: 8; 422331, 422424, 422430, 422570, 422584, 423188, 423200 and 423202.

Distribution. North, Eastern Pacific (from Okhotsk, Japan and the Bering Sea to Chile) and western South Atlantic (South Georgia, United Kingdom), occurring at depths between 60 and 2688 m.

Literature. Bean (1890: 39), McAllister (1990: 156), Anderson (1994: 116; 2006: 2; 2009: 274), Nakabo (2000: 1041, 2002: 1041), Mecklenburg *et al.* (2002: 732), Anderson *et al.* (2009: 182), Balushkin *et al.* (2011: 973) and Parin *et al.* (2014: 385).

FIGURE 94. *Bothrocara molle.* Top: entire specimen; Bottom: detail of head; USNM 422570, 178 mm. TL.

(103) ***Lycenchelys* sp.1**

MOP stations. 2; 025 and 029; **Depth range**: 1101–1126 m; **USNM voucher specimens**: 3; 422609 and 422617.

Literature. Anderson (1994: 1; 2009: 276).

Remarks. Up to this point, no formal review of eastern Pacific *Lycenchelys* Gill, 1884 has been published. The taxonomy of the genus, as well as from other genera of the family (e.g. *Lycodes*, *Ophthalmolycus* and *Pachycara*, among others; see below) is complicated and the validity of several forms is questioned given the absence, in most cases, of reliable diagnostic characters (Anderson 1994). Accordingly, we were not able to make a specific identification of these specimens; however, despite the apparent absence of external diagnostical features between them, two different forms (*Lycenchelys* sp.1 and *Lycenchelys* sp.2) are herein listed based on molecular differences (6% divergence in COI sequences).

FIGURE 95. *Lycenchelys* sp.1

(104) ***Lycenchelys* sp.2**

MOP stations. 1; 086; **Depth range**: 1353–1389 m; **USNM voucher specimens**: 1; 421515.

Literature. Anderson (1994: 64; 2009: 276).

Remarks. see remarks about *Lycenchelys* sp 1.

(105) ***Lycodapus dermatinus* Gilbert, 1896**. Looseskin eelpout (En); Viruela pielfloja (Sp)

MOP stations. 2; 001 and 076; **Depth range**: 165–1145 m; **USNM voucher specimens**: 2; 421188 and 422332.

Distribution. Eastern Pacific (from the Welker Seamount off Alaska, USA, to Peru), occurring at depths between 165 and 1145 m.

Literature. Gilbert (1896: 471), Springer & Anderson (1997: 17), Peden & Anderson (1978: 1948; 1989: 152; 1994:118), Mecklenburg *et al.* (2002: 740) and Balushkin *et al.* (2011: 985).

Remarks. Specimens collected at 165 and 1145 m represent a new maximum depth record for the species (Anderson 1978, 1989, 1994; Froese & Pauly 2016).

FIGURE 96. *Lycodapus dermatinus.* Top: entire specimen; Bottom: detail of head; USNM 422332, 124 mm. SL.

(106) ***Lycodes*** **sp.**

MOP stations. 1; 056; **Depth range**: 656–668 m; **USNM voucher specimens**: 2; 421556 and 422538.

Literature. Anderson (1994: 68).

FIGURE 97. *Lycodes* sp. Top: entire specimen; Bottom: detail of head.

(107) ***Ophthalmolycus*** **sp.**

MOP stations. 4; 058, 078, 083 and 096; **Depth range**: 965–1270 m; **USNM voucher specimens**: 8; 421307, 421309, 421318, 421473, 421542, 422367, 422428 and 422452.

Literature. Anderson (1992: 1; 1994: 80).

FIGURE 98. *Ophthalmolycus* sp. Top: entire specimen; Bottom: detail of head.

(108) ***Pachycara* sp.1**

MOP stations. 2; 040 and 073; **Depth range**: 153–1185 m; **USNM voucher specimens**: 2; 422432 and 422599.

Literature. Anderson (1994: 82).

Remarks. We were not able to make a specific identification of these specimens; however, despite the apparent absence of external diagnostical features between them, two different forms (*Pachycara* sp.1 and *Pachycara* sp.2) are herein listed based on molecular differences (3.81% divergence in COI sequences).

(109) ***Pachycara* sp.2**

MOP stations. 1; 082; **Depth range**: 1471–1527 m; **USNM voucher specimens**: 2; 421417 and 421562.

Literature. Anderson (1994: 82).

Remarks. see remarks about *Pachycara* sp 1.

FIGURE 99. *Pachycara* sp.2. Top: entire specimen; Bottom: detail of head.

Chiasmodontidae

Swallowers (En); Engullidores (Sp). 2 G, 2 S.

(110) ***Chiasmodon subniger* Garman, 1899.** Eastern Pacific black swallower (En); Engullidor negro del Pacifico oriental (Sp)

MOP stations. 3; 001, 094 and 100; **Depth range**: 183–1406 m; **USNM voucher specimens**: 3; 422491, 435801 and 435803.

Distribution. Eastern (from Canada to northern Chile) and Central Pacific (Hawai), occurring at depths between 183 and 4568 m.

Literature. Garman (1899:73), Pequeño (1989: 64), Watson & Sandknop (1996b: 1131), McEachran & Fechhelm (2005: 554), Prokofiev (2008: 212; 2010: 507), Melo (2009: 589), Prokofiev & Kukuev (2009: 901) and Reyes-Bonilla *et al.* (2011: 10).

Remarks. Prokofiev & Kukuev (2009) and Prokofiev (2010) suggested that *C. subniger* is a synonym of *C. niger* Johnson 1864 based on the absence of "significant distinctions between specimens from the equatorial and southeastern Pacific and from other regions of the World Ocean." In contrast, Melo (2009) used several morphometric and meristic characters to clearly separate *C. subniger* (eastern Pacific), from *C.niger* (Atlantic Ocean). DNA barcodes for our specimens of *C. subniger* match those for *C. subniger* from the eastern Pacific in the BOLD database. DNA barcodes in BOLD for *C.niger* from the Atlantic are approximately 7.5% different, which provides empirical support for the validity of *C. subniger* as proposed by Melo (2009). Specimens collected at 183 m represent a new minimum depth record for the species (Melo 2009, Froese & Pauly 2016).

FIGURE 100. *Chiasmodon subniger;* USNM 422491, 130 mm. SL.

(111) ***Pseudoscopelus lavenbergi*** **Melo, Walker & Klepadlo 2007.**

MOP stations. 1; 029; **Depth range**: 1113–1126 m; **USNM voucher specimens**: 1; 422507.

Distribution. Eastern Pacific (from California, USA, to Chile, including the Hawaiian Islands), occurring at depths between 200 and 2300 m.

Literature. Melo *et al.* (2007: 33), Melo *et al.* (2010: 65) and Prokofiev (2014: 647).

FIGURE 101. *Pseudoscopelus lavenbergi*. Top: entire specimen; Bottom: detail of head; USNM 422507, 160 mm. SL.

Uranoscopidae

Stargazers (En); Miracielos (Sp). 1 G, 1 S.

(112) ***Kathetostoma averruncus*** **Jordan & Bollman, 1890.** Smooth stargazer (En); Miracielo buldog (Sp)

MOP stations. 4; 006, 015, 049 and 068; **Depth range**: 109–145 m; **USNM voucher specimens**: 8; 421220, 421228, 421231, 421232, 421261, 421335, 422305 and 422321.

Distribution. Eastern Pacific (from California, USA, to Isla Lobos de Tierra, Peru, including the Galápagos Islands), occurring at depths between 13 and 600 m.

Literature. Jordan & Bollman (1890: 163), Fierstine & Werner (1963: 50), Eschmeyer *et al.* (1983: 240), Kirsch (1989: 260), Pietsch (1989: 296), Bussing & López (1994: 140; 2009: 463), Bussing & Lavenberg (1995b: 1649), Bearez (1996: 738), Fitch & Lavenberg (1968: 102), Castro-Aguirre & Balart (1996: 71), Watson (1996h: 1144), De La Cruz Agüero *et al.* (1997: 306), Grove & Lavenberg (1997: 512), Chirichigno & Vélez (1998: 240), Rodríguez-Romero *et al.* (2008: 1776), Odani (2009: 291), McCosker & Rosenblatt (2010: 193), López-Martínez *et al.* (2012: 353), Vilasri (2013: 89), Fuentes *et al.* (2015: 616) and Robertson & Allen (2015: 1712).

FIGURE 102. *Kathetostoma averruncus*.

Callionymidae

Dragonets (En); Dragoncillos (Sp). 1 G, 1 S.

(113) ***Synchiropus atrilabiatus*** **(Garman, 1899)**. Antler dragonet, Blacklip dragonet, Sleepy dragonet (En); Dragoncito de asta, Gobio-adorno vistoso (Sp)

MOP stations. 1; 001; **Depth range**: 165–183 m; **USNM voucher specimens**: 1; 422551.

Distribution. Eastern Pacific (from the mouth of the Gulf of California, to Paita, Peru, including the Cocos, Malpelo and Galapagos Islands), occurring at depths between 3 and 235 m.

Literature. Garman (1899: 122), Fricke (1981: 33; 1982: 75; 1983: 567; 2002:52), Castro-Aguirre (1991: 82), Castro-Aguirre *et al.* (1993: 86), Bussing & López (1994: 142; 2009: 465), Watson (1996i: 1205), Grove & Lavenberg (1997: 545), Lea & Rosenblatt (2000: 126), Rodríguez-Romero *et al.* (2008: 1776), Hooker (2009c: 294), McCosker & Rosenblatt (2010: 194), López-Martínez *et al.* (2012: 353), Fuentes *et al.* (2015: 616) and Robertson & Allen (2015: 1965).

FIGURE 103. *Synchiropus atrilabiatus*; USNM 422551, 120 mm. SL.

Gobiidae
Gobies (En); Gobios, Chupapiedras, Guarasapas (Sp). 1 G, 2 S.

(114) ***Bollmannia* sp 1.**

MOP stations. 3; 003, 038 and 048; **Depth range**: 116–154 m; **USNM voucher specimens**: 6; 421390, 421397, 421408, 421428, 422310 and 422401.

Literature. Hoese (1995: 1132) and Van Tassel *et al.* (2012: 61).

Remarks. As noted by Van Tassel *et al.* (2012), no formal review of eastern Pacific *Bollmannia* Jordan, 1890 has been published up to this point. The taxonomy of the genus is complicated and the validity of several forms is questioned given the absence of real diagnostic characters. Additionally, several of the characters described as diagnostic for the most of the "valid" species are of little value as these characters are commonly destroyed when specimens are trawled or dredged from considerable depths, as in the present case. Accordingly, we were not able to make a specific identification of these specimens; however, despite the apparent absence of external diagnostical features between them, two different forms (*Bollmannia* sp.1 and *Bollmannia* sp.2) are herein listed based on molecular differences (6.1–6.8% divergence in COI sequences).

(115) ***Bollmannia* sp 2.**

MOP stations. 5; 003, 038, 048, 081 and 082; **Depth range**: 116–154 m; **USNM voucher specimens**: 6; 421380, 421381, 421387, 421403, 421412 and 422308. **Literature.** Hoese (1995: 1132) and Van Tassel *et al.* (2012: 61).

Remarks. see remarks about *Bollmannia* sp 1.

FIGURE 104. *Bollmannia* sp 2. Two different specimens to demonstrate color variation.

Trichiuridae
Cutlassfishes (En); Cintas, Fajas (Sp). 1 G, 1 S.

(116) ***Trichiurus nitens* Garman 1899.** Largehead hairtail (En); Pez cinta, Pez sable (Sp)

MOP stations. 4; 004, 036, 038 and 102; **Depth range**: 115–165 m; **USNM voucher specimens**: 10; 421385, 421407, 421433, 422317, 422326, 422372, 422376, 422380, 422445 and 422553.

Distribution. Eastern Pacific (from California, USA, to Peru, including the Galápagos Islands), occurring at depths between 3 and 500 m.

Literature. Garman (1899: 69), Eschmeyer & Herald (1983: 267), Nakamura & Parin (1993: 106), Allen & Robertson (1994: 275), Bussing & López (1994: 148; 2009: 468), Nakamura (1995: 1639), Bearez (1996: 739), De La Cruz Agüero *et al.* (1997: 299), Grove & Lavenberg (1997: 577), Chirichigno & Vélez (1998: 117), Castro-

Aguirre *et al.* (1999: 461), Lea & Rosenblatt (2000: 126), Hutchins (2001: 45), Menezes *et al.* (2003: 102), Parin (2003: S27), McEachran & Fechhelm (2005: 770), Chakraborty *et al.* (2006: 93), Burhanuddin & Parin (2008: 825), McCosker & Rosenblatt (2010: 194), Psomadakis *et al.* (2015: 313) and Robertson & Allen (2015: 4507).

FIGURE 105. *Trichiurus nitens*. Top: entire specimen; Bottom: detail of head.

Nomeidae
Driftfishes, Cigarfishes (En); Derivantes, Flotadores (Sp). 2 G, 3 S.

(117) ***Cubiceps pauciradiatus* Günther, 1872**. Bigeye cigarfish (En); Derivante ojón (Sp)

MOP stations. 4; 003, 028, 034 and 062; **Depth range**: 116–1472 m; **USNM voucher specimens**: 5; 421415, 421436, 421513, 422357 and 422496.

FIGURE 106. *Cubiceps pauciradiatus*.

Distribution. Circumglobal in tropical through warm temperate seas, occurring at depths between 58 and 1000 m. In the eastern Pacific this species has been previously recorded from Baja California, Mexico, to Chile.

Literature. Günther (1872: 423), Haedrich (1967: 81; 1995: 1323), Ahlstrom *et al.* (1976: 285), Butler (1979: 236), Scott & Scott (1988: 473), Pequeño (1989: 68), McAllister (1990: 181), Gomon *et al.* (1994: 839), Bearez (1996: 739), Watson (1996j: 1301), Castro-Aguirre & Balart (1996: 71), Grove & Lavenberg (1997: 603), Chirichigno & Vélez (1998: 292), Nakabo (2000: 964; 2002:964), Hutchins (2001: 46), McEachran & Fechhelm (2005: 805), Mundy (2005: 512), Shimazaki (2009b: 302), Ho *et al.* (2010: 257), McCosker & Rosenblatt (2010: 195), Del Moral-Flores *et al.* (2013: 208) and Robertson & Allen (2015: 2266).

Remarks. The specimens of this pelagic species (see Bussing & López 1994, Mundy 2005), Robertson &

Allen 2015, Froese & Pauly 2016), could have been caught in shallow water during deployment or retrieval of the net. Hence we do not record an increase in maximum depth for this species.

(118) ***Psenes cyanophrys*** **Valenciennes, 1833**. Freckled driftfish, Striped driftfish (En); Flotador derivante, Derivante rayado (Sp)

MOP stations. 1; 021; **Depth range**: 764–987 m; **USNM voucher specimens**: 1; 421567.

Distribution. Circumglobal in tropical through warm temperate seas, occurring at depths between 0 and 550 m. In the eastern Pacific this species has been previously recorded from Costa Rica to Peru, including the Cocos, Malpelo and Galápagos Islands.

Literature. Valenciennes (1833a: 260), Haedrich (1967: 84; 1995: 1323), Ahlstrom *et al.* (1976: 285), Uyeno *et al.* (1983: 423), Allen & Robertson (1994: 284), Grove & Lavenberg (1997: 605), Chirichigno & Vélez (1998: 291), Nakabo (2000: 964; 2002: 964), Hutchins (2001: 46), Menezes *et al.* (2003: 104), Parin & Piotrovsky (2004: S53), McEachran & Fechhelm (2005: 808), Mundy (2005: 512), Bussing & López (2009: 469), McCosker & Rosenblatt (2010: 195) and Robertson & Allen (2015: 2271).

Remarks. The specimens of this pelagic species (see Bussing & López (1994), Mundy (2005), Robertson & Allen (2015) and Froese & Pauly (2016), could have been caught in shallow water during deployment or retrieval of the net. Hence we do not record an increase in maximum depth for this species.

FIGURE 107. *Psenes cyanophrys;* USNM 421567, 90 mm. SL.

(119) ***Psenes sio*** **Haedrich, 1970.** Two-spine driftfish (En); Flotador dos espinas (Sp)

MOP stations. 8; 037, 065, 070, 074, 077, 080, 082 and 103; **Depth range**: 117–1527 m; **USNM voucher specimens**: 14; 421342, 421375, 421382, 421405, 421410, 421434, 421570, 422373, 422377, 422378, 422411, 422472, 422526 and 422547.

Distribution. Eastern Pacific (from Baja California, Mexico, to Chile, including the Galápagos Islands), occurring at depths between 0 and 500m (see Remarks).

Literature. Haedrich (1970: 2; 1995: 1323), Pequeño (1989: 68), Fujita (1991: 323), Ahlstrom *et al.* (1976: 285), Bussing & López (2009: 469), Castro-Aguirre *et al.* (1993: 85), Bearez (1996: 739), Watson (1996j: 1300), Castro-Aguirre & Balart (1996: 71), Grove & Lavenberg (1997: 606), Chirichigno & Vélez (1998: 291), Shimazaki (2009b: 303), McCosker & Rosenblatt (2010: 195), Del Moral-Flores *et al.* (2013: 208) and Robertson & Allen (2015: 2271).

Remarks. The specimens of this pelagic species (see Bussing & López (1994), Mundy (2005), Robertson & Allen (2015) and Froese & Pauly (2016), could have been caught in shallow water during deployment or retrieval of the net. Hence we do not record an increase in maximum depth for this species.

FIGURE 108. *Psenes sio*. Top: entire specimen; Bottom: detail of head.

Stromateidae
Butterfishes (En); Palometas (Sp). 1 G, 2 S.

(120) ***Peprilus medius* (Peters, 1869).** Pacific harvestfish (En); Pampanito aleta larga, Palometa cometrapo, Palometa común (Sp)

MOP stations. 2; 006 and 015; **Depth range**: 109–114 m; **USNM voucher specimens**: 5; 421322, 421325, 421328, 422337 and 422358.

FIGURE 109. *Peprilus medius.*

Distribution. Eastern Pacific (From Southern Baja California Sur, Mexico, including the Gulf of California, to northern Chile, including the Galápagos Islands), occurring at depths between 4 and 220 m.

Literature. Peters (1869: 707), Horn (1970: 175), Allen & Robertson (1994: 285), Bussing & López (1994: 116; 2009: 469), Balart *et al.* (1995: 83), Haedrich & Schneider (1995: 1623), Sielfeld *et al.* (1995: 25), Bearez (1996: 739), Grove & Lavenberg (1997: 598), Chirichigno & Vélez (1998: 141), Rodríguez-Romero *et al.* (2008:

1776), McCosker & Rosenblatt (2010: 195), Del Moral-Flores *et al.* (2013: 208), Murase et al (2014: 1408) and Robertson & Allen (2015: 2280).

(121) ***Peprilus snyderi*** **Gilbert & Starks, 1904**. Salema butterfish (En); Palometa salema (Sp)

MOP stations. 2; 006 and 068; **Depth range**: 109–145 m; **USNM voucher specimens**: 4; 421333, 422303, 422315 and 422330.

Distribution. Eastern Pacific (from southern Baja California Sur, Mexico, including the Gulf of California, to northern Peru), occurring at depths between 0 and 235 m.

Literature. Gilbert & Starks (1904: 87), Böhlke (1953: 105), Haedrich (1967: 107), Horn (1970: 189), Allen & Robertson (1994: 285), Bussing & López (1994: 116; 2009: 469), Balart *et al.* (1995: 83), Haedrich & Schneider (1995: 1623), Bearez (1996: 739), Chirichigno & Vélez (1998: 142), Rodríguez-Romero *et al.* (2008: 1776), López-Martínez *et al.* (2012: 353) and Robertson & Allen (2015: 2283).

FIGURE 110. *Peprilus snyderi.*

PLEURONECTIFORMES

3 F, 5 G, 7 S.

Paralichthyidae

Sand flounders (En); Lenguados, Peces Hoja (Sp). 2 G, 3 S.

(122) ***Citharichthys platophrys*** **Gilbert, 1891.** Small sandab (En); Lenguado frentón (Sp)

MOP stations. 2; 041 and 049; **Depth range**: 115–152 m; **USNM voucher specimens**: 4; 421283, 421298, 422562 and 422576.

Distribution. Eastern Pacific (from southern Baja California, Mexico, including the Gulf of California, to northern Peru, including the Cocos Island), occurring at depths between 10 and 152 m (see Remarks).

Literature. Gilbert (1891b: 454), Castro-Aguirre *et al.* (1992: 100), Bussing & López (1994: 150; 2009: 470), Hensley (1995b: 1349), Bearez (1996: 739), Moser & Sumida (1996: 1325), De La Cruz Agüero *et al.* (1997: 249), Grove & Lavenberg (1997: 613), Chirichigno & Vélez (1998: 210), Rodríguez-Romero *et al.* (2008: 1777), Amaoka (2009a: 310), van der Heiden *et al.* (2009: 814), Del Moral-Flores *et al.* (2013: 208), Murase et al (2014: 1408), Fuentes *et al.* (2015: 617) and Robertson & Allen (2015: 2312).

Remarks. Specimens collected at 152 m represent a new maximum depth record for the species (Bussing & López 1994, 2009; Hensley 1995b; Robertson & Allen 2015; Froese & Pauly 2016).

FIGURE 111. *Citharichthys platophrys.*

(123) ***Hippoglossina bollmani*** **Gilbert, 1890.** Spotted flounder (En); Lenguado pintado (Sp)

MOP stations. 4; 015, 041, 049 and 068; **Depth range**: 113–152 m; **USNM voucher specimens**: 7; 421239, 421313, 421327, 421339, 421351, 421489 and 422468.

Distribution. Eastern Pacific (from southern Baja California, Mexico, including the Gulf of California, to Peru, including the Cocos and Galápagos Islands), occurring at depths between 18 and 191 m.

Literature. Gilbert (1890: 122), Norman (1934: 68), Bussing & López (1994: 154; 2009: 470), Hensley (1995b: 1355), Bearez (1996: 739), Moser & Sumida (1996: 1325), De La Cruz Agüero *et al.* (1997: 252), Chirichigno & Vélez (1998: 200), Rodríguez-Romero *et al.* (2008: 1777), Amaoka (2009a: 312), McCosker & Rosenblatt (2010: 195), López-Martínez *et al.* (2012: 353), Del Moral-Flores *et al.* (2013: 208) and Robertson & Allen (2015: 2326).

FIGURE 112. *Hippoglossina bollmani.*

(124) ***Hippoglossina tetrophthalma*** **(Gilbert, 1890).** Fourspot flounder (En); Lenguado cuatro ojos (Sp)

MOP stations. 1; 041; **Depth range**: 115–152 m; **USNM voucher specimens**: 2; 422597 and 422637.

Distribution. Eastern Pacific (from southern Baja California, Mexico, including the Gulf of California, to Peru), occurring at depths between 23 and 233 m.

Literature. Gilbert (1890: 122), Allen & Robertson (1994: 288), Bussing & López (1994: 152; 2009: 470), Hensley (1995b: 1355), Bearez (1996: 739), Moser & Sumida (1996: 1325), De La Cruz Agüero *et al.* (1997: 253), Chirichigno F. & Vélez D. (1998: 200), Rodríguez-Romero *et al.* (2008: 1777), López-Martínez *et al.* (2012: 354), Del Moral-Flores *et al.* (2013: 208) and Robertson & Allen (2015: 2331).

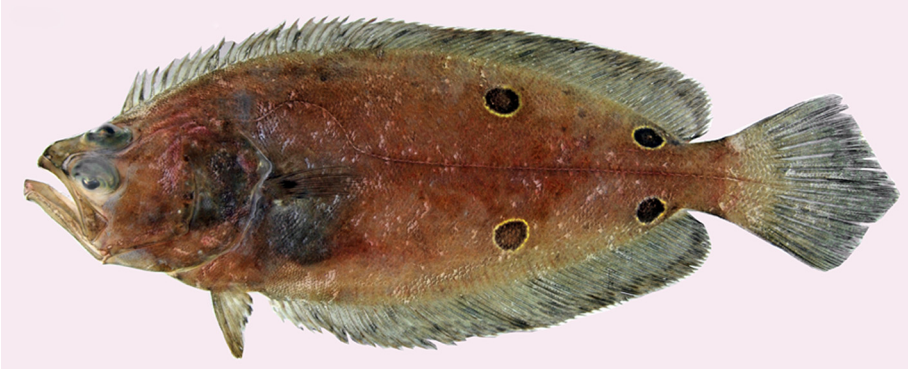

FIGURE 113. *Hippoglossina tetrophthalma.*

Bothidae

Lefteye flounders (En); Lenguados, Lenguados Izquierdos (Sp). 2 G, 3 S.

(125) ***Engyophrys sanctilaurentii* Jordan & Bollman, 1890**. Speckled-tail flounder (En); Lenguado colimanchada (Sp)

MOP stations. 2; 001and 015; **Depth range**: 113–183 m; **USNM voucher specimens**: 3; 421316, 422515 and 422537.

Distribution. Eastern Pacific (from southern Baja California, Mexico, including the Gulf of California, to Peru, including the Malpelo Island), occurring at depths between 40 and 235 m.

Literature. Jordan & Bollman (1890: 176), Böhlke (1953: 139), Castro-Aguirre *et al.* (1992: 102), Bussing & López (1994: 152; 2009: 469), Hensley (1995a: 931), Castro-Aguirre & Balart (1996: 71), Moser & Charter (1996: 1357), De La Cruz Agüero *et al.* (1997: 74), Chirichigno & Vélez (1998: 203), Lea & Rosenblatt (2000: 126), Allen & Groce (2001: 137), Rodríguez-Romero *et al.* (2008: 1777), Murase et al (2014: 1408), Fuentes *et al.* (2015: 617) and Robertson & Allen (2015: 2294).

(126) ***Monolene dubiosa* Garman, 1899.** Acapulco flounder (En); Lenguado acapulqueño, Lenguado carbón (Sp)

FIGURE 114. *Monolene dubiosa.*

MOP stations. 3; 039, 061 and 068; **Depth range**: 137–237 m; **USNM voucher specimens**: 8; 421486, 422323, 422328, 422488, 422490, 422493, 422501 and 422516.

Distribution. Eastern Pacific (from southern Baja California, Mexico, including the Gulf of California, to Peru), occurring at depths between 68 and 255 m.

Literature. Garman (1899: 227), Bussing & López (1994: 152; 2009: 469), Hensley (1995a: 931), Castro-Aguirre & Balart (1996: 71), Moser & Charter (1996: 1357), De La Cruz Agüero *et al.* (1997: 74), Evseenko (1999: 625), Rodríguez-Romero *et al.* (2008: 1777), Amaoka (2009b: 315), Fuentes *et al.* (2015: 617) and Robertson & Allen (2015: 2296).

Remarks. The USNM 422493 specimen differs from the others by having a relatively shorter eye (about 17% of head length, vs. about 21%), a feature that, according to some authors, e.g. Clark (1936) and Hensley (1995), distinguishes *M. assaedae* Clark, 1936 from *M. dubiosa*. However, other authors, e.g. Evseenko (1999) have questioned the validity of *M. assaedae* given the apparent absence of other more robust, distinctive characters, and have considered it to be a junior synonym of *M. dubiosa*. COI sequences for both the multiple *M. dubiosa* specimens and the single *M.* "*assaedae*" specimen in our collection are very similar (less than 1% sequence divergence), which supports Evseenko's (1999) proposal. Hence all these specimens are listed here as *M. dubiosa.*

(127) ***Monolene maculipinna*** **Garman, 1899.** Pacific deepwater flounder (En); Lenguado de profundidad (Sp)

MOP stations. 2; 001 and 049; **Depth range**: 128–183 m; **USNM voucher specimens**: 5; 421550, 422351, 422356, 422517 and 422565.

Distribution. Eastern Pacific (from Nicaragua to Peru, including the Galapagos Islands), occurring at depths between 65 and 385 m.

Literature. Garman (1899: 226), Bussing & López (1994: 152; 2009: 470), Hensley (1995a: 931), Moser & Charter (1996: 1357), Sánchez (1997: 7), Chirichigno & Vélez (1998: 202), Hoshino *et al.* (2000: 293), Amaoka (2009b: 316), McCosker & Rosenblatt (2010: 195) and Robertson & Allen (2015: 2637).

FIGURE 115. *Monolene maculipinna.*

Cynoglossidae

Tonguefishes (En); Lengüetas, Lenguas (Sp). 1 G, 1 S.

(128) ***Symphurus leei*** **Jordan & Bollman 1890.** Black-tail tonguefish, Lee's tonguefish (En); Lengua colinegra, Lengua de Lee (sp)

MOP stations. 2; 038 and 073; **Depth range**: 144–176 m; **USNM voucher specimens**: 6; 421245, 421418, 421442, 421452, 421454 and 421507.

Distribution. Eastern Pacific (from the Gulf of California, Mexico, to Panama), occurring at depths between 10 and 176 m (see Remarks).

Literature. Jordan & Bollman (1890: 178), Böhlke (1953: 143), Munroe & Nizinski (1990: 994), Allen & Robertson (1994: 291), Bussing & López (1994: 146), Munroe *et al.* (1995: 1051), De La Cruz Agüero *et al.* (1997: 116), Chirichigno & Vélez (1998: 215) and Robertson & Allen (2015: 2382).

Remarks. Specimens collected at 176 m represent a new maximum depth record for the species (Bussing & López 1994, 2009; Munroe *et al.* 1995; Robertson & Allen 2015; Froese & Pauly 2016).

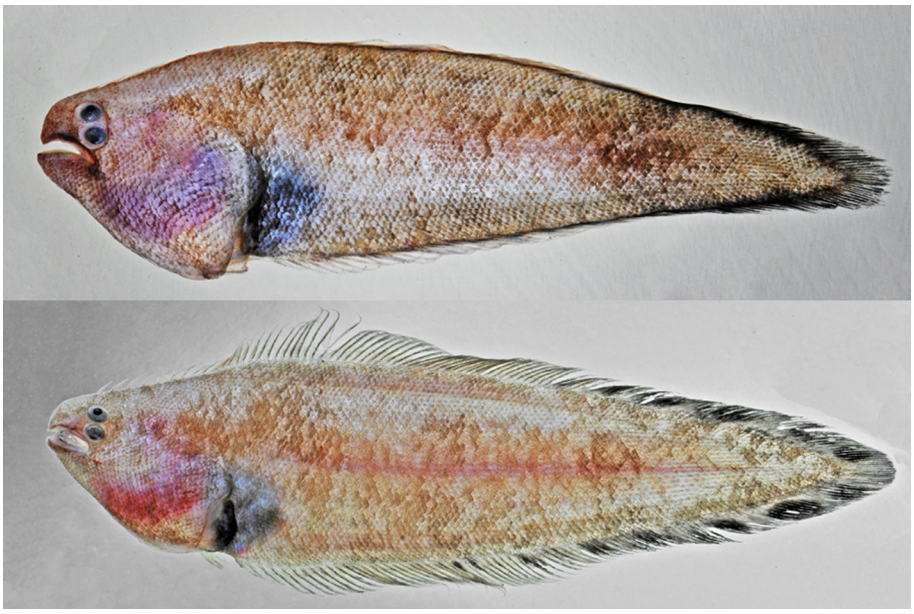

FIGURE 116. *Symphurus leei.* Top and Bottom: two specimens to illustrate variation.

TETRAODONTIFORMES

1 F, 1 G, 1 S.

Balistidae

Triggerfishes (En); Peces Chanchos, Calafates (Sp). 1 G, 1 S.

(129) ***Balistes polylepis*** **Steindachner, 1876.** Finescale triggerfish (En); Pejepuerco coche, Cochi (Sp)

MOP stations. 1; 091; **Depth range**: 105–107 m; **USNM voucher specimens**: 1; 421241.

FIGURE 117. *Balistes polylepis;* USNM 421241, 35 mm. SL.

Distribution. Eastern (from northern California, USA, including the Gulf of California, to Chile, including all the offshore islands) and Central Pacific (Marquesas Islands and Hawaii), occurring at depths between 2 and 512 m.

Literature. Steindachner (1876: 69), Berry & Baldwin (1966: 436), Eschmeyer *et al.* (1983: 295), Pequeño (1989: 77), Allen & Robertson (1994: 294), Bussing & López (1994: 158; 2009: 471), Bearez (1996: 739), Watson (1996k: 1417), De La Cruz Agüero *et al.* (1997: 64), Grove & Lavenberg (1997: 628), Randall & Mundy (1998: 324), Chirichigno & Vélez (1998: 137), Thomson *et al.* (2000: 268), Richards & Engle (2001: 18), Mecklenburg *et al.* (2002: 851), Mundy (2005: 523), Randall (2007: 470), Rodríguez-Romero *et al.* (2008: 1778), McCosker & Rosenblatt (2010: 195), Del Moral-Flores *et al.* (2013: 209), Murase et al (2014: 1408), Fuentes *et al.* (2015: 617), Delrieu-Trottin *et al.* (2015: 8) and Robertson & Allen (2015: 2396).

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