Ecologica Montenegrina
ISSN 2336-0744 (online) | ISSN 2337-0173 (print)

Ecologica Montenegrina 24: 11-16 (2019)
This journal is available online at: www.biotaxa.org/em

Article

Linking a gap, First record of dusky-gilled mudskipper *Periophthalmus variabilis* Eggert, 1935 (Perciformes: Gobiidae) in southern Sumatra, Indonesia

ARUM SETIAWAN[1], MUHAMMAD IQBAL[2*], BELA PRISCILLIA[3], PORMANSYAH[4], DONI SETIAWAN[1], INDRA YUSTIAN[1]

[1]Department of Biology, Faculty of Science, Sriwijaya University, Jalan Raya Palembang-Prabumulih km 32, Indralaya, Sumatera Selatan 30662, Indonesia.
[2]Biology Program, Faculty of Science, Sriwijaya University, Jalan Padang Selasa 524, Palembang, Sumatera Selatan 30129, Indonesia.
[3]Community of Conservation, Faculty of Science, Sriwijaya University, Jalan Raya Palembang-Prabumulih km 32, Indralaya, Sumatera Selatan 30662, Indonesia.
[4]Conservation Biology Program, Faculty of Science, Sriwijaya University, Jalan Padang Selasa 524, Palembang, Sumatera Selatan 30129, Indonesia.
**Corresponding author: Muhammad Iqbal, E-mail: kpbsos26@yahoo.com*

Received 20 September 2019 | Accepted by *V. Pešić*: 30 October 2019 | Published online 8 November 2019.

Abstract
An individual of *Periophthalmus variabilis* was preserved and examined on August 11, 2018, collected from the Sugihan estuary, South Sumatra Province, Indonesia. This specimen represents the first record of *P. variabilis* in mainland of southern Sumatra, and provides additional information on its currently known distribution.

Key words: Perciformes, Gobiidae, *Periophthalmus variabilis*, Sumatra, wetland, estuary, distribution.

Introduction

Most of Indonesia's fish species found in mangrove habitats are widely distributed throughout the central Indo-west Pacific region, including mudskippers (Tomascik *et al.* 1997). The mudskippers or oxudercine gobies (Gobiidae: Oxudercinae) are restricted to soft bottom intertidal areas and mangrove swamps of the Indo-west Pacific, except for one species (Atlantic mudskipper, *Periophthalmus barbarus* (Linnaeus, 1766)) in tropical west Africa (Murdy1989; Takita *et al.* 1999; Polgar & Khaironizam 2008). Ten mudskipper genera are recognized (Murdy1989); and of these four genera, namely *Boleophthalmus*, *Periophthalmodon*, *Periophthalmus* and *Scartelaos*, conspicuously emerge out of water to display, forage and defend territories during low tide (Clayton 1993).

The mudskipper genus *Periophthalmus* Bloch & Schneider, 1801 is represented by 19 species: *Periophthalmus argentilineatus*, *P. barbarus*, *P. chrysospilos*, *P. darwini*, *P. gracilis*, *P. kalolo*, *P. magnuspinnatus*, *P. malaccensis*, *P. minutus*, *P. modestus*, *P. novaeguineaensis*, *P. novemradiatus*, *P.*

pusing, *P. spilotus*, *P. takita*, *P. variabilis*, *P. walailakae*, *P. waltoni*, and *P. weberi* (Murdy & Jaafar 2017). The species *Periophthalmus variabilis* has been considered a valid after re-examination of specimens of *P. novemradiatus* by Jaafar *et al.* (2009). This species occurs in Vietnam, Thailand, Malaysia, Singapore and Indonesia (Jaafar *et al.* 2009; Tran *et al.* 2013). Records of *P. variabilis* in Sumatra are very limited and based on only two verified records (Eggert 1935; Jaafar *et al.* 2009). The presence of *P. variabilis* in Sugihan estuary represents the first record of this species for southern Sumatra.

Methods

One specimen of *P. variabilis* was caught with hand net on 11 August 2018 in Sugihan estuary (02°55'41.8"S; 104°45'51.6"E), Banyuasin District, South Sumatra Province, Indonesia (Figs 1, 2). This specimen was preserved in 90% ethanol and deposited at the Zoology Museum of Biology Department (Sriwijaya University, South Sumatra, Indonesia), and assigned a catalogue number (Muszoo/Icth/Deposit/Coll.01.11082018). Diagnostic meristic and morphometric characters of the specimen were compared to Jaafar *et al.* (2009). Morphological examination was completed by photographs of the life coloration taken immediately after capture and examination of the preserved coloration.

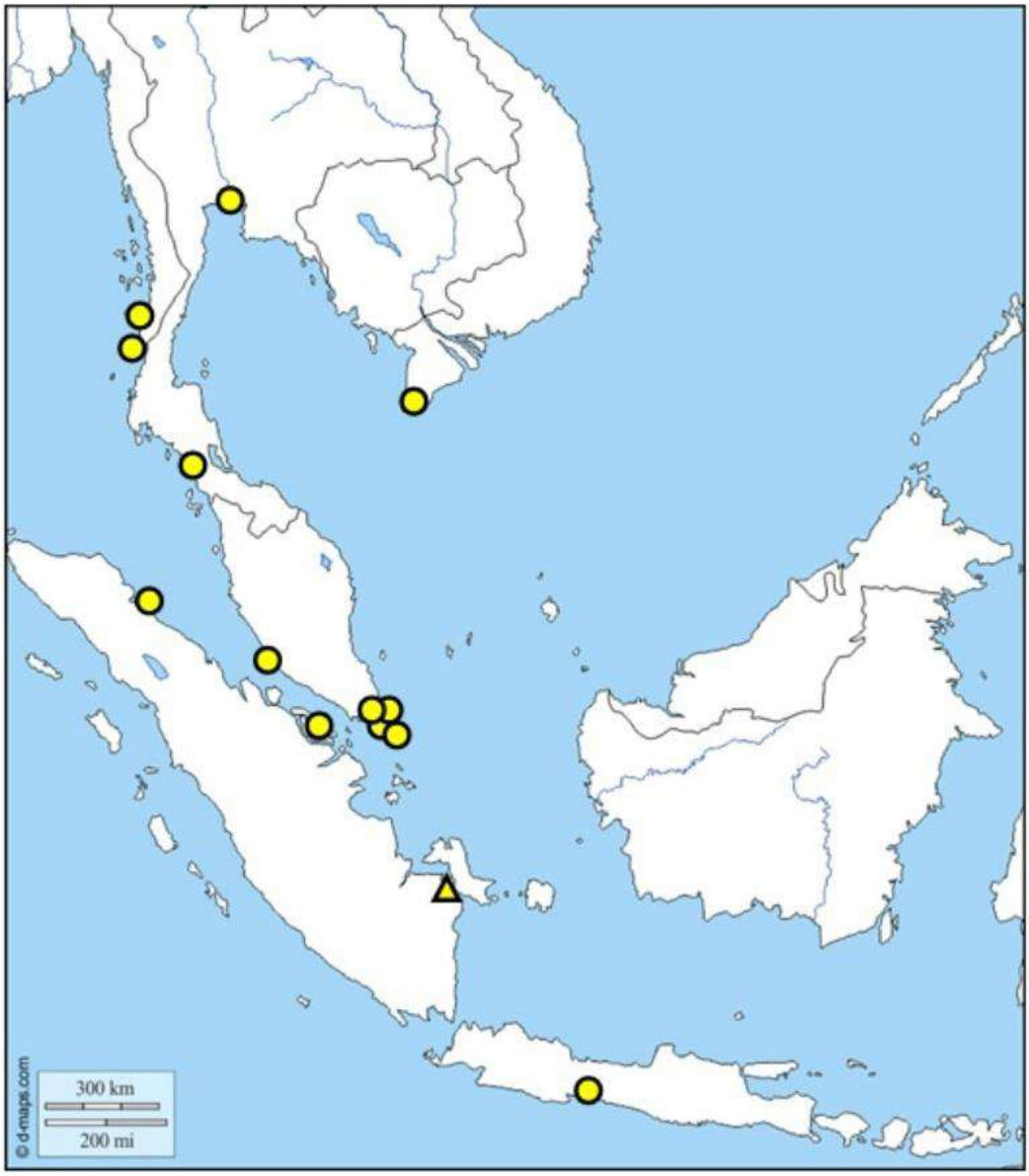

Figure 1. Distribution of *Periophthalmus variabilis*, circles indicate previous records, triangle represents most recent record in southern Sumatra, Sugihan estuary, 02°55'41.8"S; 104°45'51.6"E.

Figure 2. Location at Sugihan estuary in southern Sumatra where *P. variabilis* was found (© M. Iqbal).

Sugihan estuary is estuarine area dominated by mangrove forest in east coastal zone of southern Sumatra. Our observation suggest Sugihan estuary was dominated by mix of few species of *Rhizophora* spp and *Avicennia* spp. Previous studies of some environment aspects in Sugihan estuary conducted by Ramadoni *et al.* (2018) and Mulyadi *et al.* (2019) suggest few water parameters in this area having value here: water temperature (26-31^{0}C), salinity (10-22‰), pH (6-7), Dissolved Oxygen or DO (4.96-6.03 mg/l), brightness (61-100%) and current velocity (0.001-0.026 m/s).

Table 1. Comparison of meristic characters of *Periophthalmus variabilis.*

Character	**Present study**	**Jaafar *et al.* 2009**
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Transverse row scales, back	14	14 (13-16)
Transverse row scales, front	14	14 (12-16)
Predorsal scales	17	17 (17-22)

Figure 3. *Periophthalmus variabilis*, Sugihan estuary, southern Sumatra (© M. Iqbal).

Figure 4. Ventral view of *P. variabilis* showing pelvic fins with frenum and the inner rays fused at their base (© M. Iqbal).

Results and Discussion

Meristic and morphometric characters of *P. variabilis* are given in Table 1. Other specific morphological characters are as follows: first dorsal fin with dark inframarginal stripe (darker in anterior portion), reddish orange rounded to elliptical spots in life coloration (appear dark in preserved specimen), and first spine moderately elongated; second dorsal fin with yellow-orange margin, a black inframarginal stripe, and round red-orange spots on the interradial membrane (appear dark in preserved specimen); pelvic fins with prominent frenum and inner rays united by a basal membrane less than half their length. Life coloration: ground color dorsally and laterally brown, ventrally whitish; branchiostegal membrane pigmented; head and trunk with numerous dark brown blotches, larger on trunk; tiny iridescent bluish speckles on cheeks and flanks; 5-8 diagonal, irregular saddle-like dark brown bars visible on dorsum; caudal fin membrane dusky, rays in distal portion orange with series of brownish speckles; anal fin whitish to yellowish; pelvic fins whitish to dusky (Figs. 3–5). These characters are consistent with the description of *P. variabilis* summarized by Jaafar *et al.* (2009) and Polgar (2014).

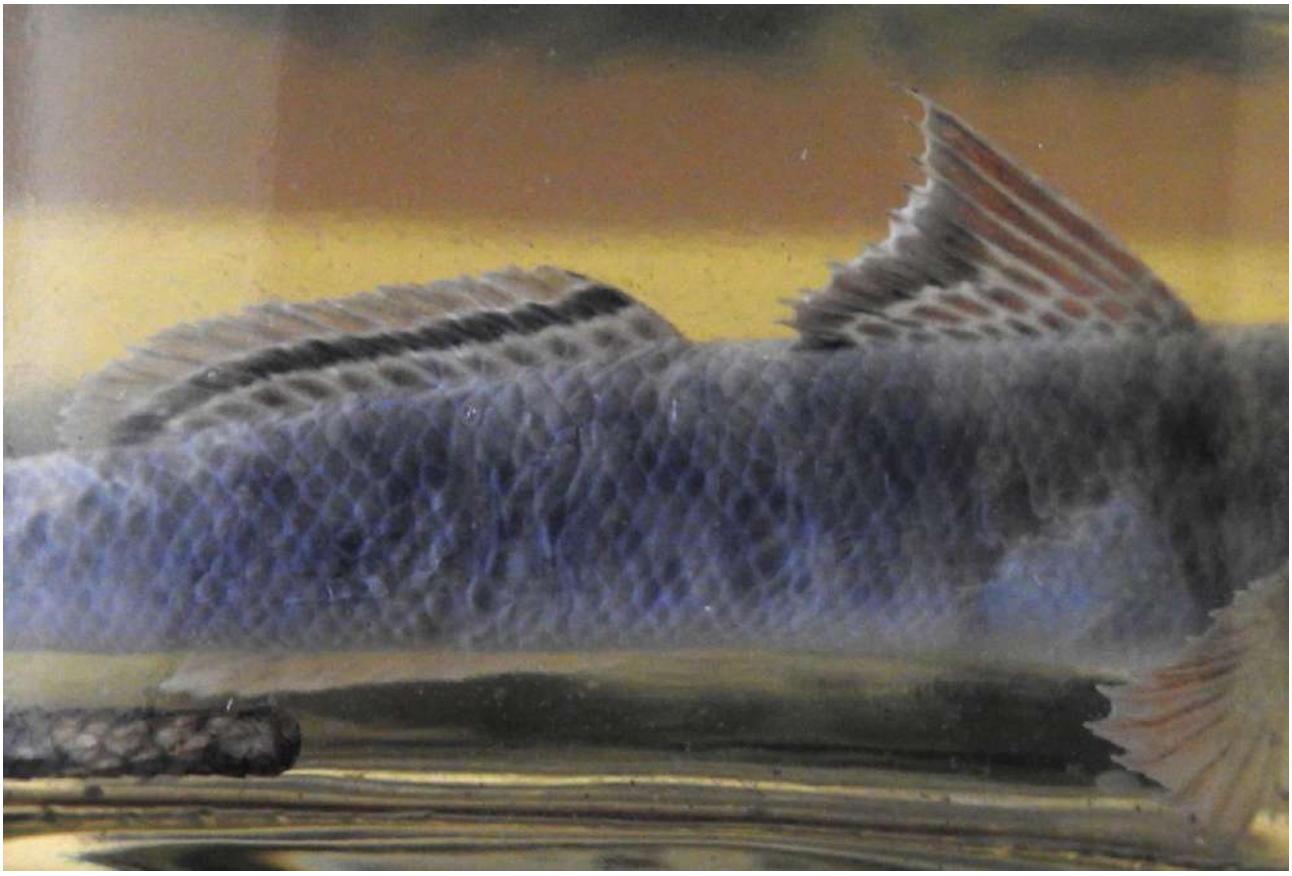

Figure 5. Raised first and second dorsal fins of *P. variabilis* with characteristic pigmentation (© M. Iqbal).

Periophthalmus variabilis occurs in Southeast Asia, from Malacca Straits to the Sulu Sea, including Sumatra (Jaafar *et al*. 2009; Polgar 2014). Only two verified records of *P. variabilis* in Sumatra are known from Eggert (1935), namely *P. variabilis sumatranus* (Belawan, North Sumatra), and from Takita *et al*. (1999), who recorded *P. novemradiatus* (Tebing Tinggi island, Riau Province). Both of these localities are located in northern Sumatra (00˚ N and 03˚ N). The presence of *P. variabilis* in the Sugihan estuary constitutes the first record of this mudskipper for southern Sumatra (02˚S). This record provides a missing link on the distributional range of this species between northern Sumatra (more than 500 km away) and Java in the south (Cilacap, the type locality, neotype specimen, more than 600 km away).

A rapidly increasing interest amongst local Indonesian researchers and ichthyologists in southern Sumatra, as well as facilitated access to cameras and internet, has led to acorrespondance increase in findings of rare fish species in recent years (Iqbal & Yustian 2016; Iqbal *et al*. 2017a, b; Iqbal *et al*. 2018a, b). Further

research is needed to establish the true distribution of this species and other mudskippers in southern Sumatra.

Acknowledgements

We are very grateful to Sriwijaya University who funded our survey to Sugihan estuary (under Sriwijaya University Competitive Research Grant 2018/2019 to first author). We thank anonymous reviewers who provided essential suggestions for this paper.

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Ecologica Montenegrina

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Coverage	2014-2020
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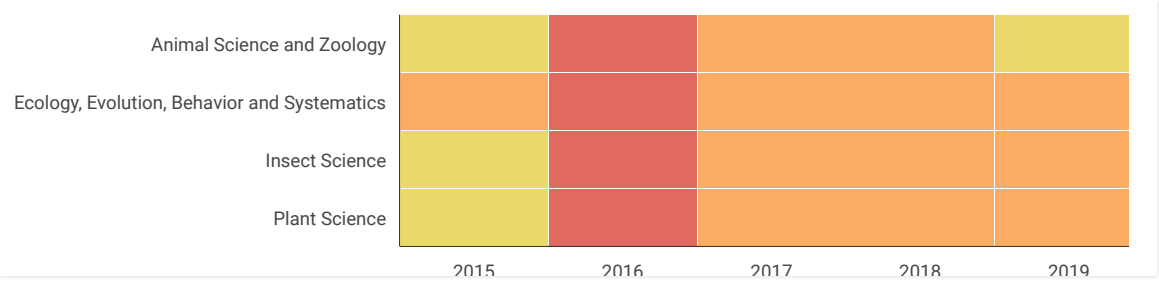

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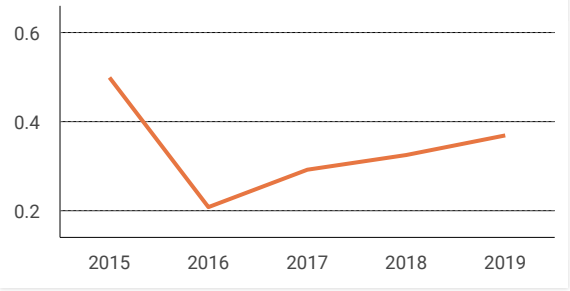

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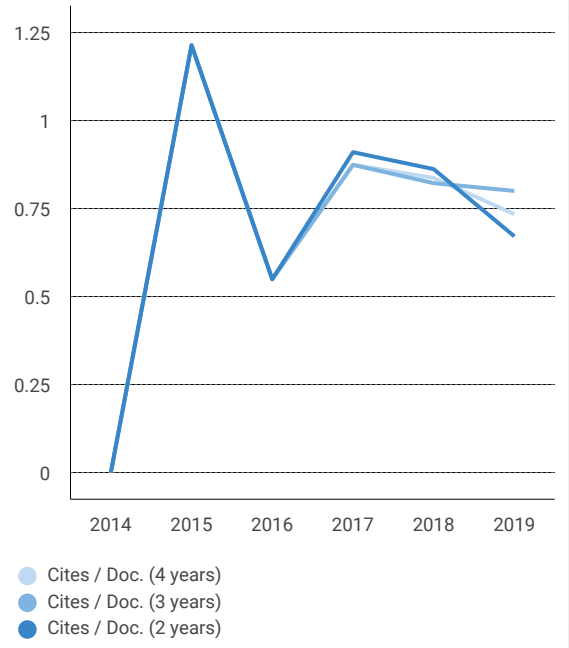

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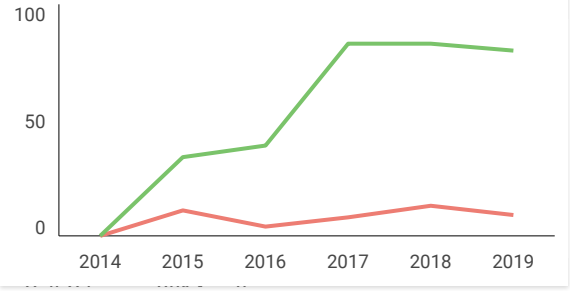

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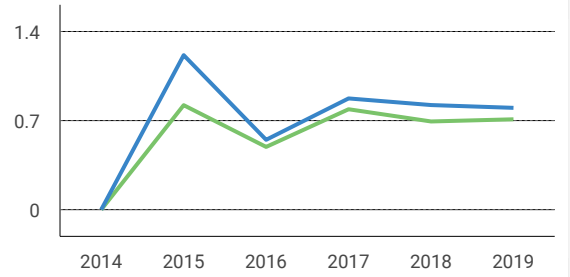

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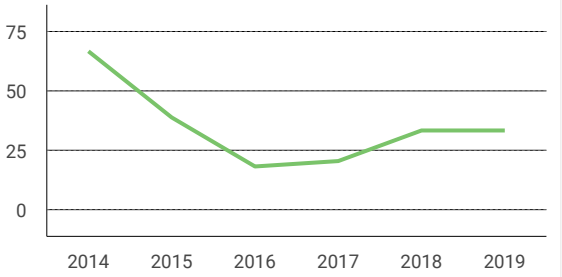

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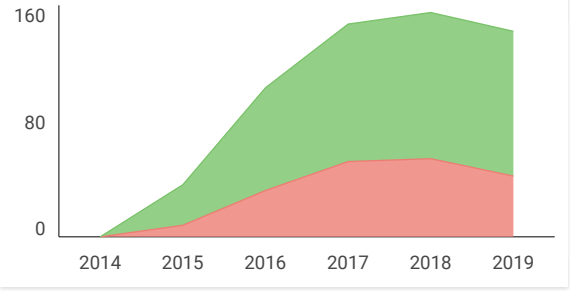

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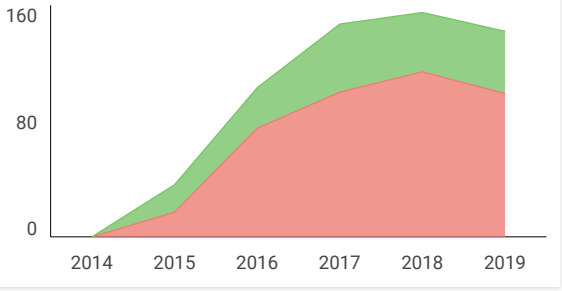

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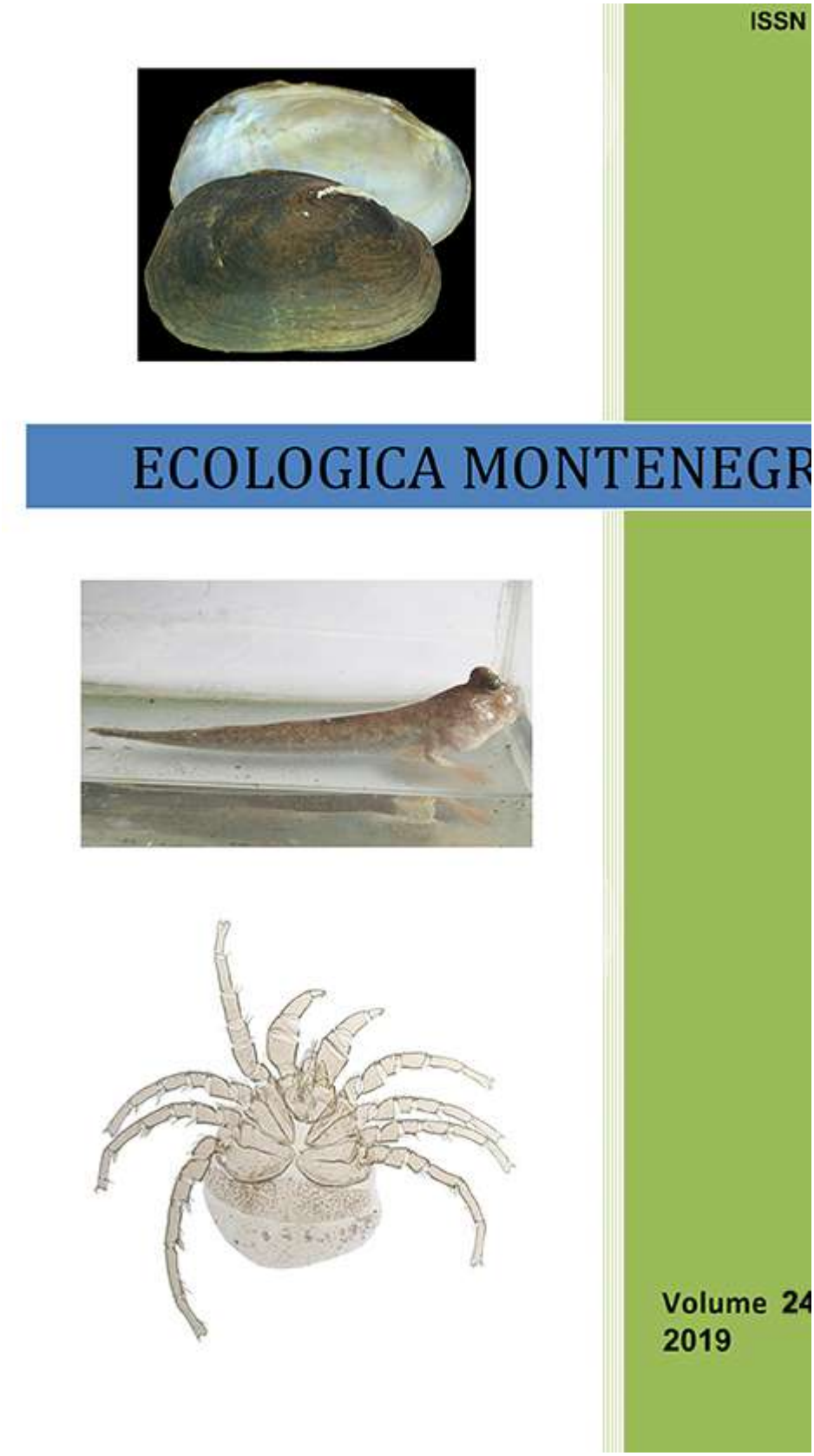

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WORD COUNT	1749	TIME SUBMITTED	22-NOV-2019 04:39AM
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Ecologica Montenegrina
ISSN 2336-9744 (online) | ISSN 2337-0173 (print)

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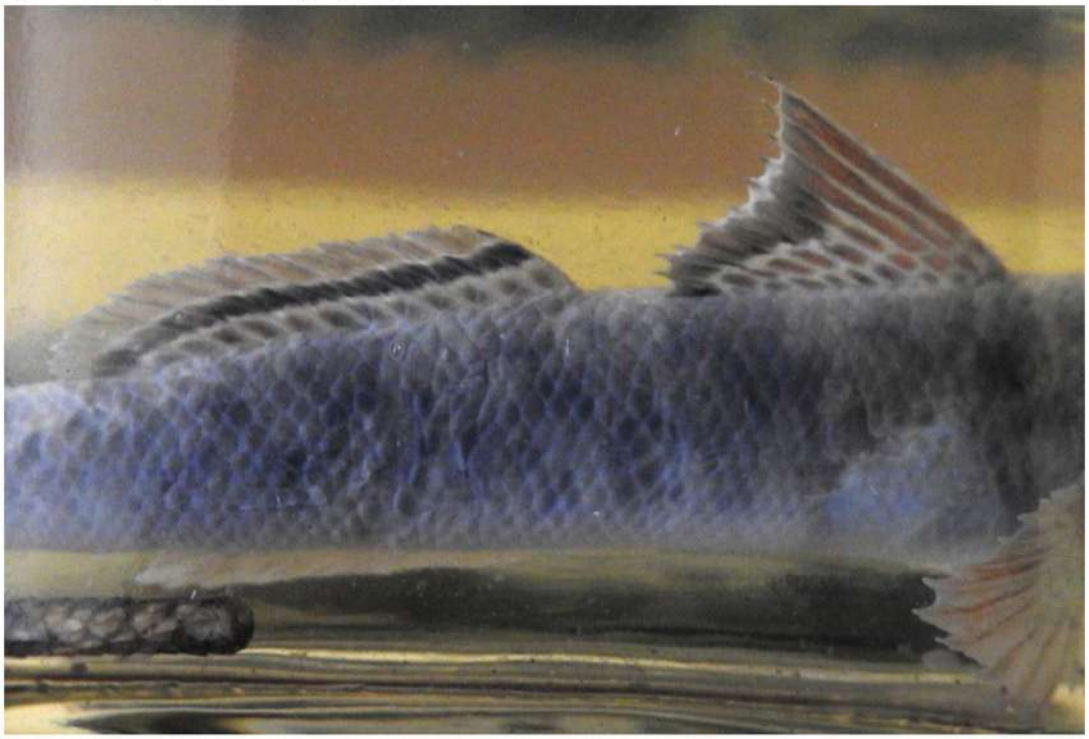

Figure 5. Raised first and second dorsal fins of *P. variabilis* with characteristic pigmentation (© M. Iqbal).

Periophthalmus variabilis occurs in Southeast Asia, from Malacca Straits to the Sulu Sea, including Sumatra (Jaafar *et al.* 2009; Polgar 2014). Only two verified records of *P. variabilis* in Sumatra are known from Eggert (1935), namely *P. variabilis sumatranus* (Belawan, North Sumatra), and from Takita *et al.* (1999), who recorded *P. novemradiatus* (Tebing Tinggi island, Riau Province). Both of these localities are located in northern Sumatra (00° N and 03° N). The presence of *P. variabilis* in the Sugihan estuary constitutes the first record of this mudskipper for southern Sumatra (02°S). This record provides a missing link on the distributional range of this species between northern Sumatra (more than 500 km away) and Java in the south (Cilacap, the type locality, neotype specimen, more than 600 km away).

A rapidly increasing interest amongst local Indonesian researchers and ichthyologists in southern Sumatra, as well as facilitated access to cameras and internet, has led to acorrespondance increase in findings of rare fish species in recent years (Iqbal & Yustian 2016; Iqbal *et al.* 2017a, b; Iqbal *et al.* 2018a, b). Further

research is needed to establish the true distribution of this species and other mudskippers in southern Sumatra.

Acknowledgements

We are very grateful to Sriwijaya University who funded our survey to Sugihan estuary (under Sriwijaya University Competitive Research Grant 2018/2019 to first author). We thank anonymous reviewers who provided essential suggestions for this paper.

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1.4

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KARYA ILMIAH : JURNAL ILMIAH

Jurnal Artikel Ilmiah : Linking a gap, First record of dusky-gilled mudskipper Periophthalmus variabilis Eggert, 1935 (Perciformes: Gobiidae) in southern Sumatra, Indonesia
Penulis Artikel Ilmiah : Arum Setiawan
Identitas Jurnal Artikel Ilmiah : a. Nama Jurnal : Ecologica Montenegrina
b. Nomor/Volume/Hal : 1/24/11-16
c. Edisi (bulan/tahun) : Oktober/2019
d. Penerbit : Center for Biodiversity of Montenegro
e. Jumlah Halaman 6

Kategori Publikasi Jurnal Ilmiah (beri √ pada kategori yang tepat) :
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KOMENTAR/ULASAN *PEER REVIEW*	
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• Ruang Lingkup dan Kedalaman Pembahasan:	Hasil penelitian dibahas secara komprehensif dengan penyampaian pembanding dari temuan-temuan penelitian lainnya dan teori terkait. Referensi yang diacu dalam pembahasan sudah cukup update untuk bidang kajian ini.
• Kecukupan & Kemutakhiran Data & Metodologi:	Data-data hasil penelitian sudah baik dan didukung peta lokasi sampling dan gambar yang ditampilkan menarik. Data didapatkan dengan menggunakan metode yang sudah standard.
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Prof. Hery Purnobasuki, M.Si., Ph.D.
NIP 196705071991021001
Unit Kerja : Jurusan Biologi FST Unair
Bidang Ilmu : Biologi
Jabatan/Pangkat : Guru Besar/ Pembina Utama Madya

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Kontribusi Pengusul (Penulis Pertama /Anggota Utama)	Ecologica Montenegrina Vol. 24: halaman 11-16 tahun 2019. Impact Factor = 0,79. Indeks similaritas nyaris batas atas, 16%. Penulis ke 1 dari 6 penulis. Nilai maksimal = 90%. Nilai pengusul = 0,6 x 0,90 x 40 = 21,6					21,6

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Prof. Dr. Suwarno Hadisusanto
NIP 195411161983031002
Unit Kerja : Fakultas Biologi UGM
Bidang Ilmu : Biologi/Ekologi
Jabatan/Pangkat : Guru Besar/ Pembina Utama Madya