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BRIEF COMMUNICATIONS

First record of *Chromogobius britoi* (Teleostei: Gobiidae) on the mainland European coast

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Chromogobius britoi is a recently described and poorly studied goby currently known only from the Macaronesian islands of Madeira and the Canarian archipelago. This species was captured for the first time on the Atlantic mainland coast of Europe (at Arrábida Marine Park, Portugal). The habitat, depth preferences and morphological characters of the species are revised.

Key words: *Chromogobius britoi*; distribution; morphological characters; new record; Portugal.

The *Chromogobius* genus includes three known species: *C. quadrivittatus* (Steindachner), *C. zebratus* (Kolombatovic) and *C. britoi* Van Tassell. The first two species occur inside the Mediterranean Sea, with the exception of two specimens of *C. zebratus* found in the Gulf of Cadiz by Alberto & Nieto (1993). The distribution of *C. zebratus* extends to Israel and the Adriatic Sea (Miller, 1971; Ahnelt, 1990). *Chromogobius quadrivittatus* occurs from Catalunia (Spain) to Israel (Golani & Ben Tuvia, 1986) and also in the Black Sea and the Adriatic (Miller, 1971; Anhelt, 1990). *Chromogobius britoi* is a poorly known goby that was recently described for the Macaronesian archipelagos of Madeira and the Canaries by Van Tassell (2001).

In this paper, the occurrence of *C. britoi* in the mainland European coast (Portugal) is recorded and the morphology of specimens collected there compared to that of the specimens described by Van Tassell (2001) from the Macaronesian islands. Additional specimens from the Canary Islands are also included in this comparison.

Four females, three juveniles and one male of *C. britoi* were captured between June and August 2003 at the Arrábida Marine Park (38°27′03″ N; 9°01′24″ W), on the western coast of Portugal. The Portuguese specimens (size range: juveniles

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16·2–20·2 mm standard length, L_S, females 20·4–31·2 mm L_S and male 28·2 mm L_S) were catalogued in the collection of the Arrábida Nature Park Oceanographic Museum (Portinho da Arrábida, Portugal), under the catalogue numbers MOPNA 590–596. One female (27·6 mm L_S) was sent to the Natural History Museum, London (catalogue number BMNH 2005.4.21.1.). The presence of this species at this study site was first detected while studying the cryptobenthic fish communities using underwater visual census (R. Beldade & E. J. Gonçalves, unpubl. data). The specimens from Portugal were captured between 5 and 9 m depth under boulders covered with algae and under small rocks on the sand. At the study site, the extension of the rocky bottom is relatively narrow (up to 100 m long and 15 m depth) and there are no tidepools in the area. One female, one male and one juvenile were captured in the Canary Islands, at Tenerife (Los Abrigos) and Lanzarote (Puerto de Carmen), between July 1988 and August 1999. These specimens (size range: 18·2–29·8 mm L_S) were catalogued in the collection of the Arrábida Nature Park Oceanographic Museum, under the catalogue numbers MOPNA 597–599.

Two of the specimens from the Canary Islands were collected at a depth of 10 m under boulders, the third specimen was collected in a 37 cm deep tidepool. All specimens were captured using the anaesthetic quinaldine diluted in alcohol (1 : 15), fixed in 4% formaldehyde solution and preserved in 70% alcohol. Meristic characters and morphometric measurements were taken under a binocular microscope (to the nearest 0·01 mm) following Miller (1988), except for the first to second dorsal fin space and mouth width.

The morphometric data are presented in Table I as body proportions of % L_S, % caudal peduncule length (CPL), % head length (HL) and in % eye diameter (Eye). In the paper by Van Tassell (2001) all body proportions were calculated as %SL including those reported as %CPL, %HL and %Eye. Table I includes the data for the specimens described in the present study and the corrected proportions for the type specimens in the original paper by Van Tassell (2001). New ranges for body proportions are highlighted.

The meristic counts for the specimens described in this study (number of individuals in parenthesis; new counts in bold) are the following. Fin rays formulae: D1 – VI (11), D2 – I + 9(1)/I + 10(9)/I + 11(1), A – I + 9(11), P – 17(11), C (branched rays) **13**(2), 14(5), 15(3), **17**(1); total number of scales in the lateral line (left side of the body): 32(1), 33(1), 34(4), 35(2); 36(3). Number of sensory papillae in vertical row 1: 5(2), 6(4), 7(5); row 2: **3**(1), 4(4), 5(6); row 3: **3**(1), **4**(4), 5(4), 6(2); row 4: **3**(2), 4(1), 5(5), 6(3); row 5: **2**(1), 3(4), 4(5), **6**(1); row y: **0**(5), 1(6); row m: 0(8); 1(3).

The body proportions and meristic counts presented here are similar to the ones described by Van Tassell (2001), with the exceptions noted above and in Table I. Body colouration of the specimens did not differ from the initial description by Van Tassell (2001).

In the Canary Islands, *C. britoi* was described as occurring mainly in small cracks and crevices on the vertical face of rock walls and also in tide pools (Van Tassell, 2001) and under boulders (present work). In Portugal, the specimens were captured under boulders covered with algae or under small rocks on sand. These habitats are similar to the ones described for the other two species of *Chromogobius*, which have been described as occurring in caves, under boulders,

TABLE I. Minimum, maximum, mean and S.D. values of body proportions for all known specimens of *Chromogobius britoi*. New ranges are in bold

Sex	Juvenile				Female				Male				Total			
Size-ranges of fish (L_s) (mm)	16·20–20·75				20·35–31·20				20·24–33·66				16·20–33·66			
Number of specimens	8				11				8				27			
	Minimum	Maximum	Mean	S.D.	Minimum	Maximum	Mean	S.D.	Minimum	Maximum	Mean	S.D.	Minimum	Maximum	Mean	S.D.
In L_S																
Head length	28·1	31·6	29·51	1·46	27·8	**31·2**	29·28	1·21	27·4	31·3	28·66	1·39	27·4	31·6	29·17	1·33
Head width	12·3	**17·3**	15·07	1·89	10·2	**16·2**	14·22	1·72	**13·8**	17·0	14·94	0·98	10·2	**17·3**	14·69	1·59
Snout to first dorsal fin origin	**36·4**	41·3	39·34	1·76	**34·4**	40·4	38·15	1·86	36·6	39·4	37·66	0·94	**34·4**	41·3	38·36	1·69
Snout to second dorsal fin origin	**54·4**	61·4	58·27	2·91	**54·2**	61·2	57·42	2·30	54·1	59·6	57·43	1·79	54·1	61·4	57·67	2·31
Snout to anus	**53·7**	56·8	54·95	1·11	**52·7**	59·7	55·82	2·24	52·2	57·1	54·14	1·69	52·2	59·7	55·07	1·88
Snout to anal fin origin	**58·8**	**64·3**	60·50	1·72	58·3	**67·0**	60·68	2·81	57·9	61·7	58·96	1·28	57·9	67·0	60·12	2·20
Snout to pelvic disc origin	**25·3**	31·1	29·54	1·86	**27·7**	34·2	30·11	1·97	27·5	35·4	29·59	2·47	**25·3**	35·4	29·79	2·03
Origin of pelvic spine to anus	**21·9**	**26·3**	24·02	1·47	**22·8**	**27·6**	24·80	1·52	23·2	26·7	24·77	1·07	**21·9**	**27·6**	24·56	1·38
Caudal peduncle length	**17·5**	**22·5**	20·51	1·57	**18·5**	22·5	20·68	1·16	20·0	21·9	21·10	0·65	**17·5**	**22·5**	20·75	1·16
First dorsal fin base	**11·9**	**14·4**	12·76	0·82	11·3	13·6	12·29	0·71	12·1	15·5	13·14	1·15	11·3	15·5	12·68	0·93
First to second dorsal fin space	5·3	8·1	6·62	0·93	5·1	**7·5**	6·53	0·84	5·0	7·4	6·59	0·94	5·0	8·1	6·58	0·86
Second dorsal fin base	**23·0**	**26·3**	24·25	1·19	23·4	**26·8**	25·01	1·00	**24·4**	26·9	26·29	0·81	**23·0**	26·9	25·16	1·26
Anal fin base	18·0	**22·0**	20·00	1·36	17·3	**22·0**	20·37	1·52	**19·4**	22·7	20·79	1·14	17·3	22·7	20·39	1·36

Caudal fin length	18·4	**25·9**	21·93	3·09	19·3	26·7	23·04	2·36	17·4	32·3	24·80	4·16	17·4	32·3	23·28	3·26
Pectoral fin length	**19·7**	**26·6**	22·74	2·23	15·5	26·4	22·85	3·83	18·5	28·0	22·88	2·91	15·5	28·0	22·82	2·97
Pelvic disc length	19·1	23·2	21·85	1·50	**19·5**	23·1	21·28	1·36	16·7	23·3	20·89	2·32	16·7	23·3	21·33	1·71
Body depth at pelvic disc origin	13·8	**15·8**	14·76	0·69	13·6	**15·5**	14·73	0·60	**11·9**	16·2	14·61	1·40	**11·9**	16·2	14·70	0·89
Body depth at anal fin origin	12·1	**15·6**	13·90	1·31	**12·3**	**15·8**	14·03	1·30	**11·5**	14·5	13·01	0·91	**11·5**	**15·8**	13·69	1·24
Body width at anal fin origin	7·8	**10·9**	9·44	1·06	7·3	**11·5**	9·80	1·55	8·5	11·4	9·96	1·18	7·3	**11·5**	9·74	1·28
In caudal peduncule length																
Caudal peduncule depth	50·4	**60·6**	54·75	3·66	45·2	**59·6**	53·46	5·03	43·4	57·0	50·37	4·52	43·4	**60·6**	52·93	4·69
In head length																
Snout length	18·4	**25·4**	20·74	2·27	**16·3**	24·4	20·70	2·18	**19·5**	24·4	20·88	1·97	**16·3**	**25·4**	20·77	2·07
Eye diameter	20·7	**29·1**	25·73	2·85	**20·2**	29·5	24·46	2·96	21·4	28·5	24·75	2·30	**20·2**	29·5	24·92	2·70
Postorbital length	46·9	**56·4**	52·23	4·02	45·5	**55·9**	51·61	2·68	50·4	53·5	51·89	1·25	45·5	**56·4**	51·87	2·76
Cheek depth	8·8	**22·0**	15·43	4·24	13·6	**23·7**	16·94	2·77	14·5	17·8	16·11	1·34	8·8	**23·7**	16·25	2·95
Mouth width	20·5	39·3	29·65	6·75	24·1	44·6	35·64	7·18	28·1	38·8	31·60	3·15	20·5	44·6	32·66	6·45
In eye diameter																
Interorbital width	1·3	21·1	13·35	7·00	1·8	27·3	15·87	6·70	15·6	29·1	20·40	4·59	1·3	29·1	16·47	6·64

L_S, standard length.

rocks on rocky and sandy substrata and tide-pools (Miller, 1971; Mercader, 1994; Kovačić, 1997).

Depth preferences vary between the three species of *Chromogobius*. *Chromogobius quadrivittatus* has been captured mainly in the shallow subtidal, at depths of 1 to 2 m (Golani & Ben Tuvia, 1986) or tidal pools (Ahnelt, 1990); *C. zebratus* has been captured both in the intertidal and subtidal areas to 10 m depth (Bouchereau & Tomasini, 1989). In contrast *C. britoi* has been found to depths of up to 65 m (Van Tassell, 2001), but also in the intertidal and shallow subtidal (Van Tassell, 2001; present study).

Habitat preferences of *C. zebratus* and *C. quadrivitattus* slightly overlap (Bouchereau & Tomasini, 1989; Kovačić, 1997), and both are within ranges of habitat types described for *C. britoi* (Van Tassel, 2001; present study). According to the present knowledge, there is still no evidence of geographic overlap between *C. britoi* and the two Mediterranean *Chromogobius* species.

In the present study, the presence of *C. britoi* in the mainland European coast is recorded for the first time. The presence of this species at other sites should be investigated since it is a very cryptic species that can only be sampled adequately with anaesthetics or ichthyocides, and can easily be overlooked.

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