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Validity and redescription of the flathead fish, *Onigocia macrocephala* (Weber, 1913) (Teleostei: Platycephalidae)

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Abstract

After the original description, *Platycephalus macrocephalus* Weber, 1913 has been rarely treated as a valid species and its taxonomic status has been unclear. It was revealed here that seven syntypes of the species belong to two species and four of them are identical with *Onigocia grandisquama* (Regan, 1908) but the remaining three specimens are identified as a distinct species of *Onigocia* Jordan & Thompson, 1913, which has been mistakenly identified as *Onigocia macrolepis* (Bleeker, 1854) by several authors. One of the three specimens illustrated in the original description is designated as the lectotype of the species. *Onigocia macrocephala* is separable from its other congeners in having 21–23 (mode 22) pectoral fin rays, 9–10 caudal fin rays, 1 + 4–6 = 5–7 (mode 6) gill rakers, a larger head (38.8–42.3% SL), a single ocular flap present and usually extending slightly beyond the posterior margin of the orbit, a few or several small and short papillae on the posteromedial portion of the eye in larger specimens, the upper iris lappet short and branched, the lachrymal with two distinct antrorse spines anteriorly, a notch on the suborbital ridge below the eye, and no interopercular flap.

Key words: *Onigocia macrocephala*, Platycephalidae, validity, redescription, lectotype

Introduction

In 1913, Weber originally described *Platycephalus macrocephalus* based on seven specimens collected from the Bali Sea, Sapeh Strait, north of Waigeo (Waigiou) and the southern Timor Sea. De Beaufort & Briggs (1962) described the species and recognized its validity, but did not provide comparison with other platycehpalid species. According to the descriptions by Weber (1913) and de Beaufort & Briggs (1962), *P. macrocephalus* has 33–36 pored scales in the lateral line and a roughly serrated suborbital ridge. These characters agree well with those of the genus *Onigocia* Jordan & Thompson, 1913 (see Knapp, 1986; Imamura, 1966). After these descriptions, no authors have treated the species to be valid nor quoted the name, except for Knapp *et al.* (2000) who stated taxonomic status of the species to be unclear. In this study, I had an opportunity to examine the seven type specimens of *O. macrocephala*. Of them, ZMA 112437, including four specimens [38.3–40.7 mm standard length (SL)] from Sapeh Strait, is identified as *Onigocia grandisquama* (Regan, 1908). The other three specimens (ZMA 112436, 70.6 mm SL, from Bari Sea; ZMA 112438, 52.9 mm SL, from north of Waigeo; and ZMA 112439, 68.1 mm SL, from southern Timor Sea) are similar to *Onigocia macrolepis* (Bleeker, 1854) in having a distinct notch on the suborbital ridge below the eye, which has been recognized only in *O. macrolepis* in the genus (e.g., Knapp, 1999; Nakabo, 2002). However, it was revealed that the three specimens belong to a distinct species being separable from *O. macrolepis* in having characters such as a larger head. In addition, the larger two specimens have a character, presence of several small and short papillae on the posteromedial portion of the eye, which is not found in other members of the genus, including *O. macrolepis*. The purposes of this study are to redescribe *O. macrocephala* based on the three type specimens and an additional 32 specimens from the South China Sea (including China, Vietnam and the Philippines), Indonesia and Australia (Fig. 1), being mistakenly identified as *O. macrolepis* by several authors (e.g., Gloerfelt-Tarp & Kailola, 1984; Sainsbury *et al.*, 1984; Imamura *et al.*, 2006), and to show the validity of the species by comparison with eight congeners.

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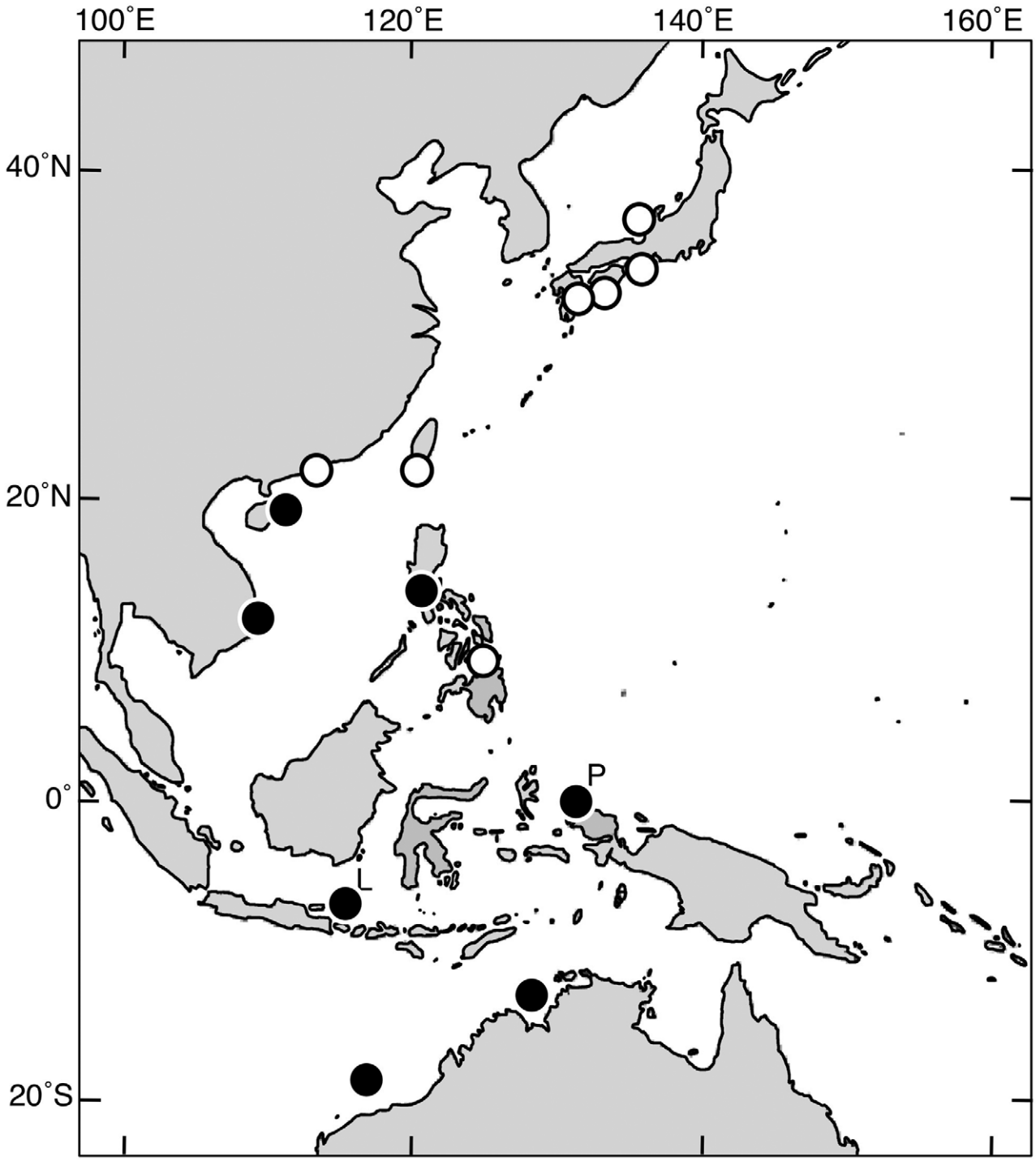

FIGURE 1. Map showing sampling localities of two species of *Onigocia*. Solid circle, *O. macrocephala*; open circle, *O. macrolepis*; L, lectotype; P, paralectotype.

Material and methods

Counts and measurements were made according to Imamura (2008). Measurements were made with calipers to the nearest 0.1 mm accuracy. Orbital diameter was measured its oblique diameter showing the greatest length. Terminology of head spines follows Knapp *et al.* (2000), and that of inner, middle and outer ridges of lachrymal follows Imamura (2011). Institutional acronyms are from Eschmeyer (1998), except for Hokkaido University Museum, Hakodate (HUMZ), National Institute of Coastal Aquaculture, Thailand (NICA), National Museum of

Nature and Science, Tsukuba (NSMT) and Natural History Museum and Institute, Chiba (CMNH). Standard, total and head lengths are abbreviated as SL, TL and HL, respectively.

Onigocia macrocephala (Weber, 1913)

(Proposed English name: Southern Notched Flathead)
(Figures 2–4)

Platycephalus macrocephalus Weber, 1913: 508, fig. 107 (original description, type locality: Bali Sea, north of Waigeo and southern Timor Sea) (in part); de Beaufort & Briggs, 1962: 146, fig. 36 (description, Bali Sea, north of Waigeo and southern Timor Sea) (in part).

Onigocia macrolepis (nec Bleeker, 1908): Gloerfelt-Tarp & Kailola, 1984: 123, an unnumbered fig. on p. 122 (short description, northwestern Australia); Sainsbury *et al.*, 1984: 110, an unnumbered fig. on p. 111 (description, southern Indonesia and northwestern Australia); Paxton & Hanley, 1989: 467 (Northwestern Shelf, Western Australia); Knapp 1999, 2404, an unnumbered fig. (description, at least southern South China Sea, Indonesia, Northwestern Shelf, Western Australia) (in part); Hoese *et al.* 2006: 938 (list, Western Australia); Imamura *et al.*, 2006: 295, fig. 3 (description, Nha Trang, Vietnam).

Lectotype (designated here)**:** ZMA 112436 (70.6 mm SL), Bali Sea (7°2.6'S, 115°23.6'E), 100 m depth, Siboga stn. 15.

Paralectotypes (2 specimens)**:** ZMA 112438 (52.9 mm SL), north of Waigeo (0°3.8'S, 130°24.3'E), 141 m depth, Siboga stn. 153; ZMA 112439 (68.1 mm SL), southern coast of Timor Sea, 36 m depth, Siboga stn. 296.

Non-types (32 specimens, 46.1–92.0 mm SL)**:** AMS I.24855-003 (2 specimens, 59.2–65.0 mm SL), north-northwest of Dampier, northwestern Australia (19°28'S, 116°29'E), 110 m depth, 26 Oct. 1983; CAS 29359 (7 of 8 specimens, 85.5–89.2 mm SL), off Taya Island, Guangdon Province, China (19°38'N, 111°30'E), ca. 92 m depth, 21 June 1958; CAS 33704 (79.3 mm SL), Batangas Bay, Luzon Island, Philippines (ca. 13.7°N, 121.0°E), 5 July 1968; CAS 88352 (5 specimens, 53.4–92.0 mm SL), 7 miles off Nha Trang, Vietnam (12°09'N, 109°25'E), 4 May 1960; CSIRO B2124 (3 specimens, 50.8–72.0 mm SL, voucher of Sainsbury *et al.*, 1984), northwest of Dampier Archipelago, northwestern Australia (19°36'S, 116°12'E), 124 m depth, 1 June 1980; CSIRO CA4035 (78.1 mm SL), off Port Headland, northwestern Australia (19°32'S, 117°13'E), 86.0 m depth, 12 Oct. 1983; HUMZ 190600 (92.0 mm SL, voucher of Imamura *et al.*, 2004), fish landing port, Nha Trang, Vietnam, 7 Oct. 2004; NTM S.13324-001 (75.5 mm SL), Timor Sea, Australia (12°57'S, 128°16'E), 97 m depth, 7 Dec. 1990; NTM S.14364-001 (4 specimens, 57.4–71.5 mm SL), southeast of Vulcan Shoal, Timor Sea, Australia, 80 m depth, 13 June 1996; NTM S. 14365-001 (6 specimens, 46.1–75.0 mm SL), northwest of West Holothuria Reef, Timor Sea, Australia, 100 m depth, 13 June 1996.

Diagnosis. A species of *Onigocia* is separable from its congeners in having the combination of the following characters: 9–10 caudal fin rays, 1 + 4–6 = 5–7 (mode 6) gill rakers, a larger head (38.8–42.3% SL), a single ocular flap present and usually extending slightly beyond the posterior margin of the orbit, a few or several small and short papillae on the posteromedial portion of the eye in larger specimens, the upper iris lappet short and branched, the lachrymal with two distinct antrorse spines anteriorly and a notch on the suborbital ridge below the eye, and no interopercular flap.

Description. Counts and proportional measurements are given in Table 1. Data of the following description are presented first for all specimens, then for the lectotype in parentheses.

Body depressed, mostly covered with ctenoid scales, some cycloid scales on undersurface. Head flattened; postorbital region, opercle and nape scaled. Snout slender, slightly longer than orbital diameter. Upper surface of eye with single ocular flap (Fig. 4A). Ocular flap having slightly thick outer margin and separated into two to six branches posteriorly; outer branch usually extending slightly beyond posterior margin of orbit, sometimes reaching posterior margin of orbit or not reaching it (reaching posterior margin of orbit in lectotype). A few or several small and short papillae present on posteromedial portion of eye in 78.8 mm SL or larger specimens (Fig. 4A), present or absent in 53.4 to 78.1 mm SL specimens, and absent in 50.8 mm SL or smaller specimen (present in lectotype). Upper iris lappet short and branched; lower iris lappet bilobed (Fig. 4B). Interorbital space narrow and concave. Top and side of head bearing spines and serrated ridges (Fig. 4A). Nasal with one to six small spines (one on left and two on right). One or three ethmoid spines present (one on both sides). Lachrymal with two distinct antrorse spines anteriorly and with zero to eight (one on both sides) small spines posteriorly. Anterior portion of lachrymal

with inner, middle, outer and posterior ridges; middle and outer ridges ending in lachrymal spine anteriorly. Inner ridge with zero to six small spines (two), middle with zero to four (one on left, zero on right) and outer with zero to three (one). Usually one, rarely two sharp preocular spines present (one on left, two on right), without small spines or tubercles basally. Distinct preorbital spines absent. Suborbital ridge finely serrated, comprised of 13–26 small spines, tending to increase with growth (16 on left, 17 on right); distinct notch present on suborbital ridge below eye, separating spines on second and third infraorbitals. Supraorbital ridge finely serrated except for anterior portion, continuous with frontal spines posteriorly. Postorbital region with one to several small spines (one). Pterotic with two or three distinct spines (two on both sides); sometimes few small spines present near base of distinct pterotic spines (two on right). One distinct parietal spine present. Supratemporal, posttemporal and supracleithrum usually with one spine, respectively; sometimes some additional small spines on supratemporal and posttemporal (supratemporal on right side with two small spines, that on left side and posttemporal on both sides with one small spine). Preopercle usually with three spines, rarely four (three); uppermost longest, not reaching posterior margin of opercle, usually bearing single supplemental spine, rarely possessing two supplemental spines or supplemental spine absent (present on both sides); lowermost smallest. Ridges of upper and lower opercular spines usually smooth; upper ridge rarely with one spine; lower one sometimes with rough serration formed by one to three spines (both ridges smooth in lectotype). Interopercular flap absent. Maxilla beyond anterior margin of pupil, attaining middle of eye or not attaining it (not attaining it). All teeth villiform, or most teeth villiform and those on anteromedial portion of upper jaw, palatine, and/or posterior portion of vomerine tooth patch small conical (all teeth villiform); teeth in bands on jaws and palatine, and in two separate patches on vomer; tooth band on upper jaw with or without small notch medially (with it). Lip margins without papillae. Sensory tubes from suborbitals and preopercle well developed, completely covering cheek region. Pored scales in lateral line with two exterior openings posteriorly. First dorsal fin originating slightly anterior to opercular margin. First and second dorsal fin narrowly separated. Pectoral fin rounded posteriorly (damaged). Posterior tip of pelvic fin attaining base of first to third (second) anal fin ray. Caudal fin mostly straight posteriorly (damaged).

Color in alcohol. In lectotype (Fig. 2), color mostly faded at present. Posterior portion of first dorsal fin brownish. Middle of pectoral fin with small brown spots. Membrane of pelvic fin with melanophores.

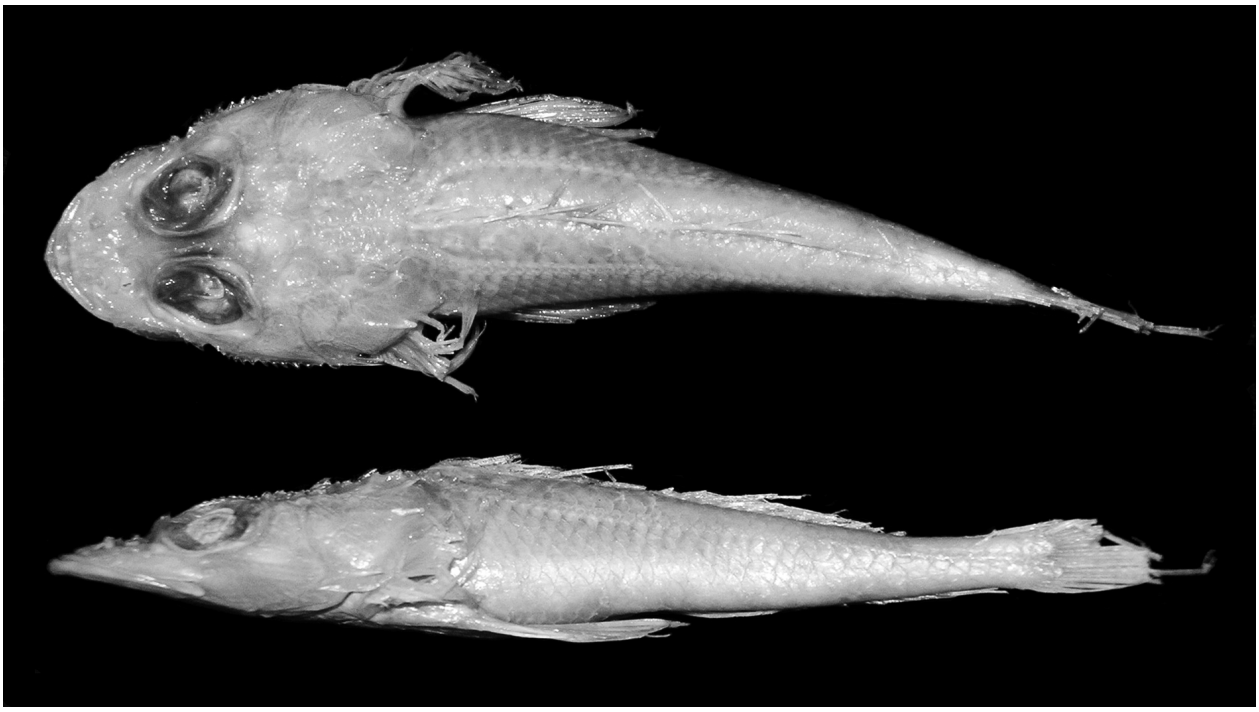

FIGURE 2. Dorsal (upper) and lateral (lower) views of *Onigocia macrocephala*, lectotype, ZMA 112436, 70.6 mm SL, Bali Sea.

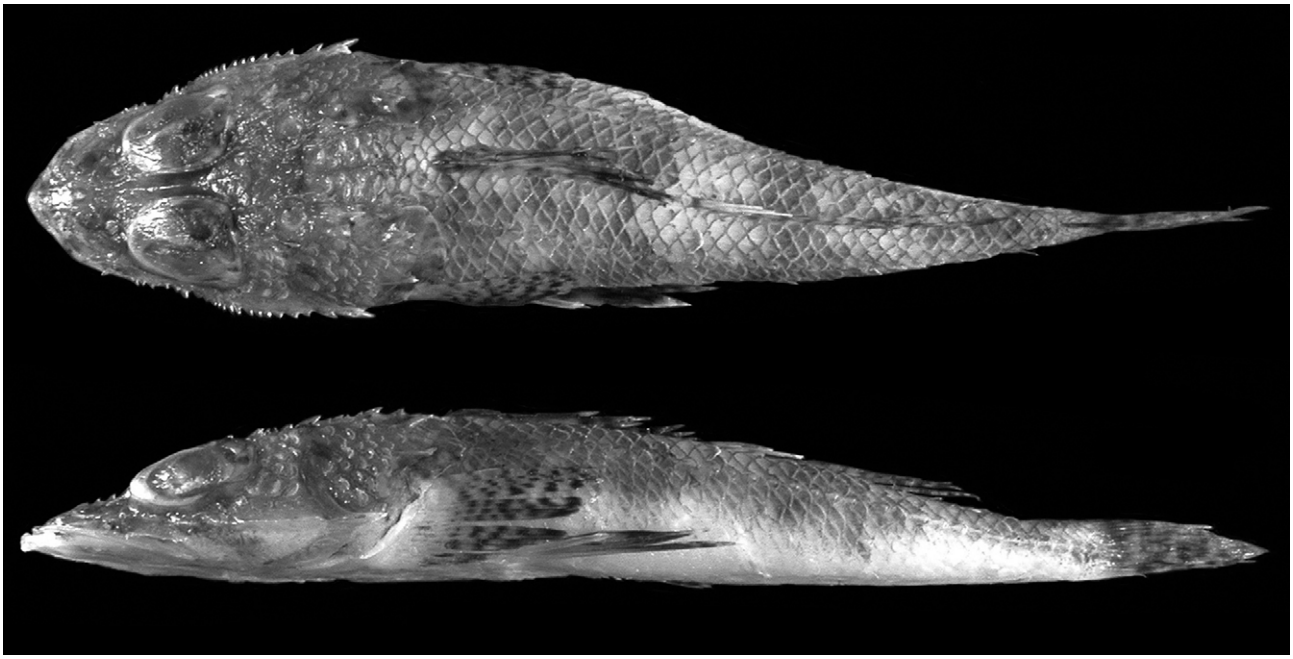

FIGURE 3. Dorsal (upper) and lateral (lower) views of *Onigocia macrocephala*, non-type, HUMZ 190600, 92.0 mm SL, Nha Trang, Vietnam.

TABLE 1. Comparison of counts and proportional measurements of *Onigocia macrocephala*.

	Lectotype	Paralectotypes		Non-types
	ZMA 112436	ZMA 112438	ZMA 112439	31 specimens
SL (mm)	70.6	52.9	68.1	46.1–92.0
Counts:				
First dorsal fin rays	I+VII	I+VII	I+VII	I+VII–VIII (VII in 3 specimens, VIII in 28)
Second dorsal fin rays	11	11	11	10–12 (10 in 2, 11 in 23, 12 in 6)
Anal fin rays	11	11	11	11–12 (11 in 4, 12 in 27)
Pectoral fin rays (upper, unbr.+middle, br.+lower, unbr.)	?+?+8=21	2+11+8=21	2+11+8=21	2+10–13+7–10=21–23 (21 in 10, 22 in 16, 23 in 5)
Pelvic fin rays	I, 5	I, 5	I, 5	I, 5
Branched caudal fin rays	–	–	10	9–10 (9 in 9, 10 in 14)
Pored scales in lateral line (with spine)	37 (4)	32 (4)	36 (4)	34–39 (3–11)
Scale rows above lateral line slanting downward and backward	39	31	–	34–41
Scale rows above lateral lineslanting downward and forward	39	34	–	35–39
Scales between second dorsal fin and lateral line	4 (3 large, 1 small)	4 (3 large, 1 small)	4 (3 large, 1 small)	4–5 (3–4 large, 1–2 small)
Gill rakers	1+4=5	1+6=7	1+5=6	1+4–6=5–7 (5 in 6, 6 in 23, 7 in 2)

.....continued on next page

TABLE 1. (Continued)

	Lectotype	Paralectotypes		Non-types
	ZMA 112436	ZMA 112438	ZMA 112439	31 specimens
Proportional measurements (% SL):				
HL	40.2	42.3	42.0	38.8–42.2
Predorsal length	39.4	40.6	40.2	37.7–41.1
Length of first dorsal fin base	18.3	18.1	16.9	17.8–21.8
Length of second dorsal fin base	25.6	24.2	24.8	23.6–27.2
Length of anal fin base	29.2	26.1	28.2	27.0–31.6
Caudal peduncle length	9.5	9.5	9.5	7.8–9.9
Caudal peduncle depth	5.1	5.7	4.8	5.0–6.0
Snout length	10.6	11.3	11.5	9.6–11.2
Orbital diameter	11.8	12.9	12.9	11.4–13.2
Upper jaw	16.4	18.0	18.1	15.7–17.4
Lower jaw	21.8	–	23.6	20.5–23.1
Interorbital width	2.7	2.8	2.6	2.1–3.2
Pectoral fin length	–	16.3	17.3	15.0–18.2
Pelvic fin length	24.2	25.7	24.2	22.5–26.1
Caudal fin length	–	–	23.8	19.5–24.1
Length of first spine of first dorsal fin	6.1	6.8	–	4.5–7.1
Length of second spine of first dorsal fin	–	16.3	14.5	12.5–18.8
Length of first ray of second dorsal fin	–	–	13.8	11.7–15.1
Length of first anal fin ray	8.2	–	–	5.8–8.2
Proportional measurements (% HL):				
Snout length	26.4	26.8	27.3	24.4–27.4
Orbital diameter	29.2	30.4	30.8	28.8–31.9
Upper jaw	40.8	42.4	43.0	39.0–42.5
Lower jaw	54.2	–	56.3	50.4–55.9
Interorbital width	6.7	6.7	6.3	5.1–8.0

In non-types (Fig. 3), ground color of body and head light brown above, paler below. Body with two or three indistinct saddle-like brownish bands; one broad band below first dorsal fin, and one broad or two narrow bands below posterior portion of second, respectively. Indistinct brown spot below eye. First dorsal fin with one broad dark brown band distally, with small paler or transparent areas along spines. Second dorsal fin with several small brownish spots. Pectoral fin light brown, with small brown to black spots tending to form narrow bands. Pelvic fin variable: uniformly dark brown or black, except for pale outer margin; ground color pale brown, with two large black spots, with three small black spots or narrow black bands, with several small black spots tending to form narrow bands, or with one black spot basally and one dark area including about three or five small black spots on middle portion; or ground color dark brown, with several small darker spots. Anal fin pale. Caudal fin with many small brownish spots, tending to form narrow bands.

Distribution. Known at present from the South China Sea (including Guangdon Province, China, Nha Trang, Vietnam and Luzon Island, Philippines), north of Waigeo, Bali Sea, Timor Sea and northwestern Australia, at depths of 36–141 m (Fig. 1).

Remarks. Weber (1913) originally described *Platycephalus macrocephalus* based on seven specimens. Of them, four specimens (38.3–40.7 mm SL) from Sapeh Strait are identical with *Onigocia grandisquama* by having characters such as I + VIII-11 dorsal and 11 anal fin rays, 32–34 lateral line scales, a single short ocular flap, lachrymal with two antrorse spines, and suborbital ridge finely serrated and without a distinct notch on suborbital

ridge below the eye (see also Imamura & McGrouther, 2008 for its taxonomic characters). In contrast, other three specimens (52.9–70.6 mm SL), from Bari Sea, north of Waigeo and southern Timor Sea, are conspecific and belong to a distinct species separable from other members of the genus *Onigocia* (see Comparison). To solve taxonomic confusion, the lectotype of *P. macrocephala* should be designated. Weber (1913) illustrated a single specimen collected from station 15 (Bali Sea), which is catalogued as ZMA 112436. Therefore, the specimen is designated here as the lectotype of *P. macrocephalus* following ICZN (1999: Rec. 74B).

After the original description, only de Beaufort and Briggs (1962) treated *O. macrocephala* as a valid species and no other authors have given any taxonomic comments on this species, except for Knapp *et al.* (2000) who stated its taxonomic status to be unclear. It was revealed in this study that *O. macrocephala* is valid and has been mistakenly identified as *Onigocia macrolepis* (e.g., Gloerfelt-Tarp & Kailola, 1984; Sainsbury *et al.*, 1984; Knapp 1999; Imamura *et al.*, 2006). In addition, it was found here that *O. macrocephala* tends to have more southern distribution than *O. macrolepis*; i.e., *O. macrocephala* occurs at least in the South China Sea (including Guangdon Province, China, Nha Trang, Vietnam and Batangas Bay, Luzon Island, Philippines), north of Waigeo, Bali Sea, Timor Sea and northwestern Australia, while *O. macrolepis* is recognized from southern Japan, Taiwan, Hong Kong and Camiguin Island (situated between Leyte and Mindanao islands, the Philippines) (Fig. 1). Therefore, the two species are known sympatrically in the Philippines.

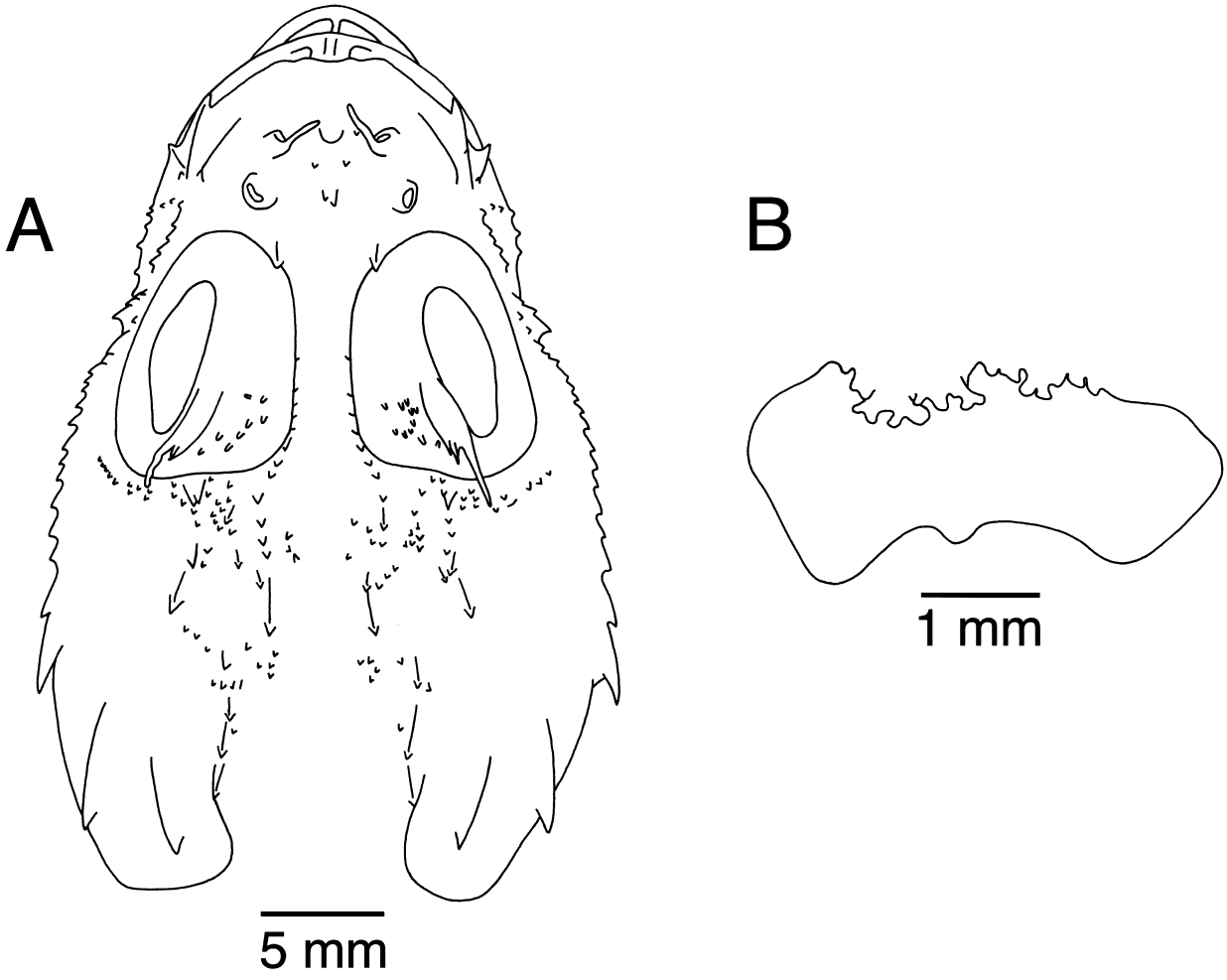

FIGURE 4. Dorsal view of head (A) and iris lappet (right eye) (B) in *Onigocia macrocephala*, non-type, HUMZ 190600, 92.0 mm SL, Nha Trang, Vietnam.

Comparison. Data used for the following comparison is from Matsubara & Ochiai (1955), Knapp (1986, 1999), Imamura & McGrouther (2008), Imamura & Knapp (2009), Imamura (2011) and this study.

The genus *Onigocia* includes the following eight valid species at present: *Onigocia bimaculata* Knapp, Imamura & Sakashita, 2000, *Onigocia grandisquama* (Regan, 1908), *Onigocia lacrimalis* Imamura & Knapp,

2010, *Onigocia macrolepis* (Bleeker, 1854), *Onigocia oligolepis* (Regan, 1908), *Onigocia pedimacula* (Regan, 1908), *Onigocia sibogae* Imamura, 2011 and *Onigocia spinosa* (Temminck & Schlegel, 1843). *Onigocia macrocephala* is similar to *O. grandisquama*, *O. macrolepis* and *O. spinosa* in having 9–10 caudal fin rays, one gill raker on the upper arch, a single ocular flap, short and branched upper iris lappet, lachrymal with two distinct antrorse spines anteriorly, and no interopercular flap (vs. the combination of characters absent in others). Of the three congeners, *O. macrocephala* most resembles *O. macrolepis* in having a notch on the suborbital ridge below the eye. This character is found only in the two species among *Onigocia*. *Onigocia macrocephala* differs from *O. macrolepis* in having a larger head (38.8–42.3% SL in *O. macrocephala* vs. 35.6–38.4% SL in *O. macrolepis*) (Fig. 5). *Onigocia macrocephala* is also separable from *O. macrolepis* in having a single ocular flap usually extending slightly beyond the posterior margin of the orbit (not reaching its posterior margin in *O. macrolepis*) and a few or several small and short papillae on the posteromedial portion of the eye in larger specimens (vs. papillae absent in *O. macrolepis*). The papillae are not seen in all other members of the genus *Onigocia*. In addition, numbers of pectoral fin rays and gill rakers are helpful to separate *O. macrocephala* from *O. macrolepis* [21–23 (mode 22) and 5–7 (6) in total in *O. macrocephala* vs. 19–22 (21) and 4–6 (5) in *O. macrolepis*], although overlaps are recognized between the two species (Table 2). Selected characters in *O. macrolepis* for the comparison with *O. macrocephala* are listed in Table 3.

TABLE 2. Comparison of two meristic characters in two species of *Onigocia.*

	Pectoral fin rays					Gill rakers (in total)			
	19	20	21	22	23	4	5	6	7
O. macrocephala (n = 34)	–	–	13*	16	5	–	7*	24	3
O. macrolepis (n = 19)	1	6	11	1	–	1	14	4	–

Asterisks indicate data including lectotype.

TABLE 3. Selected characters of *Onigocia macrolepis*.

O. macrolepis (n=19, 47.6–110.6 mm SL)					
Counts		Proportions		Others	
First dorsal fin rays	I+VII–VIII (usually VIII)	% SL		Notch on suborbital ridge	Present
Second dorsal fin rays	11–12	HL	35.6–38.0	Ocular flap	Single, not reaching posterior
Anal fin rays	12–13 (usually 12)	% HL			margin of orbit
Pectoral fin rays	19–22	Snout length	25.1–27.9	Papillae on posteromedial	Absent
Branched caudal fin rays	9–11	Orbital diameter	25.4–29.9	portion of eye	
Pores scales in lateral line (with spine)	36–42 (2–5)	Upper jaw length*	38.0–41.8	Upper iris lappet	Short and branched
Gill rakers	1+ 3–5 = 4–6 (usually 5)	Lower jaw length*	50.4–55.0	Lachrymal spines	Two (antrorse)
		Interorbital width	5.5–9.1	Interopercular flap	Absent

*Based on nine specimens

Comparative materials. Other paralectotypes of *Onigocia macrocephala*: ZMA 112435 [4 specimens, 38.3–40.7 mm SL, identified as *Onigocia grandisquama* (Regan)], Sapeh Strait, Indonesia. *O. macrolepis* (7 specimens): CAS 89383 (2 specimens, 71.6–75.4 mm SL), Hong Kong; HUMZ 79919 (59.3 mm SL), Taiwan; NSMT-P 57398 (57.5 mm SL), NSMT-P 59307 (1 of 3 specimens, 65.7 mm SL), Japan; USNM 99773 (47.6 mm SL), Camiguin Island, Philippines; USNM 344483 (79.7 mm SL), Taiwan.

The other 69 and 54 specimens of *Onigocia*, including type specimens of each species, except for *O. macrolepis* lacking existent types, and deposited at AMS, BMNH, BPBM, CMNH, HUMZ, MNHN, NICA, NSMT, QM, RMNH, USNM and ZMA, are listed in Imamura & Knapp (2009) and Imamura (2011).

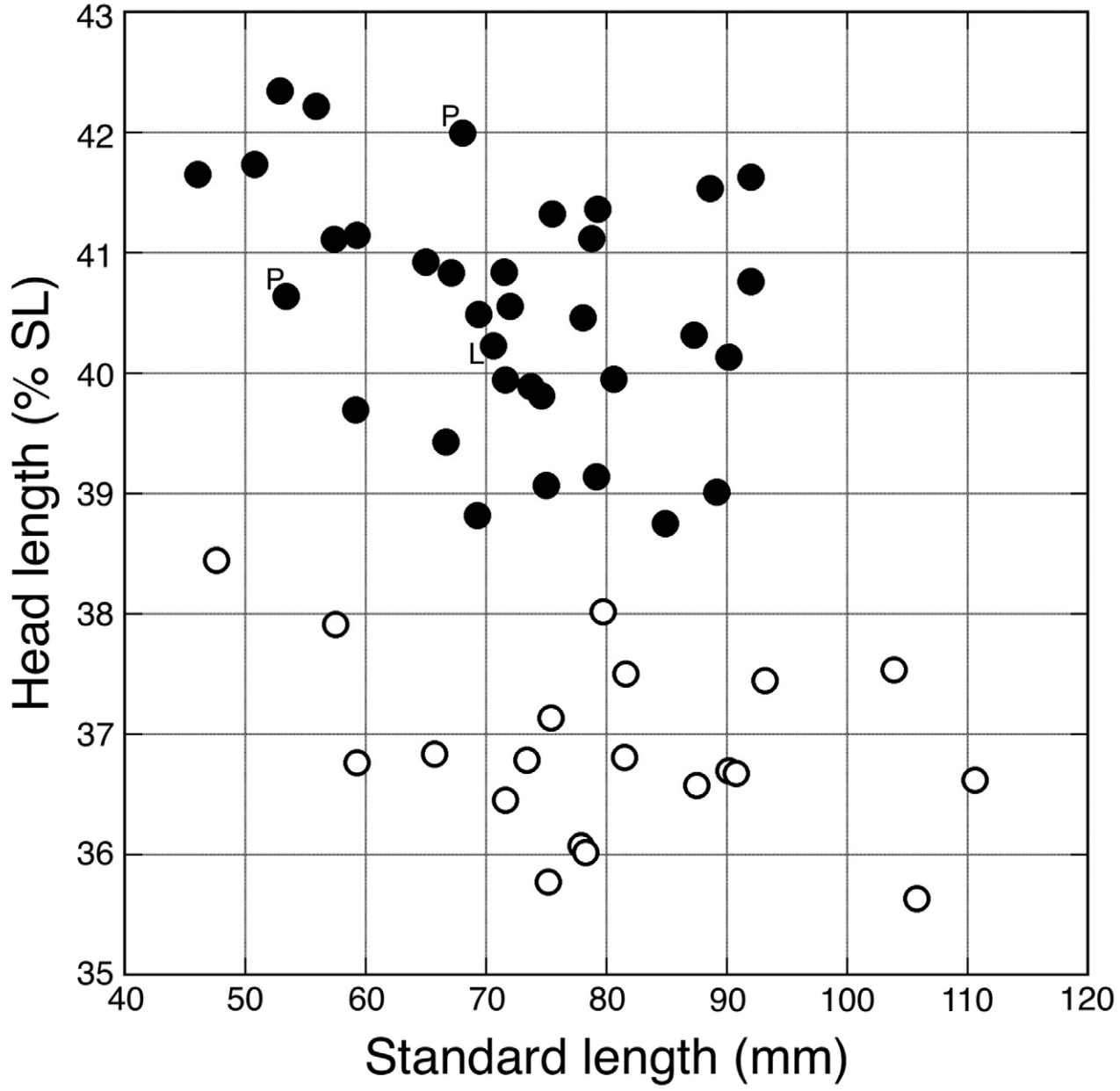

FIGURE 5. Relationship of head length (% SL) and standard length (mm) in two species of *Onigocia*. Solid circle, *Onigocia macrocephala*; open circle, *O. macrolepis*; L, lectotype; P, paralectotype.

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