TAXA JOURNAL OF TAXONOMY AND SYSTEMATICS

CAPPADOCIA ACADEMY PUBLISHING

Research Article

Diplecogaster roseioculus, a new species of clingfish (Teleostei: Gobiesocidae) from São Tomé Island, eastern Atlantic Ocean

Ronald Fricke[1], **Peter Wirtz**[2]

[1]Staatliches Museum für Naturkunde in Stuttgart, Rosenstein 1, 70191 Stuttgart, Germany.
[2]Centro de Ciências do Mar, Universidade do Algarve, P-8005-139 Faro, Portugal.
*Correspondence: ronald.fricke@smns-bw.de; ronfricke@web.de

Citation: Fricke, R., & Wirtz, P. (2023). *Diplecogaster roseioculus*, a new species of clingfish (Teleostei: Gobiesocidae) from São Tomé Island, eastern Atlantic Ocean. *Taxa, 1*, ad23104: 9p.

Received: 01.05.2023
Revised: 18.05.2023
Accepted: 18.05.2023
Published online: 22.05.2023

Abstract

The clingfish *Diplecogaster roseioculus* sp. nov. is described on the basis of a single specimen from São Tomé Island, eastern Atlantic Ocean. The species is small, not exceeding 16 mm total length; it is characterized by having 7 dorsal-fin rays and 7 anal-fin rays, 29 pectoral-fin rays, 17 caudal-fin rays; gill rakers on 3rd arch 12; head width 4.9 in SL; orbit diameter 3.0 in head length; snout short, bluntly rounded; disc length 5.2 in SL; disc with 2 rows of papillae in region A, 5 rows of papillae in region B, and 1 row of papillae in region C; lateral papillae in disc region A absent; anus closer to anal fin than disc; sides of body with 6 vertical bars. The new species is compared with the other species of the genus; a revised key to the species of the eastern Atlantic genus *Diplecogaster* is presented.

Keywords: clingfishes, taxonomy, morphology, distribution, identification key
ZooBank: urn:lsid:zoobank.org:pub:BA4749C0-C6ED-44CD-95CC-70B484ADFD81

Introduction

The clingfishes of the family Gobiesocidae are distributed worldwide in tropical and temperate seas, with some also living in freshwater streams in the tropics. They inhabit hard substrates, usually on rocky bottom or in coral reefs, mostly in shallow waters. Clingfishes are characterized by possessing an adhesive disk formed by the pelvic fins, the head depressed, the skin naked, one dorsal and anal fin each, and several specialized osteological characters. The family was revised by Briggs (1955), who distinguished nine species from the eastern Atlantic and the Mediterranean. Briggs (1957) described two additional species of clingfishes from West Africa, 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 2 species of clingfishes from tropical West Africa. Briggs (1986) found that *Lepadogaster microcephalus* Brook, 1890 is a junior synonym of *Apletodon dentatus* (Facciolà 1887); he distinguished eigth nominal species of clingfishes from the northeastern Atlantic and Mediterranean, some having several subspecies. Briggs (1990) recorded eigth species of clingfishes from the eastern tropical Atlantic. Hofrichter & Patzner (1997) described *Apletodon incognitus* from the northwestern Mediterranean Sea and the Azores. Vakily et al. (2002) listed five clingfish species from

northwestern Africa. Henriques et al. (2002) synonymized *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: 1155, as *Mirbelia candollei*). Fricke (2007) described *Apletodon wirtzi* from Sao Tomé and Principe; Fricke et al. (2010) reported another species, *Apletodon barbatus*, from the Cape Verde Islands; Fricke & Wirtz (2018) described *Apletodon gabonensis* from Gabon.

The clingfish genus *Diplecogaster* was first described by Fraser-Brunner (1938: 415), based on *Cyclopterus bimaculatus* Bonnaterre [ex Pennant], 1788 as the type species by original designation; the genus was considered monotypic. In his revision of gobiesocid fishes, Briggs (1955) described *Diplecogaster ctenocrypta, D. megalops* and *D. bimaculata pectoralis*, distinguishing a total of four species/subspecies in the genus. Murgoci (1964: 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 (including subspecies). Fricke et al. (2015) described *Diplecogaster tonstricula* from the Canary Islands and Senegal, and redescribed *D. ctenocrypta* Briggs 1955; Bilecenoğlu et al. (2017) described *D. umutturali* from the northeastern Mediterranean. This results in a total number of seven previously known valid species in the genus *Diplecogaster*.

In January 2023, the second author discovered a single specimen of a previously unknown species of *Diplecogaster* with pink eyes, while SCUBA diving at São Tomé Island. The new species is described in the present paper, and compared with other species of the genus.

Materials and Methods

Methods follow Briggs (1955) and Hofrichter & 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), '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 3 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). 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); HUJ (Hebrew University of Jerusalem, Fish Collection, Jerusalem, Israel; MNHN (Muséum National d'Histoire Naturelle, Paris, France); SMNS (Staatliches Museum für Naturkunde Stuttgart, Germany); 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, Sep. 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 Apr. 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 Apr. 1993; SMNS 19204, 2 spec., 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; SMNS 24491, 1 specimen, Croatia, Osor, M. Grabert, May 1998; SMNS 27552,1 specimen, Balearic Islands, north of Cabrera, R. Fricke, 22 June 2022; SMNS 27571, 1 specimen, Balearic Islands, north of Mallorca, R. Fricke, 24 June 2021.

***Diplecogaster ctenocrypta*:** 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 Mar. 1930.

***Diplecogaster euxinica*:** SMNS 25361, 4 specimens, Sea of Marmara, Turkey, Erdek Körfezi, 13 May 2006.

***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, Dec. 1990; SMNS 20163, 8 specimens, Madeira, off Hotel Roca Mar, Caniço de Baixo, 40-70 m depth, P. Wirtz, 22 Sep. 1996; SMNS 21202, 2 specimens, Madeira, Porto Novo, 1-2 m depth, P. Wirtz, 16 Oct. 1998; SMNS 27325, 2 specimens, Canary Islands, Lanzarote, 2004; SMNS 27326, 1 specimen, Canary Islands, La Graciosa, 2004; SMNS 27327, 1 specimen, Canary Islands, Fuerteventura, 2004; ZMUC P9034, holotype, off La Luz, Gran Canaria, 100 fms [183 m] depth, T. Mortensen, July 1929.
***Diplecogaster tonstricula*:** ZSM 40089, holotype, 21.3 mm SL, Eastern Atlantic Ocean, Senegal, Dakar, 1.3 km southsouthwest of La Pointe des Almades, 14°43.806'N, 17°32.046'W, 28 m depth, P. Wirtz, 20-24 Oct. 2009; SMNS 27324, 2 specimens, paratypes, 18.7-22.9 mm SL, Eastern Atlantic Ocean, Canary Islands, Fuerteventura, Morro del Jable, ca. 28°02'42''N, 14°21'12''W, 38 m depth, R/V Ventura; ZSM uncat., 5 specimens, paratypes, 11.8-21.1 mm SL, Eastern Atlantic Ocean, Senegal, Dakar, 1.3 km south-southwest of La Pointe des Almades, 14°43.806'N, 17°32.046'W, 28 m depth, P. Wirtz, 20-24 Oct. 2009.
***Diplecogaster umutturali*:** 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.

Results

Systematics

The present paper follows the classifications provided by Nelson (2016) and Laan et al. (2014):

Superclass Gnathostomata
Subclass Neopterygii
Division Teleostei
Order Gobiesociformes
Family Gobiesocidae Bleeker 1859
Genus *Diplecogaster* Fraser-Brunner 1938

***Diplecogaster roseioculus* n. sp.** (Figures 1-4, Table 1)

Common name: Pink-eye clingfish

Holotype: SMNS 27756, 14.7 mm SL, eastern Atlantic Ocean, São Tomé and Principe, São Tomé Island Group, ca. 500 m southeast of Ilheu Santana, ca. 0°14.23'N 6°45.84'E, 40 m depth, P. Wirtz, 31 Jan. 2023.

Diagnosis: A species of *Diplecogaster* with 7 dorsal-fin rays, 7 anal-fin rays, 29 pectoral-fin rays, and 17 caudal-fin rays; gill rakers on 3rd arch 12; head width 4.9 in SL; orbit diameter 3.0 in head length; snout short, bluntly rounded; disc length 5.2 in SL; disc with 2 rows of papillae in region A, 5 rows of papillae in region B, and 1 row of papillae in region C; lateral papillae in disc region A absent; anus closer to anal fin than disc; sides of body with 6 vertical bars.

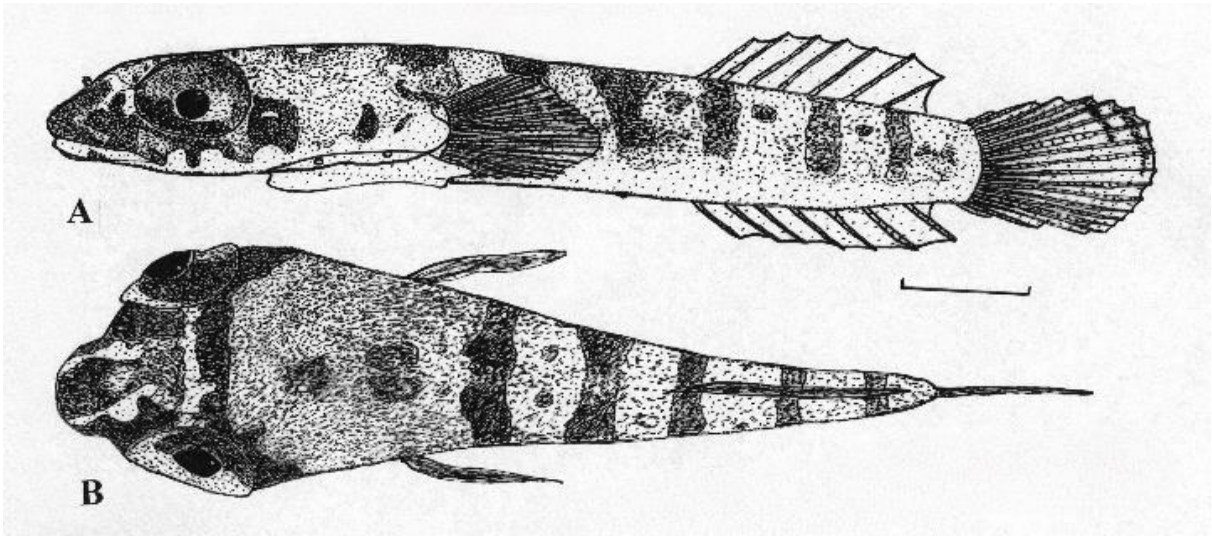

Figure 1. *Diplecogaster roseioculus* n. sp., SMNS 27756, holotype, 14.7 mm SL, eastern Atlantic Ocean, São Tomé and Principe, São Tomé Island Group, ca. 500 m southeast of Ilheu Santana. **A** Lateral view. **B** dorsal view. Scale bar 2 mm.

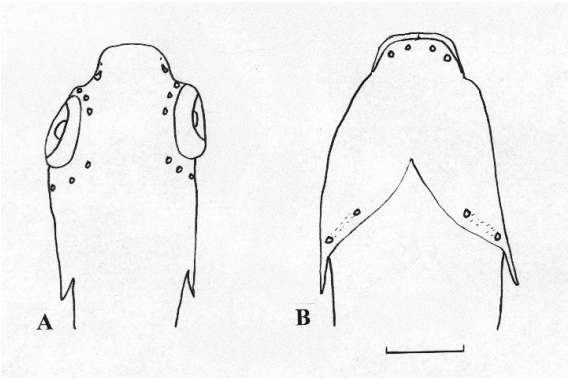

Figure 2. *Diplecogaster roseioculus* n. sp., SMNS 27756, holotype, 14.7 mm SL, eastern Atlantic Ocean, São Tomé and Principe, São Tomé Island Group, ca. 500 m southeast of Ilheu Santana. **A** Head, dorsal view, showing pores. **B** head, ventral view, showing pores. Scale bar 2 mm.

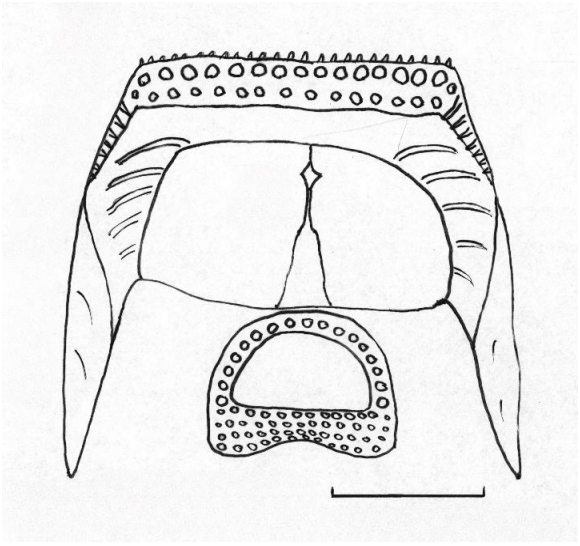

Figure 3. *Diplecogaster roseioculus* n. sp., SMNS 27756, holotype, 14.7 mm SL, eastern Atlantic Ocean, São Tomé and Principe, São Tomé Island Group, ca. 500 m southeast of Ilheu Santana. Disc, ventral view. Scale bar 1 mm.

Figure 4. *Diplecogaster roseioculus* n. sp., SMNS 27756, holotype, 14.7 mm SL, eastern Atlantic Ocean, São Tomé and Principe, São Tomé Island Group, ca. 500 m southeast of Ilheu Santana. Live colouration immediately after collection. Photograph: P. Wirtz.

Table 1. Counts and measurements of *Diplecogaster roseioculus* n. sp.

Holotype, SMNS 27756			
Counts:			
Dorsal-fin rays	7		
Anal-fin rays	7		
Pectoral-fin rays	29		
Caudal-fin rays	17		
Gill rakers on 3rd arch	12		
Papilla rows in disc region A	2		
Papilla rows in disc region B	5		
Papilla rows in disc region C	1		
Meristics:	**Measurement (mm)**	**Proportion (% of SL)**	**Proportion (% of head length)**
SL	14.7	--	
Maximum body depth	2.1	14.3	
Head length	5.5	37.4	
Maximum head width	3.0	20.4	
Distance disc - anus	3.0	20.4	
Distance anus - anal-fin origin	1.9	12.9	
Predorsal length	12.2	83.0	
Preanal length	11.7	79.6	
Preanus length	9.8	66.7	
Prepectoral length	5.5	37.4	
Prepelvic length	3.9	26.5	
Pre-disc length	4.0	27.2	
Disc length	2.8	19.0	
Disc width	2.8	19.0	
Caudal-fin length	2.9	19.7	
Caudal-peduncle length	1.1	7.5	
Caudal-peduncle depth	1.4	9.5	
Maximum orbit diameter	1.8	12.2	32.7
Preorbital length	1.5	10.2	27.3
Interorbital distance	1.7	11.6	30.9
Upper-jaw length	2.0	13.6	36.4

Description: Dorsal-fin vii; anal-fin vii; pectoral-fin vi,5,xviii (total 29); caudal-fin xvii. Gill rakers on 3rd arch 12, very small, pointed. Measurements of the holotype see Table 1.

Teeth very small, conical, slightly recurved, in patches towards the front of each jaw, narrowing to a line of single teeth on the laterally. Head lateral line system with 3 pores in nasal canal, 3 pores in postorbital canal, and 2 pores in lacrymal canal (Figure 2); 2 + 2 mandibular pores.

Head broad, depressed. Head length 37.4% SL (2.7 in SL). Maximum body depth 14.3 % SL (7.0 in SL). Maximum head width 20.4 % SL (4.9 in SL). Maximum (horizontal) orbit diameter 12.2 % SL (3.1 in head length). Snout short, bluntly rounded (Figure 1b). Preorbital length 10.2 % SL (3.7 in head length). Interorbital distance 11.6 % SL (3.2 in head length). Upper jaw length 13.6 % SL (2.8 in head length). Anus situated closer to the anal-fin origin than to the disc; distance between disc and anus 20.4 % SL (equalling head length), distance between anus and anal-fin origin 12.9 % SL. Preanus length 66.7 % SL (1.5 in SL). Caudal-peduncle length 7.5 % SL (13.4 in SL). Caudal-peduncle depth 9.5 % SL (10.5 in SL).

Predorsal-fin length 83.0 % SL (1.2 in SL). Preanal-fin length 79.6 % SL (1.3 in SL). Prepectoral-fin length 37.4 % SL (2.7 in SL). Prepelvic-fin length 26.5 % SL (3.8 in SL). Pre-disc length 27.2 % SL (3.7 in SL). Disc as long as wide, length 19.0 % SL (5.2 in SL). Disc membrane inserting at base of 21th pectoral-fin ray. Disc with 2 rows of papillae in region A, 1 row of weak papillae in region B, and 5 rows of weak papillae in region C (Figure 2). No lateral papillae in disc region A. Caudal-fin length 19.7 % SL (5.1 in SL).

Colour in life: (Figure 4) Ground colouration yellowish, anterior and lower parts of head light grey, mottled with dark grey, upper jaws with three dark grey blotches on each side; eyes bright pink. Interorbital with a white bar connecting the eyes; a dark grey blotch behind the eye. Upper sides of body with rows of pale blue spots, sides of body with 6 faint vertical yellowish bars. Fins yellowish.

Colour in alcohol: Head and body rose, ventrally white, sides of body with 6 vertical brownish bars, and intermediate brown blotches (Figure 1). Lower parts of head marbled with black, around lower jaw with black spots. Eye rose-pink. Fins translucent; caudal fin posterio-dorsally with two faint grey bars.
Etymology: *Roseus* (Latin) means rose, *oculus* (Latin) means eye. The name refers to the pink eyes of the new species. It is an adjective with a masculine ending when classified in the genus *Diplecogaster*.
Distribution and habitat: This new species is currently known only from the holotype that was collected at São Tomé and Principe (Figure 5). It was collected at a depth of 40 m depth, at an isolated rock (ca. 8 m long, 5 m wide) on sandy bottom, in a small crevice, together with *Corcyrogobius lubbocki* Miller 1988.

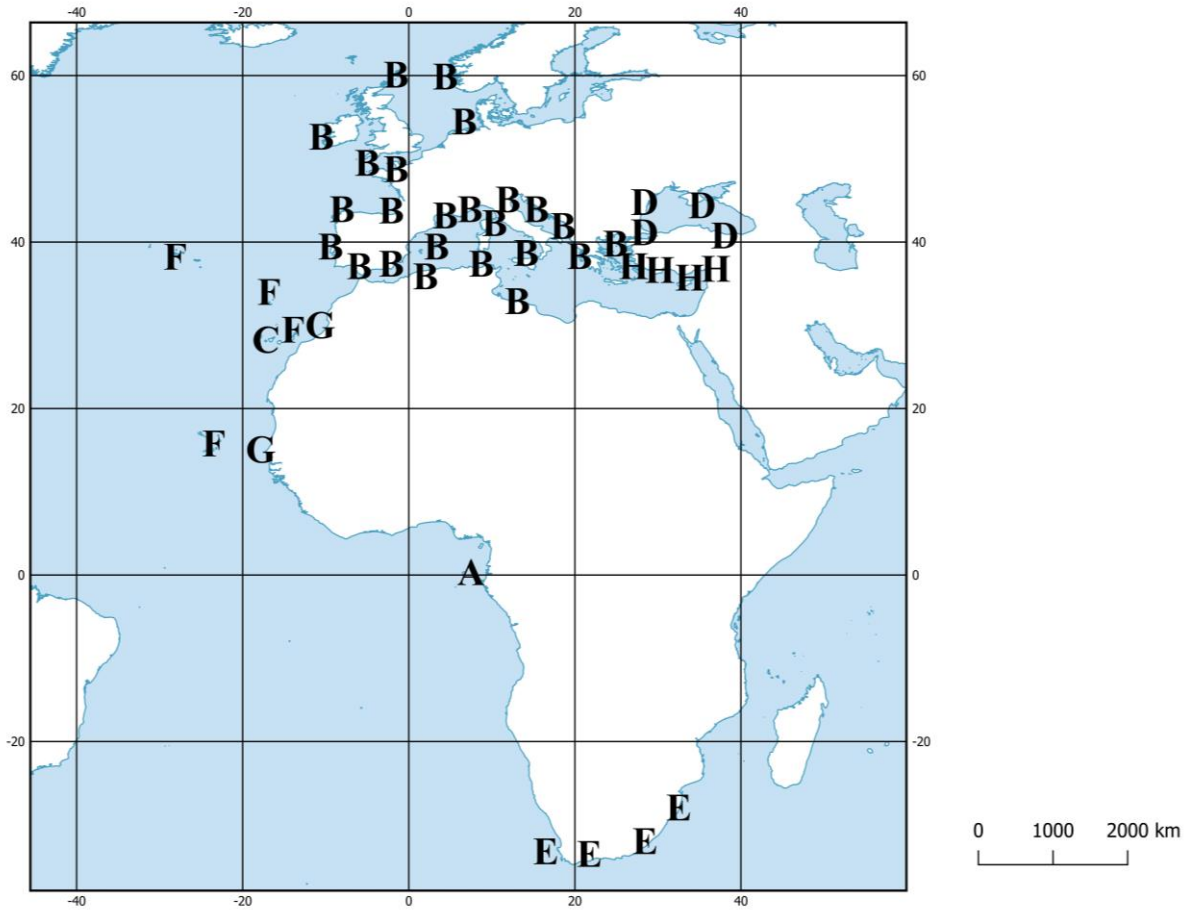

Figure 5. Geographical distribution of the species of *Diplecogaster*. **A** *Diplecogaster roseioculus* n. sp. **B** *Diplecogaster bimaculata*. **C** *Diplecogaster ctenocrypta*. **D** *Diplecogaster euxinica*. **E** *Diplecogaster megalops*. **F** *Diplecogaster pectoralis*. **G** *Diplecogaster tonstricula*. **H** *Diplecogaster umutturali*.

Comparisons: Within the genus *Diplecogaster*, the new species has the highest number of pectoral-fin rays and principal caudal-fin rays observed in any species (pectoral rays 29 in *D. roseioculus*, versus 20-26 in the other species; principal caudal rays 17, vs. 12-16), and only one papilla row in disc region C (vs. 2-9) (Table 2). It is similar to *D. tonstricula* in the absence of lateral papillae in disc region A (versus lateral papillae present in the other species), but is distinguished by having 7 dorsal- and anal-fin rays (vs. 8-9 in *D. tonstricula*), 2 papillae rows in disc region A (vs. 3), 5 papillae rows in disc region B (vs. 4), and 6 broad vertical bars on the body (vs. 10-13 narrow bars). The new species also differs from other species in having 7 dorsal-fin rays (vs. 9 in *D. ctenocrypt*a, 4-5 in *D. megalops*, 5-6 in *D. umutturali*), 7 anal-fin rays (vs. 4-6 in *D. bimaculata*, 3-4 in *D. megalops*, 4-5 in *D. umutturali*), 12 gill rakers on 3rd arch (vs. 18 in *D. ctenocrypta*, 7-10 in *D. euxinica*, 6-9 in *D. megalops*, 8-11 in *D. pectoralis*), disc length 5.2 in SL (vs. 3.4-4.3 in *D. bimaculata*, 3.9 in *D. ctenocrypta*, 3.2-4.8 in *D. euxinica*, 3.4-4.0 in *D. megalops*, 3.9-4.6 in *D. pectoralis*, 3.4-4.7 in *D. umutturali*), eye diameter 3.0 in head length (vs. 3.7-4.9 in *D. bimaculata*, 3.5 in *D. ctenocrypta*), 2 papillae rows in disc region A (vs. 4-7 in *D. bimaculata*, 4 in *D. ctenocrypta*, 3-7 in *D.*

euxinica, 4-5 in *D. megalops*, 3-5 in *D. pectoralis*, 4-6 in *D. umutturali*), and 5 papillae rows in disc region B (vs. 4 in *D. ctenocrypta*, 3 in *D. pectoralis*) (Table 2).

Table 2. 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. roseioculus* n. sp.**	***D. bimaculata***	***D. ctenocrypta***	***D. euxinica***	***D. megalops***	***D. pectoralis***	***D. tonstricula***	***D. umuttura***
Maximum SL (mm)	15	49	16	48	26	27	23	27
Dorsal-fin rays	7	5-7	**9**	5-8	**4-5**	7	**9**	**5-6**
Anal-fin rays	7	**4-6**	8	4-7	**3-4**	6-7	8	4-5
Pectoral-fin rays	29	**20-25**	**25**	**21-26**	**22-25**	**25-26**	**24-25**	**22-25**
Principal caudal- fin rays	17	**12-14**	**16**	**12-14**	**10-15**	**14-15**	**14-15**	**12-13**
Gill rakers on 3rd arch	12	**7-11**	**18**	**7-10**	**6-9**	**8-11**	**13-16**	?
Disc length in SL	5.2	**3.4-4.3**	**3.9**	**3.2-4.8**	**3.4-4.0**	**3.9-4.6**	4.7-5.2	**3.4-4.7**
Head length in SL	2.7	2.4-3.1	2.5	2.3-3.3	2.6-3.0	2.5-2.8	2.7-2.8	2.6-3.3
Head width in SL	4.9	3.2-4.8	6.0	**3.1-4.7**	**3.2-3.7**	**3.6-4.2**	**4.2**	**2.9-4.1**
Eye diameter in head length	3.0	**3.7-4.9**	**3.5**	3.2-6.1	2.3-3.6	3.2-3.9	3.2-3.5	2.7-4.0
Papilla rows in disc region A	2	**4-7**	**4**	**3-7**	**4-5**	**3-5**	**3**	**4-6**
Papilla rows in disc region B	5	3-5	**4**	3-5	5-7	**3**	**4**	5-7
Papilla rows in disc region C	1	**5-9**	**5**	**4-9**	**3-4**	**6**	**2**	**3-4**
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**	Closer to anal fin than to disc	**Closer to disc than to anal fin**
Lateral papillae in disc region A	absent	**present**	**present**	**present**	**present**	**present**	absent	**present**
Distribution	São Tomé Island	western and central Mediterranean to Norway	Canary Islands	Black Sea	South Africa	Canary Islands, Madeira, Azores, Cape Verde Islands	Canary Islands, Senegal	northeastern Mediterranean

Discussion

The new species was classified in the genus *Diplecogaster* as it agrees with the generic characters given by Briggs (1955) as 3 1/2 gills, the gill membranes attached to the isthmus, the disc double, the dorsal and anal fins with strong rays, normal, the subopercular region without a spine, 24-25 pectoral fin rays, the absence of incisors or well developed canines, and 13-16 rakers on the third gill arch. It is a member of the *Diplecogaster-ctenocrypta* group (otherwise comprising *D. ctenocrypta* and *D. tonstricula*), which is characterised within the genus by the position of the anus which is situated closer to the anal-fin origin than to the end of the disc.

The new species not only resembles *D. tonstricula* in the absence of lateral papillae in region A, but also in having a rather small disc, and in the colour pattern of the lips of living specimens. It may be the sister species of *D. tonstricula*.

Geographically, the new species was found in the middle between the distribution ranges of *D. ctenocrypta* and *D. tonstricula* (off northwestern Africa), and that of *D. melagops* (South Africa) (Figure 5). It is the first member of the genus observed in the Gulf of Guinea. The genus might be more widespread along the coast of West Africa, but is difficult to find due to its cryptic habits.

Including the new species, the genus *Diplecogaster* now comprises eight valid species (Tab. 2). A key to the species of the genus is provided below.

Key to the Species of the Genus *Diplecogaster*

1a. Dorsal-fin rays 4-8; anal-fin rays 3-7 2
1a. Dorsal-fin rays 9; anal-fin rays 8 7
2a. Eye large, eye diameter 0.5-0.6 in bony interorbital, 2.3-3.6 in head length; South Africa ..... *Diplecogaster megalops*
2b. Eye relatively small, eye diameter 0.7-1.2 in bony interorbital, 2.7-4.9 in head length; eastern Atlantic, Mediterranean Sea, Black Sea 3
3a. Anus closer to anal fin than to disc; lateral papillae in disc region A absent; São Tomé and Principe ..... *Diplecogaster roseioculus* **n. sp.**
3b. Anus in the middle between disc and anal fin, or closer to disc than to anal fin; lateral papillae in disc region A present; northeastern Atlantic, Mediterranean Sea, Black Sea 4
4a. 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*

4b. Snout length 3.3-3.9 in head length; upper attachment of axial, dermal flap opposite pectoral-fin rays 10-14 (mean 12); principal caudal rays 9-13 5

5a. Caudal peduncle depth in caudal peduncle length 0.77-0.96; anal-fin length in distance between anus and anal-fin origin 1.92-2.35 .....*Diplecogaster umutturali*

5b. Caudal peduncle depth in caudal peduncle length 1.0-1.7; anal-fin length in distance between anus and anal-fin origin 0.83-1.23 6

6a. 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*

6b. 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*

7a. 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*

7a. 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*

Acknowledgements: The holotype was collected while SCUBA diving at the Atlantic Diving Centre at Santana, São Tomé Island; many thanks to the owner, Alberto Miranda, for all his support. The second author would also like to thank M. M. Bandeira (Ministério de Agricultura, Desenvolvimento Rural e Pescas, Direção das Pescas e Aquaculture, República Democrática de São Tomé e Principe) for issuing an export permit that covered the holotype of this species.

Author Contributions: Resources, A.B., M.A.; writing—original draft preparation, A.B., M.A.; writing—review and editing, A.B., M.A.; visualization, M.A.; funding acquisition, A.B. A.B., M.A. have read and agreed to the published version of the manuscript.

Funding: This study received Portuguese national funds from FCT - Foundation for Science and Technology through projects UIDB/04326/2020, UIDP/04326/2020 and LA/P/0101/2020.

Data Availability Statement: The data underlying this article will be shared upon reasonable request to the corresponding author.

Conflicts of Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Almada, F., Henriques, M., Levy, A., Pereira, A., Robalo, J., & Almada, V. C. (2008). Reclassification of *Lepadogaster candollei* based on molecular and meristic evidence with a redefinition of the genus *Lepadogaster*. *Moleclar Phylogenetics and Evolution, 46*, 1151-1156.

Bilecenoğlu, M., Yokeş, M. B., & Kovačić, M. (2017). A new species of *Diplecogaster* (Actinopterygii: Gobiesocidae) from the Mediterranean Sea. *Zoology of the Middle East, 63*(3), 210-218.

Blache, J., Cadenat, J., & Stauch, A. (1970). *Faune tropicale XVIII Clés de détermination des poissons de mer signalés dans l'atlantique oriental entre le 20° parallèle nord et le 15° parallèle sud*. ORSTOM, Paris: 479 pp.

Bonnaterre. J. P. (1788). *Tableau encyclopédique et methodique des trois règnes de la nature... Ichthyologie*. Panckoucke, Paris: lvi + 215 pp., pls. A-B + 1-100.

Briggs, J. C. (1955). A monograph of the clingfishes (order Xenopterygii). *Stanford Ichthyological Bulletin, 6*, i-iv + 1-224.

Briggs, J. C. (1957). A new genus and two new species of Eastern Atlantic clingfishes. *Copeia, 1957*(3): 204-208.

Briggs, J. C. (1986). *Gobiesocidae*. In: Whitehead, P.J.P., Bauchot, M.-L., Hureau, J.-C., Nielsen, J., Tortonese, E. (ed.): Fishes of the North-eastern Atlantic and the Mediterranean, 3. UNESCO, Paris: pp 1351-1359.

Briggs, J. C. (1990). *Gobiesocidae*. In: Quéro, J.-C., Hureau J.-C., Karrer, C., Post, A., Saldanha, L. (ed.): Check-list of the fishes of the eastern tropical Atlantic. UNESCO, Lisbon: pp 474-478.

Fraser-Brunner, A. (1938). Notes on the classification of certain British fishes. *Annals and Magazine of Natural History, 2*(11), 410-416.

Fricke, R. (1983). A method of counting caudal fin rays of actinopterygian fishes. *Braunschweiger Naturkundliche Schriften*, 1, 729-733.

Fricke, R. (2007). A new species of the clingfish genus *Apletodon* (Teleostei: Gobiesocidae) from Sao Tome and Principe, Eastern Central Atlantic. *Ichthyological Research*, 54, 68-73.

Fricke, R., Bilecenoglu, M., & Sari, H. M. (2007). Annotated checklist of fish and lamprey species (Gnathostomata and Petromyzontomorphi) of Turkey, including a Red List of threatened and declining species. *Stuttgarter Beiträge zur Naturkunde Serie A (Biologie), 706*, 1-174.

Fricke, R., & Wirtz, P. (2018). *Apletodon gabonensis*, a new species of clingfish (Teleostei: Gobiesocidae) from Gabon, eastern Atlantic Ocean. *Arquipélago, Life and Marine Science, 36*, 1-8.

Fricke, R., Wirtz, P., & Brito, A. (2010). A new species of the clingfish genus *Apletodon* (Teleostei: Gobiesocidae) from the Cape Verde Islands, Eastern Central Atlantic. *Ichthyological Research*, 57, 91-97.

Fricke, R., Wirtz, P., & Brito, A. (2015). *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. *Journal of Natural History*, *50*(11-12), 731-748.

Henriques, M, Lourenço, R., Almada, F., Calado, G., Gonçalves, D., Guillemaud, T., Cancela, M. L., & Almada, V. C. (2002). A revision of the status of *Lepadogaster lepadogaster* (Pisces: Gobiesocidae): sympatric sub-species or a long misunderstood blend of species? *Biological Journal of the Linnean Society, 76*, 327-338.

Hofrichter, R. (1995). *Taxonomie, Verbreitung und Ökologie von Schildfischen der Unterfamilie Lepadogastrinae (Gobiesocidae, Teleostei)*. Unpublished doctoral dissertation; Naturwissenschaftliche Fakultät, Paris Lodron Universität, Salzburg: viii + 448 pp.

Hofrichter, R., & Patzner, R. A. (1997). A new species of *Apletodon* from the Mediterranean Sea and the eastern Atlantic with notes on the differentiation between *Apletodon* and *Diplecogaster* species (Pisces: Teleostei: Gobiesociformes: Gobiesocidae). *Senckenbergiana Biologica, 77*, 15-22.

Laan, R. van der, Eschmeyer, W. N., & Fricke, R. (2014). Family-group names of Recent fishes. *Zootaxa*, *3882*(2), 1-230.

Murgoci, A. A. (1964). Contribution à la connaissance des gobiesocides (ordre des Xenopterygii) de la Mer Noire. *Revue Roumaine de Biologie, Série Zoologique, 9*, 297-306.

Nelson J. S., Grande T. C., & Wilson M. V. H. (2016). *Fishes of the World*. Fifth edition. John Wiley and Sons, Hoboken, N.J. 707 p.

Smith, J. L. B. (1964). The clingfishes of the western Indian Ocean and the Red Sea. *Ichthyological Bulletin, Rhodes University*, 30, 581-597, pls. 92-97.

Vakily, J. M., Camara, S. B., Mendy, A. N., Marques, V., Samb, B., Dos Santos, A. J., Sheriff, M. F., Ould Taleb Sidi, M., & Pauly, D. (2002). *Poissons marins de la sous-région nord-ouest africaine*. EUR 20379 FR, Commission Européenne, Bruxelles; 124 pp.