

A new record of congrid eel, *Bathycongrus bleekeri* (Congridae) from Vietnam

Quang Van Vo^{1,*}, Hsuan-Ching Ho², Hoa Hong Thi Tran¹, Thao Thu Thi Le¹,
Thinh Cong Tran¹

¹*Institute of Oceanography, VAST, Vietnam*

²*National Museum of Marine Biology & Aquarium, Taiwan*

*E-mail: quangvanvo@gmail.com

Received: 30 July 2019; Accepted: 6 October 2019

©2019 Vietnam Academy of Science and Technology (VAST)

Abstract

Three specimens of *Bathycongrus bleekeri* were collected during the survey in 2015 and 2017. The newly recorded species is described herein, a small, moderately elongate species of *Bathycongrus* with head and body compressed; vertical fins without black mark; tail slender, attenuated, but not filiform; trunk length 1.2 times greater than head length; teeth small, conical, in about three-four rows on jaws, in a small triangular patch on vomer; 28–29 preanal vertebrae, total of 111–113 vertebrae; 26–28 preanal lateral-line pores. Additional data on the morphology and distribution of the species increases the total number of known species in the family Congridae in Vietnamese waters to twelve.

Keywords: *Bathycongrus bleekeri*, Congridae, new record.

INTRODUCTION

The Congridae is poorly known at the species level in the Indo-West Pacific, and a composition list is proposed for this family [1], in which genus *Bathycongrus* Ogilby 1898 only has one species *Bathycongrus guttulatus* (Günther, 1887) and an undescribed species. It is difficult to identify the species in this genus, because these eels possess very few distinctive external characters. This genus in waters of the Indo-West Pacific was revised with seven valid species being recognized for this ocean [2]. The authors suggested a key that permits the differentiation of an Indo-West Pacific species within this genus according to a combination of characters. Many new species for science are being discovered; the five species are described as new in Taiwan in 2018, including *Bathycongrus bimaculatus*, *Bathycongrus graciliceps* and *Bathycongrus castlei* [3], *Bathycongrus albimarginatus* and *Bathycongrus brunneus* [4]. Recently, its species composition was supplemented by the description of new species; the list recognized 13 valid species in Indo-Pacific: *Bathycongrus aequoreus* (Gilbert & Cramer, 1897); *B. bleekeri* (Fowler, 1934); *B. guttulatus* (Günther, 1887); *B. macrocerus* (Alcock, 1894); *Bathycongrus macroporis* (Kotthaus, 1968); *B. odontostomus* (Fowler, 1934); *B. retrotinctus* (Jordan & Snyder, 1901); *B. wallacei* (Castle, 1968); *B. trimaculatus* Karmovskaya & Smith, 2008; *B. longicavis* Karmovskaya, 2009; *B. parapolyporus* Karmovskaya, 2009; *B. unimaculatus* Karmovskaya, 2009; *B. parviporus* Karmovskaya, 2011 [1, 5–7], and five species newly described in 2018 from Taiwan; including *Bathycongrus bimaculatus*; *Bathycongrus graciliceps*; *Bathycongrus castlei*; *Bathycongrus albimarginatus* and *Bathycongrus brunneus* [3, 4].

In Vietnamese waters, 9 species of the family Congridae have been recorded: *Ariosoma anago* (Temminck & Schlegel, 1846); *Bathymyrus simus* Smith, 1965; *Conger cinereus* Rüppell, 1830; *Conger conger* (Linnaeus, 1758); *Conger japonicus* Bleeker, 1879; *Gnathophis nystromi* (Jordan & Snyder, 1901); *Parabathymyrus macrophthalmus*

Kamohara, 1938; *Rhynchoconger ectenurus* (Jordan & Richardson, 1909); *Uroconger lepturus* (Richardson, 1845) [8–10]. Based on those works, the genus *Bathycongrus* is not recorded in Vietnam. Karmovskaya (2011) [7] described a new species belonging to genus *Bathycongrus* (*Bathycongrus parviporus*) from specimens collected in the coastal waters of Central Vietnam within the depth range 17–80 m and other new species is also described (*Ariosoma dolichopterum* Karmovskaya, 2015) which has been collected from specimens in Vietnam [11]. The species composition of the family Congridae was supplemented by the description of new species and new records, in which eleven species are recognized in the Vietnamese waters.

MATERIALS AND METHODS

The present study is based on the material collected during investigations in July 2015 and March 2017. We collected three specimens; one specimen at the fish landing ground of My Tho commune, Phu My district, Binh Dinh province, OIM (VNMN) Fi.01370 (156 mm TL) and two specimens at the fish landing ground of Tho Quang commune, Son Tra district, Da Nang city, OIM (VNMN) Fi.03701 (154 mm TL); OIM (VNMN) Fi.03702 (148 mm TL) on 26 March 2017. Three specimens are deposited in the Museum of Oceanography (Institute of Oceanography), Nha Trang, Vietnam (OIM).

Counts, measurements, and bone terminology are as in [3, 12]. All measurements are in mm, and unless otherwise stated, lengths are total lengths. Vertebral counts were taken directly from digital radiographs, while tooth counts were taken from the specimens. Counts of sensory pores were made under the light microscope. The general arrangement of the head pores is shown in Fig. 1. Head pores vary in size, many of them are enlarged, including supraorbital pore (including terminal ethmoidal pore); infraorbital pore; preopercular-mandibular pore (mandibular pores and preopercular pores); ST - supratemporal pore. The very first pore, which is at the junction of the lateral-line and supratemporal canals and usually enlarged, is counted as the first pore of lateral-line series. The number of lateral-line

pores was counted when available; predorsal, prepectoral and preanal pores are counted to verticals of just before first dorsal fin ray, upper pectoral fin base and end of the anus (or just before first anal fin ray), respectively [3, 5]. Jaw teeth include teeth on maxilla and mandible in multiserial bands. Intermaxillary teeth are moderately enlarged, in 2 to several rows separated from maxillary and vomerine teeth, mostly exposed when the mouth closed. Vomerine teeth are highly variable in size, number and arrangement, although some are quite similar. Vertebral counts, including the preanal and total vertebrae have long been used to distinguish eel species. The proportions of head length, predorsal length, preanal length, and trunk length and other proportions of the head are used for description. Because the tip of the tail is usually damaged and regenerated, the total length is not always accurate [3].

The identification and comparison of morphology of specimens are based on documents [2–7, 11–15].

The following abbreviations are used TL - total length; HL - head length, PAL - preanal length; SO - supraorbital pore; IO - infraorbital pore; POM - preopercular-mandibular pore; ST - supratemporal pore.

RESULTS

Family Congridae

Genus *Bathycongrus* Ogilby, 1898

Bathycongrus Ogilby, 1898: 292; type species *Congromuraena nasica* Alcock, 1893 [12].

Bathycongrus bleekeri Fowler, 1934

Vietnamese name: Cá Chình đuôi nhọn sọc bạc.

Bathycongrus bleekeri Fowler, 1934: 272 (type locality: Utara Pt., Bongo Island, southern Mindanao, Philippines); Karmovskaya & Smith, 2008: 30; Karmovskaya, 2009: 150; Karmovskaya, 2011: 417; Smith & Ho, 2018: 126–129.

Description. Proportional measurements and meristics are provided in table 1.

Head length 2.0 (1.9–2.1) in PAL, 5.8 (5.5–6.0) in TL; preanal length 2.9 (2.8–3.0) in TL; predorsal length 1.9 in PAL, 5.3 (5.2–5.4) in TL; trunk length 2.0 (1.9–2.1) in PAL, 5.8

(5.6–5.9) in TL; tail length ~1.5 in TL; depth at head 5.3 (5.2–5.3) in PAL, width at head 5.6 (5.4–5.7) in PAL. Snout length 4.8 (4.6–5.0) in HL; eye diameter 4.5; interorbital width 10.0 (9.7–10.6); upper jaw 3.3; gill opening width 7.5 (7.3–7.7); interbranchial width 5.0 (4.9–5.0); pectoral-fin length 3.7 (3.6–3.7).

Body is moderately elongate, laterally compressed through the entire length, oval in cross section, becoming more compressed posteriorly; tip of the tail is rightly attenuated; anus is slightly behind anterior third of total length (fig. 2). Dorsal fin begins over the middle of appressed pectoral fin, is continuous around the tip of the tail with caudal and anal fins. Anal fin begins immediately behind the anus. Pectoral fin is well developed, pointed distally with narrow base. Gill opening is relatively large, about the same size of the eye, its upper end is nearly opposite to the upper pectoral fin base; interbranchial space is broader than gill opening and eye. Head is relatively large, its length 16.6–18.3% TL, deepest about midway between gill opening and tip of the snout, descending forward from that point. Snout is short, broadly pointed on dorsal view, its length 1.0–1.3 times of eye diameter, projecting beyond the lower jaw; it is longer than snout; fleshy part of snout projects anterior beyond the anterior end of the intermaxillary tooth patches; rictus is nearly below posterior half of the eye. Upper jaw is with flange greatly reduced; lower jaw is with downturned flange. Tongue is free, long, and broad. Anterior nostrils are tubular, near a tip of the snout, directly ventrolaterally. Posterior nostrils are elliptical, with a slightly raised rim, in front of mid-eye level. Upper lip is with a shallow, free, upturned flange, beginning at second infraorbital pore and ending below middle of the eye. Lower lip is with a well-developed downturned flange. Lateral-line is complete, first pore on each side is slightly enlarged, the canal is extended to caudal fin base; 5–6 pores before the dorsal fin origin, 3–4 pores before pectoral fin base, 26–28 pores before the anal fin origin, 90+ –93+ total pores, but this number may be a bit more than 100. 8 predorsal vertebrae; 28–29 preanal vertebrae; total of 111–113 vertebrae (fig. 3).

Table 1. Morphometric characters in percent of total length and head length of *Bathycongrus bleekeri* in Vietnam, Philippines and Taiwan

	Vietnam	Philippines (Karmovskaya & Smith, 2008)	Taiwan (Smith & Ho, 2018)
Total length (TL)	148–156	76–180	168–185
Measurements	n=3	n=3	n=3
As % TL			
Head length	16.6–18.3	18.0	15.5–16.1
Preanal length	35.1–37.8	34–38	36.8–36.9
Predorsal length	18.4–19.1	17–21	17.7–18.5
Trunk length	18.8–21.3	*	20.7–21.4
Tail length	64.7–66.2	*	63.1–63.2
Head depth at gill opening	6.5–6.6	*	*
Head width at gill opening	6.1–6.2	*	*
Body depth at mid-anus	6.9–7.2	7.1–7.3	*
Body width at mid-anus	5.4–5.9	*	*
As % HL			
Snout length	20.0–21.6	19–22	23.9–25.2
Eye diameter	22.1–22.5	22–28	18.2–21.5
Upper jaw length	28.1–31.8	28–37	35.1–37.2
Lower jaw length	22.8–24.5	*	*
Interorbital width	9.5–10.4	*	13.7–14.9
Gill opening	13.0–13.7	13–20	14.0–28.2
Isthmus width	20.0–20.5	19–25	17.7–21.5
Pectoral fin length	27.0–27.7	27–30	29.1–35.0
Counts	n=3	n=3	n=4
Lateral-line pores before anus	26–28	25–26	25–26
Predorsal vertebrae	8	7–9	8–9
Preanal vertebrae	29	28–29	27–28
Total vertebrae	111–113	105–113	107–113

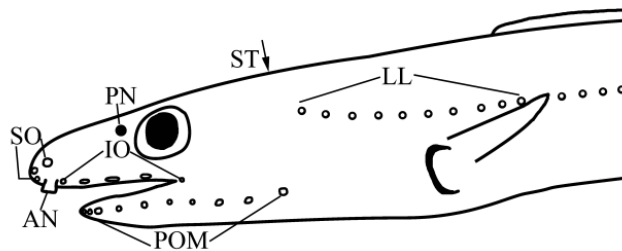


Fig. 1. Illustration of head pore system of a typical *Bathycongrus* [3]

AN: Anterior nostril; IO: Infraorbital pores; LL: Lateral-line pores; PN: Posterior nostril; POM: Preopercular-mandibular pores; SO: Supraorbital pores; ST: Supratemporal pore

Head pores vary in size, are mostly enlarged (fig. 4A); supraorbital canal has 3 pores, the first (ethmoidal pore) on the ventral side of a tip of the snout, just ahead of lip, the second enlarged, about twice the size of the first, and immediately in front of the anterior nostril, the third greatly enlarged and immediately above the anterior nostril, about the same size as the anterior nostrils. Infraorbital canal has 5 pores with first 3 pores enlarged, the first at the posterodorsal corner of

the anterior nostril, the second to fourth above the flange, the third below posterior nostril, the fourth below prior half of the eye, and the fifth moderately large and behind rictus, no pores behind the eye. Preoperculum-mandibular canal has 10 pores, 7 in mandibular section and 3 in preoperculum pore, first pore very small, near the anterior tip of the lower jaw, the third greatly enlarged, the seventh behind rictus. Supratemporal canal is without pore.

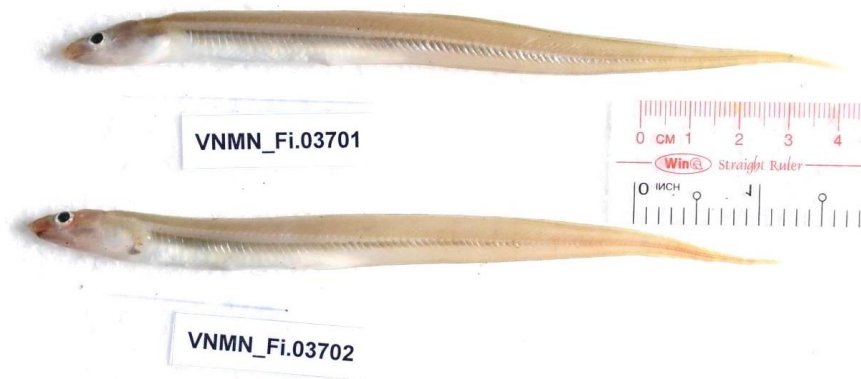


Fig. 2. The fresh color of two specimens collected in Da Nang City

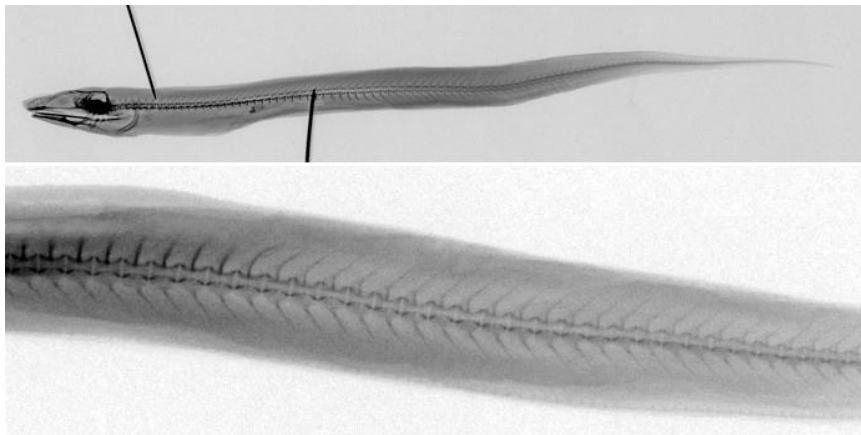


Fig. 3. The radiographs of vertebrate of specimen VNNM_Fi.01370 collected in Binh Dinh

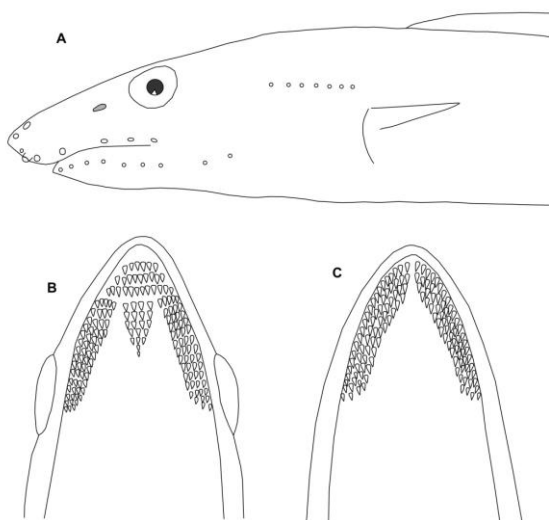


Fig. 4. Head lateral view (A) and teeth view (B- upper jaw; C- lower jaw) of specimen VNMN_Fi.03701 collected in Da Nang

Teeth are moderately large, conical (fig. 4B–4C). Intermaxillary teeth are in about four transverse rows, separated from maxillary and vomerine teeth, mostly excluded from a closed mouth. Maxillary and mandibular teeth are in bands, wider anteriorly, roughly into four or five rows, narrower posteriorly in 1 to 2 rows; outermost teeth are slightly larger than the innermost teeth. Vomerine teeth form a small triangular patch, 2–3 transverse rows of small teeth are followed by several large blunt teeth, roughly in 3–4 rows.

Coloration. In preservative, body is brown on dorsum and pale elsewhere. Lateral and ventral surfaces of body and abdomen are without chromatophores; dorsal surface with a darker wash is composed of numerous tiny brown chromatophores on either side of dorsal fin. Snout is mostly covered by black pigmentation under the skin, extending to level

of posterior margin of the eye, except for a clearly white band in front of the eye; a black patch under skin is at about brain chamber; dark pigment outlines supratemporal canal; a large patch of pigment is on opercle in front of pectoral fin base. Row of few black dots is on the ventral surface of the abdomen. Pectoral fin is with scattered pigment, denser at base. Dorsal fin is uniformly light brownish, without any black marks, each fin ray with clear internal pigment and a black spot at base; anal fin is pale, each ray with slight internal pigment and a black spot at base. Caudal fin is with a black base and scattered pigment. Anterior third of the stomach is blackish, posterior 2/3 is pale with some small black patches of pigments internally and pale ones externally. Intestine, is mostly damaged but presumably pale with numerous black dots based on the membrane left. Dorsal third of the peritoneum is densely covered by black or brown pigments; ventral 2/3 of the peritoneum is unpigmented. Mouth cavity and gill chamber are pale.

Distribution. Known species are from the Philippines at depth 51–333 m [5]; from southwestern Taiwan at depth ca. 200–300 m [3]; newly record specimens are collected from Central Vietnam at depth ca. 50–60 m.

DISCUSSION

The redescription of *B. bleekeri* is based on three samples of size 70 mm (holotype), 180mm and 142mm TL with the total of 113 vertebrae, 25–26 preanal lateral-line pores ca. [5]. Smith & Ho (2018) [3] recorded them from 168–185 mm TL with total of 107–113 vertebrae, and 27–28 preanal lateral-line pores ca.. In comparison to the three samples obtained in Vietnam in this study, the percentage of some lengths relative to the total length is similar in three areas, such as, preanal length, predorsal length. However, based on these results, it is shown that the head length of specimens in Taiwan is shorter than in Vietnam and the Philippines. In contrast to the snout length, maxillary length and eye diameter of those in Taiwan are larger than in Vietnam and the Philippines. The difference in these length ratios may be from the alteration of local type (table 1). Our specimens have roughly 3 or 4

transverse rows of teeth on intermaxilla and those on vomer forming a narrow triangular patch, in about 3 irregular rows, which is similar to a comment from [5] for species from Taiwan.

B. bleekeri differs in some ways from the other species currently assigned to the genus, but they are quite similar in morphological characteristics to *Bathycongrus parviporus* [7]. *Bathycongrus parviporus* differs from *B. bleekeri* in a higher total number of vertebrae (120–122 vs 105–113), in somewhat fewer predorsal vertebrae (6–7 vs. 7–9), in a higher number of branchiostegal rays (9–10 vs. 8), and in the beginning of the dorsal fin above the pectoral fin base (in *B. bleekeri*, the dorsal fin begins behind the pectoral fin base approximately at the vertical through the middle of its length). There are also differences in the body proportions. Thus, in *B. parviporus*, the head length is noticeably shorter than in *B. bleekeri* (14.3–15.9 vs. 15.5–18.3% TL); the antedorsal distance is shorter (14.3–16.3 vs. 17.0–21.0% TL); the anteanal distance is shorter (31.4–34.7 vs. 34.0–38.0% TL); the snout is longer (21.2–26.7 vs. 19.0–25.2% HL), and pectoral fins are longer (30.7–41.8 vs. 27.0–35.0% HL) [3, 5].

Acknowledgements: We thank R.-R. Chen (NMMB-P) for curatorial assistance. This study belongs to the “New Southbound Policy” project supported by the Ministry of Education and National Museum of Marine Biology & Aquarium, Taiwan, R.O.C. We also would like to thank the reviewer for carefully reviewing the manuscript and valuable suggestions.

REFERENCES

- [1] Smith, D. G., 1999. Congridae. In: Carpenter, K. E., & Niem, V. H., (Eds), *FAO species identification guide for fishery purposes. The living marine resources of the Western Central Pacific*, 3, 1680–1687.
- [2] Castle, P. H. J., and Smith, D. G., 1999. A reassessment of the eels of the genus *Bathycongrus* in the Indo-west Pacific. *Journal of Fish Biology*, 54(5), 973–995.

- [3] Smith, D. G., and Ho, H. C., 2018. The congrid eel genus *Bathycongrus* of Taiwan, with descriptions of three new species (Anguilliformes: Congridae). *Zootaxa*, 4454(1), 118–146.
- [4] Huang, J. F., Ho, H. C., Chang, Y. H., Smith, D. G., & Chen, H. M. (2018). Two new species of the conger eel genus *Bathycongrus* (Anguilliformes: Congridae) from Taiwan. *Zootaxa*, 4454(1), 107–117.
- [5] Karmovskaya, E. S., and Smith, D. G., 2008. *Bathycongrus trimaculatus*, a new congrid eel (Teleostei: Anguilliformes) from the southwestern Pacific, with a redescription of *Bathycongrus bleekeri* Fowler. *Zootaxa*, 1943(1), 26–36.
- [6] Karmovskaya, E. S., 2009. New records of congrid eels of the genus *Bathycongrus* (Congridae) in the west-central tropical part of the Pacific Ocean, with a description of three new species. *Journal of Ichthyology*, 49(2), 139–153.
- [7] Karmovskaya, E. S., 2011. New species of the genus *Bathycongrus* - *B. parviporus* (Congridae, Anguilliformes) - from waters of central Vietnam (Nha Trang and Van Phong bays). *Journal of Ichthyology*, 51(6), 417–425.
- [8] Orsi, J. J., 1974. A check list of the marine and freshwater fishes of Vietnam. *Publications of The Seto Marine Biological Laboratory*, 21(3), 153–177.
- [9] Nguyen, H. P. and N. T. Nguyen, 1994. Check list of marine fishes of Vietnam. *Science and Technics Publishing House*. 270 p.
- [10] Le, T. T. T., V. Q. Vo, P. U. V. Nguyen, T. H. H. Tran and C. T. Tran, 2013. A checklist of the eels and morays (order: Anguilliformes) in the Vietnamese marine waters. *Proceedings of the 5th Scientific Conference on Ecological and Biological Resources, Hanoi*, pp. 282–294. (in Vietnamese).
- [11] Karmovskaya, E. S., 2015. New species of the genus *Ariosoma*, *A. dolichopterum* (Bathymyrinae), from the waters of Central Vietnam. *Journal of ichthyology*, 55(6), 906–910.
- [12] Smith, D. G., 1989. Family Congridae. In: *Böhlke, E. B. (Ed), Fishes of the Western North Atlantic. Memoir of the Sears Foundation for Marine Research*, No. 1, Part 9, pp. 460–567.
- [13] Alcock, A. W., 1894. Natural history notes from H. M. Indian marine survey steamer, “Investigator”, Commander C. F. Oldham, R. N., commanding. Series II., No. 9. An account of the deep sea collection made during the season of 1892–93. *Journal of the Asiatic Society of Bengal*, 62(4), 169–184.
- [14] Garman, S., 1899. The fishes. In: *Reports on an exploration off the west coasts of Mexico, Central and South America, and off the Galapagos islands. Memoirs of the Museum of Comparative Zoology*, 24(26), 1–431.
- [15] Fowler, H. W., 1933. Descriptions of new fishes obtained 1907 to 1910, chiefly in the Philippine Islands and adjacent seas. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 85, 233–367.