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Description of a new species of *Istigobius* (Teleostei: Gobiidae) from Australia and Indonesia

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Abstract

Istigobius murdyi is described as a new species of gobiid fish from the continental shelf of northern Australia and Indonesia. The new species is generally similar in morphological features to other species in the genus, differing in having the anterior nasal tube just above the upper lip vs. well above the upper lip. Other distinctive features included cycloid scales on the nape, a narrow suborbital region, and a distinctive vertical black bar below the eye. The species occurs in deeper water (60–100 m) than other known species in the genus. It appears to be most closely related to *Istigobius spence*, which occurs in very shallow coastal reef environments.

Key words: taxonomy, systematics, ichthyology, coral-reef fishes, gobies, Pacific Ocean, Raja Ampat, West Papua.

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Introduction

Species of the gobiid genus *Istigobius* Whitley, 1932 are normally found over sand in depths of 1 to about 20 m. The exception is *Istigobius rigilius*, which normally occurs over sand on oceanic and clear-water offshore reefs in depths to 35 m. The present species is known from sandy areas in depths of 60 to 100 m. The species was first discovered from trawl specimens in 2007 from off the northern coast of Western Australia. The specimens were damaged and sufficient characters could not be determined to describe the species. In 2011 and 2012, two fresh specimens were collected by the junior author from the Raja Ampat Islands, West Papua Province, Indonesia.

The new species generally agrees with other species of *Istigobius* as characterized by the following combination of features: the snout overhanging the anterior margin of the jaws; the first dorsal fin with 6 spines; the chin with a small rounded bump just behind the tip of the lower jaw; a characteristic head-pore pattern with 3 preopercular pores, a median anterior interorbital pore, and a short tube above the operculum; the caudal fin with 17 segmented rays, 13–14 branched, with medial rays slightly longer than other rays, giving the caudal fin a rounded shape; the pectoral fin normally with 17–19 rays; the pelvic fins each with one spine and 5 rays, the two fins fully united to form a disc with a well-developed frenum, the medial rays the longest; all predorsal scales cycloid, body scales ctenoid; a lateral scale count of 29–38; the cheek and operculum without scales (except in *I. perspicillatus*, which has scales on the upper operculum); and the anterior-nostril opening at the end of a short tube.

Materials and Methods

Type specimens are deposited at the Museum Zoologicum Bogoriense, Cibinong, Java, Indonesia (MZB), Museum Victoria, Melbourne, Australia (NMV), and the Western Australian Museum, Perth, Australia (WAM). Comparative material examined was from the Australian Museum, Sydney, Australia (AMS).

All measurements are straight line, point-to-point measurements. All fish lengths given are mm standard length (SL), which were measured with digital calipers. All other measurements were taken with an ocular micrometer. Methods of measurement follow those of Murdy & Hoese (1985), which are generally standard, except as follows: head length = distance from the anterior tip of the upper lip to the posterior upper attachment of the opercular membrane; head depth = depth of the head at the vertical posterior margin of the preoperculum; body depth at anal origin = the vertical distance from the base of the anal-fin spine to the base of the second dorsal fin; and body depth at pelvic origin = the shortest distance between the pelvic-fin origin and the top of the nape. Measurements were only taken on the two specimens which were hand collected and not damaged; the values for the holotype are indicated with an asterisk. For meristic features, the count of the holotype is also indicated by an asterisk. The last ray in the second dorsal and anal fin as counted is branched to the base.

Cephalic sensory-canal pore terminology follows Murdy & Hoese (1985) using the position of the head pores, except that the supraorbital pore is referred to here as the postorbital pore. The pore terminology of Akihito (2002), often used by many workers, using letters, is listed in parentheses at the end of each pore description. Cyanine Blue 5R (acid blue 113) stain was used to determine positions of the sensory papillae on the head, following the method outlined by Akihito *et al.* (1993, 2002). The papillae pattern is described in reference to the orientation of each papilla to the axis of the row of papillae it belongs in. While it is not clear if the pattern is homologous with other gobioid genera, we use the terminology developed by Sanzo (1911), elaborated on by Wongrat & Miller (1991).

Comparisons for the new species were based on descriptions in Murdy & Hoese (1985) and the following comparative material:

Istigobius spence: (all from Queensland, Australia) AMS I. 19461-072, 27 (11–41 mm SL), Decapolis Reef, Queensland; AMS I.22054-003, 1 (35 mm SL), Cape Kimberley; AMS I.22070-003, 6 (30–50 mm SL), Kewara Beach; AMS I.20990-015, 4 (34–37 mm SL), Decapolis Reef; I.22701-003, 35 (27–50 mm SL), Wonga Beach.

Istigobius nigroocellatus: AMS I.20990, 2 (33–39 mm SL), Decapolis Reef, Queensland, Australia.

Istigobius murdyi, n. sp.

Murdy's Sandgoby

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Figures 1–6.

Holotype. MZB 24601 [ex WAM P.33700-003], 27.6 mm SL female, Indonesia, West Papua, Raja Ampat Islands, Misool, -2.2199°, 130.5638, 69–70 m, clove oil and hand net, M.V. Erdmann, 17 February 2012.

Paratypes. WAM P.33686-001, 29.7 mm SL female, Indonesia, West Papua, Raja Ampat Islands, Misool, -2.2184°, 130.5656, 64–65 m, clove oil and hand net, M.V. Erdmann, 1 December 2011; NMV A.29685-010, 20 mm SL, Western Australia, North West Shelf, southeast of Rowley Shoals, -18.4589°, 120.1442°, 80 m, Sherman sled, 19 June 2007; NMV A.29690-003, 2 (31–31 mm SL), Western Australia, North West Shelf, east of Rowley Shoals, -17.7683°, 120.7189°, 100m, Sherman sled, 20 June 2007.

Diagnosis. Predorsal fully scaled, scales entirely cycloid even above operculum; anterior nostril at end of short tube just above upper lip; suborbital narrow subequal to or less than pupil diameter; prepelvic area covered with large cycloid scales to below middle of operculum to posterior margin of eye; a distinct black vertical bar below eye in life; midsides of body with large rectangular dark spots.

Description. (based on 5 specimens, 20–31 mm SL [excluding smallest specimen damaged in trawl], measurements and scale counts not obtained on damaged trawl specimens; * = holotype; number of specimens in parentheses) First dorsal-fin spines VI (4)*; second dorsal-fin rays I,10 (4)*; anal-fin rays, I,9 (4)*; pectoral-fin rays; 16 (1), 17 (2)*, 18 (1); longitudinal-scale count (scales from upper pectoral-fin base insertion to end of caudal peduncle) 24 (1), 25 (1)*, with 2 scale rows above pectoral-fin base, 3 scale rows on base of caudal fin; midline predorsal-scale count 7 (1), 8 (1)*; transverse-scale count (TRB), 8 (2)*; segmented caudal-fin rays 9/8 (4)*; branched caudal-fin rays 7/6 (3), 7/7 (1)*. Head slightly depressed, length 27.9–29.7*% SL. Head depth at preopercular margin 15.2–17.4*% SL. Head width at preopercular margin 18.5–18.8*% SL. Snout rounded in dorsal view, deeply rounded in side view, extending anterior to upper lip, 6.2*–8.8% SL. Eye moderate, close to upper lip, about equal to snout, 7.4–8.3*% SL. Anterior nostril at end of short tube one nostril diameter above upper lip and about two nostril diameters below and slightly anterior to posterior nostril. Posterior nostril a large pore in contact with anterior margin of orbit. Preoperculum short, distance from end of eye to most posterior



Figure 1. *Istigobius murdyi*, live holotype, MZB 24601, 27.6 mm SL female, Misool, West Papua, Indonesia (M.V. Erdmann).

preopercular margin subequal to distance from snout to anterior margin of pupil. Postorbital moderately long, subequal to distance from tip of snout to behind eye, halfway to posterior preopercular margin. Body slender, depth at anal-fin origin 16.8–17.4*% SL; depth at pelvic-fin origin 17.8*% SL; caudal-peduncle depth 11.4*–12% SL; caudal-peduncle length 24.3*–26.6% SL. Upper jaw 8.4–9.4*% SL, ending below middle of eye to posterior end of pupil.

Teeth conical; upper jaw with outer row of teeth curved, slightly larger than teeth in inner rows and with wider gaps separating teeth, two to three rows of smaller, depressible teeth anteriorly, tapering to one row posteriorly; lower jaw with outer row slightly curved, slightly larger than teeth in inner rows, wide-set, covering anterior end of dentary only, two inner rows of smaller teeth anteriorly and one row posteriorly. Tongue tip more-or-less truncate with a shallow notch medially. Body covered with ctenoid scales, cycloid before a line from upper pectoral-fin insertion to below second dorsal-fin spine, cycloid on midline of belly, pectoral-fin base and prepelvic area. Adpressed first dorsal fin reaching to base of spine in second dorsal fin, origin above a point just behind pelvic-fin insertion. Pectoral fin with pointed posterior margin, reaching to beyond pelvic-fin tip, to above first 1–3 elements of anal fin, pectoral-fin length 25.9–30.8*% SL. Pelvic disc reaching almost to anus, pelvic-fin length 21.0*–22.6% SL. Caudal fin with rounded posterior margin, length 25.7*–30.3% SL.

Head pores (Fig. 2A): posterior nasal pore just in front and slightly above posterior nostril (B'); median anterior interorbital pore just behind anterior margin of eye (C); median posterior interorbital pore just behind posterior margin of pupil (D); postorbital (supraorbital) pore behind upper quarter of eye (E); infraorbital pore below and before postorbital pore (F), behind middle of eye; lateral-canal pore above a point just behind middle of preoperculum (G); terminal lateral-canal pore above and slightly behind posterior preopercular margin (H); a short, separate tube with pores at each end above middle of operculum (L' & K'); three preopercular pores (M', N & O'), uppermost in line with lower quarter of eye.

Head papillae (Fig 2a): pattern longitudinal, generally similar to other species of *Istigobius*, except that number of papillae appear to be fewer than in other species (Fig. 2b); a short row of papillae with axis of orientation of each papilla in line with axis of row along posteroventral margin of eye = row *a* of Wongrat & Miller (1991); a short row of papillae with axis of orientation of each papilla at right angle to axis of row on upper third of preoperculum below eye = row *b* of Wongrat & Miller (1991); a row with axis of orientation of each papilla at right angle to axis of row from near posterior nostril, following upper jaw to below posterior end of eye = row

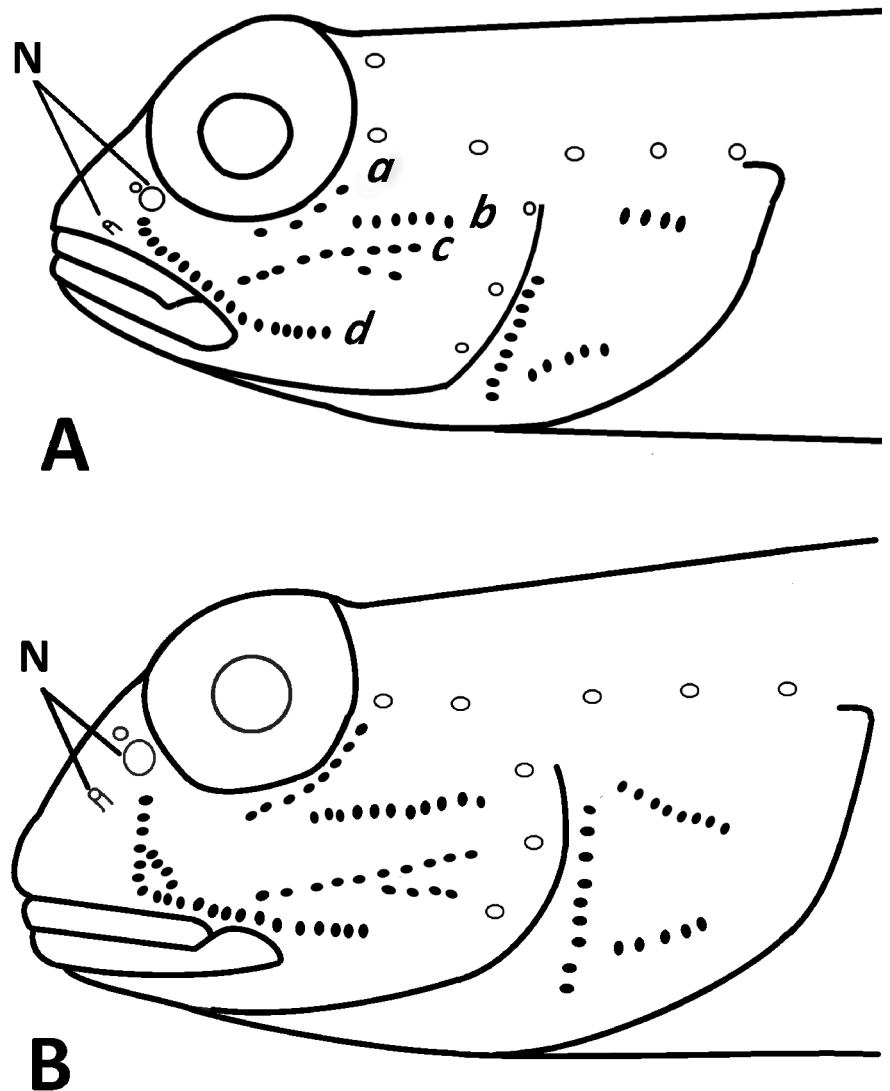


Figure 2. Position of nostrils, pores, and sensory papillae (N = nostrils, open circles = head pores, oval dark spots = sensory papillae) A: *Istigobius murdyi*, based on the Raja Ampat holotype and paratype; B: *Istigobius spence*, AMS I.22701-003, 31 mm SL (D.F. Hoese).

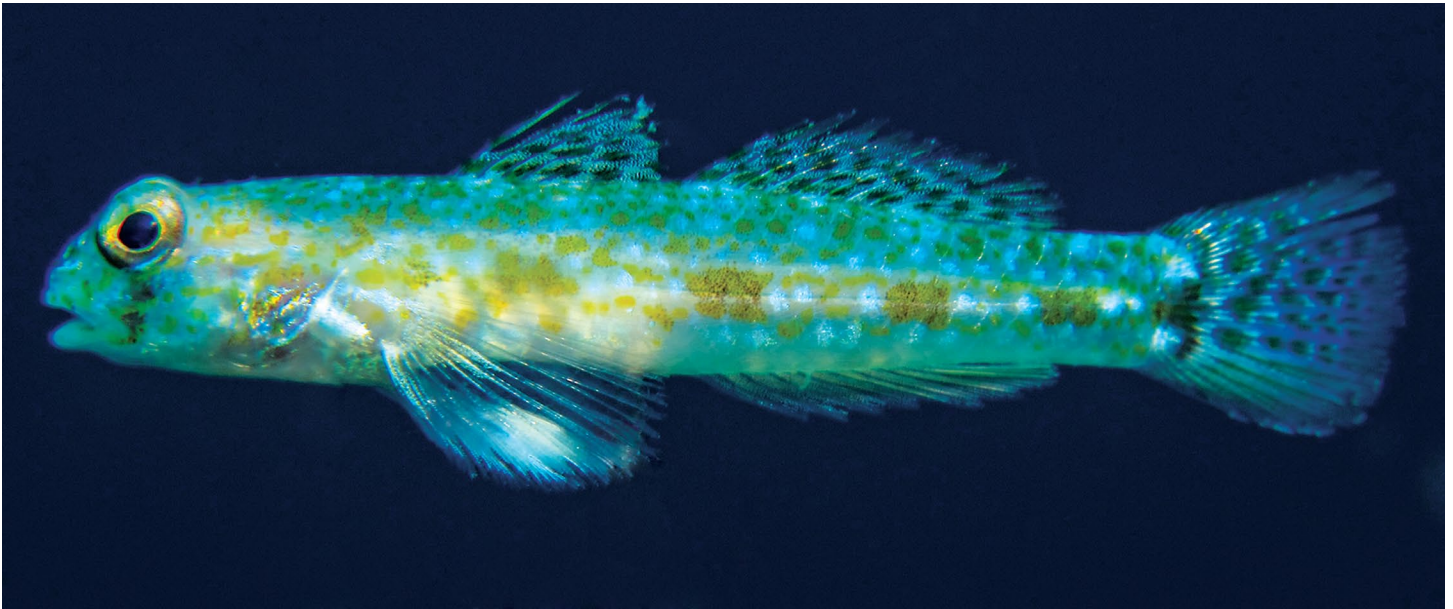


Figure 3. *Istigobius murdyi*, freshly collected holotype, MZB 24601, 27.6 mm SL female, Misool, West Papua, Indonesia (M.V. Erdmann).

d of Wongrat & Miller (1991); a short row of papillae with axis of orientation of each papilla in line with axis of row from above posterior end of upper jaw extending posteriorly and upwardly to about halfway between eye and posterior margin of preoperculum = row *c* of Wongrat & Miller (1991); a short row of 2–3 papillae below posterior part of row *c* (often referred to as row *cp* of Sanzo [1911]); chin with 2 parallel rows extending posteriorly from side of mental frenum (often referred to as row *f* of Sanzo [1911]).

Color in life. (Figs. 1 & 4) Head and body light brown. Head with a dark-brown to black bar (narrower than pupil diameter) extending from below middle of eye to posterior end of jaws; sides of head with scattered small bluish-white spots and larger irregularly shaped yellow patches. Body with a series of dark-brown rectangular spots along midside, first below middle of first dorsal fin; second below anterior part of second dorsal fin, third below middle of second dorsal fin; fourth on middle of caudal peduncle; a dark brown spot at posterior end of caudal peduncle, with curved thin upward and downward projections, or with an isolated spot above and a similar spot below behind midline spot. First dorsal fin with two rows of small dark-brown elongate spots; second dorsal fin with 3 to 5 oblique rows of similar spots; anal fin pale brown to whitish; caudal fin with larger spots in 4–6 wavy rows; pectoral-fin base with a prominent short white stripe, base of fin with a small black spot dorsally, rest of fin translucent. Shortly after collection body became more translucent and white spots more numerous (Figs. 3 & 5).



Figure 4. *Istigobius murdyi*, live paratype, WAMP.33686-001, 29.7 mm SL, Misool, West Papua, Indonesia (M.V. Erdmann).

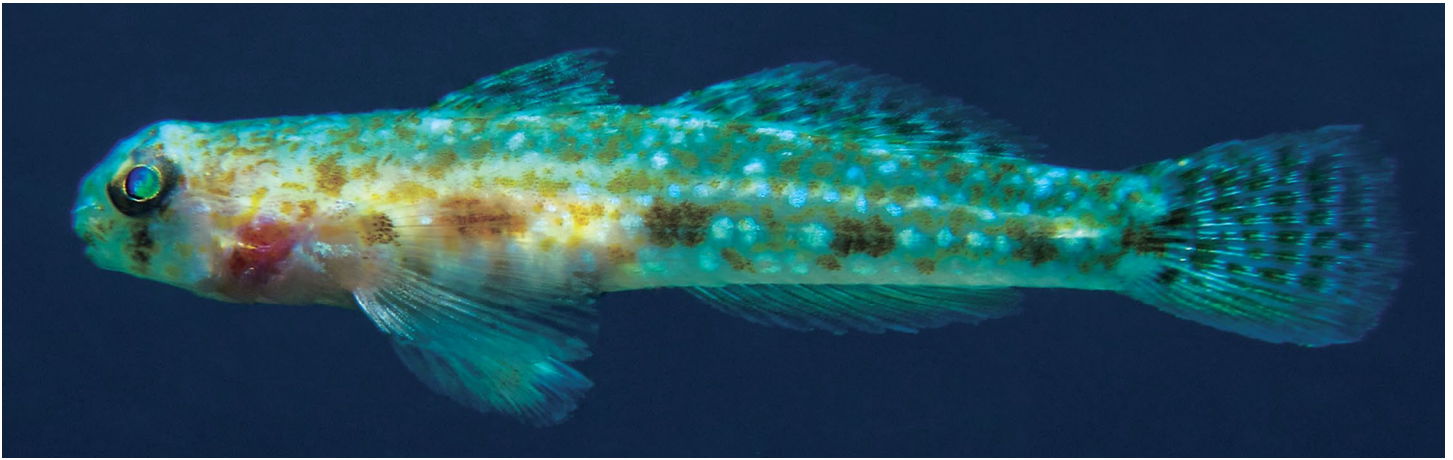


Figure 5. *Istigobius murdyi*, freshly collected paratype, WAM P.33686-001, 29.7 mm SL, Misool, West Papua, Indonesia (M.V. Erdmann).

Color in alcohol. (Fig. 6) Head and body brown. Head with distinct vertical dark-brown to black bar below eye. Elongate spots on body and spot at posterior end of caudal peduncle present, but not as distinct as in life; scattered dark-brown, irregularly shaped spots dorsally. Fins largely without pigment, except for faint small dark spots on caudal fin.

Etymology. The specific epithet is an eponym named for Ed Murdy, who pioneered research on the genus.

Distribution and habitat. The new species is known from only two localities, in the Raja Ampat Islands, West Papua Province, Indonesia and the North West Shelf of Western Australia, although it is presumably more widespread. It is found in depths of 60 to at least 100 m, and has not been seen shallower. In Raja Ampat, it was



Figure 6. *Istigobius murdyi*, preserved holotype (A), MZB 24601, 27.6 mm SL female, Misool, West Papua, Indonesia; preserved paratype (B), NMV A.29690-003, 31 mm SL, North West Shelf, Western Australia (D.F. Hoese).



Figure 7. *Istigobius spence*, freshly collected from Great Barrier Reef, Australia: A) AMS. I.19461-072, 41 mm SL; B) AMS I.22070-003, 50 mm SL (D.F. Hoese).

found on a gentle slope with a mixed sand and small coral rubble substrate, exposed to frequent currents and cold-water upwelling.

Comparisons. The new species differs from all other species in the genus in having the anterior nostril much closer to the upper lip than to the eye and the distance from the upper lip to the anterior nostril subequal to the distance between the anterior and posterior nostrils (vs. about halfway between the eye and the upper lip and closer to or equal to the distance between the anterior and posterior nostrils; see Fig. 2). *Istigobius murdyi* is most similar to *I. spence* in the anterior extent of the prepelvic scales, reaching to below the posterior margin of the eye or just behind the eye. In *I. murdyi*, the row of predorsal scales above the operculum are cycloid vs. ctenoid in *I. spence*. The sensory papillae appear to be more reduced in the new species than in *I. spence* (see Fig. 2). Lastly, The new species differs from *I. spence* in having a prominent black bar below the eye (vs. a horizontal dark bar), rectangular blotches on the midside (vs. single or paired spots, see Fig. 7), and the suborbital depth about half the eye (vs. about equal). *Istigobius spence* is widely distributed from east Africa to Australia and is normally found in coastal and near shore silty reefs on the Great Barrier Reef in depths of 1–12 m.

Acknowledgments

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References

Akihito, Sakamoto, K., Ikeda, Y. & Sugiyama, K. (2002) Gobioidi. In: Nakabo, T. (Ed.), *Fishes of Japan with pictorial keys to the species. English edition, Vol. II*. Tokai University Press, Tokyo, Japan, pp. 1139–1310.

- Akihito, Sakamoto, K., Iwata, A. & Ikeda, Y. (1993) Cephalic sensory organs of the gobioid fishes. *In*: Nakabo, T. (Ed.), *Fishes of Japan with pictorial keys to the species*. Tokai University Press, Tokyo, Japan, pp. 1088–1116.
- Murdy, E.O. & Hoese, D.F. (1985) A revision of the gobioid fish genus *Istigobius*. *Indo-Pacific Fishes*, 4, 1–41.
- Sanzo, L. (1911) Distribuzione delle papille cutanee (organi ciatiformi) e suo valore sistematico nei Gobi. *Mitteilungen aus der Zoologischen Station zu Neapel*, 20 (2), 251–328.
- Wongrat, P. & Miller, P.J. (1991) The innervation of head neuromastrows in eleotridine gobies (Teleostei: Gobioidi). *Journal of the Zoological Society of London*, 225, 27–42. <https://doi.org/10.1111/j.1469-7998.1991.tb03799.x>