

## *Gymnochanda ploegi*, a new species of ambassid glassperch from West Kalimantan, Indonesia

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**Abstract.** A spectacularly coloured sexually dimorphic freshwater glassfish allied to *Gymnochanda verae* is described herein. It shares with its other congeners a body without scales, but differing from its congeners with males having a maroon-red first dorsal fin, expanded maroon-red anal and second dorsal fins with black distal portions, without any individual fin ray elongations free from the interradial fin membranes; head with reddish opercle cover. A key to the genus *Gymnochanda* is also provided.

**Key words.** Taxonomy, new species, *Gymnochanda*, sexual dimorphism, Southeast Asia

### INTRODUCTION

Currently there are four species of *Gymnochanda* known — *G. filamentosa* Fraser-Brunner (1955), *G. flamea* Roberts (1994), *G. limi* Kottelat (1995) and *G. verae* Tan & Lim (2011). All of these are minute glassfishes, not growing larger than 22 to 32 mm SL (Tan & Lim, 2011). Very little is known about the biology of this taxon, but it seems that it is restricted to brown to black water habitats in open areas, adjacent to peat and freshwater swamp forests (Roberts, 1994; Tan & Kottelat, 2009).

Members of the genus *Gymnochanda* are completely scaleless and exhibits transparency throughout the whole body except the silvery peritoneum lining the abdominal cavity. These members also exhibit extreme sexual dimorphism, the males having elongated second dorsal and anal fin rays, either filamentous and free from the interradial fin-membrane (viz. *G. filamentosa* and *G. flamea*) or extended fin rays that are continuous with the fin membrane (viz. *G. verae* and new species described herein). For the case of *G. limi* where only one specimen is currently known, it is most probably sexually dimorphic but awaits confirmation once a larger series of specimens becomes available (see Kottelat, 1995 for more details). All females lack the dorsal and anal-fin ray elongations or extensions. Members of *Gymnochanda* also exhibit sexual dichromatism, with males showing brighter fin colours (white and/or red colours), whereas females are mainly colourless or with faded colouration.

Collections from West Kalimantan had yielded *Gymnochanda* previously (see Roberts, 1989 and Kottelat & Widjarnati, 2005). However, these had been identified as *G. filamentosa*, as there was filamentous second dorsal-fin and anal-fin rays developed in the males. For definitive identification of these reported populations, it would be imperative to obtain living or fresh material to take into account life colouration; as it seems that colour is an important character for species differentiation in *Gymnochanda*.

Recently, a spectacularly coloured sexually dimorphic *Gymnochanda* closely allied to *G. verae* (Fig. 2A) became available through the ornamental fish trade. It was initially identified as *G. verae*, but on closer examination we noticed differences in colour pattern and body proportions. Kottelat & Widjarnati (2005) also reported *Gymnochanda* cf. *flamea* from West Kalimantan but could not definitively identify it (M Kottelat, pers. comm.). This taxon is most probably the same as the one being described herein.

### MATERIAL AND METHODS

Specimens examined are deposited in the Research and Development Centre for Biology, The Indonesian Institute of Sciences (LIPI, formerly the Museum Zoologicum Bogoriense), Cibinong, Indonesia (MZB); Zoological Reference Collection of the Lee Kong Chian Natural History Museum, National University of Singapore, Singapore (ZRC); and the collection of Maurice Kottelat in Delémont, Switzerland (CMK).

The nomenclature for head serrations follows that of Fraser-Brunner (1955). All measurements are made from point to point with a pair of dial calipers (up to 0.05 mm). Specimens obtained were euthanized in accordance to Institutional Animal Care and Use Committee, National University of Singapore. Euthanized specimens were fixed in formalin solution and subsequently stored in ethanol.

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## TAXONOMY

*Gymnochanda* Fraser-Brunner, 1955

A redefinition of the genus is provided by Tan & Lim (2011) to take into account the non-filamentous dorsal and anal-fin rays of male *G. verae* and applies to the present new species.

Key to the species of *Gymnochanda*

(based on a series of mature male specimens, either living or freshly dead; with the exception of *G. limi* where only one specimen is currently known)

1. Modification and elongation of second dorsal and/or anal fin rays into free filaments (up to three times SL).....2
- 1\*. Elongation and expansion of second dorsal and anal fin rays continuous with interradial fin membrane (not exceeding caudal fin tip) .....4
2. Extension and elongation of both second dorsal and anal fin rays; more than 2 preorbital ridge serrae; more than 3 supraorbital serrae.....3
- 2\*. Extension and elongation of only the second anal spine (reaching end of anal fin); 2 preorbital ridge serrae; 3 supraorbital serrae; recorded from Central Sumatra.....  
..... *Gymnochanda limi* Kottelat, 1995
3. Adult size up to 32 mm SL; filamentous rays light red to white; second spine of first dorsal fin up to 2.5 times of first spine; hyaline first dorsal fin; white pelvic fins; 3 preorbital serrae; 8 supraorbital serrae; recorded from Peninsular Malaysia, Central Sumatra and West Kalimantan.....  
..... *Gymnochanda filamentosa* Fraser-Brunner, 1955
- 3\*. Adult size up to 22 mm SL; filamentous rays bright red; body suffused with red pigments; second spine of first dorsal fin up to 3 times of first spine; reddish first dorsal fin; red pelvic fins; 4 preorbital serrae; 5 supraorbital serrae; recorded from Central Kalimantan .....  
..... *Gymnochanda flamea* Roberts, 1994
4. Caudal fin lobes with red tips; elongated dorsal and anal fin profile triangular; deeper body (body depth at anus 35.3-40.0 % SL); 3 preorbital ridge serrae; 7 supraorbital serrae; recorded from Belitung Island .....  
..... *Gymnochanda verae* Tan & Lim, 2011
- 4\*. Caudal fin suffused with light red; elongated dorsal and anal fin profile crescentic; less deep body (body depth at anus 30.1-33.8 % SL); 4 preorbital ridge serrae; 12 supraorbital serrae; recorded from West Kalimantan.....  
..... *Gymnochanda ploegi*, new species

***Gymnochanda ploegi*, new species**  
(Figs. 1A, B, 2B, C, 3, 4A, B)

*Gymnochanda* cf. *flamea* – Kottelat & Widjarnati, 2005: 164.

**Material examined.** Holotype: MZB 17220, (male) 25.9 mm SL; West Kalimantan: Sanggau area; local collector, 12 August 2014. Paratypes: MZB 17221, 1 ex. (female), 26.0 mm SL; same locality as holotype. — ZRC 54552, 24 ex. (8 males, 16 females), CMK 25256, 6 ex. (3 males, 3 females), 21.3–27.5 mm SL; same locality as holotype; local collector, 12 August 2014. — CMK 10234, 1 ex.; West Kalimantan: Kapuas Lakes area: Nanga Semunak, dry season location (0°56'37"N 112°05'31"E); M Kottelat, 8 September 1993.

**Diagnosis.** *Gymnochanda ploegi* can be differentiated from its congeners by the following characters: mature males with pinkish body with the dorsal half suffused with reddish pigments, expanded anal and second dorsal fins, the soft rays of both fins expanded to reach  $\frac{2}{3}$  of caudal fin forming a crescentic profile, without any individual fin ray free from the interradial fin membrane; anterior part to whole of both anal and second dorsal fins maroon red in life, with posterior portion of distal rays black forming a crescentic pattern (hyaline when preserved); whole caudal fin lightly suffused with red in life (hyaline when preserved); female with yellowish body suffused with reddish pigments without any fin elongation (hyaline when preserved), both dorsal fins suffused with reddish pigments (hyaline when preserved).

**Description.** See Table 1 for morphometric data for holotype and nine paratype specimens. Body compressed, relatively deep, roughly elongate ovoid with a pointed head, deepest at second dorsal-fin origin. Dorsum of head to pre-dorsal-fin with a slanted slope, forming a slight hump at region before first dorsal-fin origin. The first dorsal-fin base with a slight concave profile, then a convex profile at second dorsal-fin origin and base. Ventrals with a convex profile peaking at anal-fin origin. Body tapering to its narrowest at the caudal peduncle. No scales present. Lateral line indistinct.

Terminally positioned mouth small and slightly upturned, lower jaw included when closed. Teeth in upper jaw in a single row laterally and in 2 rows near symphysis, in a narrow band in lower jaw. Gill rakers long and slender, 12 on lower branch of first branchial arch.

Preorbital ridge with 4 strong, backward oriented serrae. Preorbital margin with up to 6 strong serrae. Preoperculum with 8 serrae along its lower edge and up to 9 blunt serrae along its posterior vertical margin. Supraorbital ridge with up to 12 low serrae. Interorbital, suborbital, operculum, suboperculum and interoperculum entire. See Fig. 3 for more details on serration distribution on the head.

First dorsal-fin origin just posterior to pelvic-fin origin, which is about halfway of pectoral-fin base. First dorsal fin relatively tall, adpressed fin touching branched ray 3 or 4 of second dorsal-fin. Second dorsal-fin origin just posterior to anal-fin origin, which is at about position of first dorsal-fin spine 6. Pelvic fin with 1 spine and 5 branched rays; pelvic fin short, adpressed fin not touching anal-fin origin. Pectoral fin with 12 rays. Caudal fin with 9+9 principal rays.

Male: First dorsal fin with 7 spines, second spine longest (more than twice length of first spine), third spine about  $\frac{3}{4}$  of second spine, spines 6 and 7 much reduced. Second dorsal fin with 1 spine and 11 branched rays, continuous with first dorsal fin by a very low membrane, spine about same length as third spine of first dorsal fin; branched ray 4 to 6 longest, adpressed fin reaching middle of caudal fin. Anal fin with 3 spines and 11 branched rays, branched ray 4 to 6 longest, adpressed fin reaching middle of caudal

Table 1. Morphometric data of *Gymnochanda ploegi*, new species.

Catalogue number	MZB 17220	ZRC 54552 (n=9)	Mean (SD, n=10)
Standard length (mm)	25.9	23.9–27.5	
<b>In percentage of standard length</b>			
Total length	123.6	121.8–127.0	125.0 (±1.4)
Trunk length	69.9	65.8–70.5	68.0 (±1.7)
Predorsal length	41.3	40.4–42.3	41.3 (±0.6)
Pre-second dorsal-fin length	58.3	54.5–61.1	59.2 (±1.8)
Preanal length	53.3	52.4–60.4	55.2 (±2.1)
Head length	34.4	32.0–36.5	33.7 (±1.4)
Body depth at dorsal-fin origin	32.8	30.1–33.8	31.8 (±1.2)
Caudal peduncle depth	10.8	10.0–11.1	10.5 (±0.3)
Dorsal-fin base length	49.8	48.4–52.2	49.9 (±1.3)
Anal-fin base length	35.1	34.5–37.3	35.6 (±0.9)
Postorbital length	11.2	11.9–13.5	12.4 (±0.6)
Snout length	9.1	7.0–9.3	8.5 (±0.6)
Orbit diameter	11.6	10.4–11.6	11.0 (±0.4)
Interorbital width	8.9	8.7–10.0	9.1 (±0.4)
<b>In percentage of head length</b>			
Postorbital length	32.6	33.7–40.7	37.0 (±2.6)
Snout length	32.6	27.3–35.2	31.6 (±2.4)
Orbit diameter	33.7	29.8–34.9	32.7 (±1.6)
Interorbital width	25.8	25.0–31.2	27.0 (±1.6)

fin. Extended dorsal and anal fin lateral profile having a crescentic shape. The shape of air bladder is different from female, deeper posterior section, reaching base (see Fig. 4A for a schematic representation).

Female: First dorsal fin with 7 spines, second spine longest (more than twice of first spine), third spine about  $\frac{3}{4}$  of second spine, spines 6 and 7 much reduced. Second dorsal fin with 1 spine and 11 branched rays, continuous with first dorsal fin by a very low membrane, spine about same length as anterior half of branched rays. Anal fin with 3 spines and 11 branched rays, spines about same length as anterior half of branched rays. The shape of air bladder is different from male, less deep posterior section, not reaching base (see Fig. 4B for a schematic representation).

Total vertebral count  $9 + 16 = 25$  (n=12). Largest specimen recorded 27.5 mm SL (male).

**Life colouration.** See Figs. 2B, C. Male: Head with red and black pigments concentrated around lips and snout. Eye with black pigments on dorsal margin. Region above and posterior to eye with gold colour. Opercular region suffused with red, partly due to translucent opercle cover showing the gills. Body translucent pink suffused with tiny yellow and red chromatophores, posterior half of body with up to 14 thin complete or interrupted black bars; with dorsal and anal-fin processes visible, main vertebral column discernible, hypural plate also visible; large translucent air bladder visible directly above abdominal cavity, which is covered with a silvery peritoneum lining. First dorsal fin mainly hyaline, with distinct red and black pigments. Second dorsal

fin with basal interradial fin membranes suffused with red pigment, posterior half of branched fin-rays and interradial fin membrane maroon red, distal part of posterior rays with thick (up to half of ray length) black margin. Anal fin anterior with black pigments, basal interradial fin membranes suffused with red pigment, posterior half of branched fin-rays and interradial fin membrane maroon red, distal part of posterior rays with black margin. Caudal fin suffused with faint red pigments. Pelvic and pectoral fins hyaline.

Female: colouration as above, except dorsal, caudal and anal fins are suffused with faint red pigments, with hyaline pelvic and pectoral fins.

**Preserved colouration.** See Fig. 1. Both male and female: no strong colours retained, region above and posterior to eye with black blotch, body an opaque white, with scattered black pigments, very faint black bars visible on body, and slight orange on body dorsum, and slight orange on both dorsal fins, anal and caudal fin bases.

**Distribution.** *Gymnochanda ploegi* is currently known from the Sanggau and Kapuas Lakes regions in West Kalimantan (Fig. 5).

**Habitat notes.** As its congeners, this species inhabits still water pools near swamp forest and riverine systems. Apparently, this is the first import for the ornamental fish trade (August 2014) and it took the collectors more than three hours to trek to the site (A Meng pers. comm.). In the Kapuas Lakes region, *G. ploegi* could be sympatric with *G. filamentosa*; but they were not collected in the same sample





Fig. 1. *Gymnochanda ploegi*: A, MZB 17220, 25.9 mm SL male holotype (note: anal fin is damaged); B, MZB 17221, 26.0 mm SL female paratype.

from fish traps in a swampy area with brown water (M. Kottelat pers. comm.).

**Etymology.** This species is named in memory of Alex Ploeg, a good friend, fellow taxonomist, advisor and fellow conservationist against alien aquatic species; for his services to the ornamental fish trade in this region and abroad in his role as the Secretary General of the Ornamental Fish International; who unfortunately perished in a terrible tragedy over Ukraine on 17 July 2014.

**Remarks.** From its congeners, the adult male *Gymnochanda ploegi* is easily distinguished in having long and broad anal and second dorsal fins without individual fin-ray extensions beyond the fin membrane; a character shared with *G. verae*

(see Fig. 2). In comparison, the males of both *G. filamentosa* and *G. flamea* have highly elongated (up to three times body length) free fin-ray extensions on the anal and second dorsal fins. *Gymnochanda limi*, however, has short fins without elongated rays, but a very long second anal-fin spine, which is unique to this species.

*Gymnochanda ploegi* can be further distinguished from *G. verae* (see Fig. 2) in having a more slender body profile (body depth at anus 30.1–33.8, vs. 35.3–40.0% SL), with reddish opercle cover (vs. absence), lack of intense red pigments on caudal fin (vs. marked red areas on both upper and lower caudal fin lobes); deeper air bladder with posterior end reaching base (vs. less deep air bladder with posterior section not reaching base; see Fig. 4C for schematic diagram); shorter



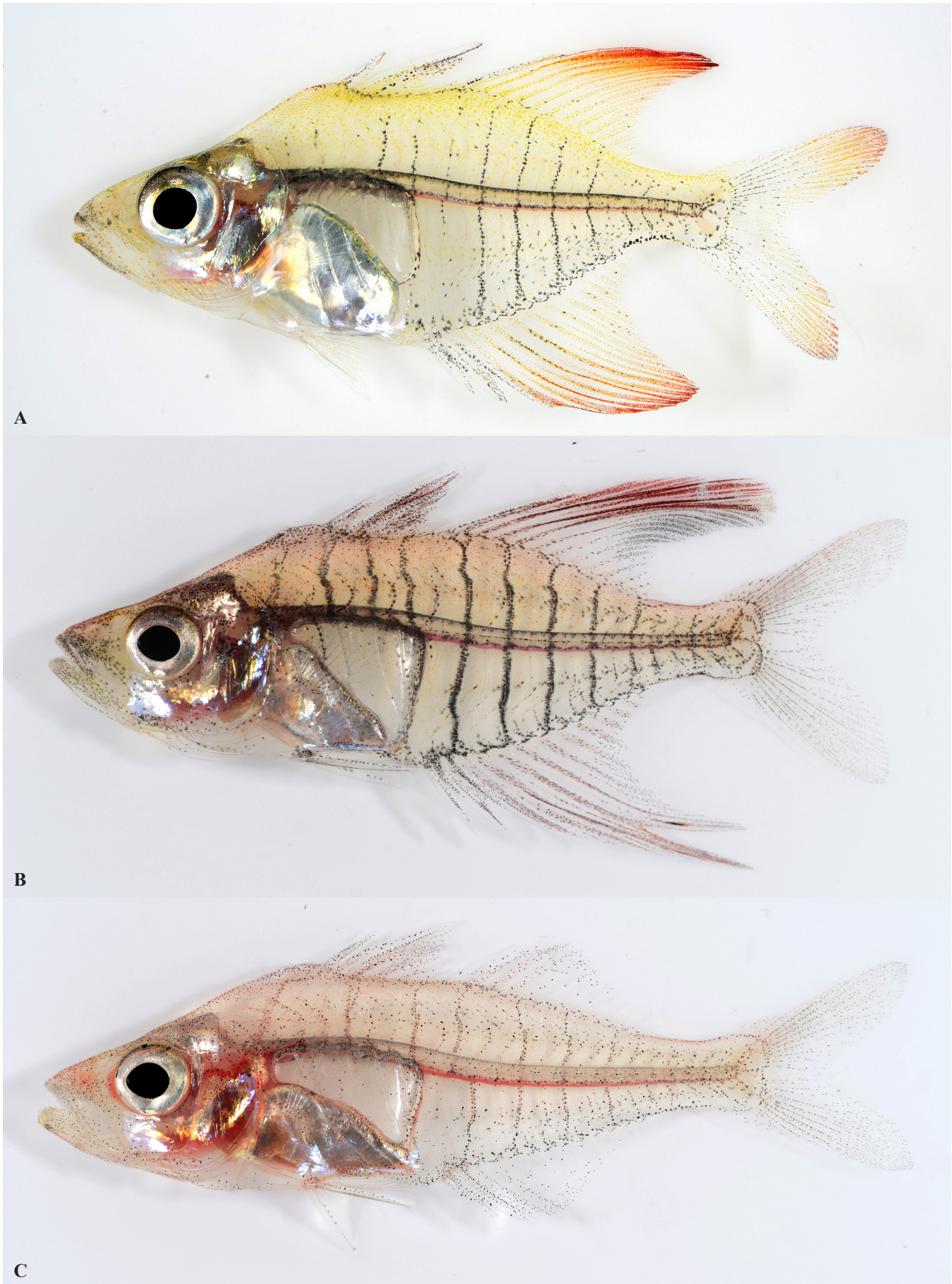


Fig. 2. A, *Gymnochanda verae* – ZRC 53122, 22.3 mm SL male paratype, freshly dead specimen; B, *Gymnochanda ploegi* – MZB 17220, 25.9 mm SL male holotype, freshly dead specimen (note: anal fin is damaged); C, *Gymnochanda ploegi* – MZB 17221, 26.0 mm SL female paratype, freshly dead specimen.

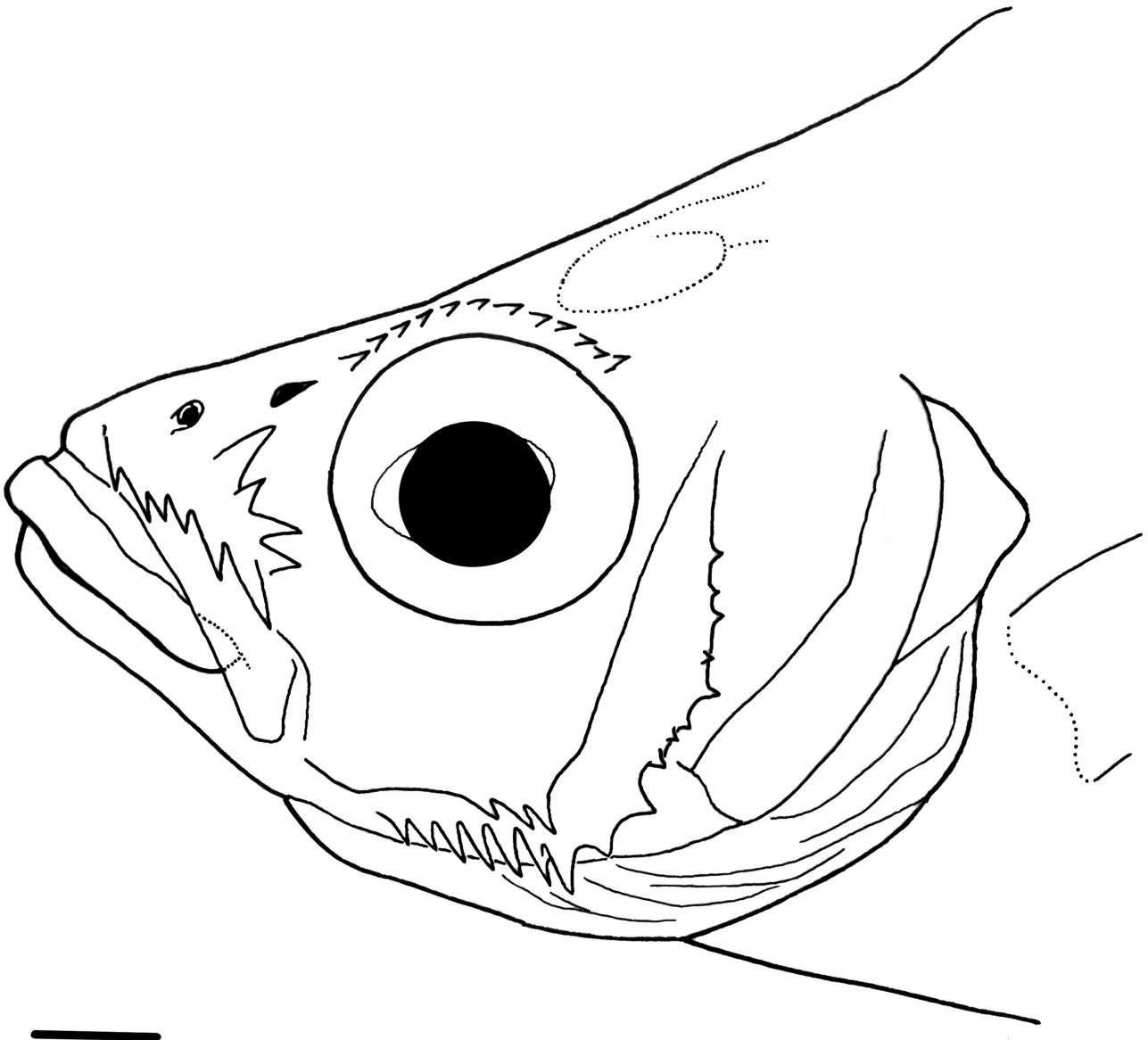


Fig. 3. *Gymnochanda ploegi* – line drawing of head, MZB 17220, 25.9 mm SL male holotype, showing serrations (scale bar = 1 mm) (Artwork by Kelvin Lim).

predorsal distance (40.4–42.3, vs. 44.7–47.9 % SL), shorter anal-fin base (34.5–37.3, vs. 37.4–41.6% SL), shorter snout (7.0–9.3, vs. 10.6–13.1% SL) and smaller orbital diameter (10.4–11.6, vs. 12.8–15.9% SL; 25.0–31.2, vs. 36.1–42.5% HL). The female *G. ploegi*, in contrast is rather similar in appearance to the females of *G. filamentosa*, *G. flamea* and *G. verae*.

*Gymnochanda ploegi* also differs from its congeners in having more serrae on its head: supraorbital ridge with 12 serrae (vs. 3 in *G. limi*, 5 in *G. flamea*, 7 in *G. verae* and 8 in *G. filamentosa*), preorbital ridge with 4 serrae (vs. 2 in *G. limi* and 3 in both *G. filamentosa* and *G. verae*); hind margin of preopercle with up to 9 serrae (vs. 1 in *G. flamea*, 5 in

*G. filamentosa* and 6 in *G. limi*); preopercular ridge with 3 serrae (vs. 1 in *G. limi*). *Gymnochanda ploegi* possess less serrae on the preopercular ridge (3, vs. 2–4 in *G. filamentosa*, 5 in *G. flamea* and 7 in *G. verae*). Information on head serrations on *G. filamentosa* from Fraser-Brunner (1954: 210) and Boeseman (1957: 76), on *G. limi* from Kottelat (1995: 56) and on both *G. flammea* and *G. verae* from Tan & Lim (2011:56, 58).

**Comparative material.** *Gymnochanda flamea* – ZRC 54518, 27 ex., 13.6–22.1 mm SL; Indonesia, Central Kalimantan: Kahayan basin, Rungan River; P. Yap, 23 June 2014. See Kottelat & Widjarnati (2005), Tan & Kottelat (2009) and Tan & Lim (2011) for a list of comparative material.

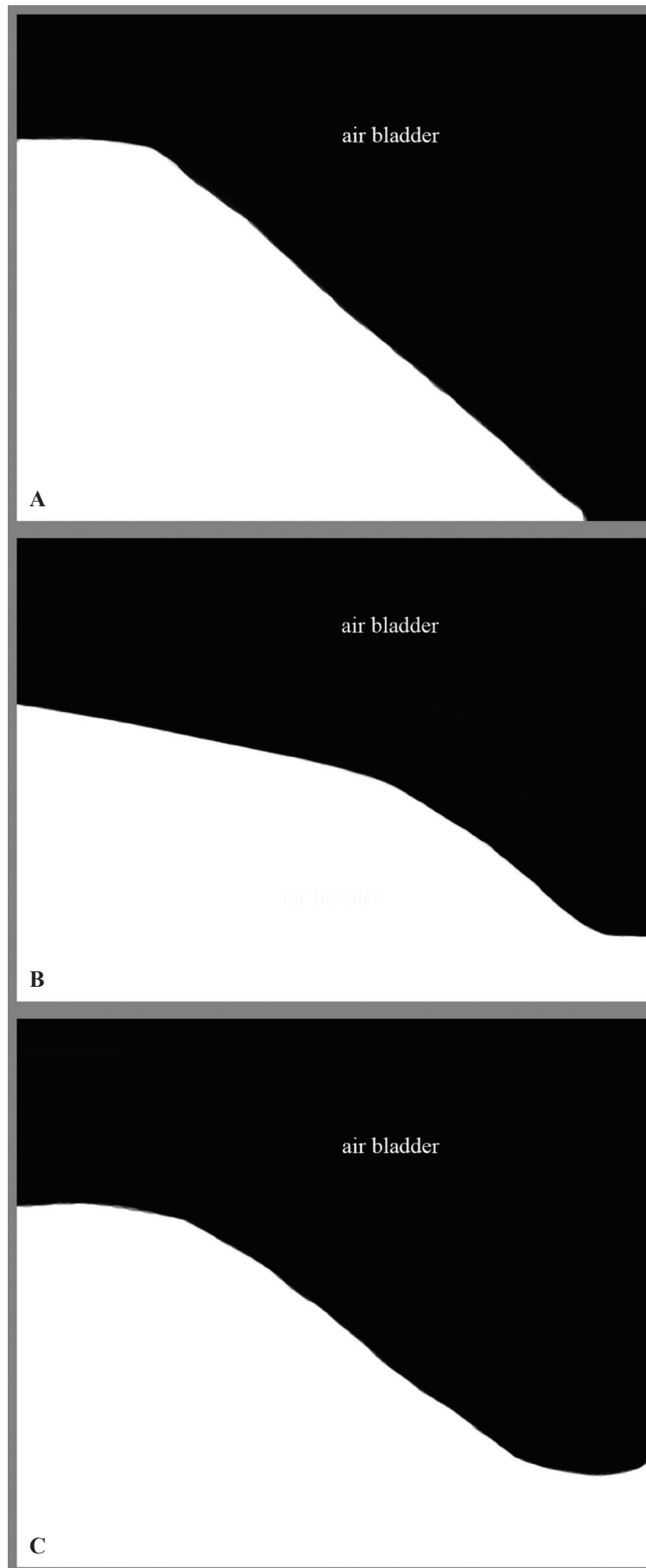


Fig. 4. Schematic diagram showing air bladder shapes of: A, *Gymnochanda ploegi* male; B, *G. ploegi* female; C, *G. verae* male (based on specimens depicted in Fig. 2).



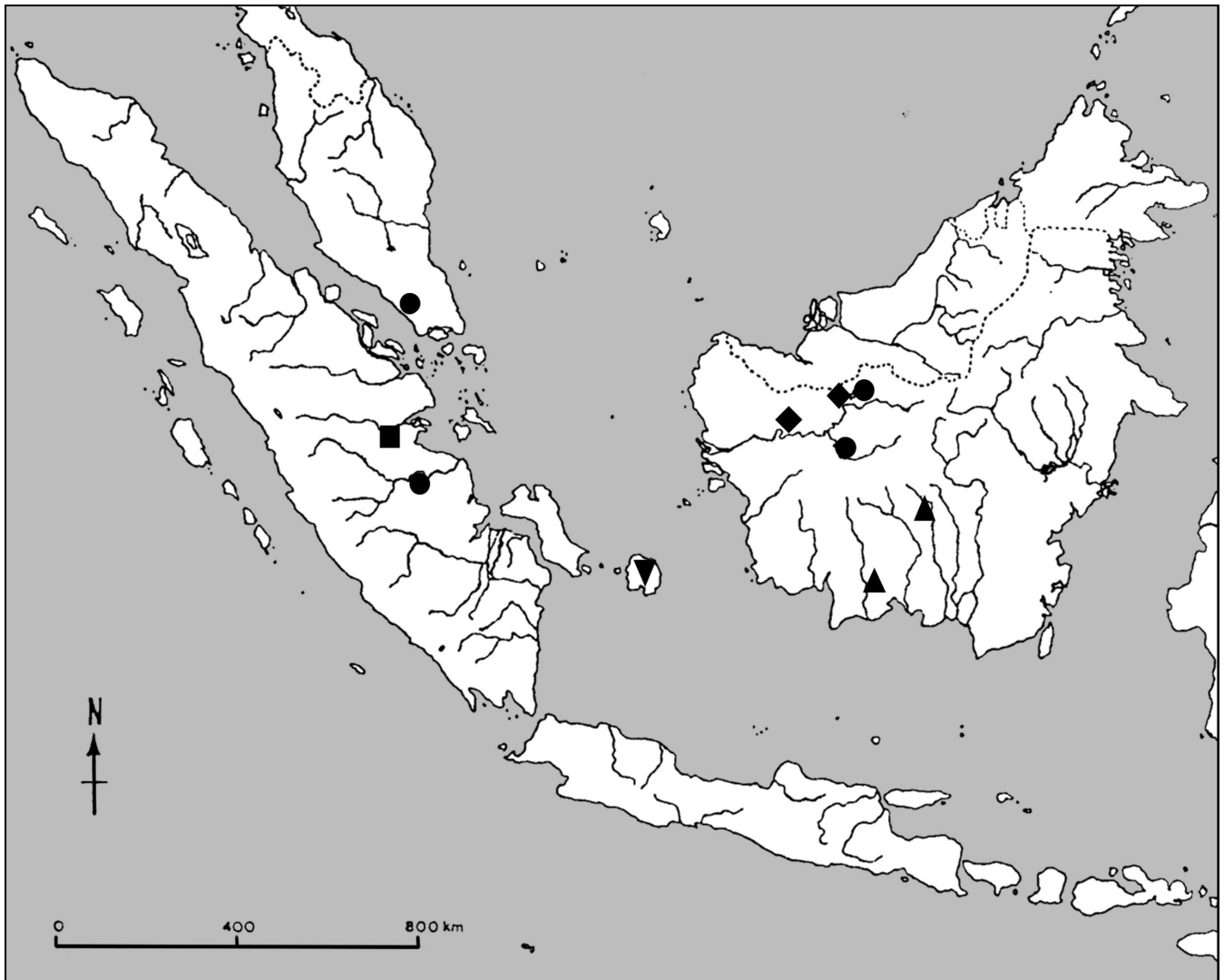


Fig. 5. Map of Sundaland showing distribution of *Gymnochanda*: round = *G. filamentosa*; triangle = *G. flamea*; square = *G. limi*; inverted triangle = *G. verae*; and diamond = *G. ploegi*.

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