Centrodraco atrifilum, a new deepwater dragonet species from eastern Australia (Teleostei: Draconettidae)

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Abstract

The new deepwater dragonet *Centrodraco atrifilum* **n. sp.** from eastern Australia is characterised by its 13–14 rays in the second dorsal fin, 12–13 rays in the anal fin, the first dorsal fin with the second spine elongate and filamentous in both sexes, the second dorsal fin without filaments in the male, and the male body colour pattern: dorsally with three pairs of vertical dark brown streaks, followed by a single saddle below the end of the second dorsal fin and on the caudal peduncle. A key to the genera and species of Draconettidae is presented.

Keywords: Fishes, deepwater dragonets, Draconettidae, Australia, New South Wales, Queensland, new species, identification key.

Zusammenfassung

Die neue Tiefseeleierfischart *Centrodraco atrifilum* **n. sp.** aus Ostaustralien ist durch 13–14 Strahlen in der zweiten Rückenflosse, 12–13 Afterflossenstrahlen, einen stark verlängerten und filamentösen zweiten Stachelstrahl der ersten Rückenflosse, die nicht filamentösen Strahlen der zweiten Rückenflosse beim männlichen Exemplar, und die Körperfärbung des männlichen Exemplars mit einer dorsalen Reihe von drei Paaren vertikaler dunkler Bänder, gefolgt von einem Sattelfleck unter dem Ende der zweiten Rückenflosse und auf dem Schwanzstiel. Ein Bestimmungsschlüssel der Gattungen und Arten der Draconettidae wird aufgestellt.

Contents

1 Introduction

Deepwater dragonets of the family Draconettidae are a small group of benthic living fishes occurring on soft bottoms of the continental edges and slopes and on submarine ridges and seamounts. Its species are distributed worldwide in tropical and subtropical areas, roughly between 35°N and 35°S. Most of the draconettids are considered to be extremely rare; many species are known only from a few specimens.

Draconettid fishes are characterised by an elongate, rounded body; a pointed snout; very large eyes; a protractile upper jaw; teeth in jaws villiform; the opercle and subopercle with a strong, simple spine each; gill opening wide; lateral line present, grooved; two dorsal fins, the first with three spines, the second with 12–14 unbranched rays (the last ray divided at its base); anal fin with 12–13 branched rays (the last ray divided at its base), pectoral fin large, rounded; pelvic fin with one spine and five rays; caudal fin truncate. The Draconettidae are distinguished from the similar Callionymidae by the lack of a preopercular spine, but the presence of an opercular and subopercular spine, the wide gill opening (restricted to a small pore in callionymids), and the grooved lateral line (covered by skin in callionymids, with small pores).

The family was first revised by BRIGGS & BERRY (1959), who considered only a single genus as valid, and then by NAKABO (1982) who treated two genera and seven species. The most recent revision of FRICKE (1992) included 11 valid species in two genera, *Centrodraco* Regan, 1913 and *Draconetta* Jordan & Fowler, 1903. FRICKE (2002a) described a new species, *Centrodraco abstractum*, from the Philippines The checklist of FRICKE (2002b) therefore included 12 valid species of the family.

The genus *Centrodraco* is characterised within the family Draconettidae by stout and pungent spines in the first dorsal fin (versus long and slender spines in *Draconetta*), usually 14 (13–15) soft rays in the second dorsal fin (versus 12 rays), usually 13 (12–14) soft rays in the anal fin (versus 12 rays), the disconnected lateral line (versus single, running to caudal peduncle), and the absent supratemporal lateral line canal (versus present) (FRICKE 1992: 169–170).

Two small draconettid specimens, trawled off eastern Australia, turned out to belong to an undescribed species of *Centrodraco*. They are described and illustrated in the present paper.

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2 Methods and Materials

Methods follow Fricke (1992); fin-ray counts follow Fricke (1983). The classification follows Eschmeyer & Fricke (2009).

The starting point for length measurements is the mid of the upper lip. The predorsal (1) length is measured from the mid of the upper lip to the base of the first spine of the first dorsal fin; the predorsal (2) length correspondingly to the base of the first ray of the second dorsal fin. The last ray of the second dorsal and anal fins is always divided at its base; counts in the key include this divided ray as one.

In the description, the data for the holotype are given first, followed by the data for the paratype, in parentheses.

The following abbreviations are used in the text:

A	anal fin counts
AEST	Australian Eastern Standard Time
C & S	cleared and stained specimen
D	dorsal fin counts
FRV	fishery research vessel
P_1	pectoral fin counts
P_2	pelvic fin counts
RV	research vessel
SL	standard length

Species are classified based on Fricke (2002b); however, subspecies of *Centrodraco oregonus* are now raised to species level following the method of Fricke et al. (2009: 5).

Materials used for this paper are deposited in: The Australian Museum, Sydney, Australia (AMS); The Natural History Museum, London, U.K. (BMNH); Bernice P. Bishop Museum, Honolulu, Hawai'i, U.S.A. (BPBM); Department of Natural Science, Faculty of Science, Kochi University, Kochi, Japan (BSKU); California Academy of Sciences, San Francisco, U.S.A. (CAS); Laboratory of Marine Zoology, Graduate School of Fisheries Science, Hokkaido University, Hakodate, Japan (HUMZ); Institute of Oceanology, Russian Academy of Sciences, Moscow, Russia (IOAN); Museum of Comparative Zoology, Harvard College, Cambridge, Massachusetts, U.S.A. (MCZ); Museo Municipal do Funchal, Madeira, Portugal (MMF); South African Institute of Aquatic Biodiversity, Grahamstown, South Africa (SAIAB); Staatliches Museum für Naturkunde, Stuttgart, Germany (SMNS); Stanford University Collection in the California Academy of Sciences, San Francisco, U.S.A. (SU); University of British Columbia, Vancouver, Canada (UBC); Florida Museum of Natural History, Gainesville, Florida, U.S.A. (UF); National Museum of Natural History, Smithsonian Institution, Washington D.C., U.S.A. (USNM); Western Australian Museum, Perth, Australia (WAM); Peabody Museum of Natural History, Yale University, New Haven, Connecticut, U.S.A. (YPM); Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia (ZISP); Zoologisches Museum, Museum für Naturkunde der Humboldt-Universität, Berlin, Germany (ZMB); Zoological Museum, Moscow State University, Russia (ZMMU); Zoologisk Museum, Copenhagen, Denmark (ZMUC); University Museum, Zoology, University of Tokyo, Japan (ZUMT). Collection abbreviations see also Fricke & Eschmeyer (2009).

Comparative materials: *Centrodraco abstractum* Fricke, 2002: AMS I.36455-006 (holotype), I.36455-000 (1 paratype), CAS 88652 (1), 88664 (5); *C. acanthopoma* (Regan, 1904): BMNH 1896.2.10.33 (holotype), 1998.8.9.6454 (1), MCZ 27990 (1), 39535 (1), 39990 (1), 60853 (3 + 1 C & S), 85927–85935 (9), 96833 (2), 98729 (1), 128239 (1), 149175–149178 (4), MMF 22868 (1), 22542 (3), 22880 (1), SU 51107 (1), UBC 59-308 (1), UF 109567 (3), 109575 (1), USNM 45752 (2), 46015 (1), 134187 (1), 156956–156958 (13), 158753 (4), 198024 (11), 240691–240694 (4), 307803 (2), ZMB 14011 (1), ZMUC P.64164 (1); *C. gegonipus* (Parin, 1982): IOAN uncat. (2 paratypes), uncat. (1 + 1 + 1); *C. insolitus* (McKay, 1971): BMNH 1997.9.17.36 (1), WAM P.19164-001 (holotype), P.19165-001 (1 paratype), P.19166-001 (1 paratype), P.25394-011 (1); *C. lineatus* Fricke, 1992: SMNS 12136 (1 paratype), ZISP 49940 (holotype), ZMMU 18680 (1 paratype); *C. nakaboi* Fricke, 1992: BSKU 29331 (1 paratype), ZISP 48693 (holotype), 48694 (5 paratypes); *C. oregonus* (Briggs & Berry 1959): MCZ 39991 (1 paratype), 40506 (1), 93488 (2), SU 50897 (4), 51106 (1 paratype), 68909 (1), UBC 58-307 (1 paratype), 58-307c (3), UF 5245 (3 paratypes), 203300 (3 paratypes), 204178 (6), USNM 158875 (28 paratypes), 159212 (2), 159234 (14), 159776 (holotype); *C. ornatus* (Fourmanoir & Rivaton, 1979): AMS I.19760-018 (1), HUMZ 75058 (holotype of *C. otohime* Nakabo & Yamamoto, 1980), 80237 (1 paratype of *C. otohime* Nakabo & Yamamoto, 1980), SMNS 21797 (1), YPM 10040 (1); *C. pseudoxenicus* (Kamohara, 1952): BSKU 1891–1892 (2), 4435 (1); *C. rubellus* (Fricke, Chave & Suzumoto in Fricke, 1992): BPBM 28915 (holotype), SMNS 8525 (1 paratype); *C. striatus* (Parin, 1982): IOAN uncat. (2 paratypes), uncat. (3 + 2), ZISP 45724 (holotype of *Draconetta nana* Parin, 1982); *Draconetta xenica* Jordan & Fowler, 1903: SMNS 8549 (1), 21798 (1), SAIAB 165 (holotype of *Draconetta africana* Smith, 1963), USNM 51633 (holotype of *Draconetta hawaiiensis* Gilbert, 1905), 314593 (1), 314595 (3), ZUMT 54341–54346 (6).

3 Taxonomy

Centrodraco atrifilum **n. sp.**
(Figs. 1–2)

Callionymus sp.: Fricke 1992: 190, fig. 14 (off Sydney, New South Wales, Australia).

H o l o t y p e : AMS I.24455-001, male, 21.2 mm SL, off Brisbane, Tasman Sea, Queensland, Australia, 27°29'S 153°50'E, 640 m depth, beam trawl, coll. RV Kimbla and party, 15 Dec. 1969, 20:25–21:30 AEST.

P a r a t y p e : AMS I.27676-007, 1 female, 33.7 mm SL, off Sydney, New South Wales, Australia, 33°41'S 151°50'E–33°50'S 151°46'E, 328–437 m depth, coll. FRV Kapala, 13 Sep. 1988.

Etymology

'Ater' (Latin) means black, 'filum' (Latin) means thread. The name refers to the black filament on the second spine of the first dorsal fin.

Diagnosis

A *Centrodraco* with 13–14 rays in the second dorsal fin, 12–13 rays in the anal fin, the first dorsal fin with the second spine elongate and filamentous in both sexes, the second dorsal fin without filaments in males, and the male body colour pattern dorsally with three pairs of vertical dark brown streaks, followed by a single saddle below the end of the second dorsal fin and on the caudal peduncle.

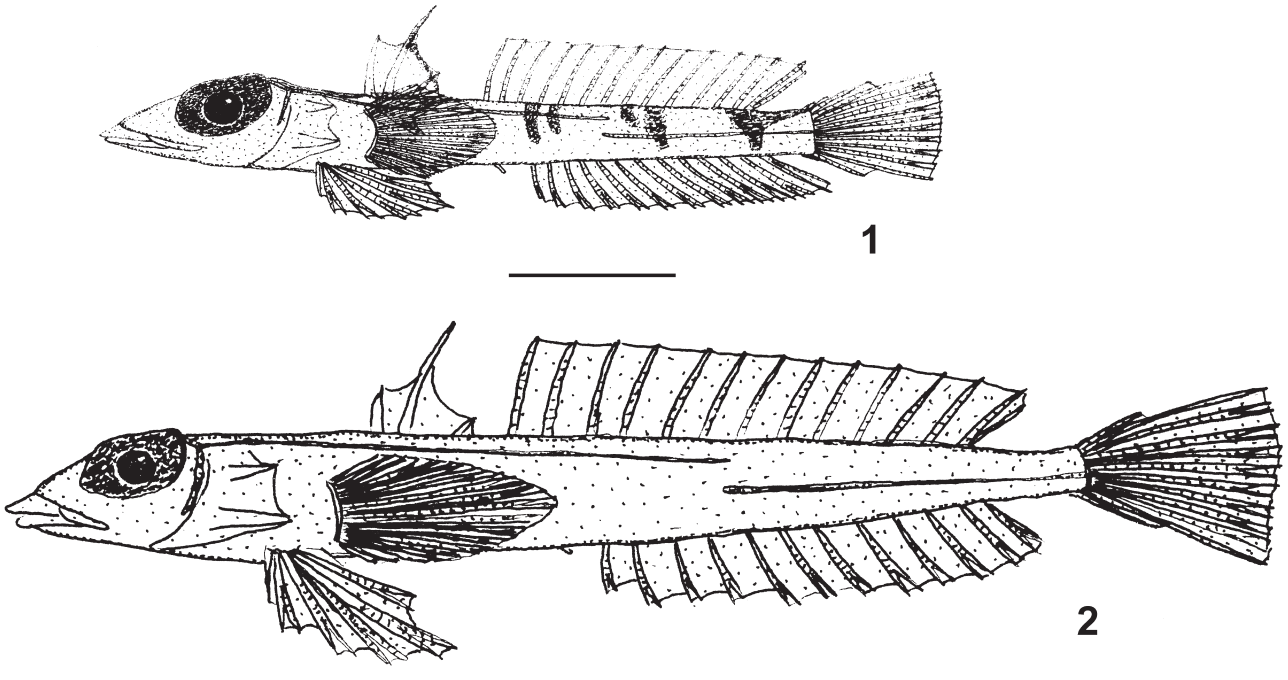
Description

D III + xiii,1 (III + xii,1); A 13 (12); P_1 iv–v,19–20, ii–iii (total 26–27) [iii,22–23,iii (total 27–28)]; P_2 I,5; C (iii),ii,8,ii,(iii) [(iii),ii,8,ii,(iii)].

Body elongate and slightly depressed. Head slightly depressed, head length 29.0 (21.6) % of SL. Eye diameter 14.1 (9.4) % of SL. Preorbital length 8 (4) % of SL. Interorbital distance 2.4 (1.3) % of SL. Upper jaw length 14.1 (8.2) % of SL. Opercle and subopercle with a strong retrorse spine each, opercular spine 1.45 (1.83) in subopercular spine. Occipital region smooth. Body depth 9.2 (10.6) % of SL. Body width 17.5 (10.9) % of SL. Urogenital papilla length 1 % of SL in male holotype. Caudal peduncle length 14.6 (8.6). Caudal peduncle depth 2.8 (4.8) % of SL.

First dorsal fin relatively low in male, but second spine bearing a filament; length of first spine 9.0 (3.7) % of SL, second spine 15.1 (11.3) % of SL, third spine 7.1 (2.0) % of SL. Predorsal (1) length 35.6 (32.1) % of SL. Second dorsal fin distally straight. Second dorsal fin rays unbranched, the last divided at base. First ray of second dorsal fin 9.4 (3.8) % of SL, last ray 11.3 (4.0) % of SL. Predorsal (2) length 52.8 (45.5) % of SL. Anal fin beginning on vertical through fourth (third) membrane of second dorsal fin. Anal fin rays branched, last unbranched but divided at base. First ray of anal fin 8.4 (4.7) % of SL, last ray 10.8 (7.0) % of SL. Preanal fin length 59.9 (54.1) % of SL. Pectoral fin reaching to anus when adpressed, pectoral fin length 17.9 (20.8) % of SL. Prepectoral fin length 36.8 (29.3) % of SL. Pelvic fin spine 15.6 (20.4) % of SL, pelvic fin length 21.2 (20.4) % of SL. Prepelvic fin length 28.8 (22.8) % of SL. Caudal fin truncate; caudal fin length 18.4 (17.2) % of SL.

Colour in alcohol: Head and body pale yellow. Eye dark grey. Sides of body in the male holotype dorsally with a row of three pairs of vertical dark brown streaks, followed by a single saddle below the end of the second dorsal fin and on the caudal peduncle. First dorsal fin in the male pale, filament on second spine and distal margin of second



Figs. 1–2. *Centrodraco atrifilum* n. sp., lateral view. – **1**. AMS I.24466-001, holotype, male, 21.2 mm SL, off Brisbane, Queensland, Australia, 640 m depth. **2**. AMS I.27676-007, paratype, female, 33.7 mm SL, off Sydney, New South Wales, Australia, 328–437 m depth. – Scale: 5 mm.

and third membranes blackish. Second dorsal, anal, caudal, pectoral and pelvic fins pale. – Female paratype pale yellowish, without markings.

Sexual dimorphism

The male differs from the female in having a higher first dorsal fin. More material is needed to judge on sexual dimorphism in colour markings.

Distribution

The male holotype was known from off Brisbane, Queensland; the paratype was collected off Sydney, New South Wales, Australia. The species is endemic to eastern Australia. It is known from depths of 437–640 m.

Habitat

The Queensland specimen was collected with a beam trawl, probably on a soft bottom. Species of *Centrodraco* usually occur on patches of soft substrate on the continental slope. As this habitat is scarce and difficult to sample, specimens are extremely rare in collections, and probably also biologically rare.

Affinities

The new species resembles *Centrodraco acanthopoma* (Regan, 1904), *C. nakaboi* Fricke, 1992 and *C. striatus* (Parin, 1982) in having the second spine of the first dorsal fin longest in male (longer than the first spine). It differs from these species in having a long filament on the second spine of the first dorsal fin (*C. acanthopoma*, *C. nakaboi* and *C. striatus*: none or a very short filament), the second dorsal fin without filaments in male (*C. striatus*: rays filamentous), the colour pattern on the sides of the body (*C. acanthopoma*: sides with 4 broad grey saddles and dark grey blotches in between; *C. nakaboi*: sides with 2–3 dark blotches; *C. striatus*: sides with 11 narrow vertical brown stripes), the pale second dorsal fin (*C. acanthopoma*: male with distal series of dark spots; *C. nakaboi*: distally dark in both sexes), the pale caudal fin (*C. nakaboi*: distally dark), and the pale anal fin (*C. striatus* and male *C. nakaboi*: distally dark).

Other species in the genus have the first spine of the first dorsal fin longest in the male, often with a filament. Several species also have the second dorsal rays filamentous, at least in males (*C. abstractum*, *C. gegonipus*, *C. insolitus*, *C. lineatus*, *C. oregonus*, *C. pseudoxenicus*), while the second dorsal rays are not filamentous in *C. atrifilum* n. sp.

Remarks

FRICKE (1992: 190) described and illustrated a single female specimen from off Sydney as *Centrodraco* sp., and remarked that this may represent an undescribed species related to *Centrodraco nakaboi* or *C. oregonus*; as the specimen completely lacked any colouration he felt the necessity to examine more material. The discovery of the male holotype from off Brisbane made it possible to describe the new species, as the collection of additional material is improbable in the near future.

The lack of colouration in the female paratype, except for the dark pigmented eye, may either be artificial due to bleaching after treatment with formalin, or natural; additional female specimens are needed to determine the natural state. The smaller eye of the female paratype may be due to allometric growth.

A revised key to draconettid fish genera and species is presented below to distinguish *Centrodraco atrifilum* n. sp. from potentially co-occurring species and other species of the family.

4 Key to genera and species of Draconettidae

1 First dorsal fin spines long and slender; second dorsal fin rays 12; anal fin rays 12; Indo-West Pacific. ..... *Draconetta* (only species: *Draconetta xenica* Jordan & Fowler, 1903)

– First dorsal fin spines stout and pungent; second dorsal fin rays 14 (rarely 12–15); anal fin rays 13 (–14). ..... *Centrodraco* **2**

2 Second dorsal fin rays with long filaments. **3**

– Second dorsal fin rays without filaments (rarely with very short filaments). **9**

3 First dorsal fin plain black; first D_1 spine shorter than second spine, not filamentous; body with dark vertical lines. – Southeastern Pacific. ..... ***C. striatus*** (Parin, 1982) (male)

– First dorsal fin light, may be distally dark; first D_1 spine longer than second spine, filamentous; body not with dark vertical lines (may bear dark horizontal lines or dark blotches). .. **4**

4 Body with 2–3 long horizontal dark streaks..... **5**

– Body without long horizontal dark streaks (may have dark spots or blotches or short ocellate dark streaks). **6**

5 Each anal fin membrane with a dark blotch; second dorsal fin membranes each with a vertical dark line; first D_1 spine 14.7 % or less of SL (in specimens with more than 70 mm SL); first ray of second dorsal fin less than 20 % of SL (in specimens with more than 70 mm SL). – Western Indian Ocean.. ..... ***C. lineatus*** Fricke, 1992 (male)

– Anal fin light, without dark blotches; second dorsal fin membranes without vertical dark lines; first D_1 spine 14.8 % or more of SL (in specimens with more than 70 mm SL); first ray of second dorsal fin more than 23 % of SL (in specimens with more than 70 mm SL). – Central Atlantic Ocean. .... ***C. oregonus*** (Briggs & Berry, 1959) (male)

6 Body with short ocellate lines and blotches; each A membrane with a dark spot. – West Pacific. .... ***C. ornatus*** (Fourmanoir & Rivaton, 1979) (male)

– Body not with ocellate lines and blotches (may have small spots); anal fin plain white. **7**

7 Body densely covered with dark spots. – Japan, China. .... ***C. pseudoxenicus*** (Kamohara, 1952) (male)

– Body plain whitish or brown; if bearing spots, not densely covered, but spots in two distinct groups. – Southeastern Pacific, Australia. **8**

8 Second dorsal fin membranes with vertical dark lines, distally dark; caudal fin base without a dark blotch. – Off northwestern Australia.. ..... ***C. insolitus*** (McKay, 1971) (male)

– Second dorsal fin membranes plain whitish, without vertical lines, may be distally dark; caudal fin base with a dark brown blotch. – Southeastern Pacific. ..... ***C. gegonipus*** (Parin, 1982) (male)

9 First spine of first dorsal fin shorter than second spine. **10**
– First spine of first dorsal fin longer than second spine. **19**

10 First spine of first dorsal fin more than 1.7 in second spine; second spine with a dark filament in male. – Eastern Australia. ..... ***C. atrifilum* n. sp.**
– First spine of first dorsal fin less than 1.7 in second spine; second spine without a dark filament. **11**

11 First dorsal fin plain black **12**
– First dorsal fin not plain black (may be distally dark). **13**

12 Body with about 11 regular vertical dark streaks; anal fin with distal dark spots. – Southeastern Pacific. ..... ***C. striatus*** (Parin, 1982) (female)
– Body with irregular dark spots and blotches, not with regular vertical dark streaks; anal fin plain white. – Hawaiian Islands, Indonesia. ..... ***C. rubellus*** Fricke, Chave & Suzumoto in Fricke, 1992 (female)

13 Body with 2–3 long horizontal dark lines. **14**
– Body with irregular dark blotches, without horizontal dark lines. **15**

14 Each anal fin membrane with a dark blotch; second dorsal fin membranes each with a vertical dark line. – Western Indian Ocean. ..... ***C. lineatus*** Fricke, 1992 (female)
– Anal fin light, without dark blotches; second dorsal fin without vertical dark lines. – Central Atlantic Ocean. ..... ***C. oregonus*** (Briggs & Berry, 1959) (female)

15 Anal fin distally blackish; caudal fin distally blackish. – Pacific Ocean. ..... ***C. nakaboi*** Fricke, 1992 (male)
– Anal fin whitish, without any dark markings; caudal fin whitish, without any dark **16**

16 Second dorsal fin whitish, without any dark markings. – Atlantic Ocean. ..... ***C. acanthopoma*** (Regan, 1904) (female)
– Second dorsal fin distally dark. **17**

17 First dorsal fin whitish, without any dark markings. – Pacific Ocean. ..... ***C. nakaboi*** Fricke, 1992 (female)
– First dorsal fin distally dark. **18**

18 Caudal fin plain whitish, occasionally with a basal dark blotch. – Atlantic Ocean. ..... ***C. acanthopoma*** (Regan, 1904) (male)
– Caudal fin with a distal dark stripe and a basal dark blotch. – Pacific Ocean. ..... ***C. nakaboi*** Fricke, 1992 (male)

19 First spine of first dorsal fin bearing a filament; upper third of caudal fin with a long dark streak reaching distal half of fin. – Hawaiian Islands, Indonesia. ..... ***C. rubellus*** Fricke, Chave & Suzumoto in Fricke, 1992 (male)
– First spine of first dorsal fin not filamentous; upper part of caudal fin without a dark streak or with a short dark streak at most in proximal one-third of fin (caudal fin may have a basal dark blotch). **20**

20 Body densely covered with numerous round dark spots. – Japan, China. ..... ***C. pseudoxenicus*** (Kamohara, 1952) (female)
– Body colouration not as described above; either plain brown or whitish, or with short longitudinal streaks in its dorsal part, or with groups of short transverse streaks, or with pale brown spots in two distinct groups. **21**

21 Body with short ocellate longitudinal streaks. – West Pacific. ..... ***C. ornatus*** (Fourmanoir & Rivaton, 1979) (female)
– Body colouration not as described above; either plain brown or whitish, or with groups of short transverse streaks, or with pale brown spots in two distinct groups. **22**

22 Caudal fin pale, without any dark markings; body usually with pale brown spots in two distinct groups. – Off northwestern Australia. ..... ***C. insolitus*** (McKay, 1971) (female)
– Caudal fin with a basal dark blotch; body plain brown or with groups of short longitudinal transverse streaks. – Pacific Ocean. **23**

23 Body light, with a group of short transverse streaks under anterior half of second dorsal fin; dorsal part of caudal fin with a short dark streak; male with tips of second dorsal fin filamentous only, female without filaments. – Philippines. ..... ***C. abstractum*** Fricke, 2002
– Body plain brown; dorsal part of caudal fin pale; distal half of second dorsal fin rays filamentous. – Southeastern Pacific. ..... ***C. gegonipus*** (Parin, 1982) (female)

5 References

BRIGGS, J. C. & BERRY, F. H. (1959): The Draconettidae – a review of the family with description of a new species. – Copeia **1959**: 123–133.

ESCHMEYER, W. N. & FRICKE, R. (2009): Catalog of fishes. Online version, updated 2 July 2009. – Internet publication, San Francisco (California Academy of Sciences). http://research.calacademy.org/research/Ichthyology/catalog/fishcatmain.asp

FRICKE, R. (1983): A method of counting caudal fin rays of actinopterygian fishes. – Braunschweiger naturkundliche Schriften **1**: 729–733.

FRICKE, R. (1992): Revision of the family Draconettidae (Teleostei), with descriptions of two new species and a new subspecies. – Journal of natural History **26**: 165–195.

FRICKE, R. (2002a): *Centrodraco abstractum*, a new species of deepwater dragonet from the Philippines (Teleostei: Draconettidae). – Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie) **633**: 8 pp.

FRICKE, R. (2002b): Annotated checklist of the dragonet families Callionymidae and Draconettidae (Teleostei: Callionymoidei), with comments on callionymid fish classification. – Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie) **645**: 103 pp.

FRICKE, R. & ESCHMEYER, W. N. (2009): A guide to fish collections in the Catalog of fishes. Online version, updated 2 July 2009. – Internet publication, San Francisco (California Academy of Sciences). http://research.calacademy.org/research/Ichthyology/catalog/collections.asp

FRICKE, R., MULOCHAU, T., DURVILLE, P., CHABANET, P., TESSIER, E. & LETOURNEUR, Y. (2009): Annotated checklist of the fish species (Pisces) of La Réunion, including a Red List of threatened and declining species. – Stuttgarter Beiträge zur Naturkunde A, Neue Serie **2**: 1–168.

NAKABO, T. (1982): Revision of the family Draconettidae. – Japanese Journal of Ichthyology **28**: 355–367.

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