

Platycephalus clavulatus Cantor, 1849 (Teleostei: Platycephalidae), a Junior Synonym of *Cociella punctata* (Cuvier, 1829)

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The validity of the platycephalid species *Platycephalus clavulatus* Cantor, 1849, described from a single specimen collected in the sea of Pinang (=Penang), Malaysia, is evaluated. Although it has been suggested that the holotype of the species is a specimen registered as BMNH 1860.3.19.270 in the Natural History Museum, London (BMNH), which is identifiable as *Cociella punctata* (Cuvier, 1829), the total length (TL) of the holotype reported by Cantor is 57/8 inches (=149 mm), significantly longer than the damaged BMNH specimen, which is estimated to have had a TL of 121 mm. According to the original description of *P. clavulatus*, the holotype has 11 second dorsal and anal fin rays, one preorbital spine, and two suborbital spines, values which agree with those of *C. punctata*, a species widely distributed in the western Pacific and the Indian Ocean, including Penang. Although these characters are also present in *Cociella crocodila* (Cuvier, 1829), that species is known only from Japan, Korea, China, and Taiwan. We conclude that *P. clavulatus* is conspecific with *C. punctata* and is a junior synonym of that species.

Key Words: *Platycephalus clavulatus*, taxonomic validity, synonymy, *Cociella punctata*.

Introduction

Platycephalus clavulatus was originally described by Cantor (1849) based on a single specimen collected from the sea of Pinang (=Penang), Malaysia. Since the original description, no author has attempted to redescribe it or discuss its taxonomic status, nor has the name of the species appeared in recent publications. Although Eschmeyer (1998) declared the whereabouts of the holotype to be unknown, he subsequently (Eschmeyer 2012) suggested that BMNH 1860.3.19.270 may be the holotype. BMNH 1860.3.19.270, a

dry specimen retaining only the left side of the body (Fig. 1), was recorded as being collected in Penang (Fig. 2). It is identifiable as *Cociella punctata* (Cuvier in Cuvier and Valenciennes, 1829), widely known from the western Pacific and Indian oceans, based on the diagnostic characters of the species presented below. However, its status as type of *P. clavulatus* remains unclear, as its total length (TL) is estimated to have been 121 mm (see discussion below), while the TL of Cantor's (1849) holotype was stated to be 57/8 inches (=149 mm). After detailed comparison of the original description of *P. clavulatus* with species known from Penang and adjacent waters, we have concluded that the former is



Fig. 1. Lateral view of BMNH 1860.3.19.270, collected at Pinang (=Penang), Malaysia, identified here as *Cociella punctata*.

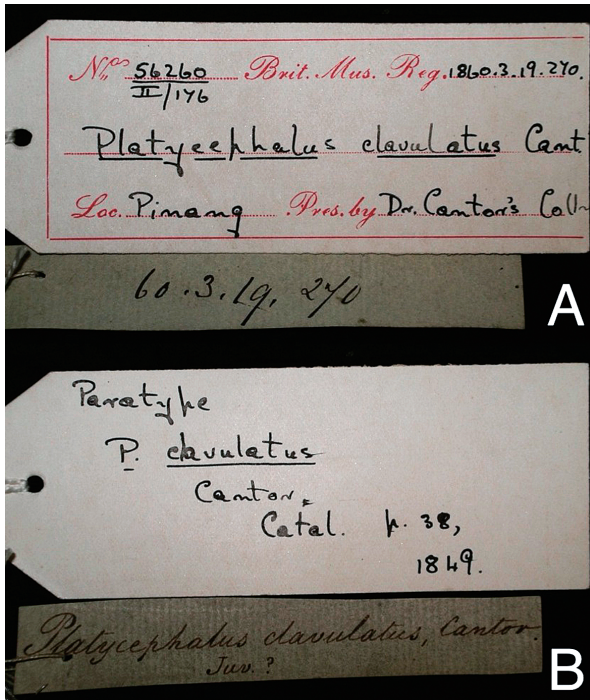


Fig. 2. Labels attached to BMNH 1860.3.19.270. A, front sides; B, back sides.

a junior synonym of *C. punctata*. This publication discusses the rationale behind this conclusion.

Materials and Methods

Counts and measurements follow Imamura (2008). Measurements were made with calipers to the nearest 0.1 mm accuracy. Orbital diameter was measured in an anterodorsal to posteroventral direction, as this is the maximum diameter in many platycephalids aside from *Platycephalus* Bloch, 1795. Interorbital width was measured level with the eye center. Terminology of head spines follows Knapp *et al.* (2000). Institutional acronyms are from Eschmeyer (1998), except for the Hokkaido University Museum, Hakodate (HUMZ), Natural History Museum and Institute, Chiba (CMNH), National Museum of Nature and Science, Tsukuba (NSMT), and South African Institute of Aquatic Biodiversity (SAIAB).

Results and Discussion

BMNH 1860.3.19.270 is identified as *Cociella punctata* because it possesses diagnostic characters of the species, including 11 second dorsal and anal fin rays, about 65 scale rows above the lateral line slanting downward and forward, a single preorbital spine, two suborbital spines, one exterior opening on each of the lateral line scales, an interopercular flap, and small dark spots on the dorsal parts of the head and body (Knapp 1999). It has no identifiable differences in other counts and proportions from the specimens of *C.*

punctata we have examined, including three syntypes (Table 1).

Although the BMNH specimen is labeled a “paratype” (Fig. 2), it cannot be a paratype of *P. clavulatus*, because the species was apparently described on the basis of only the holotype [Cantor (1849: 1021) stated, “The present species of which a single, apparently young, individual was observed in Pinang in 1843, ...”]. Discrepancies between the length of this specimen and the stated length of the holotype of *P. clavulatus* also place some doubt on whether they are the same. Cantor (1849) gave the TL of the holotype as 5 7/8 inches (=149.2 mm), but BMNH 1860.3.19.270 possesses a broken caudal fin, preventing a direct measurement of its TL. However, after comparing the relationships of TL and standard length (SL) in 28 specimens of *C. punctata*, the TL of the damaged BMNH 1860.3.19.270 was calculated to have been 121 mm, based on its SL of 100 mm and a regression line expressed as $y(TL)=1.1907 \times (SL)+1.9087$ ($R^2=0.9990$). Consequently, we regard the identity of BMNH 1860.3.19.270 as the holotype of *P. clavulatus* unproven. The following analysis of the taxonomic status of *P. clavulatus* is based on a comparison of its original description with species known from Penang and adjacent waters.

According to the original description of *P. clavulatus*, the species has one preorbital and two suborbital spines [described by Cantor (1849: 1021) as, “On the middle of the anterior infraorbital bone is a small reclining spine; on the posterior two distant (maybe meaning distinct) larger, ...”], and these are present in the BMNH specimen as well. Within the Platycephalidae, this condition is present only in *Elates ransonnetii* (Steindachner, 1876), smaller specimens of many species of *Platycephalus*, and members of the genus *Cociella* Whitley, 1940, except for *Cociella hutchinsi* Knapp, 1996, which is known only from Australia and has five or six suborbital spines and no or one preorbital spine (Knapp 1996, 1999; Imamura 2015). Although *E. ransonnetii*, *Platycephalus cultellatus* Richardson, 1846, and *Platycephalus indicus* (Linnaeus, 1758) are also distributed in the western Malay Peninsula and adjacent waters, *P. clavulatus* apparently differs from them in having 11 second dorsal and anal fin rays rather than 13 as they usually have (Knapp 1999; Imamura 2012; this study). The number of suborbital spines tends to increase with growth in some platycephalids [*i.e.*, *Suggrundus meerdervoortii* (Bleeker, 1860): Imamura *et al.* (1996); *Inegocia japonica* Cuvier in Cuvier and Valenciennes, 1829, *Onigocia macrolepis* (Bleeker, 1854), *Onigocia spinosa* (Temminck and Schlegel, 1843), and *Rogadius asper* (Cuvier in Cuvier and Valenciennes, 1829): Hirota and Sasaki (1998); and four species of *Onigocia* Jordan and Thompson, 1913: Imamura (2011)]. Knapp (1999) reported the following platycephalid species with three or more suborbital spines from Penang and adjacent waters: *Grammoplites knappi* Imamura and Amaoka, 1994; *Grammoplites scaber* (Linnaeus, 1758); *Kumococcius rodericensis* (Cuvier in Cuvier and Valenciennes, 1829); *Rogadius pristiger* (Cuvier in Cuvier and Valenciennes, 1829); *Rogadius tuberculatus* (Cuvier in Cuvier and Valenciennes, 1829); *Suggrundus macracanthus* (Bleeker, 1869); *Sunagocia carbunculus* (Va-

Table 1. Comparison of counts and proportional measurements of *Platycephalus clavulatus* and *Cociella punctata*.

	<i>Platycephalus clavulatus</i>		<i>Cociella punctata</i>			
	Holotype	Holotype?	Syntypes (n=3)			Others
	Cantor (1849)	BMNH 1860.3.19.270	MNHN 5836	MNHN 6851	MNHN 6852	n=34
SL (TL) (mm)	124* (149)	100 (121*)	179 (—)	188 (—)	239 (—)	72.5–293 (87.6–351)
Counts:						
First dorsal fin rays	VIII (total)	I+VIII	I+VIII	I+VIII	I+VIII	I+VIII
Second dorsal fin rays	11	11	11	11	11	11
Anal fin rays	11	11	11	11	11	10–11 (usually 11)
Pectoral fin rays (upper unbranched+ branched+lower unbranched)	?+?+?=20	?+?+?=19	2+10+8=20	2+12+7=21	2+11+7=20	1–3+9–13+6–11=19–22
Pelvic fin rays	I, 5	I, 5	I, 5	I, 5	I, 5	I, 5
Branched caudal fin rays	15 3/3**	12	11	12	11	10–13
Pored scales in lateral line (with spine)	— (—)	— (—)	54 (12)	54 (6)	54 (5)	51–54 (2–27)
Scale rows above lateral line slanting downward and backward	—	ca. 65	65	—	75	58–74
Gill rakers	—	—	1+5=6	1+5=6	1+5=6	1+4–6=5–7 (usually 6)
Proportional measurements (% SL):						
HL	—	34.8	33.1	33.2	32.6	32.5–36.9
Predorsal length	—	34.3	35.0	35.1	33.7	33.7–37.4
Length of first dorsal fin base	—	19.6	21.1	20.3	19.8	18.3–21.9
Length of second dorsal fin base	—	31.1	28.4	28.5	27.4	26.7–29.4
Length of anal fin base	—	30.8	32.4	31.1	31.8	28.3–35.2
Length of caudal peduncle	—	10.1	10.1	10.1	10.0	8.8–13.3
Depth of caudal peduncle	—	4.7	5.1	4.7	4.5	4.2–5.5
Snout length	—	9.5	9.7	10.0	9.8	9.5–11.3
Orbital diameter	—	7.7	8.1	8.3	7.9	6.7–9.4
Upper jaw length	—	12.4	12.4	12.2	11.9	11.8–14.0
Lower jaw length	—	18.4	20.1	19.7	19.0	18.6–21.8
Interorbital width	—	—	2.3	2.1	2.5	1.9–3.1
Pectoral fin length	—	—	16.3	16.5	15.9	13.6–17.3
Pelvic fin length	—	—	28.2	29.1	28.4	18.2–31.1
Caudal fin length	—	—	19.3	—	18.9	16.1–22.3
Proportional measurements (% HL):						
Snout length	—	27.2	29.3	30.2	30.1	28.1–32.6
Orbital diameter	—	22.1	24.6	25.1	24.3	19.8–26.6
Upper jaw length	—	35.5	37.4	36.6	36.6	35.6–38.9
Lower jaw length	—	53.0	60.8	59.4	58.4	54.9–62.1
Interorbital width	—	—	7.1	6.4	7.6	5.7–9.2

Dash (—) indicates data unavailable; * Estimated based on morphometrics of 28 specimens of *C. punctata*; ** Counting method unknown.

lenciennes in Cuvier and Valenciennes, 1833); *Thysanophrys celebica* (Bleeker, 1855); and *Thysanophrys chiltonae* (Schultz in Schultz *et al.*, 1966) [see diagnoses of genera in Imamura (1996) for usual number of spines on suborbital ridge, including both preorbital and suborbital spines]. An examination of the species listed above revealed that the smallest examined specimens, which are smaller than the holotype of *P. clavulatus*, already have four or more suborbital spines or serration on the suborbital ridge (Table 2), a situation that excludes them as potential synonyms. Consequently, it appears that *P. clavulatus* belongs to the genus *Cociella*. In the following discussion, we compare *P. clavulatus* and species of *Cociella*, with the exception of *C. hutchinsi* for the reasons mentioned above.

Among the four known relevant species of *Cociella*, *C. punctata* is known from Penang [see also the list of examined material of *C. punctata* in Knapp (1996), including

Table 2. Numbers of suborbital spines (NSO) in smallest examined specimens of nine species of platycephalid.

Species	SL (mm)	TL (mm)	NSO (left/right)
<i>Grammoplites knappi</i>	70.3	84.9	4/4
<i>Grammoplites scaber</i>	92.6	108	4/5
<i>Kumococius rodericensis</i>	64.8	—	4/4
<i>Rogadius pristiger</i>	63.8	—	serration/serration
<i>Rogadius tuberculatus</i>	65.0	79.6	serration/serration
<i>Suggrundus macracanthus</i>	56.4	67.6	4/4
<i>Sunagocia carbunculus</i>	46.9	58.5	4/4
<i>Thysanophrys celebica</i>	32.1	—	4/4
<i>Thysanophrys chiltonae</i>	54.9	68.4	4/5

Dash (—) indicates data unavailable.

those from Penang], while the other three have not been reported from there [*Cociella crocodila* (Cuvier in Cuvier and Valenciennes, 1829) from Japan, Korea, China, and Taiwan,

and *Cociella heemstrai* Knapp, 1996 and *Cociella somaliensis* Knapp, 1996 from the western Indian Ocean; see Knapp (1996)]. The original description of *P. clavulatus* states that the species has 11 second dorsal and anal fin rays, and 20 pectoral fin rays, as does *C. punctata* (Table 1). Although some taxonomic characters that are useful in separating *C. punctata* and *C. crocodila* were not described by Cantor (1849) [*i.e.*, numbers of gill rakers and scale rows above lateral line slanting downward and backward, and presence or absence of interopercular flap; see Knapp (1996)], *C. heemstrai* and *C. somaliensis* usually possess 12 second dorsal and anal fin rays (Knapp 1996), different from the counts in *C. punctata* (and also *P. clavulatus*). Cantor (1849) gave the dorsal fin spine number in *P. clavulatus* as eight whereas *C. punctata* has nine in total (I+VIII). Among the platycephalids known from Penang and adjacent waters, few species have eight dorsal fin spines even as a variation of the count, and the species having it usually do not have both 11 second dorsal and anal fin rays [*i.e.*, *S. curbunculus*, *T. celebica*, and *T. chiltonae* with eight or nine dorsal fin spines in total, but usually 12 anal fin rays, 12 second dorsal and 13 anal fin rays, and 12 anal fin rays, respectively; see Knapp (1999)]. In addition, in our experience the last dorsal fin spine is short and sometimes easily overlooked in platycephalids, while mistakes in counting second dorsal and anal fin rays rarely occur. We think the report of the eight dorsal fin spines in *P. clavulatus* is likely to be erroneous.

As a consequence of all these considerations, we regard *P. clavulatus* as conspecific with *C. punctata*; *P. clavulatus* thus becomes a junior synonym of *C. punctata*, which has priority.

Comparative material. *Cociella punctata* (37 specimens). Syntypes: MNHN 6836, 179 mm SL, MNHN 6851, 188 mm SL, Trincomalee; MNHN 6852, 239 mm SL, Vanicoro.

Other types. BMNH 1872.10.18.117, holotype of *Platycephalus fasciatus* Günther 1872, 191 mm SL, Luzon Is., Philippines; BMNH 1880.4.21.102, paralectotype of *P. batakensis* or Bleeker's specimen, 91.7 mm SL, Batavia (=Jakarta), Indonesia (or locality unknown in latter case); MNHN 6848, holotype of *Platycephalus malabaricus* Cuvier and Valenciennes, 1829, 215 mm SL, Mahé, India; RMNH 5915, 3 syntypes of *Platycephalus quoyi* Bleeker, 1856–57, 126–178 mm SL, 2 of the 3 from Ambon or Ternate Island, Indonesia.

Non-types. India: SU 41735 (2), 160–168 mm SL. Indonesia: BMNH 1984.1.1.65, 265 mm SL; NSMT-P 55454, 126 mm SL; USNM 327289 (4), 72.8–147 mm SL. Japan: NSMT-P 29286, 72.5 mm SL; NSMT-P 57007, 132 mm SL. Palau: CAS 81322, 128 mm SL; USNM 329288, 250 mm SL. Philippines: HUMZ 198665, 277 mm SL; CAS-SU 27207, 176 mm SL. Red Sea: MNHN 6845, 209 mm SL; NMW 11167, 162 mm SL; NMW 11718, 165 mm SL; NMW 11719, 160 mm SL. Singapore: NMW 11171 (2), 173–176 mm SL. South Africa: SAIAB 1519, 156 mm SL; SAIAB 1520, 131 mm SL. Sri Lanka: USNM 340853, 220 mm SL. Thailand (Indian Ocean): FRLM 30670, 122 mm SL; PMBC uncat., 293 mm SL. Thailand (western Pacific): ANSP 62861,

150 mm SL. Tanzania: USNM 326291, 195 mm SL. Vietnam: MNHN 1905-222, 167 mm SL.

Other species. *Grammoplites knappi*: NSMT-P 70943, 70.3 mm SL (84.9 mm TL), Thailand, western Pacific. *Grammoplites scaber*: HUMZ 201968, 92.6 mm SL (108 mm TL), Malacca Strait. *Kumococcius rodericensis*: MNHN 6900, 64.8 mm SL (TL not measured owing to damaged caudal fin), holotype of *Platycephalus timorensis* Cuvier in Cuvier and Valenciennes, 1829, Timor. *Rogadius pristiger*: CAS 52338, 63.8 mm SL (TL not measured), Celebes. *Rogadius tuberculatus*: URM-P 15156, 65.0 mm SL (79.6 mm TL), Japan. *Suggrundus macracanthus*: NSMT-P 112069, 56.4 mm SL (67.6 mm TL), Thailand. *Sunagocia carbunculus*: PMBC 20659 (1 of 6), 46.9 mm SL (58.5 mm TL), Phuket, Thailand. *Thysanophrys celebica*: ZMA 112435 (1 of 2 syntypes of *Platycephalus horai* de Beaufort, 1956), 32.1 mm SL (TL not measured owing to damaged caudal fin), Ceram Sea. *Thysanophrys chiltonae*: CMNH-ZF 13962, 54.9 mm SL (68.4 mm TL), Japan. Examined specimens of *Platycephalus*, including *P. cultellatus* and *P. indicus*, are listed in Imamura (2012).

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References

- Cantor, T. E. 1849. Catalogue of Malayan fishes. Journal of the Asiatic Society of Bengal 18 (2): i–xii+983–1443, pls 1–14.
- Eschmeyer, W. N. 1998. Collection abbreviations. Pp. 16–22. In: Eschmeyer, W. N. (Ed.) *Catalog of Fishes. Vols. 1–3*. California Academy of Sciences, San Francisco.
- Eschmeyer, W. N. (Ed.) 2012. Catalog of fishes: genera, species, references. Online version, updated 23 July 2012. <http://research.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>. Accessed 20 August 2014.
- Hirota, M. and Sasaki, K. 1998. Development of juveniles of four flat-heads (Perciformes, Platycephalidae) occurring in southern Japan.

- Ichthyological Research 45: 291–301.
- Imamura, H. 1996. Phylogeny of the family Platycephalidae and related taxa (Pisces: Scorpaeniformes). *Species Diversity* 1: 123–233.
- Imamura, H. 2008. Synonymy of two species of the genus *Platycephalus* and validity of *Platycephalus westraliae* (Pisces: Scorpaeniformes). *Ichthyological Research* 55: 399–406.
- Imamura, H. 2011. *Onigocia sibogae*, a replacement name for a distinct species of flathead fish, *Platycephalus grandisquamis* Weber, 1913 (Teleostei: Platycephalidae). *Zootaxa* 3066: 52–60.
- Imamura, H. 2012. Redescription of *Platycephalus angustus* Steindachner 1866 (Teleostei: Platycephalidae), a valid flathead in northern Australia and New Guinea. *Ichthyological Research* DOI: 10.1007/s10228-012-0319-6. (also appeared in *Ichthyological Research* 60: 112–121 published in 2013)
- Imamura, H. 2015. Taxonomic revision of the flathead fish genus *Platycephalus* Bloch, 1785 (Teleostei: Platycephalidae) from Australia, with description of a new species. *Zootaxa* 3904: 151–207.
- Imamura, H., Yabe, M., Iguchi, M., and Amaoka, K. 1996. Juvenile development of a flathead, *Suggrundus meerdervoortii* (Scorpaeniformes: Platycephalidae). *Ichthyological Research* 43: 47–53.
- Knapp, L. W. 1996. Review of the genus *Cociella* Whitley (Teleostei: Platycephalidae) with the description of three new species. *Proceedings of the Biological Society of Washington* 109: 17–33.
- Knapp, L. W. 1999. Platycephalidae. Pp. 2385–2421. In: Carpenter, K. E. and Niem, V. H. (Eds) *FAO Species Identification Guide for Fishery Purposes. The Living Marine Resources of Western Central Pacific, Vol. 4. Bony Fishes Part 2 (Mugilidae to Carangidae)*. FAO, Rome.
- Knapp, L. W., Imamura, H., and Sakashita, M. 2000. *Onigocia bimaculata*, a new species of flathead fish (Scorpaeniformes: Platycephalidae) from the Indo-Pacific. *Special Publication of the J. L. B. Smith Institute of Ichthyology* (64): 1–10.