

New and rare records of teleost fishes from the Cape Verde Islands (eastern-central Atlantic Ocean)

by

José A. GONZÁLEZ* (1), Albertino MARTINS (2), José I. SANTANA (1), Raül TRIAY-PORTELLA (1), Carlos MONTEIRO (2), Verónica GARCÍA-MARTÍN (1), Sebastián JIMÉNEZ (3), Gustavo GONZÁLEZ-LORENZO (3), José G. PAJUELO (1), José M. LORENZO (1) & Manuel BISCOITO (4)



Abstract. – As a result of six exploratory surveys and several opportunistic catches in the Cape Verde Islands from a few metres to about 1000 m of depth, a list of 66 species of teleost fishes is given, six of which are first records from the archipelago: *Gnathophis mystax* (Congridae), *Nezumia africana*, *Nezumia duodecim* (Macrouridae), *Ectreposebastes imus* (Scorpaenidae), *Paraliparis* sp. (Liparidae) and *Lappanella fasciata* (Labridae). Additionally, data on six poorly-known species is also given: *Myroconger compressus* (Myrocongridae), *Myrichthys pardalis*, *Phaenomonas longissima* (Ophichthidae), *Sphagemacrurus hirundo* (Macrouridae), *Gadella imberbis* and *Physiculus cyanostrophus* (Moridae). Data includes distribution, habitat, morphometry and reproduction.

Résumé. – Nouveaux ou rares signalements de poissons téléostéens des îles du Cap-Vert (océan Atlantique centre-oriental).

Six campagnes exploratoires ainsi que quelques captures opportunistes réalisées de quelques mètres jusqu'à environ 1000 m de profondeur aux îles du Cap-Vert ont permis d'établir une liste comprenant 66 espèces de poissons téléostéens. Six espèces sont signalées pour la première fois aux îles du Cap-Vert : *Gnathophis mystax* (Congridae), *Nezumia africana*, *Nezumia duodecim* (Macrouridae), *Ectreposebastes imus* (Scorpaenidae), *Paraliparis* sp. (Liparidae) et *Lappanella fasciata* (Labridae). La présence de six autres espèces mal connues est confirmée pour cet archipel : *Myroconger compressus* (Myrocongridae), *Myrichthys pardalis*, *Phaenomonas longissima* (Ophichthidae), *Sphagemacrurus hirundo* (Macrouridae), *Gadella imberbis* et *Physiculus cyanostrophus* (Moridae). Les données présentées concernent la distribution, l'habitat, la morphométrie et la reproduction.

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Key words

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The first specific account on the Cape Verde Islands' ichthyology was done by Osório (1911), who summarized previous records and gave a list of 48 species deposited in the collections of Museu Bocage (Lisbon). Subsequent accounts and notes based either on field work or bibliographic research were published by Cadenat (1951), Franca and Vasconcelos (1962), Cadenat and Roux (1964), Hartog (1984), Edwards (1986), Hensley (1986), Wirtz and Bath (1989), Bath (1990a, b), Reiner (1996, 2005), Brito *et al.* (1999, 2007), Matallanas and Brito (1999), Munroe *et al.* (2000), Brito and Miller (2001), González *et al.* (2004, 2010), Meneses *et al.* (2004), Monteiro (2008), González and Tariche (2009), Wirtz (2009), Almeida *et al.* (2010), Pereira *et al.* (2012) and Wirtz *et al.* (2013).

In a broader geographic scale, studies by Fowler (1936), Quéro *et al.* (1990) and Lloris *et al.* (1991) also include species from the Cape Verde Islands.

According to the above mentioned contributions and considering that the knowledge on the marine biodiversity of Cape Verde is still incomplete, in particular in the deep-sea, and some records need confirmation (see Brito *et al.*, 2007; González and Tariche, 2009; González *et al.*, 2010), the list of fish species from the archipelago can attain ca. 520 species (ca. 320 of which are deep-sea living species).

Following six exploratory surveys off the Cape Verde Islands, a list of new records and data on little known teleost fishes is given herein. Data on distribution, morphometry and reproduction of the species studied are presented. Sev-

- (1) EMAP - Ecología Marina Aplicada y Pesquerías, Departamento de Biología, Universidad de Las Palmas de Gran Canaria, Campus Universitario de Tafira, 35017 Las Palmas de Gran Canaria, Spain. [ignacio.santana@ulpgc.es] [emap.raul@gmail.com] [veronica@biologiapesquera.org] [jose.pajuelo@ulpgc.es] [josemaria.lorenzo@ulpgc.es]
- (2) Instituto Nacional de Desenvolvimento das Pescas, C.P. 132, Mindelo, São Vicente, Cape Verde. [Albertino.Martins@indp.gov.cv] [Carlos.Monteiro@indp.gov.cv]
- (3) Instituto Español de Oceanografía, Centro Oceanográfico de Canarias, vía Espaldón, parcela 8, Dársena Pesquera, 38180 Santa Cruz de Tenerife, Spain. [sebastian.jimenez@ca.ieo.es] [jacio.gustavo@gmail.com]
- (4) MARE - Museu de História Natural do Funchal / Estação de Biologia Marinha do Funchal, Cais do Carvão, Gorgulho, 9000-107 Funchal, Madeira, Portugal. [manuel.biscoito@cm-funchal.pt]

* Corresponding author [pepe.solea@ulpgc.es]

eral contributions to the knowledge of the ichthyology of the Cape Verde Islands were already published based on these collections: González *et al.* (2004) (the first record of *Myroconger compressus*, *Platyberyx opalescens* and *Pagrus africanus*), González *et al.* (2010) (the family Moridae from the Cape Verdes with first record of *Physiculus cyanostrophus*) and Almeida *et al.* (2010) (first record of *Synaphobranchus affinis*).

MATERIAL AND METHODS

Six exploratory fish-trapping surveys of the bottom fauna of the Cape Verde Islands were carried out off the islands of Boa Vista, Santiago, including the Bancona Bank, São Vicente, Santa Luzia, Sal, and São Nicolau, between 2003 and 2012, at depths down to 1000 m (Fig. 1). Fishing operations during the first two cruises (2003 and 2005) covered a depth range between 435 m and 1060 m, in order to search for new living resources off the islands of Boa Vista, which is characterised by a sediment-covered broad shelf and slope, and Santiago, with a narrow shelf and slope dominated by

hard substrata. The remaining cruises (2010–2012) were mainly directed to the exploration and stock assessment of the striped soldier shrimp (*Plesionika edwardsii*) between 66 m and 458 m depth and covered four additional islands (Tab. I).

In all cruises bottom traps (BT) and semifloating shrimp traps (SFST, operated around 2.4 m above the seafloor) (González *et al.*, 1992, 2004) were used as fishing gear. On average, all traps were deployed for 16–18 h. Atlantic chub mackerel (*Scomber colias*) (Scombridae) was used as bait during the first two cruises and mackerel scad (*Decapterus macarellus*) (Carangidae) in the remaining ones (Tab. I).

Several opportunistic catches using bottom traps, pole-and-line or hand net, while ships were anchored, provided additional interesting specimens.

The present work follows the best practice approach to overcome unverified and unverifiable “first records” as proposed by Bello *et al.* (2014).

Voucher specimens were deposited in the collections of the Museu de História Natural do Funchal (MMF), the Museo de Ciencias Naturales de Tenerife (TFMC), The Natural History Museum (BMNH) and the Muséum national

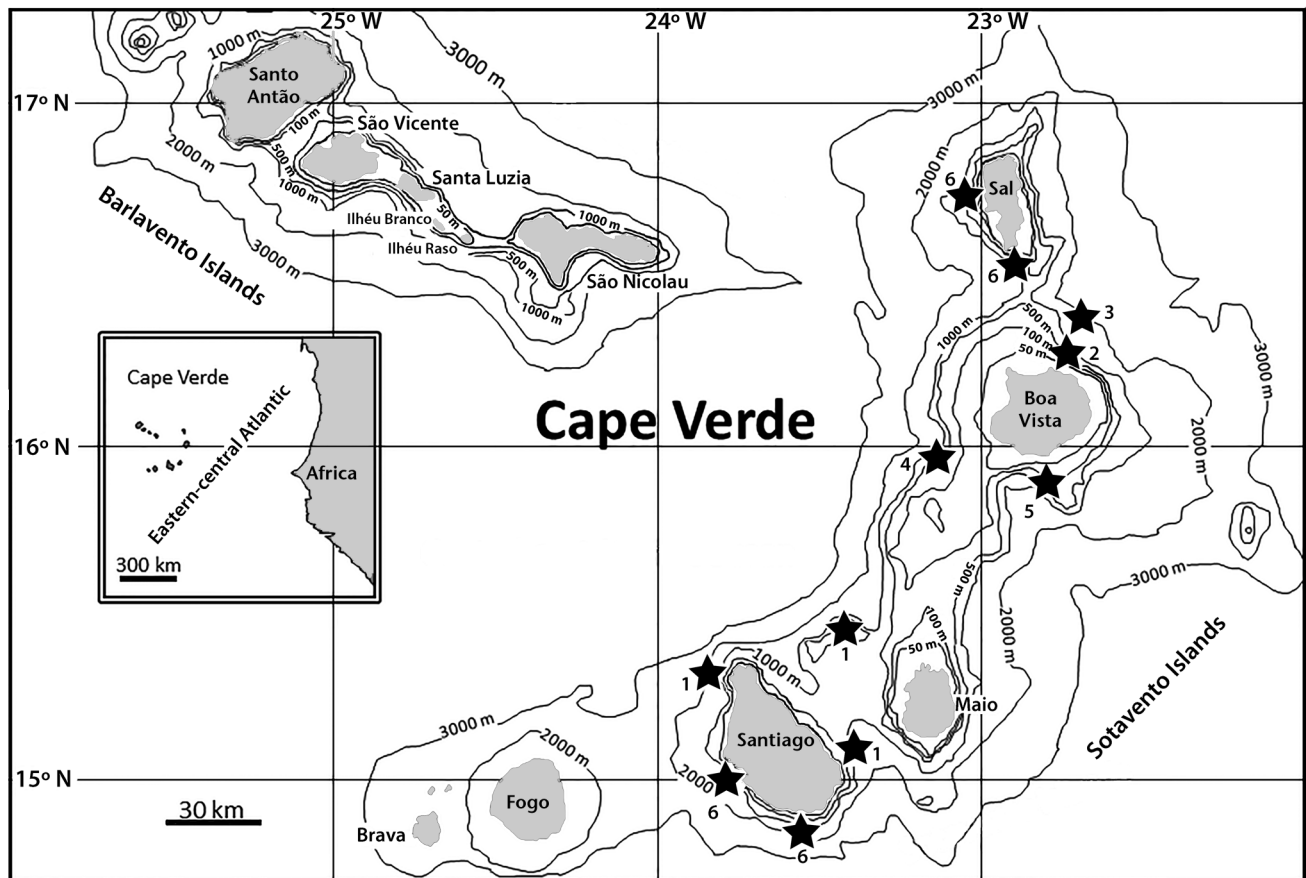


Figure 1. - Collection locations for the first records of teleost fishes from the Cape Verde Islands: (★) 1: *Gnathophis mystax*; 2: *Nezumia africana*; 3: *Nezumia duodecim*; 4: *Ectreposebastes imus*; 5: *Paraliparis* sp.; 6: *Lappanella fasciata*.

Table I. - List of cruises, locations, gear used and depth of sampling, from which specimens were obtained (BT: bottom traps; SFST: semi-floating shrimp traps).

Project	Cruise	Research vessel	Islands	Dates	Collecting gear	Depth interval (m)
HYDROCARPO	Taliarte 2003-08	Taliarte	Boa Vista, Santiago	Aug. 10-23, 2003	BT	435-975
HYDROCARPO	Cabo Verde 2005-06	Pixape II	Boa Vista, Santiago	Jun. 4-16, 2005	BT, SFST	447-1060
PROACTIVA	Cabo Verde 2010-04	Prof. I. Lozano	S.Vicente, Sta. Luzia	Apr. 12-30, 2010	BT, SFST	81-425
MARPROF-CV	Camarão-1	Prof. I. Lozano	Santiago	Nov. 17-30, 2011	BT, SFST	66-364
MARPROF-CV	Camarão-2	Prof. I. Lozano	Boa Vista	Mar. 3-15, 2012	BT, SFST	94-289
MARPROF-CV	Camarão-3	Prof. I. Lozano	Sal, S.Nicolau	Jul. 10-25, 2012	BT, SFST	74-458

d'Histoire naturelle (MNHN). Muscle tissue samples taken from each specimen were stored at ICCM (Iniciativa de Colecciones de Ciencias Marinas) from the University of Las Palmas de Gran Canaria. Additional unpreserved material was included in the present account whenever relevant for species' depth range or biological information.

Meristic and morphometric measurements (in mm) were made following Hubbs and Lagler (1958). SL: standard length; TL: total length; PAL: pre-anal length; PDL: pre-dorsal length; HL: head length. Institutional abbreviations follow Sabaj Pérez (2014). Taxonomical arrangement follows Nelson (2006) and taxonomy used according to Froese and Pauly (2014) and Eschmeyer (2014).

RESULTS AND DISCUSSION

The list of the species collected is given in table II, with indication of depth interval, collection gear and island where specimens were caught. Of the 66 species of teleost fishes collected, six are recorded for the first time from the Cape Verde Islands, data on six poorly-known species is also given, and the presence of three species is now confirmed in waters of this archipelago. These 17 species are detailed as follows:

Myroconger compressus Günther, 1870

Material examined. - MMF41909, 606 mm TL, MMF41910, 526 mm TL, MMF41911, 390 mm TL, 16°15'N 23°05'W, Baía de Sal Rei, Boa Vista Island, 215 m, cruise Cabo Verde 2005-06, sta. 22, 5 Jun. 2005, SFST.

Additional material. - 171 specimens, 303-620 mm TL, caught between 104 and 905 m depth, from off São Vicente, Santa Luzia, Boa Vista, Santiago and Sal islands.

Remarks. - A tropical demersal species occurring in a few scattered localities of the eastern Atlantic: from St. Helena, and Dakar, Senegal (Smith, 1990), São Tomé and Príncipe (Smith, 1990; Afonso *et al.*, 1999), the Cape Verde Islands (Brito *et al.*, 1999; González *et al.*, 2004; Menezes *et al.*, 2004; González and Tariche, 2009), and the Vavilov Underwater Ridge (the eastern part of the Atlantic Ocean) (Parin *et al.*, 2010). The present material was caught in both traps

used (Tab. II). Their major presence in bottom traps (81%) confirms its demersal nature. Gonad examination revealed that the red eel is a gonochoristic species. The 620 mm TL specimen is apparently the largest ever recorded (538 mm TL: Smith, 1990).

Echelus pachyrhynchus (Vaillant, 1888)

Material examined. - TFMCV/01581, 410 mm TL, 16°09'N 23°06'W, Ponta do Sol, Boa Vista Island, 295-299 m, cruise Cabo Verde 2005-06, sta. 1/3, soft bottom, 5 Jun. 2005, BT; MMF36366, 465 mm TL, 15°56'N 22°42'W, Ponta Medronha, Boa Vista Island, 210 m, cruise Cabo Verde 2005-06, sta. 73, soft bottom, 9 Jun. 2005, SFST; TFMCV/01582, 465 mm TL, 15°52'N 22°46'W, S of Ponta do Roque, Boa Vista Island, 240 m, cruise Cabo Verde 2005-06, sta. 90, soft bottom, 10 Jun. 2005, SFST.

Additional material. - 10 specimens, 407-513 mm TL, caught on soft bottoms, with certainty between 175 m and 460 m depth, from off São Vicente, Boa Vista and Santiago islands, cruises Cabo Verde 2005-06 and Cabo Verde 2010-04.

Remarks. - A deep-water bathydemersal species burrowing in sand or mud on the upper-slope at a 200-500 m depth range (Leiby, 1990; Froese and Pauly, 2014). Known from the eastern Atlantic, from Morocco to Angola and central Namibia (Bianchi *et al.*, 1993; Froese and Pauly, 2014), including the Cape Verde Islands (Leiby, 1990; Reiner, 1996, 2005; Froese and Pauly, 2014). Although the present material was caught in both traps, 76% occurred in bottom traps, therefore confirming its demersal nature. The 513 mm TL specimen is apparently the largest of this species ever recorded (485 mm TL: Leiby, 1990).

Myrichthys pardalis (Valenciennes, 1839)

Material examined. - MMF43114, 390 mm TL, 16°35'N 22°54'W, Baía de Santa Maria, Sal Island, cruise Cabo Verde 2005-06, caught at surface over a substrate of sand and pebbles with green (*Avrainvillea* sp.) and red algae and rhodoliths at 13 m depth, 21 Jul. 2012, hand net.

Additional material. - Another specimen was caught at 15°26'N 23°27'W, Bancona Bank, NE of Santiago Island,

Table II. - Systematic list of the species collected, with depth of capture, number of individuals caught, collecting gear and location. First records in bold. SV: São Vicente, SZ: Santa Luzia, BV: Boa Vista, ST: Santiago, SL: Sal, and SN: São Nicolau; * incidental collection; 0: no catches, -: collecting gear not operated at this depth in this island.

Order / Family	Species	Depth of capture (m)	Total	Collecting gear			Islands					
				BT	SFST	Other	SV	SZ	BV	ST	SL	SN
Anguilliformes												
Myrocongridae	<i>Myroconger compressus</i>	104-925	174	142	32		8	2	23	130	11	
Muraenidae	<i>Gymnothorax maderensis</i>	149-250	10	0	10		7					3
	<i>Gymnothorax polygonius</i>	88-220	103	29	74		11	7	7		16	62
	<i>Gymnothorax vicinus</i>	41-96	6	6	0				3	2	1	
	<i>Muraena helena</i>	83-300	256	72	184		39	8	9	41	154	5
	<i>Muraena robusta</i>	47	1	1	0				1			
Synaphobranchidae	<i>Synaphobranchus affinis</i>	191-1060	427	279	148		1		117	307		2
Ophichthidae	<i>Echelus myrus</i>	118-339	27	8	19				18	9		
	<i>Echelus pachyrhynchus</i>	175-460	13	10	3		1		8	4		
	<i>Myrichthys pardalis</i>	0	2			2				1	1	
	<i>Phaenomonas longissima</i>	0	1			1			1			
Colocongridae	<i>Coloconger cadenati</i>	260-900	273	226	47				179	92		2
Congridae	<i>Conger conger</i>	66-344	63	38	25		3	5	7	36	9	3
	<i>Gnathophis mystax</i>	110-289	7	7	0					7		
Stomiiformes												
Gnostomatidae	<i>Cyclothone microdon</i>	300-500	1	1*	-				1			
Stomiidae	<i>Stomias affinis</i>	500-700	2	2*	-				2			
Aulopiformes												
Synodontidae	<i>Synodus synodus</i>	140-150	1	1	0					1		
Polymixiiformes												
Polymixiidae	<i>Polymixia nobilis</i>	66-289	8	8	0					7	1	
Gadiformes												
Macrouridae	<i>Hymenocephalus italicus</i>	300-500	1	1	-				1			
	<i>Nezumia aequalis</i>	500-700	1	1	-				1			
	<i>Nezumia africana</i>	191-198	1	1	-				1			
	<i>Nezumia duodecim</i>	831-1023	2	2	-				2			
	<i>Sphagemacrurus hirundo</i>	268-292	1	1	0					1		
Moridae	<i>Gadella imberbis</i>	192-400	3	1	2				1	2		
	<i>Laemonema laureysi</i>	305-745	58	57	1				38	18		2
	<i>Physiculus cyanostrophus</i>	90-339	459	12	447		31	62	14	315	22	15
	<i>Physiculus</i> spp.	104-506	80	5	75			5	25	44	6	
Phycidae	<i>Phycis phycis</i>	50-700	20	19	1				16	1	2	1
Beryciformes												
Trachichthyidae	<i>Gephyroberyx darwinii</i>	126-450	3	3	0				1	1	1	
Holocentridae	<i>Sargocentrum hastatum</i>	74-96	1	1	0						1	
Gasterosteiformes												
Syngnathidae	<i>Hippocampus algiricus</i>	175-274	1	1	-				1			
Aulostomidae	<i>Aulostomus strigosus</i>	104-131	4	1	3			4				
Scorpaeniformes												
Scorpaenidae	<i>Ectreposebastes imus</i>	651-670	1	1	-				1			
	<i>Helicolenus dactylopterus</i>	175-659	37	34	3				8	27	2	
	<i>Neomerinthe folgori</i>	110-378	13	7	6		3		1	9		
	<i>Pontinus kuhlii</i>	89-360	352	117	235		41	3	17	178	98	15
	<i>Scorpaena elongata</i>	106-270	15	15	0					1	13	1
	<i>Scorpaena laevis</i>	25	1			1						1

Table I. - Continued.

Order / Family	Species	Depth of capture (m)	Total	Collecting gear			Islands					
				BT	SFST	Other	SV	SZ	BV	ST	SL	SN
Liparidae	<i>Paraliparis</i> sp.	502-592	1	1	-				1			
Perciformes												
Serranidae	<i>Anthias anthias</i>	104-225	7	3	4		1			5	1	
	<i>Cephalopholis taeniops</i>	104-121	1	1	0					1		
	<i>Epinephelus goreensis</i>	113-180	2	1	1			1			1	
	<i>Rypticus saponaceus</i>	66-74	1	1	0					1		
	<i>Serranus atricauda</i>	66-180	41	3	38		4	11		9	17	
Carangidae	<i>Seriola fasciata</i>	132-148	1	0	1		1					
Caristiidae	<i>Platyberyx opalescens</i>	776-800	1	1	-				1			
Lutjanidae	<i>Lutjanus goreensis</i>	51-60	5			5			5			
Haemulidae	<i>Parapristipoma humile</i>	70-135	20	5	15		2	3			6	9
	<i>Pomadasys perotaei</i>	11-55	5	1	-	4			4	1		
Sparidae	<i>Boops boops</i>	100-230	2	2	0				2			
	<i>Dentex macrophthalmus</i>	89-592	1081	146	935		25	4	1027		25	
	<i>Pagellus acarne</i>	67-335	2210	1252	958		591	117	1477	20	5	
	<i>Pagrus africanus</i>	100	2	2	-				2			
	<i>Spondylisoma cantharus</i>	90-187	1	1	0						1	
Mullidae	<i>Pseudupeneus prayensis</i>	74-96	1	1	0						1	
Labridae	<i>Acantholabrus palloni</i>	74-302	13	0	13		4	1		6	2	
	<i>Bodianus scrofa</i>	104-131	6	1	5		2	1		1	2	
	<i>Lappanella fasciata</i>	102-125	7	0	7					4	3	
Trachinidae	<i>Trachinus</i> sp.	122-137	1	1	0				1			
Blenniidae	<i>Ophioblennius atlanticus</i>	112-220	2	2*	0					2		
Gempylidae	<i>Promethichthys prometheus</i>	125-197	6	0	6		2	1	2		1	
Caproidae	<i>Antigonia capros</i>	96-234	12	0	12		8		4			
	<i>Capros aper</i>	113-182	3	1	2				3			
Tetraodontiformes												
Tetraodontidae	<i>Sphoeroides marmoratus</i>	74-96	2	2	0						2	
	<i>Sphoeroides pachygaster</i>	66-255	309	51	258		76	91	113	13	15	1

cruise Taliarte 2003-08, caught at surface over a hard substrate at 35-40 m depth, 17 Aug. 2003, hand net.

Remarks. - A tropical demersal eastern Atlantic species found burrowing in coarse sand along rocky coasts. Known from the Canary Islands and Western Sahara (Leiby, 1990), the Cape Verdes (Franca and Vasconcelos, 1962; Blache and Cadenat, 1971; Brito *et al.*, 1999) and São Tomé Island (Afonso *et al.*, 1999) to Annobon Island, Equatorial Guinea (Leiby, 1990). Information on its bathymetric distribution is scarce. In the Canaries it has been found between 3 and 15 m (Brito *et al.*, 2002), and recently between 1 and 25 m (in sea grass meadows) (Espino *et al.*, 2007; Arturo Boyra, pers. com. 2014). Our specimens were caught while actively swimming at surface at night, over 13 to 35 m depth, probably due to the large number of small organisms concentrated around the vessel, attracted by its bright lights.

***Phaenomonas longissima* (Cadenat & Marchal, 1963)**

Material examined. - MMF42806, 430 mm TL, 10 mm PDL, 16°09'N 22°55'W, Baía do Sal Rei, Boa Vista Island, at surface over a substrate of sands and stones at 20 m depth, cruise Camarão-2, 14 Mar. 2012, hand net.

Remarks. - This tropical benthic species was first recorded from the Cape Verdes by Cadenat and Roux (1964) as *Sphagebranchus foresti*. The specimen was X-rayed and vertebral count was 205. In the Atlantic Ocean it is known from Senegal and Ghana and from the islands of Cape Verde, Ascension and St. Helena; also from Brazil (Froese and Pauly, 2014). Found from tide pools down to 60 m depth, sometimes burrowing in sand or mud (McCosker *et al.*, 1989; Leiby, 1990). Our finding seems to be the first collection of this species swimming freely at surface.

***Gnathophis mystax* (Delaroche, 1809)** (Fig. 2A)

Material examined. - MMF39446, 365 mm TL, MMF43111, 380 mm TL, MMF43112, 315+ mm TL, 15°26'N 23°26'W, Bancona Bank, NE of Santiago Island, 110-172 m, cruise Cabo Verde 2005-06, sta. 152/154, rocky bottom, 13 Jun. 2005, BT; MMF43113, 395 mm TL, 15°16'N 23°46'W, Tarrafal, Santiago Island, 155-175 m, cruise Camarão-1, sta. 2, rocky bottom, 18 Nov. 2011, BT.

Additional material. - Three specimens, cruise Cabo Verde 2005-06: 315+ and 380 mm TL, 15°26'N 23°26'W, Bancona Bank, NE of Santiago Island, 110-172 m, sta. 152/154, rocky bottom, 13 Jun. 2005, BT; 390 mm TL, a ripe female, 15°04'N 23°27'W, Ponta da Achada da Baleia, Santiago Island, 275-289 m, sta. 232/234, soft bottom, 16 Jun. 2005, BT.

Remarks. - A subtropical demersal species found on muddy or sandy bottoms of the shelf and continental slope between 80 m and 800 m depth. Known in the eastern Atlantic from southern Portugal to Morocco and the Canary Islands (Brito *et al.*, 2002), including the Mediterranean (Bauchot and Saldanha, 1986; Bauchot, 1987; Froese and Pauly, 2014). The voucher specimen MMF39446 has 33 lateral line pores anterior to anus. Our material was caught on both rocky and soft bottoms between 110 and 289 m depth.

This is the first record for this species from the Cape Verde Islands and the southernmost in the Atlantic Ocean. The finding of a ripe female proves the presence of a viable population.

***Nezumia africana* (Iwamoto, 1970)** (Fig. 2B)

Material examined. - MMF43121, 65.2 mm PAL, 41.2 mm HL, 16°17'N 22°46'W, E of Ponta Antónia, Boa Vista Island, 191-198 m, cruise Cabo Verde 2005-06, sta. 35/37, 7 Jun. 2005, BT.

Remarks. - A tropical benthopelagic species occurring along the slope down to 732 m depth. Previously known only from the Gulf of Guinea in the eastern-central Atlantic (Cohen *et al.*, 1990; Geistdoerfer, 1990; Froese and Pauly, 2014), it is recorded for the first time from the Cape Verde Islands, which fixes the northernmost limit of its distribution.

***Nezumia duodecim* (Iwamoto, 1970)** (Fig. 2C)

Material examined. - MMF39286, 72.8 mm PAL, MMF39287, 62.9 mm PAL, 16°18'N 22°44'W, E of Ponta Antónia, Boa Vista Island, 831-1023 m, cruise Cabo Verde 2005-06, sta. 48, 7 Jun. 2005, BT.

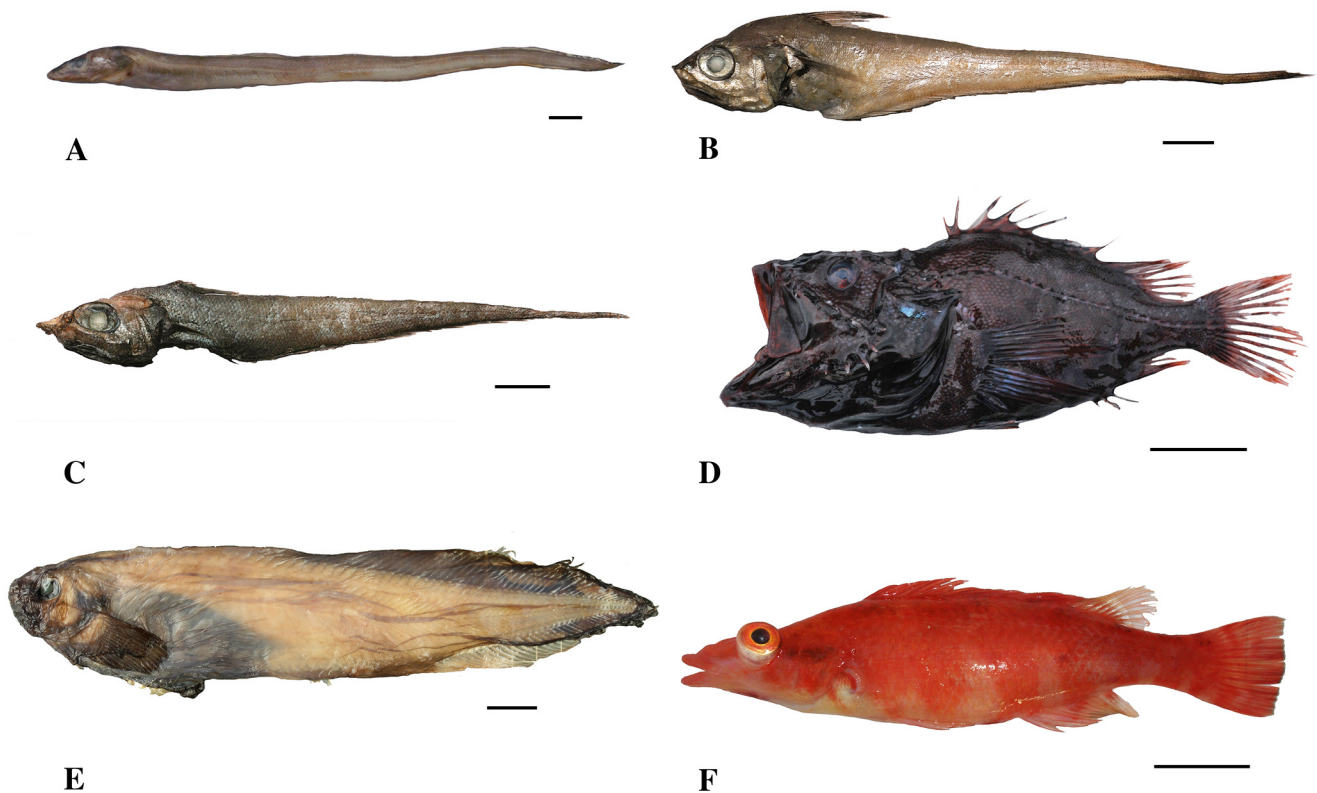


Figure 2. - First records of teleost fishes from the Cape Verde Islands. **A:** *Gnathophis mystax*, SL 365 mm, MMF39446; **B:** *Nezumia africana*, PAL 65.2 mm, MMF43121; **C:** *Nezumia duodecim*, PAL 72.8 mm, MMF39286; **D:** *Ectreposebastes imus*, SL 91 mm, MMF48816; **E:** *Paraliparis* sp., SL 251 mm, TFCM-VP/01377; **F:** *Lappanella fasciata*, SL 140 mm, MMF42284. Scale bars = 20 mm.

Remarks. - A benthopelagic deep-water species found between 329 and 1261 m depth. Known only from the eastern Atlantic, from Mauritania (24°N) to Angola (Cohen *et al.*, 1990). Apparently found deeper in the northern part of its range (Merrett and Marshall, 1981). This is the first record of this species from the Cape Verde Islands.

***Sphagemacrus hirundo* (Collett, 1896)**

Material examined. - MMF42815, partially damaged, 180 mm PDL, 160 mm HL, 15°08'N 23°47'W, Ribeira da Barca, Santiago Island, 268-292, cruise Camarão-1, sta. 8-D2, rocky bottom, 27 Nov 2011, BT.

Remarks. - A benthopelagic deep-water species found between 873 m and 2330 m depth (Merrett and Domanski, 1985; Geistdoerfer, 1990). An eastern Atlantic species mostly known from insular areas and adjacent seamounts: the Azores (Collett, 1896, holotype), Madeira (Geistdoerfer, 1986), the Canaries (Merrett and Domanski, 1985) and the Cape Verde Islands (Maio Island) (Roule, 1919). Also present in the Bay of Cadiz (Nybelin, 1948). This is the southernmost record for the species.

***Gadella imberbis* (Vaillant, 1888)**

Material examined. - MMF42808, 229 mm TL, 209 mm SL, 15°01'N 23°44'W, Ponta Covinha, Santiago Island, 260-270 m, cruise Camarão-1, sta. 10, rocky bottom, 21 Nov. 2011, SFST; MMF42809, 230 mm TL, 207 mm SL, 15°55'N 22°53'W, E of Ponta Taráfe, Boa Vista island, 192-236 m, cruise Camarão-2, sta. 18, rocky bottom, 14 Mar. 2012, SFST.

Remarks. - This species was recorded for the first time from Cape Verde by Vaillant (1888) (as *Brosmiculus imberbis*) and collected again by González *et al.* (2010). The present material is the third record of this species from the Cape Verde Islands and the northernmost limit (Boa Vista island) for *G. imberbis* in the eastern Atlantic.

***Physiculus cyanostrophus* Anderson & Tweddle, 2002**

Material examined. - MMF42538, 326 mm TL, 295 mm SL, 195-220 m, st. 170, MMF42539, 246 mm TL, 221 mm SL, 174-175 m, sta. 186, rocky bottom, both from Baía do Tarrafal, Santiago Island, approx. at 15°14'N 23°45'W, cruise Cabo Verde 2005-06, 14 Jun. 2005, NB.

Additional material. - A total of 459 specimens of this species were caught and are being used for a biology study by one of the authors (RTP).

Remarks. - Specimens were collected seasonally between 2010 and 2012, off all the islands surveyed, between 90 m and 339 m depth. Since 97.4% of the catches (447 specimens) were made with SFST, this species is confirmed as benthopelagic. Furthermore it is a more abundant species than suspected before by González *et al.* (2010), due to the fact that those authors have used mostly BT. Up to the

present, this species seems to be geographically restricted to Angola (Anderson and Tweddle, 2002) and the Cape Verde Islands (González *et al.*, 2010). Due to its relative abundance, size, and flesh quality, it will eventually be a species of some commercial interest and caught, as a by-catch, in the trap fishery for striped soldier shrimp *Plesionika edwardsii* (Brandt, 1851) around the Cape Verde Islands.

***Physiculus* spp.**

Material examined. - MMF39704, 254 mm TL, 232 mm SL, Boa Vista Island, off Ponta do Sol, 16°19'N-23°03'W, 420-506 m, cruise Cabo Verde 2005-06, sta. 5/7, bottom trap, 5 Jun. 2005, BMNH 2013.5.10.1, 226 mm TL, 207 mm SL, same locality and capture data as holotype; MNHN 2013-0648, 230 mm TL, 212 mm SL, same locality and capture data as MMF39704 and MMF42536, 159 mm TL, 144 mm SL, MMF42537, 187 mm TL, 172 mm SL, 15°14'N-23°34'W, Cidade Velha, Santiago Island, 108-111 m, cruise Camarão-1, sta. 14-D4, rocky bottom, 25 Nov. 2011, SFST.

Remarks. - The material examined has revealed at least two different species, eventually new to science, and are therefore being under study.

***Hippocampus algiricus* Kaup, 1856**

Material examined. - TFMC-VP/01858, 73.6 mm SL, 15.7 mm HL, 15°02'N-23°45'W, Ponta Covinha, Santiago Island, 175-274 m, cruise Cabo Verde 2005-06, sta. 200/202, 15 Jun. 2005, BT.

Remarks. - A tropical benthic eastern-central Atlantic species found from Senegal to Angola, including São Tomé and Príncipe Islands (Lourie *et al.*, 1999; Froese and Pauly, 2014). According to Wirtz *et al.* (2013), this species was previously recorded from the Cape Verdes by Reiner (1996, 2005) and Brito *et al.* (1999) as *H. punctulatus*, and by González and Tariche (2009) as *H. hippocampus*. It inhabits shallow inshore waters (Reiner, 1996, 2005). The present material was caught at between 175 m and 274 m depth, which enlarges considerably its vertical distribution in more than 150 m. The specimen examined has 19 dorsal rays, 13 pectoral rays, and 12+35 rings. The presence of this species is confirmed in waters of this archipelago.

***Ectreposebastes imus* Garman, 1899** (Fig. 2D)

Material examined. - MMF48816, 110 mm TL, 91 mm SL, 15°58'N 23°06'W, Ponta Varandinha, Boa Vista Island, 651-670 m, cruise Cabo Verde 2005-06, sta. 128, 12 Jun. 2005, BT.

Remarks. - A circumtropical mid- to deepwater species found above the upper slope and deep continental shelf and in the vicinity of oceanic islands, at a 150 m to 2000 m depth, usually at 500-850 m (Bianchi *et al.*, 1999; Poss and Eshmeyer, 2002; Froese and Pauly, 2014). It occurs in tropical, subtropical and temperate seas of the Indian, Pacific,

western and eastern Atlantic oceans. In tropical West Africa it can be found from Sierra Leone to Cameroon, including the Gulf of Guinea (Eschmeyer and Collette, 1966; Eschmeyer, 1969; Froese and Pauly, 2014). It has recently been recorded for the first time off the Canary Islands, at a 800 m to over 1500 m depth, which extends the northern limit of its distribution in the Atlantic Ocean (Escáñez and Brito, 2011). The present material being caught on BT, may indicate that this species is benthic in the area. This is the first record of this species from the Cape Verde Islands.

***Paraliparis* sp.** (Fig. 2E)

Material examined. - TFMC-VP/01377, 260 mm TL, 258 mm SL, 15°49'N 22°46'W, S of Ponta do Roque, Boa Vista Island, 502-592 m, cruise Cabo Verde 2005-06, sta. 91, 10 Jun. 2005, BT.

Remarks. - Ten species of *Paraliparis* are known from the North Atlantic Ocean, and one from the Mediterranean. One Atlantic species (*P. copei*) has four recognized subspecies (Chernova *et al.*, 2004; Chernova and Møller, 2008). Our specimen needs to be compared at least with all the Atlantic species and for the time being we have opted not to assign our specimen to any known species or subspecies. This is the first record of this genus from the Cape Verde Islands.

***Acantholabrus palloni* (Risso, 1810)**

Material examined. - MMF41912, 310 mm TL, 261 mm SL, MMF41913, 307 mm TL, 256 mm SL, 16°45'N-25°03'W, Vale Flamengos, São Vicente Island, 180-240 m, cruise Cabo Verde 2010-04, sta. 8-D3, rocky bottom, 30 Apr. 2010, SFST.

Additional material. - Seven specimens: 320 mm TL, 275 mm SL, São Pedro, São Vicente Island, 206-247 m, cruise Cabo Verde 2010-04, sta. 2, rocky bottom, 14 Apr. 2010, SFST; a post-spawn male, 200 mm TL, 160 mm SL, Vale Flamengos, São Vicente Island, 180-240 m, cruise Cabo Verde 2010-04, sta. 8, rocky bottom, 16 Apr. 2010, SFST; a post-spawn male, 290 mm TL, 240 mm SL, Ponta dos Piquinhos, Santa Luzia Island, 112-136 m, cruise Cabo Verde 2010-04, sta. 16, rocky bottom, 19 Apr. 2010, SFST; a post-spawn male, 330 mm TL, 275 mm SL, Ponta Lobo, Santiago Island, 109-109 m, cruise Camarão-1, sta. 19, rocky bottom, 24 Nov. 2011, SFST; a post-spawn male, 326 mm TL, 274 mm SL, two immature males, 235 mm TL, 192 mm SL, 231 mm TL, 191 mm SL, S of Ponta Leste, Santiago Island, 104-121 m, cruise Camarão-1, sta. 18-D2, rocky bottom, 25 Nov. 2011, SFST.

Remarks. - A temperate eastern Atlantic species inhabiting (adults) coastal waters near rocky or sandy bottoms, also found reef-associated, between 30 and 500 m depth (Schneider, 1990; Froese and Pauly, 2014). It has been recorded from Norway south to Cape Lopez, Gabon and including the Azores, Madeira and the Canary Islands. Also present in

the Mediterranean and Adriatic seas (Gomon and Forsyth, 1990; Schneider, 1990; Froese and Pauly, 2014). The presence of this species in Cape Verde is given for the first time by Reiner (1996), but with no collection details. Wirtz *et al.* (2013) mention a photograph of this species. The material examined in the present paper represents in fact the first confirmed record of this species from the Cape Verde, present in at least four islands of this archipelago, between 104 m and 247 m depth. All specimens were collected in SFST, therefore indicating the benthopelagic nature of this species in these waters.

***Lappanella fasciata* (Cocco, 1833)** (Fig. 2F)

Material examined. - MMF42284, 158 mm TL, 140 mm SL, MMF42812, 150 mm TL, 127 mm SL, 14°54'N-23°34'W, East of Cidade Velha, Santiago Island, 108-111 m, cruise Camarão-1, sta. 14-D2/14-D4, rocky bottom, 25/27 Nov. 2011, SFST; MMF48813, 172 mm TL, 146 mm SL, MMF48814, 156 mm TL, 136 mm SL, 15°01'N-23°44'W, Ponta Covinha, Santiago Island, 104-112 m, cruise Camarão-1, sta. 12-D3, rocky bottom, 28 Nov. 2011, SFST; MMF42811, 167 mm TL, 140 mm SL, MMF42810, 151 mm TL, 129 mm SL, 16°35'N 22°55'W, Baía de Santa Maria, Sal Island, 102-105 m, cruise Camarão-3, sta. 12-D3, rocky bottom, 21 Jul. 2012, SFST; MMF42807, 141 mm TL, 120 mm SL, 16°44'N 23°01'W, Palmeira, Sal Island, 105-125 m, cruise Camarão-3, sta. 2-D3, rocky bottom, 22 Jul. 2012, SFST.

Remarks. - A subtropical reef-associated species, ranging from 35 m to 200 m depth (Gomon and Forsyth, 1990), found in deep rocky areas (Quignard and Pras, 1986; Froese and Pauly, 2014). It is known from the south-western and central Mediterranean Sea and in the eastern Atlantic it was known only from the Josephine Bank, Madeira and the Canary Islands (Maul, 1949, 1976; Quignard and Pras, 1986; Brito *et al.*, 2002; Dulčić *et al.*, 2006). This is the first time this species is recorded from the Cape Verde Islands, which enlarges its area of distribution by 1400 km to the South. All specimens were collected in SFST, therefore indicating the benthopelagic nature of this species in these waters.

It is interesting to note that in the eastern Atlantic Ocean this species has a patchy distribution on islands and associated seamounts. Its continental counterpart, *Lappanella guineensis* Bauchot, 1969, is so far restricted to Sierra Leone (Bauchot, 1969; Gomon and Forsyth, 1990; Froese and Pauly, 2014). Assuming that these species are not cryptic to the point that have been overlooked along the West African coast, this rather eccentric distributions should foster a detailed genetic study of these two species, along all their areas of occurrence to shed some light on its colonization pattern.

Trachinus sp.

Material examined. - MMF42285, 119 mm TL, 101 mm SL, 15°55'N-22°56'W, Ponta Lacacão, Boa Vista Island, 122-137 m, cruise Camarão-2, sta. 15, rocky bottom with sand, 7 Mar. 2012, BT.

Remarks. - Body proportions, meristics and colour pattern do not match with descriptions of any of the known *Trachinus* species occurring in waters of the Cape Verde Islands and adjacent seas. Although this specimen seems to be close to *Trachinus pellegrini* Cadenat, 1937, it may belong to a still undescribed species and an in-depth taxonomical and genetic study is being done, the results of which will be published elsewhere.

CONCLUSION

The present account results from a series of surveys using unconventional collecting gear – fish traps at bottom and near bottom (2.4 m above seafloor). Attractiveness to bait, feeding habits of the species and habitat preferences account to the selectivity of the fishing gear and reflects on the specific composition of the catches.

Among the 66 species collected, six are first records from the Cape Verde Islands. The findings of *Gnathopis mystax* (Congridae) represent the southernmost record (Santiago Island, at 15°04'N) for this species. Also the catches of *Lappanella fasciata* (Labridae) represent the southernmost record (Santiago Island, at 14°54'N) for this species, while *Nezumia africana* (Macrouridae) the northernmost (Boa Vista Island, at 16°17'N). *Nezumia duodecim* and *Ectreposebastes imus* (Scorpaenidae) are not so unexpected, as they occur north and south of the Cape Verde Islands. *Paraliparis* sp. is a rather interesting record, as the family Liparidae has never been recorded from the archipelago. The nearest record is *P. copei wilsoni* Richards, 1966 from Gabon, only known from the holotype. A preliminary examination of our specimen do not allow us to assign it to this species.

The presence of *Echelus pachyrhynchus* (Ophichthidae), *Hippocampus algiricus* (Synnathidae) and *Acantholabrus palloni* (Labridae) is now confirmed in waters of this archipelago.

Regarding the poorly-known Cape Verdean species, *Myroconger compressus* (Myrocongridae) is a gonochoristic species based on gonad examination, and the 620 mm TL specimen is apparently the largest ever recorded. The collections of specimens of *Myrichthys pardalis* (Ophichthidae) while actively swimming at surface at night, over 13 to 35 m of depth, were probably due to the large number of small organisms concentrated around the vessel, attracted by its bright lights. Also the finding of one specimen of *Phaenomonas longissima* (Ophichthidae) seems to be the first collection of this species swimming freely at surface. The capture

of one specimen of *Sphagemacrurus hirundo* (Macrouridae) represents the southernmost record (Santiago Island, at 15°08'N) for this species. The present material is the third record (just three records since 1888) of *Gadella imberbis* (Moridae) from the Cape Verde Islands and the northernmost limit (Boa Vista Island, at 15°55'N) for this species in the eastern Atlantic. *Physiculus cyanostrophus* (Moridae) is a more abundant species in Cape Verdean waters at 90-340 m depth than suspected before.

Since only one specimen of *Trachinus* has been collected, we have opted to wait for further collections in order to identify this specimen to species level.

Physiculus sp. (Moridae) specimens are being studied in detail and will eventually reveal to be new species to science.

Based on the position of the traps in relation to the seafloor, we can confirm the benthic nature of 24 species and the benthopelagic nature of 19. The collection of two Stomiiformes (*Cyclothone microdon* and *Stomias affinis*), typical mesopelagic species (Haedrich, 1997), and two juveniles of *Ophioblennius atlanticus* (Blenniidae), which occur pelagically over deep water (Bath, 1990c), inside bottom traps, can only be explained as an incidental collection while traps were being hauled. For the remaining 20 species data is not conclusive.

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