



A new species of *Priolepis* (Pisces: Gobiidae) from Papua New Guinea

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Abstract

A new species of goby, *Priolepis billbrooksi* n. sp., is described from mud-bottom habitat in 30 m depth at Milne Bay Province, Papua New Guinea, on the basis of 5 specimens, 13.3–22.7 mm SL. It belongs to a group of *Priolepis* that share a well-developed pattern of transverse cheek papillae, but differs from other members of the group by a combination of diagnostic features that include dorsal-fin elements VI + I, 9–10 (usually 9), a second dorsal-fin spine forming an elongate filament extending to between the base of the fourth and the last segmented dorsal-fin ray when adpressed, anal-fin rays I, 8–9 (usually 9), pectoral-fin rays 18, a relatively broad interorbital (75–91% pupil diameter), 10–12 papillae in the posterior transverse interorbital row, the upper portion of the opercle with about 10–12 scales arranged in 3 or 4 transverse rows, no pelvic frenum, and the color when fresh generally yellow with numerous pepper-like melanophores.

Key words: taxonomy, systematics, ichthyology, coral-reef fishes, gobies, Indo-Pacific Ocean, Citron Mudgoby.

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Introduction

The genus *Priolepis* Valenciennes, 1837 contains tiny gobiid fishes occurring on Indo-Pacific and Atlantic coral reefs. Most of the 31 Indo-Pacific species currently recognized as valid (Eschmeyer *et al.* 2018) were treated by Winterbottom & Burridge (1992, 1993a, 1993b & 1993c). An additional 5 species were later described by Goren & Baranes (1995), Nogawa & Endo (2007), Hoese & Larson (2010), and Bogorodsky *et al.* (2016). The Indo-Pacific species are nearly equally divisible into three groups, based on their pattern of cheek papillae and the presence or absence of predorsal scales (Winterbottom & Burridge 1992, 1993a & 1993b): Group I is characterized by a well-developed transverse pattern of cheek papillae and the presence of predorsal scales, Group II has a much reduced pattern of transverse cheek papillae and lacks predorsal scales, and Group III has a similar reduced pattern of transverse cheek papillae, but also has predorsal scales. Color illustrations and diagnoses for 16 species inhabiting the East Indian Region (Andaman Islands to Solomon Islands, north to Philippines) were provided by Allen & Erdmann (2012). The present paper describes a new species of *Priolepis* belonging to Group I that was collected by the authors from a mud-bottom habitat that is unusual for this genus, which is most often encountered in coral-reef crevices.

Materials and Methods

Type specimens are deposited at the Western Australian Museum, Perth, Australia (WAM).

Lengths are given as standard length (SL), measured from the median anterior point of the upper lip to the base of the caudal fin (posterior end of the hypural plate); head length is taken from the upper lip to the posterior end of the opercular membrane, and head depth and width at the level of the posterior margin of the preopercle; body depth is measured at both the origin of the pelvic fins and the origin of the anal fin; caudal-peduncle length is the horizontal distance between verticals at the rear base of the anal fin and the caudal-fin base; caudal- and pectoral-fin lengths are the length of the longest ray; pelvic-fin length is measured from the base of the pelvic-fin spine to the tip of the longest (fourth) segmented pelvic-fin ray. The lateral scale count is the number of scales in a horizontal series from the scale overlapping the distal end of the hypural plate anteriorly along the midlateral septum to the base of the pectoral fin. Transverse scales are counted upward and backwards from the anal-fin origin to the dorsal-fin base. Gill rakers include rudiments and are counted on the first gill arch, those on the upper limb given first and separated by a plus sign from the lower-limb rakers. The raker at the angle of the gill arch is included in the lower-limb count. Cyanine blue 5R (Acid Blue 113) stain was used to make papillae more obvious (Akihito *et al.* 1993, Saruwatari *et al.* 1997). The range of counts and proportional measurements for paratypes are indicated in parentheses when different from the value for the holotype.

Priolepis billbrooksi, n. sp.

Citron Mudgoby

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Figures 1–4.

Holotype. WAM P.34854-021, female, 22.5 mm SL, Papua New Guinea, Milne Bay Province, Nuakata Island, Duduwali Bay, -10.2892°, 151.0056°, 30 m, rotenone, G.R. Allen, M.V. Erdmann & M. Brooks, 6 May 2018.

Paratypes. WAM P.34854-041, 4 specimens, 13.3–22.7 mm SL, collected with holotype.

Diagnosis. A species of *Priolepis* with the following combination of characters: dorsal-fin elements VI+I, 9–10 (usually 9), a second dorsal-fin spine forming an elongate filament extending to between base of fourth and last segmented dorsal-fin ray when adpressed, anal-fin elements I, 8–9 (usually 9), pectoral-fin rays 18, a relatively



Figure 1. *Priolepis billbrooksi*, fresh female paratype, WAM P.34854-000, 22.4 mm SL, Nuakata Island, Milne Bay Province, Papua New Guinea (G.R. Allen).

broad interorbital (75–91% pupil diameter), 10–12 papillae in posterior transverse interorbital row, upper portion of opercle with about 10–12 scales arranged in 3 or 4 transverse rows, no pelvic frenum, and color when fresh generally yellow with numerous pepper-like melanophores.

Description. Dorsal-fin elements VI+I,9 (one paratype with 10), second spine elongate and filamentous, reaching to between base of fourth and last segmented dorsal-fin ray when adpressed; anal-fin elements I,9 (one paratype with I,8), all segmented dorsal- and anal-fin rays branched; pectoral-fin rays 18, all rays branched except uppermost one; pelvic-fin rays I,5, segmented rays with three sequential branch points except second and third sometimes with 4 branch points, innermost (fifth) rays fully bound by membrane, fifth pelvic-fin ray 71% (63–77%) length of fourth ray; frenum absent; caudal fin with 13 branched and 17 segmented rays and 4 (4–5) upper and lower procurent rays; gill rakers on first branchial arch 4+15 (3–4 + 13–14), total rakers 19 (16–19); vertebrae 26.

Scale pattern of head and body as shown in Fig. 2; lateral scales 26 (one paratype with 25); transverse scales 9 (10 in one paratype); nape fully scaled (Fig. 4), predorsal scales about 18 or 19, extending forward to about mid-interorbital; uppermost portion of opercle with about 10–12 scales arranged in 3 or 4 transverse rows; head



Figure 2. *Priolepis billbrooksi*, scale pattern of female holotype (Cyanine Blue stain), WAM P.34854-021, 22.5 mm SL, Nuakata Island, Milne Bay Province, Papua New Guinea (G.R. Allen).



Figure 3. *Priolepis billbrooksi*, transverse pattern of cheek papillae of female holotype (Cyanine Blue stain), WAM P.34854-021, 22.5 mm SL, Nuakata Island, Milne Bay Province, Papua New Guinea (G.R. Allen).

and body scales weakly ctenoid, except for cycloid scales on belly and 5 or 6 rows of embedded cycloid scales on prepelvic region; pectoral-fin base scaleless (Fig. 3).

Mouth terminal, inclined obliquely upwards. Upper jaw with outer row of 10–12 slender conical teeth on each side, anteriormost widely separated and largest, and 3 or 4 inner rows of small conical teeth, except for several enlarged, backward-projecting, depressible teeth at front of jaw; medial portion of lower jaw with 2 or 3 forward-projecting, slender, conical teeth with 1 or 2 enlarged, fang-like canines at outer corner (bend of dentary) on each side and 2 or 3 inner rows of small, but variably-sized teeth. Tongue slightly bilobed. Gill opening extending ventrally to below level of posterior preopercular margin; outer gill rakers of first gill arch 4+15 (3–4 + 13–14). Anterior nasal opening a short tube, posterior nasal opening relatively large and pore-like with an elevated rim. A shallow, poorly-developed interorbital trench; bony interorbital width 75% (81–91%) pupil diameter; epaxialis musculature reaching anteriorly to about mid-interorbital.

Transverse pattern of cheek papillae (Fig. 3) with fifth transverse row extending ventrally to intersect with termination of lower longitudinal row; 7–13 papillae in anterior longitudinal row on each side of interorbital and 12–16 papillae in posterior transverse row (Fig. 4).

Measurements (percentage of SL): head length 29.8 (29.3–31.2), head width 21.6 (17.8–22.0), head depth 18.2 (19.0–20.3), body depth at pelvic-fin origin 21.7 (20.9–23.1), body depth at anal-fin origin



Figure 4. *Priolepis billbrooksi*, sensory papillae (white dots) on interorbital-snout region of female holotype (Cyanine Blue stain), WAM P.34854-021, 22.5 mm SL, Papua New Guinea (G.R. Allen).

18.8 (17.5–20.1); length of second dorsal-fin spine filament 29.6 (39.1–42.2, except absent in juvenile paratype); pectoral-fin length 31.2 (33.3–36.7), pelvic-fin length 28.9 (26.9–28.0), caudal-peduncle length 23.6 (23.3–25.9), and caudal-fin length 29.3 (27.7–29.2). Caudal fin rounded, about equal to or slightly shorter than head length.

Color when fresh. (Fig. 1) Generally yellow, including iris, except opercle, upper part of cheek, and area immediately behind eye sometimes pinkish; head, body, and fins covered with pepper-like melanophores, most prominent on side of body; fins yellow, except pelvic fins translucent; second dorsal fin, caudal fin, and anal fin with blue margin, widest on anal fin; dorsal fins with narrow blue stripe at base, second dorsal fin also with longitudinal row of blue spots just above stripe; filamentous extension of second dorsal-fin spine blue.

Color in alcohol. Generally whitish with head, body, and fins covered with pepper-like melanophores, most prominent on of side of body; fins translucent whitish without markings.

Etymology. The new species is named for William (“Bill”) Mathews Brooks, the third author’s son.

Distribution and habitat. The new species is currently known only from the type locality in Milne Bay Province, Papua New Guinea. However, it is likely more widespread in the East Indian region and has no doubt eluded collectors due to its small size and predilection for seldom-dived, mud-bottom habitat. The specimens were collected in a sheltered bay on a mainly flat mud bottom in 30 m depth. Although we did not observe individuals live and *in situ* (they were collected with rotenone), it is likely this species lives in the burrows of larger mud-dwelling fishes such as jawfish or *Oxymetopon* ribbongobies. Two other *Priolepis* species which are found in similar deep-mud habitat, *P. aithiops* and *Priolepis* sp. (Allen & Erdmann 2012), shelter in the burrows of *Oxymetopon compressus* and *Opistognathus* jawfish, respectively; these burrowing fishes were also found at the type locality and we suspect the new species was living in such burrows.

Remarks. The new species belongs to the subgroup of Indo-Pacific *Priolepis* with a well-developed pattern of transverse cheek papillae that was reviewed by Winterbottom & Burrridge (1992). They included the following species (approximate known distribution in parentheses): *P. aithiops* Winterbottom & Burrridge, 1992 (Flores and Batanta Islands, Indonesia); *P. anthioides* (Smith, 1959) (Zanzibar); *P. fallacincta* Winterbottom & Burrridge, 1992 (Philippines and Sulawesi to Fiji); *P. profunda* (Weber, 1909) (Andamans to Papua New Guinea and Australia); *P. randalli* Winterbottom & Burrridge, 1992 (Persian Gulf and Brunei); *P. sticta* (Flores, Indonesia) Winterbottom & Burrridge, 1992; and “RW sp. 8” (= *P. akihitoi* Hoese & Larson, 2010) (Japan, Australia, and New Caledonia). Three more recently described species, *P. goldshmidtae* Goren & Baranes, 1995 (Red Sea, 400 m depth); *P. winterbottomi* Nogawa & Endo, 2007 (Japan); and *P. melanops* Bogorodsky *et al.*, 2016 (Red Sea) also appear to be members of this group. However, *P. billbrooksi* is immediately separable from most of these species on the basis of its uniform yellow color pattern. Nearly all other species, with the exception of *P. aithiops* and *P.*



Figure 5. *Priolepis aithiops*, about 22 mm SL, Batanta Isl., Raja Ampat Islands, West Papua Province, Indonesia (G.R. Allen).

melanops, feature a pattern of alternating light and dark bars. The latter species is mainly brownish-orange with a blackish snout and further differs in having a scaleless predorsal midline, two transverse rows of interorbital papillae, 14 or 15 pectoral-fin rays, no elongate dorsal-fin spines, and a truncate caudal fin. *Priolepis aithops* (Fig. 5), although possessing a very similar pattern of cheek and interorbital papillae and dwelling in a similar deeper mud-bottom habitat, differs in having a brownish red color pattern with primarily red dorsal, anal, and caudal fins, and also a strong reticulated pattern due to its dark scale margins. It also differs in having a shorter filamentous second dorsal-fin spine that extends to about the base of the third segmented dorsal-fin ray when fully developed.

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