

## *Pseudomugil ivantsoffi* (Pseudomugilidae), a new species of blue-eye from the Timika region, Irian Jaya

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Accepted: 19.11.1999

### Keywords

*Pseudomugil*, blue-eye, freshwater species, Pseudomugilidae, Irian Jaya, Indonesia

### Abstract

*Pseudomugil ivantsoffi*, a new species of blue-eye, is described on the basis of 60 specimens, 17.9-30.8 mm SL, collected from the Timika vicinity of southern Irian Jaya. The new species was formerly confused with *P. reticulatus*, which occurs in the vicinity of Lake Ayamaru on the Vogelkop Peninsula of Irian Jaya. The differences between these two species are contrasted and illustrations of each are provided.

### Zusammenfassung

*Pseudomugil ivantsoffi*, eine neue Art (17.9 - 30.8 mm SL) der Blau-Augen aus der Umgebung von Timika (südliches Irian Jaya) wird anhand von 60 Exemplaren, 17.9-30.8 mm SL, beschrieben. Bisher wurde sie mit *P. reticulatus* verwechselt, die im Bereich des Ayamaru Sees auf der Vogelkop Halbinsel in Irian Jaya vorkommt. Der Unterschied zwischen diesen beiden Spezies wird in erarbeiteten Vergleichen und Illustrationen dargestellt.

### Résumé

*Pseudomugil ivantsoffi*, une nouvelle espèce d'œil bleu est décrite à partir de 60 spécimens, de 17,9 à 30,8 mm de SL, saisis dans la région Timika au sud de l'Irian Jaya (Nouvelle Guinée). Les nouvelles espèces étaient autrefois confondues avec *P. reticulatus*, que l'on rencontre près du lac Ayamaru de la péninsule Vogelkop de l'Irian Jaya. Les différences entre ces deux espèces sont mises en évidence et des illustrations de chacune d'elles sont proposées.

### Sommario

Una nuova specie, *Pseudomugil ivantsoffi*, dagli occhi blu viene descritta sulla base di 60 esemplari, 17,9 - 30,8 mm SL, raccolti nelle vicinanze di Timika, Irian Jaya meridionale. La nuova specie veniva in precedenza confusa con il *P. reticulatus*, che si trova nelle

vicinanze del Lago Ayamaru sulla penisola di Vogelkop in Irian Jaya. Le differenze tra queste due specie sono contrapposte e forniamo illustrazioni di entrambe.

### Introduction

Blue-eyes (family Pseudomugilidae) are tiny fishes that inhabit fresh and brackish waters of Australia and New Guinea, including some of the larger offshore islands formerly connected to the mainland (e.g. Aru Islands, Waigeo, Batanta, and Misool). The family was reviewed in detail by Saeed *et al.* (1989) and Allen (1995) provided a popular account with illustrations of the known species. Controversy still exists as to whether blue-eyes should be regarded as a subfamily of Melanotaeniidae (Dyer and Chernoff 1996) or in a family of their own (Ivantsoff *et al.* 1997).

The present paper describes a new species collected in the Timika region of Irian Jaya during survey work with the Environmental Laboratory of Freeport Mining Company. It was first identified as *P. reticulatus* Allen and Ivantsoff, a species that was originally described from a single specimen collected near Lake Ayamaru in the central Vogelkop Peninsula of Irian Jaya (Ivantsoff *et al.* 1997). However, recent collections near the type locality of *P. reticulatus*, which lies some 900 km northwest of Timika, revealed that the two populations are distinctive.

### Methods

Methods of counting and measuring follow those of Saeed *et al.* (1989). Measurements and counts for the holotype and 27 paratypes of *P. ivantsoffi* n. sp. are presented in Table I. Measurements are expressed as proportions of the standard length (SL), head length, and eye diameter. Counts of second dorsal and anal rays do not include spinous elements (never present in the second dorsal of this species). The following abbreviations are used in the table: Pec. L: length of pectoral fin; H max: greatest body depth; width max: greatest body width; H min: least body depth; Pec-anus: distance between dorsal origin of pectoral and anus; Sn: vertical through tip of snout from where

following measurements are taken: Sn-OD1: snout and origin of first dorsal fin; Sn-OD2: snout and origin of second dorsal fin; Sn-OV: snout and origin of pelvic fin; Sn-TV: snout and tips of pelvic fins; Sn-OA: snout and origin of anal fin; Sn-TA: snout and origin of last anal ray. Premax. Process: dorsal process of premaxilla. The values listed under "other attributes" refer to the position of the fins and/or anus relative to each other and are expressed as the number of scales in front (+) or behind (-) each other.

Type specimens are deposited at the Museum Zoologicum Bogoriense, Bogor, Indonesia (MZB) and the Western Australian Museum, Perth (WAM).

### *Pseudomugil ivantsoffi* n. sp.

Ivantsoff's Blue-eye (Figs. 2-3)

*Pseudomugil reticulatus* (non Allen and Ivantsoff, 1986) Ivantsoff, *et al.* 1997: 55 (figs. 2a-b).

**Holotype:** MZB 10120, 27.5 mm SL, tributary of Kopi River about 1km E of Tembagapura Road (40°25'S 136°56.44'E) and Mile 39 Camp of Freeport Mining Company, seine net, G. Allen and D. Norris, 2 August 1995.

**Paratypes:** MZB 10121, 15 specimens, 19.4-30.8 mm SL, collected with holotype; WAM P.31051-003, 2 specimens, 20.7-27.7 mm SL, tributary of Aikwa River, 15 km northwest of Timika near townsite of Kuala Kencana, seine net, G. Allen and D. Norris, 1 August 1995; WAM P.31052-004, 4 specimens, 17.9-22.4 mm SL, tributary of Iweka River, 15 km northwest of Timika near townsite of Kuala Kencana, seine net, G. Allen and S. Renyaan, 1 August 1995; WAM P.31055-004, 14 specimens, 19.2-28.4 mm SL, collected with holotype; WAM P.31057-004, 23 specimens, 19.3-27.7 mm SL, tributary of Iweka River about 15 km northwest of Timika near Kuala Kencana townsite (approximately 4°24'S, 136°49'E), rotenone,



Fig. 1. Map of Irian Jaya showing collecting site.

G. Allen and D. Norris, 3 August 1995; WAM P.31298-003, 1 specimen, 22.4 mm SL, small tributary on north side of Freeport levee across Aikwa River (4°40.14'S, 136°56.72'E), rotenone, G. Allen, 24 April 1997.

### Description

For meristics and morphometrics see Table I. Small, laterally compressed fish, presently not known to exceed 31 mm SL. Mouth subvertical and small, but not greatly restricted by labial ligament. Lower jaw protruding slightly beyond premaxilla. Both jaws oblique. Teeth numerous on jaws near symphysis, small and pointed. Lateral premaxillary teeth larger, hooked, pointed and distinctly noticeable. Premaxilla notched and thus narrow in mid region. Dorsal process of premaxilla relatively long (Table I) and spatulate. Anterior half of maxilla wide, narrowing to less than half width in distal half. Free edge of dentary elevated obliquely distally, anterior half with pungent villiform teeth. Other bones in mouth edentulous. Pelvic girdle attached to 3rd, 4th, or 5th rib. Principal caudal rays mostly 8+7. Gill rakers on lower gill arch 8-10, shorter than diameter of pupil, sometimes leaf-like in shape. Spines in first dorsal fin usually 4-7, rarely less. Second dorsal fin rays 7-10. Anal fin one spine and 9-13 rays. Vertebral count 30-33. Transverse scale rows 6-7, predorsal scales count 11-14, midlateral scales 27-30. Body scales cycloid, dorsoventrally elongated, circuli complete and obvious. Pointed axillary scale at lateral origin of ventral fins. Small scales covering preopercle and two large scales on dorsum of head. Sensory pits on dorsum of head large. Origin of first dorsal fin always behind vertical through tips of ventrals; origin of ventrals usually in front of vertical through tips of pelvic fins; origin of pelvic fins in front of vertical through pectoral tips. Spine present in anal fin. Sexual dimorphism obvious, first three spines of first dorsal fin of males often extended as filaments, pelvic fins extending beyond origin of anal fin. Dorsal and ventral fins of female shorter.

A detailed, illustrated description of the osteology of this species was presented by Ivantsoff *et al.* (1997).

### Coloration

**Colour in life:** Head and body of males semitransparent, often with bluish hue; opercle, abdomen and swim bladder region silvery; upper half of first dorsal and anterior half of second dorsal fins, and edge of anal fin bright red; dorsal and ventral contour posterior to second dorsal and anal fins edged with similar red; upper and lower third of caudal fin also red; head with reddish suffusion; pelvic fins pink. Iris of eye intensely blue; edges of some scales on abdomen with narrow black margins. Females overall semitransparent, lacking bright red shades of male; opercle, abdomen and swim bladder region silvery; some scales on anterior half of body with faint, fine black

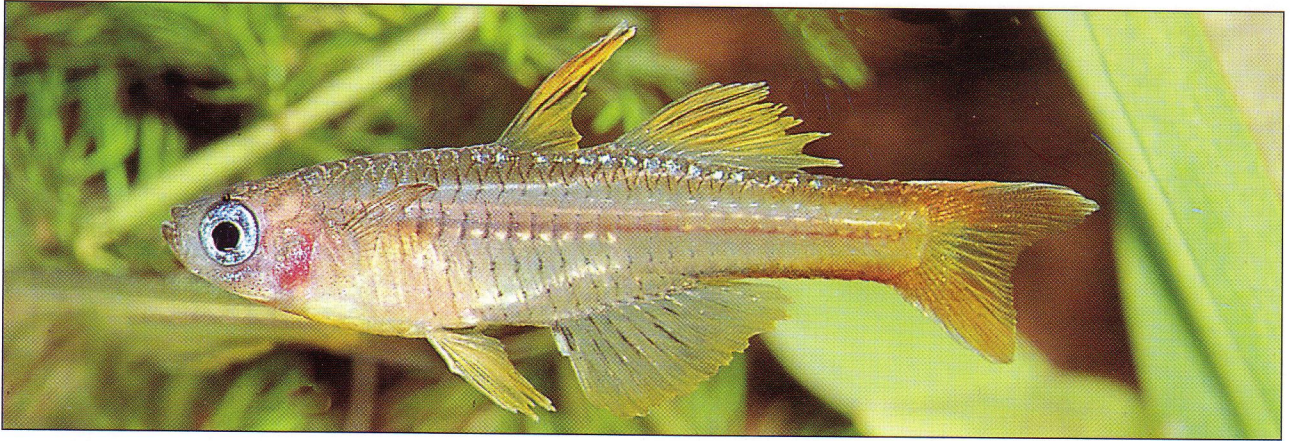


Fig. 2. *Pseudomugil ivantsoffi*, male, approximately 30 mm SL, vicinity of Timika, Irian Jaya, photographed alive in an aquarium.

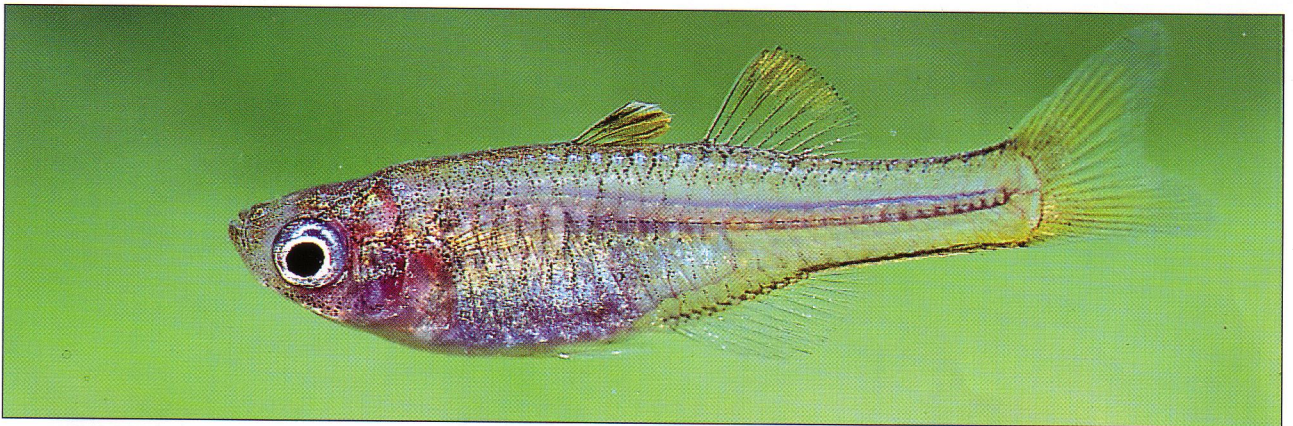


Fig. 3. *Pseudomugil ivantsoffi*, female, approximately 22 mm SL, vicinity of Timika, Irian Jaya, photographed alive in an aquarium.

margins; fins mainly translucent to faintly yellowish, the outer tips of the first and second dorsal fins yellow.

**Colour in alcohol:** Body colour yellow brown; edges of scales outlined with chromatophores; fins whitish to translucent, the edges of rays and spines peppered with chromatophores.

#### Habitat

When first collected in July-August 1995 this species was common in several small creeks in the area now occupied by the Kuala Kencana housing development of Freeport Mining Company and along the road linking Freeport's Mile 39 camp and the Kopi River. The habitat (Fig. 4) consisted of small (1-2 m wide), shallow, slow-flowing streams in dense rainforest at an altitude of approximately 100-150 m above mean sea level. Water clarity was excellent, but some streams were tannin stained, and aquatic vegetation was generally sparse. Bottom conditions included sand, gravel, cobble, and rocks. Water temperature and pH values ranged from 24- 28°C and pH 6.7-7.8 respectively. Other fishes collected from this habitat included

*Pseudomugil pellucidus*, *Melanotaenia goldiei*, *M. ogilbyi*, *Craterocephalus randi*, *Neosilurus brevidorsalis*, *Ambassis agrammus*, *Glossamia sandei*, *Glossogobius concavifrons*, *Bostrichthys strigogenys*, *Mogurnda cingulata*, *Oxyeleotris fimbriata*, and *O. nullipora*.

The same species and habitat conditions were encountered in January 1997, but by the following year, after a prolonged *El Niño*-related drought, the two species of *Pseudomugil*, as well as the melanotaeniid *Melanotaenia ogilbyi*, could not be found in any of the former areas, and this condition continues to persist at the time of writing (July 1999). The Kuala Kencana housing development and recent forest destruction near the Kopi river sites may well have caused the local extinction of these species. However, they no doubt will continue to survive in primary forest to the immediate east and west of the Timika region.

A single paratype (WAM P.31298-001) was collected in 1997 from a sago-*Pandanus* swamp at an elevation of 5-10 m, approximately 20-25 km upstream from the Aikwa estuary or about 15 km south of Timika.

**Table I.** Measurements and counts of type specimens of *P. ivantsoffi* (see Methods for explanation).

Character	Holotype	Paratypes		
		Mean	SD	Range
Standard length (mm)	27.5			19.3-30.7
<b>In SL</b>				
Head	4.2	3.7	0.2	3.2-4.3
Pec. L.	6.3	5.9	0.48	5.1-7.4
H. max	3.9	3.9	0.19	3.5-4.3
Width max	8.0	6.8	0.51	5.9-8.4
H min	8.3	7.5	0.49	6.4-9.1
Pec-anus	3.5	4.0	0.36	3.3-4.9
Sn-OD1	2.2	2.2	0.08	2.0-2.3
Sn-OD2	1.6	1.6	0.04	1.5-1.7
Sn-OV	2.8	2.4	0.11	2.2-2.6
Sn-TV	1.8	1.8	0.05	1.6-1.9
Sn-OA	1.9	1.8	0.05	1.7-1.9
Sn-TA	1.4	1.3	0.04	1.3-1.9
<b>In Head</b>				
Eye	2.7	2.8	0.22	2.4-3.2
Interorbital	2.6	2.7	0.14	2.3-3.1
Postorbital	2.5	2.2	0.53	2.2-2.7
Caudal peduncle length	0.9	1.0	0.60	0.9-1.2
<b>In Eye</b>				
Snout	2.2	1.8	0.25	1.4-2.2
Premaxilla	1.6	1.4	0.40	1.1-1.8
Premaxillary process	2.4	3.7	0.90	2.2-5.6
<b>Meristics</b>				
Midlateral scales	28	28.7	0.70	27-30
Transverse scale rows	6	6.4	0.46	6-7
Predorsal scales	11	11.9	0.73	11-14
Interdorsal scales	2	3.0	0.73	2-4
Vertebral count	32	32.1	0.79	30-33
First dorsal fin spines	4	5.4	0.72	4-7
Second dorsal fin rays	8	8.0	0.60	7-10
Anal fin rays	10	11.1	0.85	9-13
Pectoral fin rays	11	10.2	0.56	9-11
Lower arch gill rakers	10	9.2	0.81	8-11
<b>Other Attributes</b>				
Anus to OA	+2	+2.6	0.76	+1.5-4.0
OD1 to TV	+4	+2.7	0.80	+2.5
OD1 to Pec base	-2	-1.2	0.71	-0.5 to-2.0
OV to Pec base	+3	+1.2	0.79	+0.0-3.5

**Etymology**

Named *ivantsoffi* in honour of Walter Ivantsoff, of Macquarie University, Sydney, Australia, in recognition of his valuable contributions to our knowledge of atherinoid taxonomy.

**Remarks**

This fish was initially identified as *P. reticulatus* Allen

and Ivantsoff, based on the close resemblance of females from the Timika area to the single known example of that species. In view of the poor knowledge of *P. reticulatus*, Ivantsoff *et al.* (1997) utilised the Timika specimens for their redescription of the species, including a detailed osteological analysis. Subsequently, in May 1999, the present authors had an opportunity to sample streams in the vicinity of



5.



6.

**Fig. 4.** A small creek near Timika, habitat of *Pseudomugil ivantsoffi*.

**Fig. 5.** *Pseudomugil reticulatus*, male, approximately 30 mm SL, vicinity of Lake Ayamaru, Irian Jaya, photographed alive in an aquarium.

**Fig. 6.** *Pseudomugil reticulatus*, female, approximately 22 mm SL, vicinity of Lake Ayamaru, Irian Jaya, photographed alive in an aquarium. Note: see also page 168 for photos of *P. reticulatus* and habitat.



*Pseudomugil reticulatus*, adult male. Photographed in an aquarium 1 month after coll. by H. Bleher. Photo by Dieter Bork



*Pseudomugil reticulatus*, adult female. Photographed in an aquarium 1 month after coll. by H. Bleher. Photo by Dieter Bork



*Melanotaenia boesemani*, semi-adult male, photographed and coll. at the type locality of *Pseudomugil reticulatus*. Both species live in nature sympatric around Ayamaru Lake, Irian Jaya, Indonesia. Photo taken in nature by H. Bleher

Lake Ayamaru, very close to the type locality of *P. reticulatus*. A total of 15 additional specimens (WAM P.31568-001) were procured and the senior author observed numerous individuals in the natural habitat with a mask and snorkel. It was immediately obvious that *P. reticulatus* from the Ayamaru Lakes region of the Vogelkop Peninsula and the fish previously collected from the Timika area were distinct species.

Males are particularly well distinguished on the basis of live colour pattern and shape (compare Figs. 2 and 3 with Figs. 5 and 6). Males of *P. ivantsoffi* are more slender and characterised by a tall first dorsal fin that greatly overlaps the second dorsal fin when folded against the body. By contrast, the first dorsal fin of *P. reticulatus* is very low, falling well short of the second

dorsal fin. Moreover, the body scales of *P. ivantsoffi* are faintly outlined with dark pigment, in contrast to the bold network pattern of *P. reticulatus*. The difference between females is less obvious, but those of *P. ivantsoffi* have more pigmentation on the outer part of the first and second dorsal fins (Fig. 3). Moreover, *P. reticulatus* has a significantly greater number of dorsal and anal fin rays. The following counts were recorded for the 15 specimens (number of specimens in parentheses): second dorsal rays - 6 (1, obviously an aberrant count), 9 (11), 10 (3), mean count for all specimens = 9.0 (compared with 8.0 (28) for *P. ivantsoffi*); anal rays - 12 (4), 13 (8), 14 (3), mean count for all specimens = 12.9. (compared with 11.1 for *P. ivantsoffi*).

Further osteological studies will provide additional differences to distinguish these two species of blue-eyes.

### Acknowledgements

We are very grateful for the support of our respective institutions, the Western Australian Museum and Universitas Cenderawasih, and especially to the Indonesian Institute of Sciences (LIPI), for sponsoring our studies of the freshwater fishes of Irian Jaya. The National Geographic Society, Washington, DC, generously provided grant funds for our field investigations. We also thank Freeport Indonesia Company for providing funds and logistic support for the 1995 and 1997 collecting visits. Collections were assisted by David Norris and Kent Hortle of Freeport.

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