



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

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Abstract

The new species of gobiid fish, *Gobiopsis jackbrooksi*, n. sp., is described from two specimens: an adult female 38.7 mm SL and a juvenile of 14.0 mm SL, both collected from mud-bottom habitat in 30 m depth at Milne Bay Province, Papua New Guinea. Diagnostic features include: head barbels absent; segmented dorsal-fin and anal-fin rays 10; longitudinal scales 31; predorsal scales 10; transverse scales 9; no scales on the cheek and operculum; cephalic sensory-canal pores B', C, D, E, F, and H' present; preopercular and posterior oculoscapular pores absent; major rows of cephalic sensory papillae on raised fleshy ridges along a mainly longitudinal orientation on the cheek; and some sensory papillae on the side of the head enlarged and fleshy. The new species is similar to *Gobiopsis namnas* from Japan and *Gobiopsis uranophilus* from the South China Sea, the only other members of the genus that lack head barbels.

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

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Introduction

The gobiid genus *Gobiopsis* Steindachner, 1861 of the Indo-west Pacific Ocean contains 16 species that are currently recognized as valid (Eschmeyer *et al.* 2018). Most occur on sand or rubble substrate, frequently in the vicinity of coral reefs. Diagnostic features shared by most species include a relatively elongate body with a broad flattened head, a pug-nosed snout profile, and the presence of barbels on the chin, snout, and sides of the head. The barbels include some that are arranged on one or more raised, longitudinal skin flaps on the cheek, often with papillae (Lachner & McKinney 1978, 1979, Shibukawa 2010, Larson & Murdy 2001). However, *G. namnas* Shibukawa, 2010 from Japan and *G. uranophilus* Prokofiev, 2016 from the South China Sea, both collected in deep water (73–101 m), differ from other members of the genus in lacking head barbels. The present paper describes a third species without barbels that was recently collected by the authors in 30 m depth at Milne Bay Province, Papua New Guinea.

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 (HL) is taken from the upper lip to the posterior end of the opercular membrane, and head width over the posterior margin of the preopercle; head depth is taken at the level of the rear edge of the preoperculum; orbit diameter is the greatest fleshy diameter; snout length is measured from the median anterior point of the upper lip to the nearest fleshy edge of the orbit; upper-jaw length from the same anterior point to the posterior end of the maxilla; caudal-peduncle depth is the least depth, and caudal-peduncle length the horizontal distance between verticals at the rear base of the anal fin and the caudal-fin base; lengths of spines and rays are measured to their extreme bases; 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 pelvic-fin soft ray.

Scales in the longitudinal series are counted from the scale above the pectoral-fin base, continuing in a longitudinal row to the posterior edge of the hypural plate; scales in the transverse series are counted from the origin of the anal fin posterodorsally to the base of the first dorsal fin; gill rakers are counted on the first gill arch, those on the upper limb listed first; rudiments are included in the counts.

Cyanine Blue 5R (Acid Blue 113) stain was used to make pores and papillae more obvious (Akihito *et al.* 1993, Saruwatari *et al.* 1997). Meristic data are presented for both the female holotype and juvenile paratype, but only the holotype was utilized for proportional measurements.

Gobiopsis jackbrooksi, n. sp.

Slender Mudgoby

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Figures 1–7; Table 1.

Holotype. WAM P.34854-004, 38.7 mm SL, female, Papua New Guinea, Milne Bay Province, Nuakata Island, Duduwali Bay, -10.2892°, 151.0056°, rotenone, G.R. Allen, M.V. Erdmann & W.M. Brooks, 6 May 2018.

Paratype. WAM P.34854-042, 14.0 mm SL, collected with holotype.

Diagnosis. A species of *Gobiopsis* with the following combination of characters: head barbels absent; segmented dorsal-fin and anal-fin rays 10; longitudinal scales 31; predorsal scales 10; transverse scales 9; no scales on cheek and operculum; cephalic sensory-canal pores B', C, D, E, F, and H' present; preopercular and



Figure 1. *Gobiopsis jackbrooksi*, fresh female holotype, WAM P.34854-004, 38.7 mm SL, Nuakata Island, Milne Bay Province, Papua New Guinea (G.R. Allen).

posterior oculoscapular pores absent; major rows of cephalic sensory-canal papillae on raised fleshy ridges along a mainly longitudinal orientation on cheek; some sensory papillae on side of head enlarged and fleshy; live coloration of female mainly mottled brown, juvenile with 5 pale yellow dorsal saddles between nape and caudal peduncle.

Description. Dorsal-fin elements VI+I,10, first dorsal fin triangular without filamentous spines, third spine longest; anal-fin elements I,10, all segmented dorsal- and anal-fin rays branched; pectoral-fin rays 18, all rays branched except uppermost and lowermost; pelvic-fin rays I,5, all segmented rays with three branch points, fifth ray longest; pelvic fins joined by membrane, frenum relatively thin, but well developed; caudal fin with 15 branched and 17 segmented rays and 6 upper and lower procurent rays; gill rakers on first branchial arch 4+12=16; total vertebrae 26.

Longitudinal scale rows 31; transverse scale rows 9; predorsal scales 10; scales finely ctenoid on posterior portion (behind level of base of fourth or fifth segmented dorsal-fin ray) of body, nape, and anterior body including prepelvic region with cycloid scales; scales absent on cheek, opercle, and pectoral-fin base.

Lower jaw protruding slightly, mouth steeply inclined, forming an angle of about 65° to horizontal axis of body; maxilla extending posteriorly to about level of anterior edge of eye; sharp villiform to conical teeth in posteriorly tapering bands arranged in approximately 4 or 5 irregular rows at front of jaws, outer row contains largest teeth, including three enlarged posteriorly hooked teeth at front of lower jaw and several slightly smaller teeth near symphysis of upper jaw; anterior naris in conspicuous tube that protrudes over edge of snout with posterior naris at



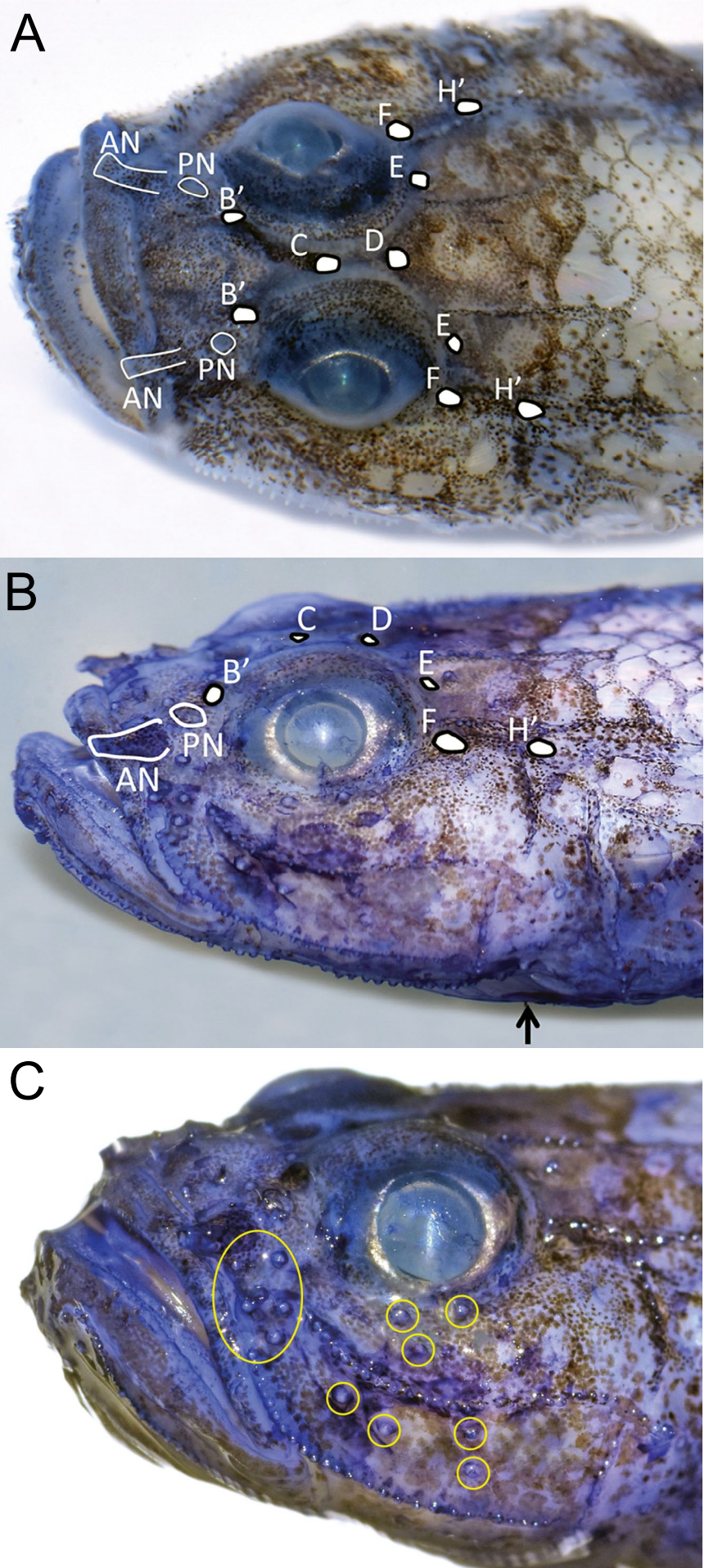
Figure 2. *Gobiopsis jackbrooksi*, preserved female holotype, WAM P.34854-004, 38.7 mm SL, Nuakata Island, Milne Bay Province, Papua New Guinea (G.R. Allen).

base of tube with slightly elevated rim; gill opening extending forward to below rear edge of preoperculum; cephalic sensory-canal pores (Figs. 3A & B) relatively large and conspicuous, consisting of pores B', C, D, E, F, and H'; preopercular and supraopercular pores absent; cephalic sensory papillae arranged on fleshy ridges and as widely spaced, enlarged, and fleshy papillae of variable size concentrated on anterior cheek and side of snout (for holotype, see Figs. 3C, 4 & 5); ventral surface of dentary (Fig. 5) with double row of papillae, outer row of numerous close-set papillae on fleshy ridge, and inner row of large, well-spaced, wart-like papillae without a fleshy ridge, ventral chin with pair of papillae (laterally flattened perpendicular to longitudinal axis of body); juvenile paratype also shows main papillae rows (precursor of raised ridges) and enlarged fleshy papillae (Fig. 6); also about 20 short transverse rows, each containing about 6–9 papillae at regular intervals on side of body between bases of pectoral and caudal fins.

Urogenital papilla in female smooth and cylindrical.

Measurements (percentage of SL of holotype): Head depressed, head length 26.7, depth 13.3, and width 18.3; snout about equal to eye diameter, length 6.4; eye diameter 6.8; interorbital narrow, eyes nearly contacting each other, noticeably bulging above interorbital; upper-jaw length 11.7; body relatively slender, depth at pelvic-fin origin 15.1 and at anal-fin origin 13.7; predorsal distance 34.8, snout to second dorsal-fin origin 53.6, preanal distance 59.2, and prepelvic distance 29.4;

Figure 3. *Gobiopsis jackbrooksi*, holotype, Cyanine Blue stain; dorsal (A) and lateral (B) head with sensory-canal pores (black-edged white spots), arrow=anterior extent of gill opening, AN=anterior naris, PN=posterior naris, C) cheek and snout region showing raised papillae ridges and enlarged fleshy papillae (circled with yellow, including cluster of 6 on side of snout) (G.R. Allen).



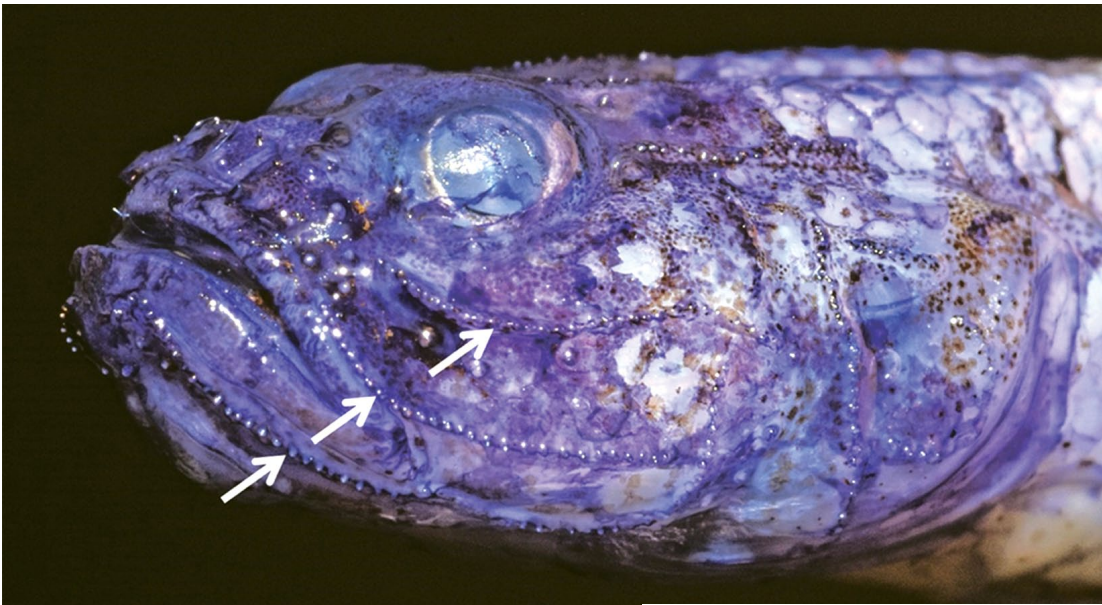


Figure 4 (above). *Gobiopsis jackbrooksi*, holotype, Cyanine Blue stain; arrows indicate main fleshy ridges of papillae on lower jaw and cheek (G.R. Allen).

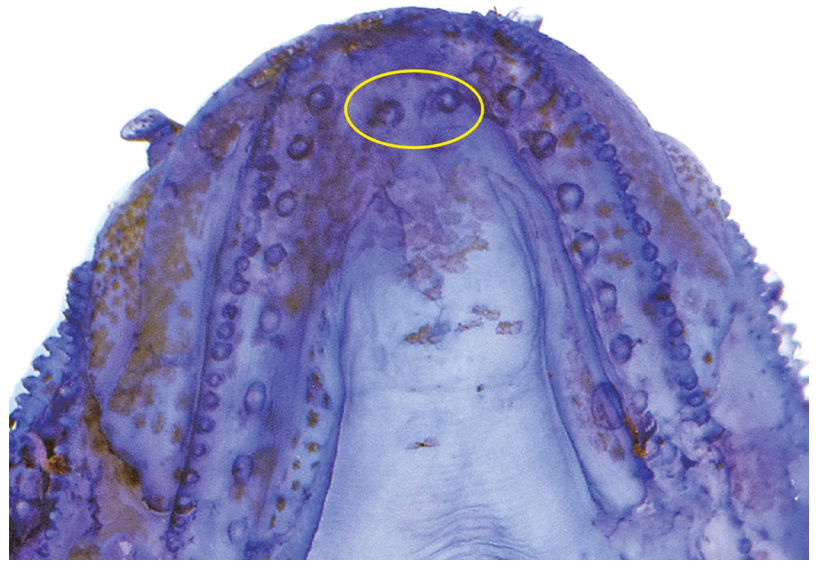


Figure 5 (right). *Gobiopsis jackbrooksi*, holotype, Cyanine Blue stain; ventral head with sensory papillae, including circled pair on central chin (G.R. Allen).

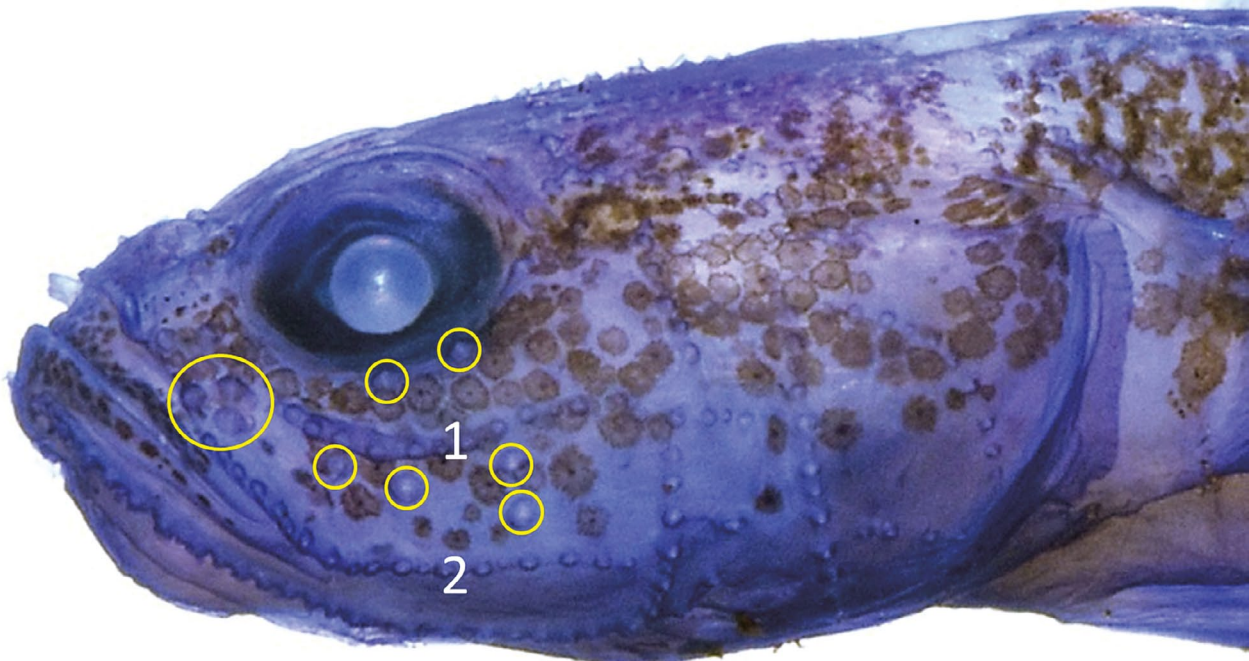


Figure 6. *Gobiopsis jackbrooksi*, juvenile paratype WAM P.34854-042, Cyanine Blue stain; showing main longitudinal rows of cheek papillae (1 & 2) and enlarged fleshy papillae (circled with yellow; cluster of 3 on side of snout) (G.R. Allen).



Figure 7. *Gobiopsis jackbrooksi*, preserved juvenile paratype, WAM P.34854-042, 14.0 mm SL, Nuakata Island, Milne Bay Province, Papua New Guinea (G.R. Allen)

caudal peduncle long and slender, length 22.2 and depth 9.8; pectoral fins relatively long, extending to level of interdorsal space, length 28.1; pelvic-fin length 20.6; caudal fin rounded, slightly longer than head, length 30.5.

Color of holotype when fresh. (Fig. 1) Generally pale bluish gray with brown scale outlines of variable width resulting in overall mottled-brown appearance with 4 small whitish marks on upper back, including one each at first and second dorsal-fin origins, one at base of middle rays of second dorsal fin, and one on caudal peduncle; head mainly pale gray with numerous, tiny, brown melanophores; iris gold; pearly yellowish markings on lower operculum and ventralmost portion of body; dorsal and caudal fins translucent with alternating brown and white bands on rays, most noticeable on caudal fin; anal fin narrowly translucent basally with broad area of frosty white on remainder; pelvic fins white; pectoral fins mostly translucent with brown pigmentation on rays and a broad zone of large brown melanophores on base.

Color in preservative. (Figs. 2 & 7) Holotype mostly mottled brown, except whitish on thorax, abdomen, dorsal nape, ventral surface of head, and basal portion of pectoral-fin base; 4 forward slanting bands on side of body, one each from origin of first and second dorsal fins, one below base of middle segmented dorsal-fin rays, and one saddle-like band on upper caudal peduncle; dorsal and caudal fins semi-translucent whitish with alternating brown and white bands on rays, both fins with numerous pepper-like melanophores on interradiation membranes and on caudal fin resulting in overall blackish color around outer margin, especially pronounced on lower edge; anal fin mainly semi-translucent whitish with fine pepper-like melanophores, especially concentrated on posterior portion of fin; pelvic fins semi-translucent whitish; pectoral fins semi-translucent whitish with large melanophores forming broad band on base of fin and smaller pepper-like melanophores on rays and membranes of fin.

Juvenile paratype (Fig. 7) brown on head and sides, grading to whitish ventrally with a series of 5 slightly oblique whitish saddles between nape and caudal peduncle; fins mainly translucent except caudal fin with dusky brown rays (fresh coloration similar, except saddles pale yellow rather than whitish).

Etymology. The new species is named for John (“Jack”) Moldaw Brooks, the third author’s son.

Distribution and habitat. The new species is currently known only from the type locality of Duduwali Bay 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 preference for seldom-dived, mud-bottom habitat. The specimens were collected in a sheltered bay on a mainly flat mud bottom in 30 m depth.

Remarks. Only two other species of *Gobiopsis*, *G. namnas* and *G. uranophilus*, share the absence of head barbels with *G. jackbrooksi*. Aside from their deeper-dwelling habits (collected at 79–101 m), they differ from the new species in possessing scales on the upper cheek and on the adjacent upper operculum, as well as by the other meristic and morphological features listed in Table 1. Although these three species, referred to here as the *G. namnas* species group, appear to be superficially similar, especially with regards to their lack of barbels and presence of cephalic sensory papillae arranged on fleshy ridges, their relationship to each other and to other members of the genus would require a phylogenetic analysis to resolve. The placement of these species in *Gobiopsis* is therefore considered as provisional, but is currently the best option.

TABLE 1

Salient features of the *Gobiopsis namnas* species group

Character	<i>G. jackbrooksi</i>	<i>G. namnas</i>	<i>G. uranophilus</i>
Segmented D & A rays	10	8 or 9	10
Upper cheek & operculum	naked	scaled	scaled
Head pores	present	present	absent
Longitudinal scales	31	24–26	approx. 26
Enlarged fleshy head papillae	present	present	present

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