

## *Platygobiopsis akihito*, New Genus and Species of Gobiid Fish from Flores, Indonesia

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**Abstract** *Platygobiopsis akihito* is described from 12 specimens 63.4–95.9 mm SL. It is most closely related to *Gobiopsis* Steindachner, based on the presence of a pair of chin barbels and two horizontal, fleshy, papillae-bearing folds on the cheek, and the absence of vertical papillae-bearing folds on the sides of the anterior half of the head. *Platygobiopsis* differs most obviously from all the species Lachner and McKinney (1978, 1979) included in *Gobiopsis* in having an exceedingly depressed head and body (both the most depressed of any gobioid), an elongate form (depth 4.5–5.8% SL), and in its dorsal- and anal-fin formulae: D. VI–I, 12, A. I, 12, which include at least one more segmented dorsal-fin ray and two more segmented anal-fin rays than is known to occur in any species of *Gobiopsis*.

During two visits to Flores, coauthor Randall had the opportunity to collect fishes in a rarely sampled habitat, a deep (between 15 and 17 m), sloping, muddy, marine bay bottom. Among the fishes obtained was a highly unusual goby, distinctive even for a group that is known for its morphological diversity. The purpose of this study is to describe that species, specimens of which look as if someone had stepped on them.

### Methods

Counts and terminology used for the cutaneous papillae and cephalic sensory pore systems generally follow those of Lachner and McKinney (1978, 1979). The spinous dorsal-fin pterygiophore formula is given according to the annotation of Birdsong et al. (1988).

The following methods differ from, or are in addition to, those provided by the cited authors.

**Scales.** Scale counts are difficult to obtain accurately because of the irregularity of the scale positions; our counts are to be considered approximate. Predorsal scales: number of scales touching an imaginary line between the dorsal-fin origin and mid-tip of snout; lateral scales: number of scales touching a line along the mid-side of the body between the pectoral-fin axil and the tip of the caudal fin; transverse scales: number of scales (scale rows) touching a diagonal line extending from the origin of the second dorsal fin to the origin of the anal fin.

Measurements (taken with needle-point dial calipers and recorded to nearest 0.1 mm). Standard length (SL): snout tip to mid-lateral caudal-fin base; head length: snout tip to posteriormost membranous margin of opercle; predorsal length: mid-tip of upper lip to dorsal-fin origin; snout length: shortest distance from snout tip to bony margin of orbit; head width: greatest width; head depth: greatest depth; postorbital length: posteriormost bony rim of orbit to posteriormost membranous margin of opercle; abdominal length: pelvic-fin origin to anal-fin origin; eye diameter: greatest horizontal bony orbital diameter; interorbital: least bony interorbital width; lower jaw: mid-tip of lower jaw to posteriormost tip of jaw; body depth: greatest body depth; body width: greatest width of body (usually occurs in area between appressed pectoral-fins); caudal peduncle length: insertion of posteriormost anal-fin ray to mid-base of caudal fin; caudal peduncle depth: least depth; pectoral fin: longest pectoral-fin ray length; pelvic fin: midpoint of line connecting bases of pelvic-fin spines (recognizable externally by a prominent bump) to mid-distalmost edge of joined fins; pelvic frenum: midpoint of line connecting bases of pelvic-fin spines to mid-distalmost edge of frenum; caudal fin: longest caudal-fin ray length. Measurements, expressed as proportions of SL, are given in Table 1.

One specimen was cleared in trypsin and counterstained with alizarin and alcian blue. Comparative osteological material was cleared and stained only with alizarin: *Gobiopsis bravoii* (Herre), USNM

216190, 2 specimens; *G. macrostoma* Steindachner, USNM 216191, 2 specimens; *G. quinquecincta* (H. M. Smith), USNM 211352, 3 specimens.

Sexual maturity was assessed by making an incision in the side of the abdomen and observing the gonads grossly. If the gonad of either sex showed little differentiation or was threadlike, or if the female gonad contained only minute eggs of uniform size, the specimen was considered immature. If the female gonad was enlarged and showed large and small eggs, the specimen was considered to be mature.

Institutional symbolic codes are those standardized by Leviton et al. (1985).

*Platygobiopsis* gen. nov.

**Diagnosis.** An elongate gobiid with greatly depressed head and body (head depth contained 2.7–3.3 times in head width; body depth contained 2.2–3.0 times in body width); dorsal fin VI–I, 12, anterior and posterior fins well separated, pterygiophore formula 3-22110; anal fin I, 12; teeth in jaws unicuspid; barbel on each side of chin symphysis, short, simple, triangular (in lateral aspect; no other prominent barbels present); anterior nostril at end of short, ventrally extending tube that just reaches

upper lip; posterior nostril without raised rim, located slightly anterior to orbit, cephalic sensory pores slit-like, comprising only supraotic, anterior otic, and unpaired anterior and posterior interorbital pores; scales cycloid anteriorly, dorsally, and ventrally on body, becoming ctenoid posterolaterally on body at point posterior to vertical from tip of appressed pectoral fin; scales irregular in size and position, becoming larger posteriorly; about 17–22 predorsal scales, about 60–70 lateral scales; about 13–16 transverse scales; pelvic-fin rays multibranching, not reaching anal opening, inner rays joined at tips, frenum well developed, tube-like, 27.6–38.6% pelvic-fin length; tongue broad, weakly emarginate.

Fleshy, papillae-bearing folds on head. Two prominent, more-or-less horizontal folds on cheek, each bearing row of coarse papillae: dorsal cheek fold extending from point well below anterior margin of orbit to about margin of preopercle; ventral cheek fold well separated from dorsal fold, paralleling oblique, upper margin of maxilla, becoming horizontal below origin of dorsal cheek fold, ending posteriorly just anterior to low preoperculomandibular fold, which begins dorsally just ventral to dorsal cheek fold and anterior to margin of preopercle, curves ventroanteriorly, and extends anteriorly along ventral side of head and lower jaw to point lateral to

Table 1. Morphometric proportions of *Platygobiopsis akihito* (expressed as thousandths of the standard length, except for pelvic frenum, which is expressed as percent of pelvic-fin length). Holotype is USNM 309181.

	BPMB 32817	NSMT-P 34720	ROM 61628	BPMB 32817	AMS-I 31467-001	USNM 309181	CAS 76005	BMNH 1991.5.7:1	USNM 309197	USNM 316643
Sex	♀	♀	♀	♂	♀	♂	♀	♂	♂	♀
Standard length (mm)	63.4	70.1	71.9	75.4	84.8	89.7	90.8	94.2	95.9	96.4
Head length	229	234	217	223	217	216	207	208	204	207
Head width	166	164	152	172	158	138	146	145	148	142
Head depth	62	56	50	64	61	44	48	44	49	42
Snout length	50	51	47	49	45	47	43	44	46	41
Orbital diameter	41	40	36	38	34	39	34	34	34	34
Postorbital length	131	141	138	133	134	129	127	131	131	129
Abdominal length	281	275	295	271	270	285	295	280	295	285
Interorbital width	32	30	36	32	28	32	30	34	32	32
Lower jaw length	74	73	72	73	61	65	68	68	64	60
Pelvic-fin	158	146	153	137	150	132	137	138	138	141
Pelvic frenum	35.0	29.8	30.1	32.0	29.4	33.8	30.6	27.6	38.6	37.5
Pectoral-fin	191	187	185	166	171	167	150	161	165	170
Caudal-fin	356	371	328	358	376	366	323	346	334	343
Body depth	55	48	58	50	47	45	58	46	54	—
Body width	125	140	136	121	128	125	129	135	122	135
Caudal peduncle depth	44	38	43	40	35	40	33	35	39	36
Caudal peduncle length	153	161	185	172	169	170	171	172	179	176
Predorsal length	290	295	281	289	290	278	273	271	272	270

chin barbel. Opercle with low vertical opercle fold anteriorly, followed posteriorly by low posteroventrally curving arching opercle fold; low horizontal opercle fold extending posteriorly from just posterior to ventral end of vertical opercle fold to ventral end of arching opercle fold. Each side of dorsal surface of head with two, very low longitudinal folds and one ventrolaterally extending fold: long lateral longitudinal fold extending posteriorly from anterior otic pore to about level of posterior margin of opercle; very short medial longitudinal fold originating just medial to supraotic pore; short, ventrolateral fold beginning at point just lateral and somewhat perpendicular to point about one-third along length of lateral longitudinal fold and ending just dorsoanterior to posterior end of dorsal cheek fold.

**Comparisons.** *Platygobiopsis* appears to be most similar, and probably most closely related, to the species currently placed in *Gobiopsis* Steindachner (1860), in having a pair of chin barbels and two horizontal, papillae-bearing, fleshy cheek folds, and in lacking vertical, papillae-bearing, fleshy cheek folds on the anterior half of the head. *Gobiopsis*, which was last defined by Lachner and McKinney (1979), has not been hypothesized cladistically as monophyletic. Although we think it probable, it is unknown whether *Platygobiopsis* will warrant recognition when the cladistic relationships of it, *Gobiopsis*, and other possibly related genera are hypothesized.

*Platygobiopsis* differs most obviously from all 13 of the species Lachner and McKinney (1978, 1979) included in *Gobiopsis* in its exceedingly depressed head and body (both the most depressed of any gobioid), its elongate form, and in having at least one more segmented ray in its dorsal-fin and two more segmented rays in its anal fin; however, Lachner and McKinney (1979) reported that one of their 19 specimens of *G. atrata* (Griffin) had 12 segmented dorsal-fin rays, the same as *Platygobiopsis*; the other 18 had 11 rays.

A complete osteological description and comparison of *Platygobiopsis* and *Gobiopsis* are beyond the scope of our study, but based on a cursory comparison of the former with three species of the latter, there are considerable differences. In *Platygobiopsis* the epioccipital has a strong, posteriorly projecting spinous process (no spinous process in *Gobiopsis*); all but the posteriormost 4 neural spines are much shorter than their respective centra (all much longer than respective centra in *Gobiopsis*), inclined poste-

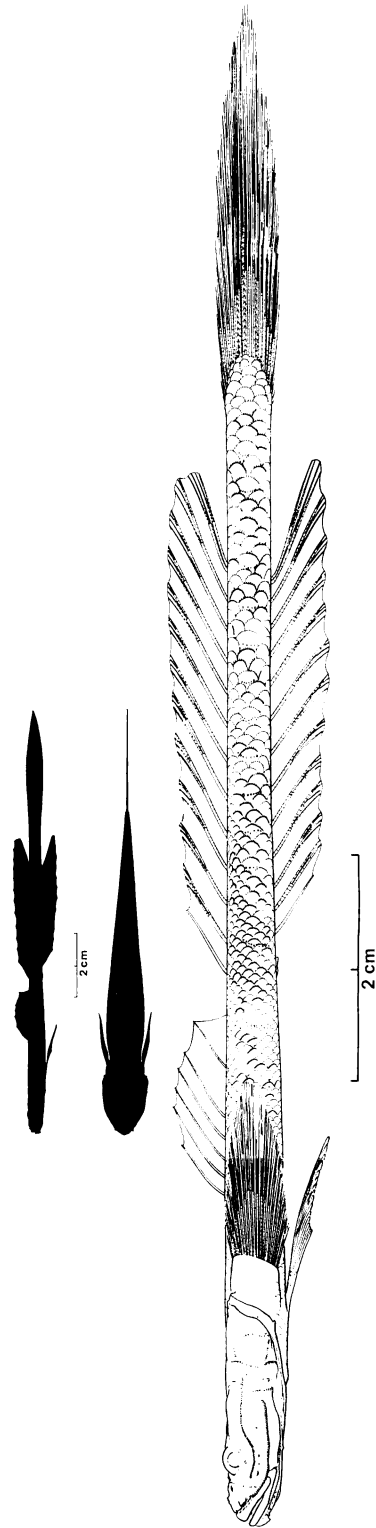


Fig. 1. *Platygobiopsis akihito*, USNM 309197, paratype, male, 95.9 mm SL (drawn by T. B. Griswold).

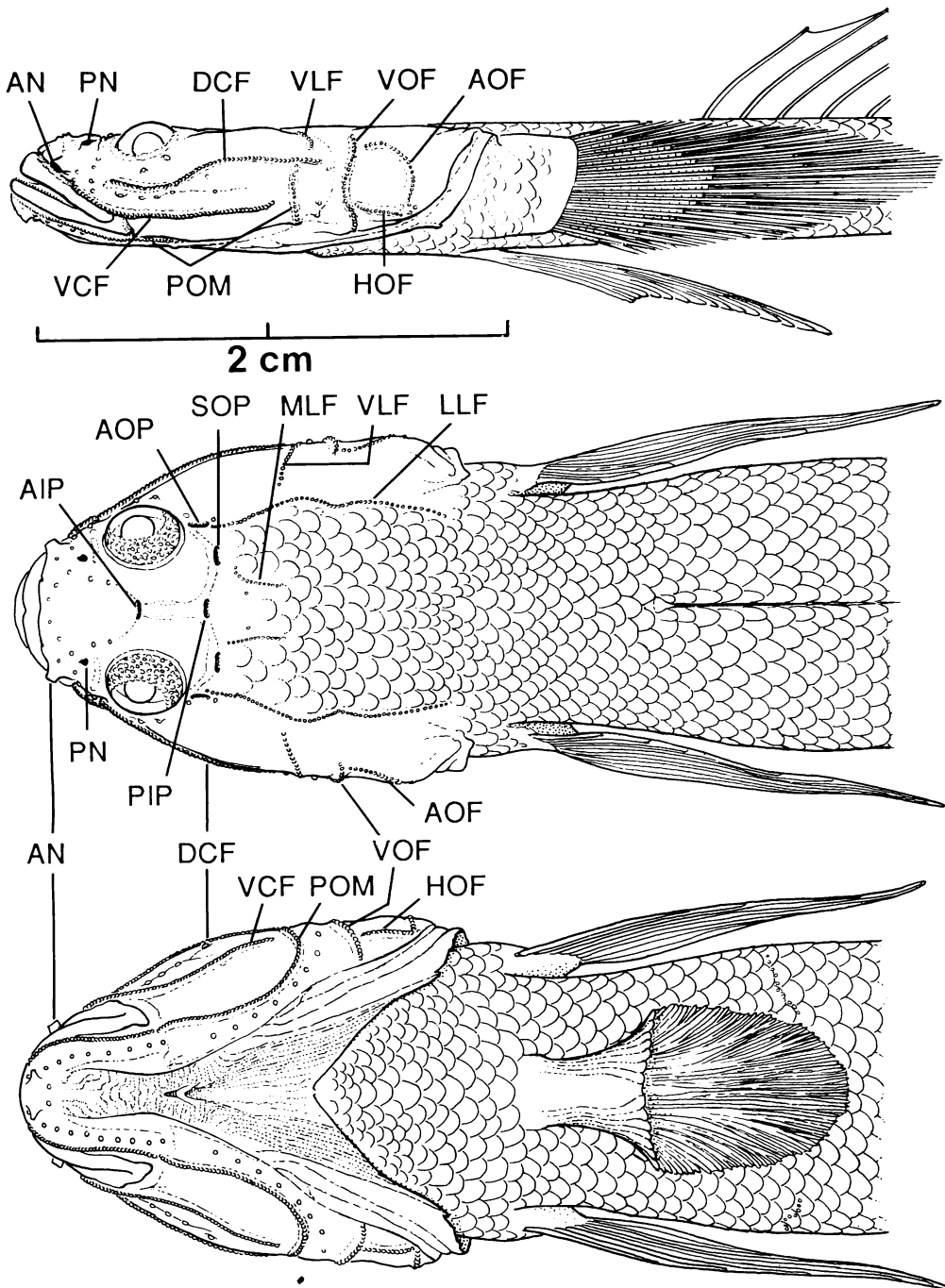


Fig. 2. *Platygobiopsis akihito*, USNM 309197, paratype, male, 95.9 mm SL. Abbreviations: AIP, anterior interorbital pore; AN, anterior nostril; AOF, arching opercle fold; AOP, anterior otic pore; DCF, dorsal cheek fold; HOF, horizontal opercle fold; LIF, lateral longitudinal fold; MLF, median longitudinal fold; PIP, posterior interorbital pore; PN, posterior nostril; POM, preoperculo-mandibular fold; SOP, supraotic pore; VCF, ventral cheek fold; VLF, ventrolateral fold; VOF, vertical opercle fold (drawn by T. B. Griswold).

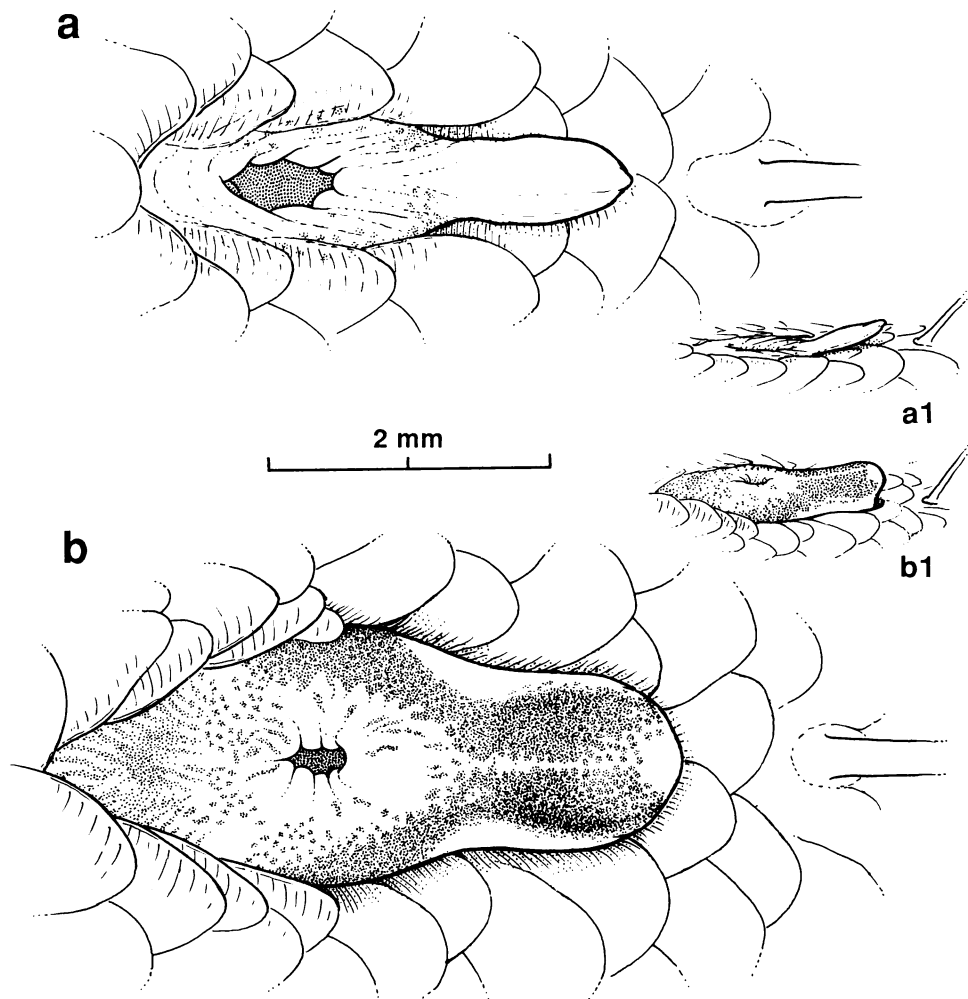


Fig. 3. *Platygobiopsis akihito*, region around anus and urogenital papilla, anal-fin spine indicated (scale refers only to a and b): a, USNM 309181 (holotype), immature male; b, USNM 316643, mature female; (drawn by T. B. Griswold).

riorly about  $80^\circ$  off vertical (versus about  $30^\circ$  off vertical in *Gobiopsis*); proximal pterygiophores of dorsal fin inclined about  $80^\circ$  off vertical (versus about  $30^\circ$  off vertical in *Gobiopsis*); basihyal relatively small, length 2.8 mm in specimen 94 mm SL (versus relatively large, e.g., length 2.8 mm in specimen of *G. macrostoma*, 43 mm SL).

**Etymology.** From the Greek “platys”, meaning flat, in reference to the distinctively flat head and body, + *Gobiopsis*, a genus of Gobiidae to which *Platygobiopsis* appears to be closely related. Gender, feminine. Type-species: *Platygobiopsis akihito* Springer and Randall.

*Platygobiopsis akihito* sp. nov.  
(Figs. 1–3)

**Holotype.** USNM 309181, immature male, 89.7 mm SL, Maumere Bay off Sao Wisata Resort, 11 km E Maumere, Flores, Indonesia, sloping mud bottom, 15–17 m, rotenone, coll. J. E. Randall, 18 Sep. 1988.

**Paratypes.** Eleven specimens, of which 9 were collected with holotype: AMS I. 31467-001, immature female, 84.8 mm SL; BMNH 1991.5.7: 1, immature male, 94.2 mm SL; BPBM 32817, immature female, 63.4 mm SL and immature male, 75.4 mm SL; CAS 76005, mature female, 90.8 mm SL; NSMT-P 34720, immature female, 70.1 mm SL; ROM

61628, immature female, 71.9 mm SL; USNM 309197, immature male, 93.9 mm SL (cleared and stained), immature male, 95.9 mm SL (Figs. 1 and 2); NTM S. 13009-001, immature male, 81.7 mm SL, and USNM 316643, mature female, 96.4 mm SL, same data as holotype, except coll. 9 Nov 1990.

**Description** (most characters given in the generic diagnosis are not repeated; number of specimens exhibiting certain character states is given in parentheses after the character; for variable character states, state in holotype, if known, is indicated by \*). Dorsal-fin rays VI-I, 12 (12), last ray split to base, counted as 1; first dorsal completely separated from second; anal-fin rays I, 12 (12), last ray split to base, counted as 1; pectoral-fin rays (both sides) 17-17 (2), 18-18 (6\*), 18-19 (1), 19-19 (2); segmented pelvic-fin rays 5 (10) (presence of vestigial pelvic-fin spine verified only in cleared-and-stained specimen); segmented caudal-fin rays 17 (12); branched caudal-fin rays 14 (1\*) or 15 (11); dorsal procurrent caudal-fin rays 5 (3), 6 (1), 7 (1); ventral procurrent caudal-fin rays 5 (2), 6 (2), 7 (1); total procurrent caudal-fin rays 10 (2), 11 (1), 13 (2); branchiostegals 5 (1); lateral scales approximately 60-70\*; predorsal scales approximately 17-22\*; first arch lower limb gill rakers (including nubs) 11 (3) or 12 (4), dorsal arch 1 (2), 2 (3), or 3 (1); gill opening deep, extending ventroanteriorly almost to ventral midline of head, continuing medially past restriction to opposite side as very low wrinkle, under which a probe cannot be inserted.

Vertebrae 10+16 (12); posteriormost pleural rib on 9th\* (10) or 10th (2) from anteriormost vertebra (present only as vestiges on 10th); posteriormost epipleural rib present on 19th\* (3), 20th (7), or 21st (2) from anteriormost vertebra.

Both lips finely fimbriate on outer edges. Upper-jaw teeth: outer row of about 15 large canines on each side, largest anteriorly, decreasing gradually in size posteriorly until smallest canine is less than half size of largest; one or two rows of tiny, fine, pointed teeth behind outer row; 3 or 4 large canines posterior to fine teeth anteriorly. Lower-jaw teeth: outer row of about 4 to 7 large canines anteriorly on each side, similar in size to those of upper jaw, followed posteriorly by up to two, possibly three, rows of tiny, fine, pointed teeth, and, anteriorly, an inner row of up to 10 large, canine teeth.

Scales on head cycloid, restricted to area posterior to orbits between low, papillae-bearing folds extending posteriorly from anterior otic pores (medial

longitudinal fold) on each side of head. Scales on breast cycloid, covering entire prepectoral region. Pectoral-fin base partially covered with very thin, cycloid scales; remainder of body, including dorsum between dorsal fins, scaled as described in generic diagnosis; scales extending onto caudal fin basally.

Aside from sensory papillae described in the generic diagnosis, there are large papillae that appear to be constant in position, but are not present in all specimens; a few large papillae anteriorly on snout and below eye; short row of papillae between dorsal and ventral papillae-bearing cheek folds; few papillae on preopercle; distinct line of 9 or 10 large papillae extending posteriorly from near chin barbel along lower jaw, followed by gap and another line of about 8 to 10 papillae extending posterodorsally up to preopercular area. Some specimens exhibit a short, double-U shaped line of fine papillae on the dorsal body scales just medial to the pectoral-fin base; there are up to 21 short, more-or-less vertical lines of fine papillae on the sides of the body; on the posterior half of the body these lines appear to be about three scales apart.

There are three short, horizontal lines of fine papillae on the interradiation membranes of the caudal fin: dorsalmost line is between 6th and 7th from dorsalmost segmented ray in all specimens, middle line is between 8th and 9th (1), 9th and 10th (9\*), or 10th and 11th (1) rays, and ventralmost line is between 10th and 11th (1), 11th and 12th (8\*), or 12th and 13th (2) rays. A few specimens have a well-developed, elongate papilla at the base of the caudal fin just ventral to the ventralmost horizontal line of papillae on the caudal fin, and another, also at the base of the caudal fin, just dorsal to the middle line of papillae. Both of these well-developed papillae may be hidden almost completely by scales.

Miscellaneous osteological information based on cleared and stained specimen. Mesopterygoids and postcleithra absent; scapulae unossified. Second through ninth centra with long (up to about 3/4 length of respective centrum), slender, bladelike transverse processes at anteriormost end of centrum; tenth vertebra with broader, bladelike transverse processes; processes on 11th-18th centra gradually decreasing in size, absent on all other centra. Neural spine of preural centrum 2 low, hemal spine long, stout. Complex urostylar vertebra with relatively short, slender hypural 5 and large, broad-based (lateral aspect) epural; ventral hypural plate autogenous. Dorsal- and anal-fin pterygiophores almost

horizontal in position. Spinous dorsal-fin pterygiophores closely appressed to vertebrae; second and fourth pterygiophores fit into anterodorsal concavity formed by neural arches of third and fourth centra, respectively. Two pterygiophores anterior to first hemal spine.

Color pattern in preservative (composite description). Overall brownish, darker dorsally and laterally, paler ventrally, palest under head; fins dusky; often with narrow, indistinct transverse band (very slightly paler than background color) crossing head posterodorsally; up to six, narrow, indistinct cross bands, slightly paler than background color, dorsally on body: anteriormost band just posterior to imaginary line through pectoral-fin axils, second band at about midlength of spinous dorsal fin, third band just posterior to second dorsal-fin origin, fourth band at about midlength of second dorsal fin, fifth band near posterior end of second dorsal fin, sixth band a small saddle at base of caudal fin. The fleshy papillae-bearing folds on the head are almost black.

**Habitat notes.** *Platygobiopsis akihito* appears to reside in large vertical burrows, probably excavated by a crustacean (a large crab and a large stomatopod were noted to make such burrows in the area), in a deep, sloping muddy bottom. All the specimens of the goby were found adjacent to these burrows, and one was seen exiting a burrow from the effect of the rotenone used in collecting. The type collections were made in an area about 200 m from the mouth of a stream, which only trickles in the dry season, but becomes a small river in the rainy season. During the dry season, the site is not brackish and visibility is about 10 m, but visibility is markedly limited if the mud is disturbed. Fishes seen or obtained with rotenone at the stations where *P. akihito* occurs include: juvenile *Apogon* sp. (Apogonidae); *Arnoglossus*, cf. *aspilos* and unidentified flatfish (Bothidae); *Acanthocephala* sp. (Cepolidae); *Oxymetopon cyanotenosus* and *O.* sp., *Yongeichthys criniger*, two undescribed *Priolepis* species, and several unidentified gobiids (Gobiidae); *Gymnothorax* sp., *Strophidon sathete*, and new genus and species of muraenid (Muraenidae); juvenile *Nemipterus* sp. (Nemipteridae); *Muraenichthys* sp., and *Yirrkala* sp. (Ophichthidae); *Amblypomacentrus breviceps* (Pomacentridae).

**Etymology.** In honor of Emperor Akihito of Japan, in recognition of his contributions to our knowledge of the classification of the gobioid fishes; here used as a noun in apposition.

**Comment.** During the course of our study we were shown specimens of a new species of gobioid from Japan that appears to be congeneric with *P. akihito*. The Japanese species exhibits numerous differences from *P. akihito*; most notably, it has no head pores, lacks scales on the pectoral-fin base, and the scales on top of the head reach anteriorly only to a transverse line at about the mid-length of the opercles.

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インドネシアのフローレスから得られた新属新種のハゼ科魚類 *Platygobiopsis akihito*

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体長 63.4-95.9 mm の 12 尾の標本をもとに *Platygobiopsis akihito* を記載した。本属は頤に 1 対のひげがあること、孔器列を伴う肉質の 2 列の横列皮褶が頬にあること、頭部側面前半に孔器列を伴う縦列皮褶がないことで *Gobiopsis* Steindachner と最も近縁である。本属は Lachner and McKinney (1978, 1979) が *Gobiopsis* に含めた種類とはいかなるハゼ科魚類と比較しても頭と体が極端に縦扁していること、伸長した体形(体高は体長の 4.5-5.8%)、第 2 背鰭と臀鰭がそれぞれ 1, 12 で、少なくとも背鰭で一本以上、臀鰭で二本以上の分節軟条を有する点で明らかに異なる。