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Diplecogaster tonstricula, a new species of cleaning clingfish (Teleostei: Gobiesocidae) from the Canary Islands and Senegal, eastern Atlantic Ocean, with a review of the *Diplecogaster-ctenocrypta* species-group

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ABSTRACT

The *Diplecogaster-ctenocrypta* species-group is reviewed; it comprises two species. The clingfish *Diplecogaster ctenocrypta* from the Canary Islands is redescribed. The new species *Diplecogaster tonstricula*, a facultative cleaner of other teleosts, is described on the basis of eight specimens and colour photos from Senegal and the Canary Islands, eastern Atlantic Ocean. The species is small, apparently not exceeding 23 mm total length; it is characterised by having nine dorsal-fin rays, eight anal-fin rays, 24–25 pectoral-fin rays, 14–15 principal caudal-fin rays, 13–16 rakers on third gill arch, pelvic disc without lateral papillae in region A, disc region B with two rows of weak papillae, interorbital distance 4.1–4.6 in head length, distance between disc and anus 14–17% of SL, head and body with 10–13 narrow vertical brownish bars, cheek with a white ocellus surrounded by black, and with a small black spot in the middle. The new species is compared with other species of the genus; a key to the six known species of the eastern Atlantic, Mediterranean and Black Sea and South African genus *Diplecogaster* is presented. A checklist is provided for the species of *Diplecogaster* and their synonyms.

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Fishes; clingfishes; taxonomy; morphology; identification key; facultative cleaner

Introduction

The clingfishes of the family Gobiesocidae are distributed worldwide in tropical and temperate seas, some also living in freshwater streams of the tropics. They occur on hard substrata, usually on rocky bottoms or in coral reefs, mostly in shallow waters. Clingfishes are characterised by possessing an adhesive disc formed by the pelvic fins, the head depressed, the skin naked, one dorsal and anal fin each, and several specialised osteological characters. The family was revised by Briggs (1955), who distinguished nine species from the eastern Atlantic and the Mediterranean (Table 1).

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Table 1. Comparison of counts and proportions of the species of *Diplecogaster*. Character states significantly differing from those of the new species are printed in bold face.

	D. tonstricula sp. nov.	*D. bimaculata*	*D. ctenocrypta*	*D. euxinica*	*D. megalops*	*D. pectoralis*
Maximum SL (mm)	23	49	16	48	26	27
Dorsal-fin rays	9	5–7	9	5–8	4–5	7
Anal-fin rays	8	4–6	8	4–7	3–4	6–7
Pectoral-fin rays	24–25	20–25	25	21–26	22–25	25–26
Caudal-fin rays	14–15	19–21	16	12–14	10–15	21–22
Gill rakers on 3rd arch	13–16	7–11	18	7–10	6–9	8–11
Disc length in SL	4.7–5.2	3.4–4.3	3.9	3.2–4.8	3.4–4.0	3.9–4.6
Head length in SL	2.7–2.8	2.4–3.1	2.5	2.3–3.3	2.6–3.0	2.5–2.8
Head width in SL	4.2	3.2–4.8	6.0	3.1–4.7	3.2–3.7	3.6–4.2
Eye diameter in head length	3.2–3.5	3.7–4.9	3.5	3.2–6.1	2.3–3.6	3.2–3.9
Papilla rows in disc region A	3	4–7	4	3–7	4–5	3–5
Papilla rows in disc region B	4	3–5	4	3–5	5–7	3
Papilla rows in disc region C	2	5–9	5	4–9	3–4	6
Position of anus	Closer to anal fin than to disc	In middle between disc and anal fin	Much closer to anal fin than to disc	In middle between disc and anal fin	In middle between disc and anal fin	In middle between disc and anal fin
Lateral papillae in disc region A	Absent	Present	Present	Present	Present	Present
Distribution	Canary Is., Senegal	Mediterranean to Norway	Canary Is.	Black Sea	South Africa	Canary Is., Madeira, Azores

Briggs (1957) described two additional species of clingfishes from West Africa, and Smith (1964) described *Apletodon knysnaensis* from South Africa, which was later found to be a junior synonym of *Apletodon pellegrini*. Blache et al. (1970) distinguished two species of clingfishes from tropical West Africa (Table 1). Briggs (1986) found that *Lepadogaster microcephalus* Brook, 1890 is a junior synonym of *Apletodon dentatus* (Facciolà 1887); he distinguished eight nominal species of clingfishes from the north-eastern Atlantic and Mediterranean, some having several subspecies. Briggs (1990) recorded eight species of clingfishes from the eastern tropical Atlantic. Hofrichter and Patzner (1997) described *Apletodon incognitus* from the north-western Mediterranean Sea and the Azores. Vakily et al. (2002) listed five clingfish species from north-western Africa. Henriques et al. (2002) synonymised *Lepadogaster zebrinus* with *L. lepadogaster* and recognised *L. purpurea* as a valid species, based on their revisional study of this species group. *Lepadogaster candolii* was recently reclassified as *Mirbelia candolii* by Almada et al. (2008, p. 1155, as *Mirbelia candollei*) (see Table 1). Fricke (2007) described *Apletodon wirtzi* from Sao Tomé and Principe; Fricke et al. (2010) reported another species, *Apletodon barbatus*, from the Cape Verde Islands.

The clingfish genus *Diplecogaster* was first described by Fraser-Brunner (1938, p. 415), based on *Cyclopterus bimaculatus* Bonnaterre [ex Pennant], 1788 as the type species by original designation; the genus was considered as monotypic. In his revision of gobiesocid fishes, Briggs (1955) described *Diplecogaster ctenocrypta, D. megalops* and *D. bimaculata pectoralis*, distinguishing a total of four species-group taxa in the genus. Murgoci (1964, p. 229) added another subspecies, *Diplecogaster bimaculata euxinica* from the Black Sea. In a revisionary study of eastern Atlantic and Mediterranean gobiesocids, Hofrichter (1995) treated all these taxa as valid, comprising three valid species of *Diplecogaster*, or five valid taxa in the species group (including subspecies).

Brito et al. (2002, p. 281, figures 364–366) reported *Diplecogaster ctenocrypta* (*non* Briggs 1955) from the Canary Islands, and illustrated a striped species that is a facultative cleaner of other teleosts. When additional specimens from the Canary Islands and specimens from Senegal became available, a comparison with the holotype of the deep-water species *D. ctenocrypta* revealed that the shallow water cleaning *Diplecogaster* belonged to a separate, undescribed species, which is described in the present paper. The *Diplecogaster-ctenocrypta* species-group is reviewed, and *Diplecogaster ctenocrypta* is redescribed.

Methods and materials

Methods follow Briggs (1955) and Hofrichter and Patzner (1997). The abbreviation SL refers to the standard length (measured from the tip of the snout to the middle of the caudal fin base), and TL to the total length (measured from the tip of the snout to the end of the caudal fin). The adhesive disc is divided into three different areas: region A is the anterior portion, region B the posterior portion, and region C the centre of the disc (as illustrated by Briggs 1955). In the description, data of the holotype are given first, followed by data of the paratypes in parentheses. Fin rays

are counted using the method of Fricke (1983), where spines are expressed as Roman numerals, unbranched soft rays are expressed as lower case Roman numerals and branched rays as Arabic numerals. Subspecies classification is no longer used, following the method of Fricke et al. (2007); valid taxa of the species group formerly treated as subspecies are raised to species level. Specimens cited in the present paper are deposited in the following collections: CCML (Colección Ictiologica, Departamento de Biología Animal, Ciencias Marinas, Facultad de Biología, Universidad de La Laguna, Tenerife, Spain); MGAB (Muzeul de Istorie Naturală 'Grigore Antipa', Bucharest, Romania); MNHN (Muséum National d'Histoire Naturelle, Paris, France); MZUF (Università di Firenze, Museo Zoologico e Historia Naturale de la Specola, Firenze, Italy); SMNS (Staatliches Museum für Naturkunde Stuttgart, Germany); ZMUC (Københavns Universitet, Zoologisk Museum, Vertebrater, Fiskesamlingen, Copenhagen, Denmark); ZSM (Zoologische Staatssammlung München, Germany).

Comparative material: ***Diplecogaster bimaculata***. SMNS 12541, 1 specimen, France, Pyrenées Orientales, Racou, 22 km SSE Perpignan, 42°32′30″N, 3°1′E, 5 m depth, M. Grabert, September 1991; SMNS 13177, 1 specimen, Italy, Giglio Island, Bay of Campese, at Faraglione, 42°22′N, 10°52′E, 20 m depth, I. Koch, 28 April 1992; SMNS 14049, 2 specimens, Italy, Giglio Island, Bay of Campese, at Tralicci, 42°22′N, 10°52′E, 8 m depth, I. Koch, 18 April 1993; SMNS 19061, 2 specimens, Northern Cyprus, Karavas Alsavcak Bay, 9 km W Kyrenia/Girne, 35°21′13″N, 33°13′15″E, 0–1 m depth, R. Fricke, 19 May 1997; SMNS 19204, 2 specimens, Italy, Giglio Island, Bay of Campese, 42°22′35″N, 10°52′58″E, 10 m depth, I. Koch, 14 June 1985; SMNS 20347, 1 specimen, Tunisia, 4 km E Tabarca, 6 km E Bone/Annaba, 36°57′22″N, 8°47′52″E, 0–6 m depth, R. Fricke, 23 May 1998. ***Diplecogaster megalops***. ZMUC P9031, holotype, South Africa, off Durban, 120 fms [220 m] depth, T. Mortensen, 22 July 1929. ***Diplecogaster pectoralis***. SMNS 11916, 4 specimens, Azores Islands, Faial Island, Horta, 38°32′N, 28°38′W, P. Wirtz, December 1990; SMNS 20163, 8 specimens, Madeira, off Hotel Roca Mar, Caniço de Baixo, 40–70 m depth, P. Wirtz, 22 September 1996; SMNS 21202, 2 specimens, Madeira, Porto Novo, 1–2 m depth, P. Wirtz, 16 October 1998; ZMUC P9034, holotype, off La Luz, Gran Canaria, 100 fms [183 m] depth, T. Mortensen, July 1929.

Diplecogaster Fraser-Brunner 1938

Diplecogaster Fraser-Brunner 1938: 415 (type species: *Cyclopterus bimaculatus* Bonnaterre 1788 by original designation).

Diagnosis

Three and one half gills; gill membranes attached to the isthmus; disc double; dorsal and anal fins normal with strong rays; disc length 3.2–5.2 in SL; no spine in subopercular area; 4–9 dorsal-fin rays; 3–8 anal-fin rays; 20–26 pectoral-fin rays; premaxillaries short; maxillaries well forward in position; head lateral-line system with two pores in the lacrymal canal.

Remarks

A total of six valid species is known in this genus; a checklist of the species and an identification key are presented below.

Within the genus *Diplecogaster*, two species groups can be distinguished:

– *Diplecogaster-bimaculata* group: characterised by a moderate number of 4–8 rays in the dorsal fin and 3–7 in the anal fin (*D.-ctenocrypta* group: 9 rays in the dorsal fin, 8 rays in the anal fin), and the position of the anus which is situated in the middle between disc and anal-fin origin (*D.-ctenocrypta* group: situated closer to the anal-fin origin than to the end of the disc).

Species. D. bimaculata, D. euxinica, D. megalops, D. pectoralis.

Distribution. Mediterranean Sea, Black Sea, eastern Atlantic Ocean, South Africa.

– *Diplecogaster-ctenocrypta* group (reviewed in the present paper): characterised by a high number of 9 rays in the dorsal fin and 8 in the anal fin (*D.-bimaculata* group: 4–8 rays in the dorsal fin, 3–7 rays in the anal fin), and the position of the anus which is situated closer to the anal-fin origin than to the end of the disc (*D.-bimaculata* group: situated in the middle between disc and anal-fin origin). The species of the group are further distinguished from the *Diplecogaster bimaculata, D. euxinica* and *D. pectoralis* in having 14–15 caudal-fin rays (18–21 in *D. bimaculata, D. euxinica* and *D. pectoralis)*, and lacking lateral papillae in disc region A (many lateral papillae present in *D. bimaculata, D. euxinica* and *D. pectoralis*), and from *D. megalops* in 13–16 rakers on third gill arch (7–9 rakers in *D. megalops*).

Species. D. ctenocrypta, D. tonstricula n. sp.

Distribution. Eastern Atlantic Ocean.

Checklist of the species of Diplecogaster

Diplecogaster bimaculata (Bonnaterre [ex Pennant] 1788)

Cyclopterus bimaculatus Bonnaterre [ex Pennant] 1788: 29, pl, 86, figure 355 (seas of England; no types known)

Lepadogaster ocellatus Risso 1810: 74 (Villefranche-sur-Mer, France; no types known).

Lepadogaster reticulatus Risso 1810: 77 (Nice, France; no types known).

Lepadogaster mirbeli Risso 1820: 249 (Nice, France; no types known).

Lepadogaster desfontanii Risso 1827: 275, pl. 14, figure 39 (Nice, France; syntypes: MZUF 584-0093, 10 specimens).

Lepadogaster latirostris Costa 1840: Lepadogaster p. 4 (Naples, Italy; no types known).

Lepadogaster urifasciatus Costa 1840: Lepadogaster p. 9 (Gulf of Salerno, Italy; no types known).

Lepadogaster norvegicus Düben 1845: 112 (Norway; no types known).

Lepadogaster listellus Nardo [ex Chiereghini] 1847: col. 113 (Italy; no types known).

Lepadogaster raninus Nardo [ex Chiereghini] 1847: col. 113 (Italy; no types known).

Lepidogaster couchii Saville-Kent 1883: 55–56 (Devonshire and Cornwall, UK; no types known).

Distribution: Mediterranean Sea, north-eastern Atlantic: Norway and Faroes south to Gibraltar.

Diplecogaster ctenocrypta Briggs 1955

Diplecogaster ctenocrypta Briggs 1955: 32, figure 85 (Gran Canaria, Canary Islands; holotype: ZMUC P9037).
Distribution: Canary Islands.

Diplecogaster euxinica Murgoci 1964

Diplecogaster bimaculata euxinica Murgoci 1964: 229, figure 1 (Romania, Black Sea; holotype: MGAB 55).
Distribution. Black Sea.

Diplecogaster melagops Briggs 1955

Diplecogaster megalops Briggs 1955: 31, figure 84 (off Durban, KwaZulu-Natal, South Africa; holotype: ZMUC P9031).
Distribution: South Africa.

Diplecogaster pectoralis Briggs 1955

Diplecogaster bimaculata pectoralis Briggs 1955: 30, figure 83 (Gran Canaria, Canary Islands; holotype: ZMUC P9034).
Distribution: Canary Islands, Madeira, Azores, Cape Verde Islands.

Diplecogaster tonstricula new species (present paper)

Distribution: Canary Islands, Senegal.

Key to the species of the genus Diplecogaster

1. Dorsal-fin rays 4–8; anal-fin rays 3–7 2
- Dorsal-fin rays 9; anal-fin rays 8 5

2. Eye large, eye diameter 0.5–0.6 in bony interorbital, 2.3–3.6 (mean 3.25) in head length; no ocelli on sides of body; South Africa..... ***Diplecogaster megalops***
- Eye relatively small, eye diameter 0.7–1.2 in bony interorbital, 3.2–4.9 (mean 4.2) in head length; at least one ocellus on side of body below pectoral fin; eastern Atlantic, Mediterranean Sea and Black Sea 3

3. Snout length 3.7–7.7 in head length; upper attachment of axial, dermal flap opposite pectoral-fin rays 10–19 (mean 18); principal caudal rays 12–14 ..... ***Diplecogaster euxinica***
- Snout length 3.3–3.8 in head length; upper attachment of axial, dermal flap opposite pectoral-fin rays 10–13 (mean 12); principal caudal rays 9–12 4

4. Pectoral-fin rays 21–24; caudal–peduncle depth 1.2–1.5 (mean 1.3); eye diameter 3.7–4.9 (mean 4.1) in head length..... ***Diplecogaster bimaculata***
- Pectoral-fin rays 25–26; caudal–peduncle depth 1.0–1.2 (mean 1.1); eye diameter 3.2–3.9 (mean 3.6) in head length..... ***Diplecogaster pectoralis***

5. Pelvic disc with lateral papillae in region A; disc region B with 5 rows of papillae; mandibular canal with 1 pore; principal caudal-fin rays 16; interorbital distance 5.4 in head length; distance between disc and anus 19% of SL ..... ***Diplecogaster ctenocrypta***
- Pelvic disc without lateral papillae in region A; disc region B with 2 rows of weak papillae; mandibular pores missing; principal caudal-fin rays 14–15; interorbital distance 4.1–4.6 in head length; distance between disc and anus 14–17% of SL ..... ***Diplecogaster tonstricula*** n. sp.

Diplecogaster-ctenocrypta species-group

Diagnosis

Dorsal fin with 9 rays; anal fin with 8 rays; anus situated closer to the anal-fin origin than to the end of the disc.

Remarks

The distribution of the two species of this group is restricted to the eastern Atlantic Ocean (Canary Islands; Senegal).

Diplecogaster tonstricula new species
Eastern Atlantic cleaner clingfish
(Figures 1–6)

Diplecogaster ctenocrypta (*non* Briggs 1955): Brito et al. 2002: 281, figures 364–366 (Canary Islands: El Hierro, Tenerife, Fuerteventura, 10–38 m). Brito et al. 2007: 98. Wirtz 2010: 42 (Senegal). Wirtz 2012: 78 (Ngor Island, Senegal).

Holotype. ZSM 40089, 21.3 mm SL, Eastern Atlantic Ocean, Senegal, Dakar, 1.3 km south-south-west of La Pointe des Almades, 14°43.806′N, 17°32.046′W, 28 m depth, P. Wirtz, 20–24 October 2009.

Paratypes. CCML uncat., 2 specimens, 18.7–22.9 mm SL, Eastern Atlantic Ocean, Canary Islands, Fuerteventura, Morro del Jable, *c*.28°02′42″N, 14°21′12″W, 38 m depth, R/V Ventura. ZSM uncat. [ex. 40089], 5 specimens, 11.8–21.1 mm SL, Eastern Atlantic Ocean, Senegal, Dakar, 1.3 km south-south-west of La Pointe des Almades, 14° 43.806′N, 17°32.046′W, 28 m depth, P. Wirtz, 20–24 October 2009.

Diagnosis

A species of *Diplecogaster* with 9 dorsal-fin rays, 8 anal-fin rays, 24–25 pectoral-fin rays, and 14–15 principal caudal-fin rays; 13–16 rakers on third gill arch; pelvic disc without lateral papillae in region A; disc region B with 2 rows of weak papillae; principal caudal-fin rays 14–15; interorbital distance 4.1–4.6 in head length; distance between disc and anus 14–17% of SL; head and body with 10–13 narrow vertical brownish bars; cheek with a white ocellus surrounded by black, and with a small black spot in the middle.

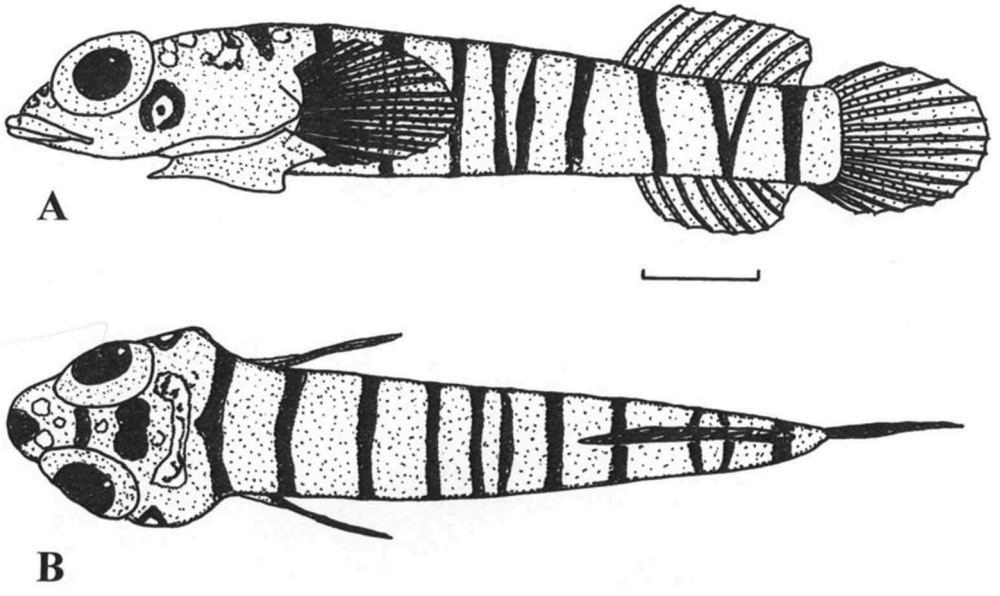

Figure 1. *Diplecogaster tonstricula* n. sp., ZSM 40089, holotype, 21.3 mm SL, Senegal. (A) Lateral view; (B) dorsal view. Bar 3 mm.

Description

Dorsal-fin ix; anal-fin viii; pectoral-fin xxiv-xxv; caudal-fin xiv-xv. Gill rakers on 3rd arch 13–16, very small, pointed.

Teeth small, conical, slightly recurved, in patches towards the front of each jaw, narrowing to a line of single teeth laterally.

Head lateral line system with 3 pores in nasal canal, 3 pores in postorbital canal, and 2 pores in lacrymal canal (Figure 3); no mandibular pores.

Head broad, depressed. Head length 36.2–36.6% SL (2.7–2.8 in SL). Maximum body depth 17.1–20.1% SL (4.8–5.8 in SL). Maximum head width 24.0–24.1% SL (4.2 in SL). Maximum (horizontal) orbit diameter 10.3–11.5% SL (3.2–3.5 in head length). Snout short, rounded (Figure 1a). Preorbital length 7.5–9.6% SL (3.8–4.9 in head length); snout slightly elongate in males. Interorbital distance 8.0–8.7% SL (4.1–4.6 in head length). Upper jaw length 11.8–14.4% SL (2.5–3.1 in head length). Anus situated closer to the anal-fin origin than to the disc; distance between disc and anus 14.4–16.8% SL, distance between anus and anal-fin origin 7.9–9.6% SL. Preanus length 58.3–59.8% SL (1.7 in SL). Caudal–peduncle length 5.7–9.0% SL (11.0–17.6 in SL). Caudal–peduncle depth 13.3–18.2% SL (5.5–7.5 in SL).

Predorsal-fin length 65.2–71.6% SL (1.40–1.53 in SL). Preanal-fin length 69.9–74.3% SL (1.3–1.4 in SL). Prepectoral-fin length 35.6–36.1% SL (2.8 in SL). Prepelvic-fin length 24.3–24.7% SL (4.1 in SL). Predisc length 21.1–27.5% SL (3.6–4.7 in SL). Disc length 19.2–21.4% SL (4.7–5.2 in SL). Disc membrane inserting at base of 19th-21st pectoral-fin ray. Disc with 3 rows of papillae in region A, 2 rows of weak papillae in region B, and 4 rows of

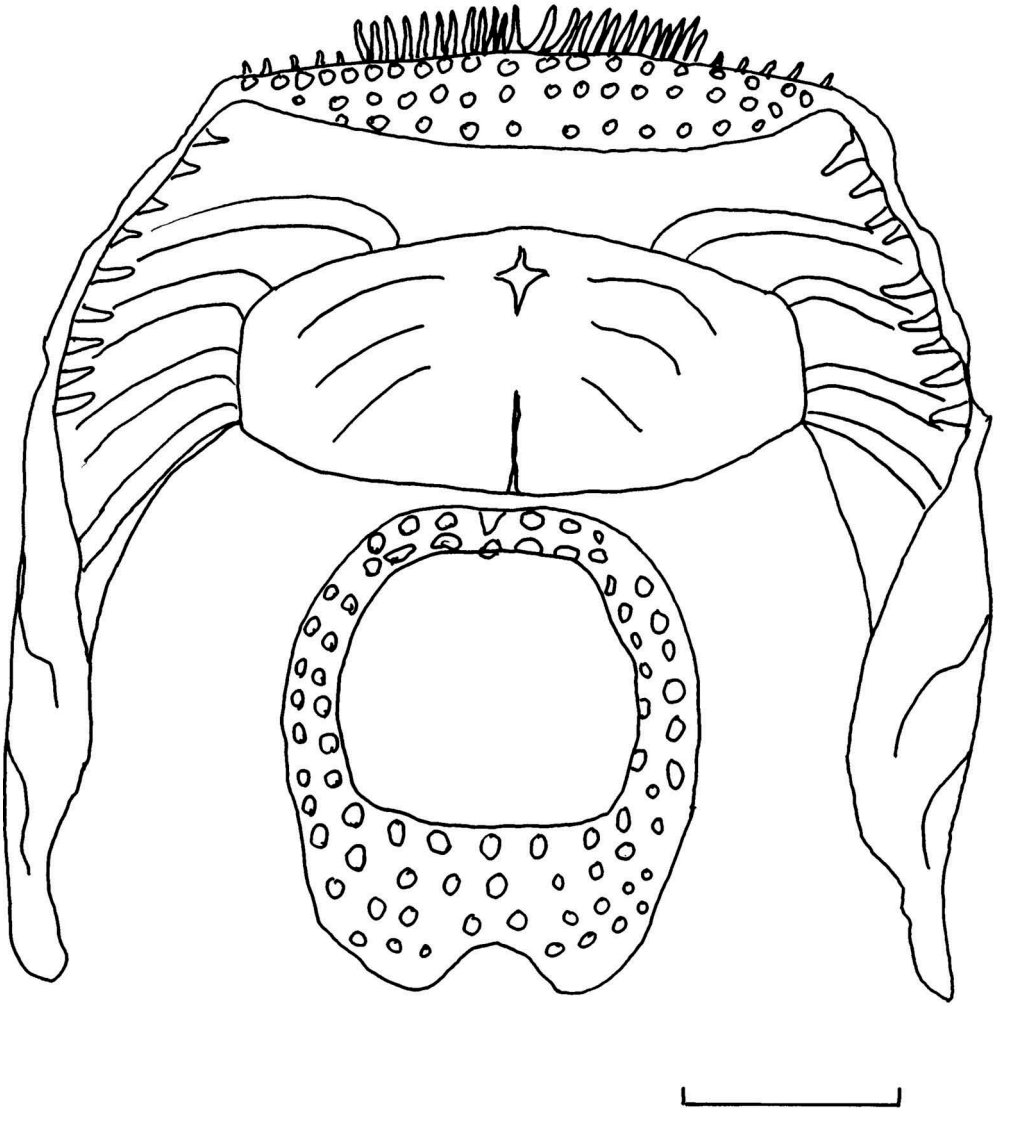

Figure 2. *Diplecogaster tonstricula* n. sp., CCML uncat., paratype, specimen 1, 22.9 mm SL. Pelvic disc. Bar 1 mm.

weak papillae in region C (Figure 2). No lateral papillae in disc region A. Caudal-fin length 20.1% SL (5.0 in SL).

Colour in life (Figures 4 and 6)

Ground colouration of head and body usually bright orange, with narrow whitish or yellowish vertical bars, the first in the interorbital region. Preorbital section of head light olive green, which whitish streaks. Eye light olive green, dorsal half with five brown bars; iris surrounded by bright yellow ring. Cheek with a white ocellus surrounded by black. Fins orange.

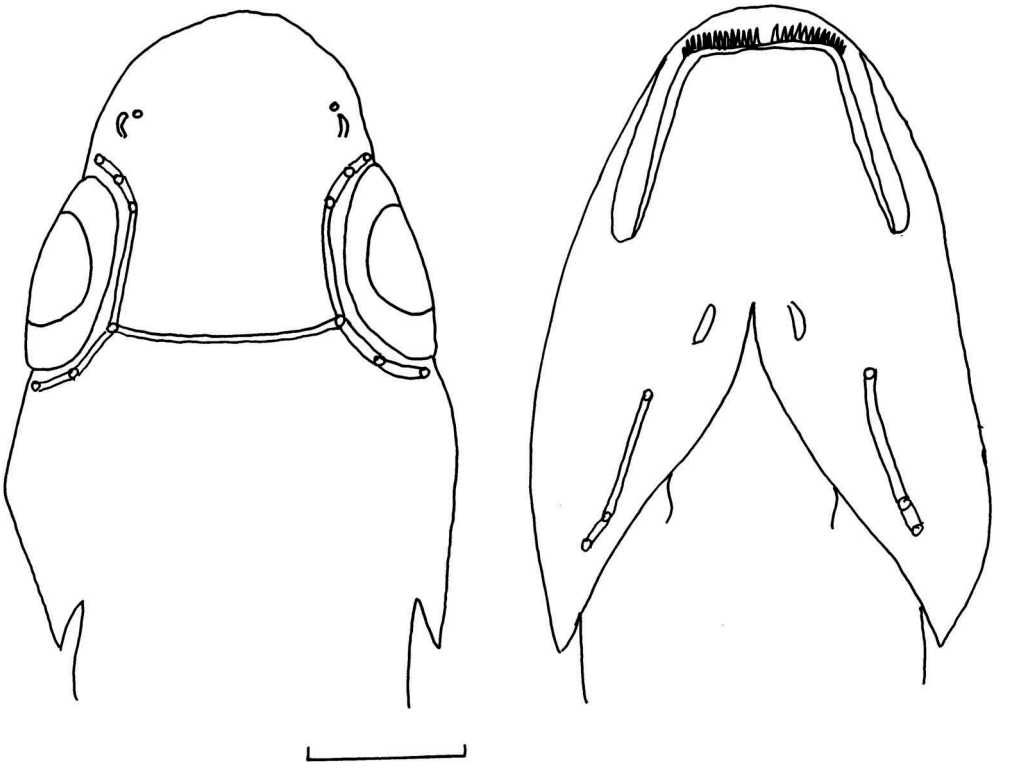

Figure 3. *Diplecogaster tonstricula* n. sp., CCML uncat., paratype, specimen 1, 22.9 mm SL. Head lateral line system. (A) Dorsal view of head; (B) ventral view of head. Bar 1 mm.

Colour of preserved material

Head and body yellowish white, with 10–13 narrow vertical brownish bars (Figure 1). Nape with small white spots. Cheek with a white ocellus surrounded by black, and with a small black spot in the middle. Fins translucent.

Etymology

Tonstricula (Latin) means little female barber. The name refers to the cleaning behaviour of the new species.

Comparison

The *Diplecogaster-ctenocrypta* group, comprising the species *D. ctenocrypta* and *D. tonstricula* n. sp., is characterised by a high number of 9 rays in the dorsal fin and 8 in the anal fin (other species of the genus: 4–8 rays in the dorsal fin, 3–7 rays in the anal fin), and the position of the anus which is situated closer to the anal-fin origin than to the end of the disc (other species of the genus: situated in the middle between disc and anal-fin origin). Species of the group are further distinguished from *D. bimaculata, D. euxinica* and *D. pectoralis* in having 14–15 caudal-fin rays (18–21 in *D. bimaculata, D. euxinica* and *D. pectoralis)*, and lacking lateral papillae in disc region A (many lateral papillae present in *D. bimaculata, D. euxinica* and *D. pectoralis*), and from *D. megalops* in 13–16 rakers on third gill arch (7–9 rakers in *D. megalops*).

Figure 4. *Diplecogaster tonstricula* n. sp., Senegal, Ngor Island, 28 m depth. Photograph by P. Wirtz, October 2009.

Diplecogaster tonstricula n. sp. differs from *D. ctenocrypta* by having the pelvic disc without lateral papillae in region A (lateral papillae present in *D. ctenocrypta*), disc region B with 2 rows of papillae (5 rows in *D. ctenocrypta*), lacking mandibular pores (one mandibula pore present in D. ctenocrypta), principal caudal-fin rays 14–15 (16 rays in *D. ctenocrypta*), the interorbital distance 4.1–4.6 in head length (5.4 in head length in *D. ctenocrypta*), the distance between disc and anus 14–17% of SL (19% of SL in *D. ctenocrypta*), and 13–16 rakers on third gill arch (18 in *D. ctenocrypta*). The live colour pattern of *D. ctenocrypta* is unknown, but the holotype is pale, without traces of bands, while the head and body of *Diplecogaster tonstricula* n. sp. is covered with 10–13 bars.

The species of *Diplecogaster* may be distinguished with an identification key (see above). Counts and proportions of the species of the genus are compared in Table 1.

Distribution and habitat

Eastern Atlantic Ocean: Canary Islands (El Hierro, Tenerife, Fuerteventura), Senegal (Dakar). Probably more widespread in the region. The species was collected and observed at 10–38 m depth, mainly on hard substrate. It was observed to act as a facultative cleaner of larger fishes (Figure 5, Senegal, cleaning a muraenid, *Gymnothorax afer*; Brito et al. (2002, figures 364–366), Canary Islands, cleaning a muraenid and a serranid).

Remarks

The new species was classified in the genus *Diplecogaster* as it agrees with the generic characters given by Briggs (1955) as 3½ gills, the gill membranes attached to the isthmus, the disc double, the dorsal and anal fins with strong rays, normal, the sub-opercular region without a spine, 24–25 pectoral fin rays, the absence of incisors or well-

Figure 5. *Diplecogaster tonstricula* n. sp. cleaning a moray eel, *Gymnothorax afer*, Senegal, Ngor Island. Photograph by P. Wirtz, October 2009.

Figure 6. *Diplecogaster tonstricula n*. sp., Canary Islands, Tenerife, Rogelio. Photograph by Joaquín Guitérrez, February 2015.

developed canines, and 13–16 rakers on the third gill arch. It is a member of the *Diplecogaster-ctenocrypta* group (comprising *D. ctenocrypta* and *D. tonstricula* n. sp.), which is characterised within the genus by a high number of 9 rays in the dorsal fin and 8 rays in the anal fin, and the position of the anus which is situated closer to the anal-fin origin than to the end of the disc.

The species was first described and illustrated by Brito et al. (2002, p. 281, figures 364–366) from the Canary islands, but it was confused by authors with *Diplecogaster ctenocrypta* Briggs 1955. A recent examination of the holotype of that deep-water species (ZMUC P9037) provided evidence that this is a separate species.

Cleaning behaviour has previously been observed in other gobiesocid fishes. Patzner and Debelius (1984) photographed a specimen of *Diplecogaster bimaculata* cleaning a moray eel, *Muraena helena*. Hutchins (1991) described *Cochleoceps bicolor* from southern and south-western Australia, and *C. orientalis* from south-eastern Australia, as setting up cleaning stations to remove parasites of other teleosts. Weitzmann and Mercader (2012) reported an observation of *Lepadogaster candolii* in the north-western Mediterranean Sea which was cleaning a grouper, *Epinephelus marginatus*.

Diplecogaster ctenocrypta Briggs 1955
Eastern Atlantic deep water clingfish
(Figures 7–9)

Diplecogaster ctenocrypta Briggs 1955: 32, figure 85 [Gran Canaria, Canary Islands, depth 90 fms (164.6 m); holotype ZMUC P9037]. Nielsen 1974: 85 (type catalogue).

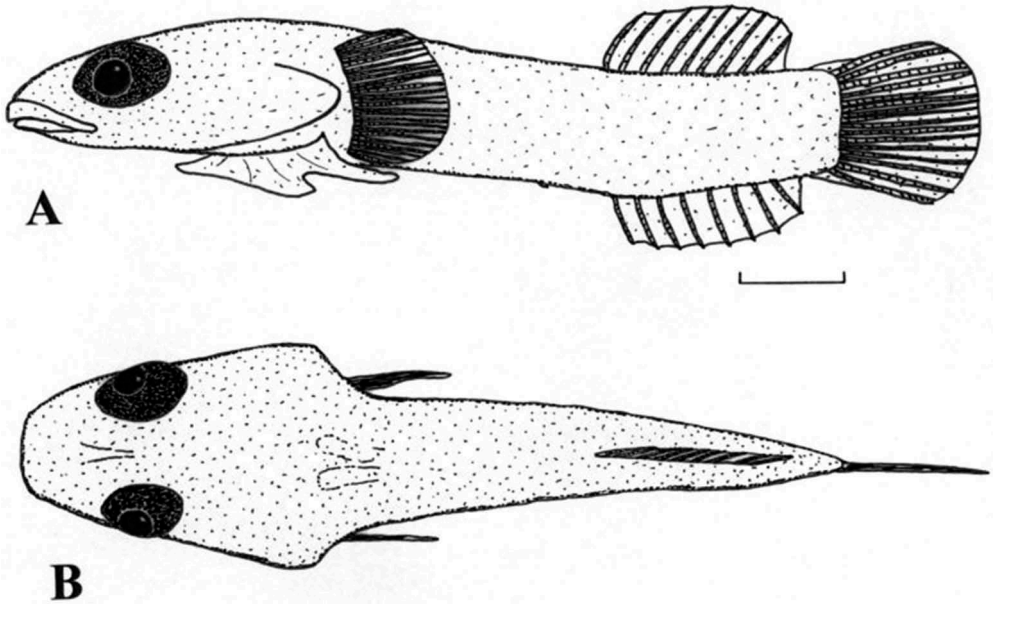

Figure 7. *Diplecogaster ctenocrypta* Briggs 1955, ZMUC P9037, holotype, 15.7 mm SL, Gran Canaria. (A) Lateral view; (B) dorsal view. Bar 2 mm.

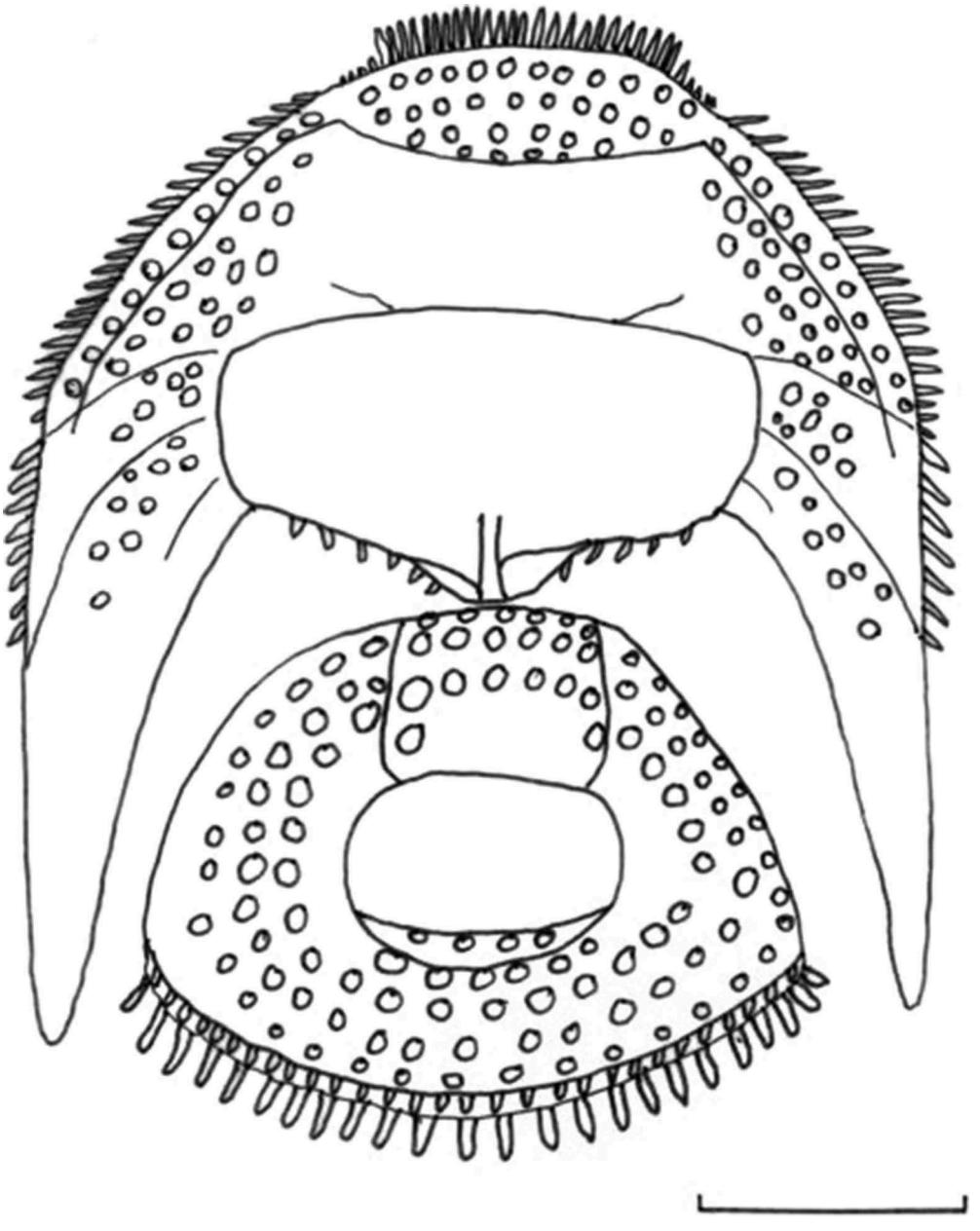

Figure 8. *Diplecogaster ctenocrypta* Briggs 1955, ZMUC P9037, holotype, 15.7 mm SL, Gran Canaria. Pelvic disc. Bar 1 mm.

Dooley et al. 1985: 43 (Canary Islands; in checklist). Briggs 1990: 475 (Canary Islands). Hofrichter 1995: 156–159, figures 95–97. Hofrichter & Patzner 1997: 21. Fricke 2007: 68. Almada et al. 2008: 1151. Hanel et al. 2009: 166 (in checklist). Fricke et al. 2010: 92.

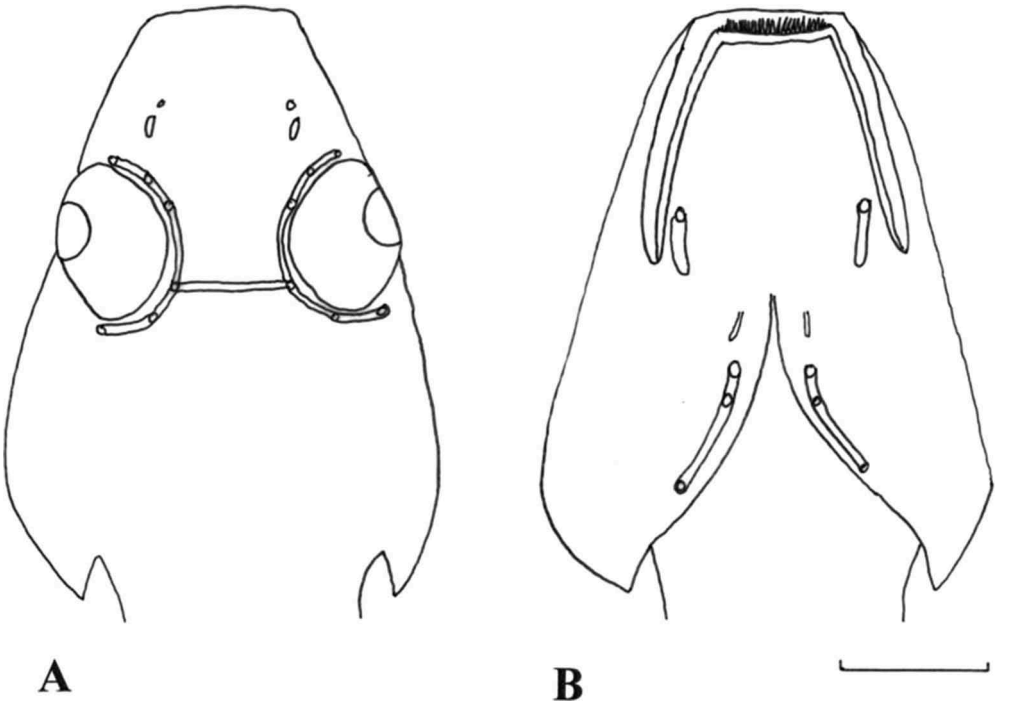

Figure 9. *Diplecogaster ctenocrypta* Briggs 1955, ZMUC P9037, holotype, 15.7 mm SL, Gran Canaria. (A) dorsal view of head; (B) ventral view of head. Bar 1 mm.

Material

ZMUC P9037, holotype, 15.7 mm SL, Eastern Atlantic Ocean, Canary Islands, Gran Canaria, off La Luz, hard bottom with algae, 90 fms [165 m] depth, T. Mortensen, 28 March 1930.

Diagnosis

A species of *Diplecogaster* with 9 dorsal-fin rays, 8 anal-fin rays, 25 pectoral-fin rays, and 16 principal caudal-fin rays; pelvic disc with lateral papillae in region A; disc region B with 5 rows of papillae; principal caudal-fin rays 16; interorbital distance 5.4 in head length; distance between disc and anus 19% of SL; head and body pale, without bars or ocelli.

Description

Dorsal-fin ix; anal-fin viii; pectoral-fin xxv; caudal-fin xvi. Gill rakers on 3rd arch 18, very small, pointed.

Teeth small, conical, slightly recurved, in patches towards the front of each jaw, narrowing to a line of single teeth laterally.

Head lateral line system with 3 pores in nasal canal, 3 pores in postorbital canal, 1 pore in mandibular canal, and 2 pores in lacrymal canal (Figure 9).

Head broad, depressed. Head length 39.5% SL (2.5 in SL). Maximum body depth 17.2% SL (5.8 in SL). Maximum head width 16.6% SL (6.0 in SL). Maximum (horizontal) orbit diameter 11.1% SL (3.5 in head length). Snout short, anteriorly straight

(Figure 7B). Preorbital length 7.6% SL (5.2 in head length). Interorbital distance 7.3% SL (5.4 in head length). Upper jaw length 10.8% SL (3.6 in head length). Anus situated much closer to the anal-fin origin than to the disc; distance between disc and anus 19.1% SL, distance between anus and anal-fin origin 7.6% SL. Preanus length 66.8% SL (1.5 in SL). Caudal–peduncle length 11.5% SL (8.7 in SL). Caudal–peduncle depth 13.4% SL (7.5 in SL).

Predorsal-fin length 72.0% SL (1.4 in SL). Preanal-fin length 73.2% SL (1.4 in SL). Prepectoral-fin length 40.1% SL (2.5 in SL). Predisc length 20.4% SL (4.9 in SL). Disc length 25.5% SL (3.9 in SL). Disc membrane inserting at base of 21st pectoral-fin ray. Disc with 4 rows of papillae in region A, 5 rows of papillae in region B, and 4 rows of papillae in region C (Figure 8). Several rows of lateral papillae in disc region A. Caudal-fin length 17.2% SL (5.8 in SL).

Colour in life

Unknown.

Colour in alcohol

Head and body yellowish white; eyes dark grey.

Distribution

Eastern Atlantic Ocean: Canary Islands (Gran Canaria). Probably more widespread in the region. The species was collected at 165 m depth, on hard substrate among algae.

Remarks

A record of *Diplecogaster ctenocrypta* (*non* Briggs 1955) from the Gulf of Guinea by Böhlke and Robins (1970, p. 6) is probably based on a different species.

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