

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

ARUM SETIAWAN¹, MUHAMMAD IQBAL^{2*}, BELA PRISCILLIA³, PORMANSYAH⁴,
DONI SETIAWAN¹, INDRA YUSTIAN¹

¹Department of Biology, Faculty of Science, Sriwijaya University, Jalan Raya Palembang-Prabumulih km 32,
Indralaya, Sumatera Selatan 30662, Indonesia.

²Biology Program, Faculty of Science, Sriwijaya University, Jalan Padang Selasa 524, Palembang, Sumatera
Selatan 30129, Indonesia.

³Community of Conservation, Faculty of Science, Sriwijaya University, Jalan Raya Palembang-Prabumulih km 32,
Indralaya, Sumatera Selatan 30662, Indonesia.

⁴Conservation 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. chrysopilos*, *P. darwini*, *P. gracilis*, *P. kalolo*, *P. magnuspinnatus*, *P. malaccensis*, *P. minutus*, *P. modestus*, *P. novaeguineensis*, *P. novemradiatus*, *P.*

pusing, *P. pilotus*, *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°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 <i>et al.</i> 2009
Number of specimen	1	26
First dorsal fin	IX	X (VIII-XI)
Second dorsal fin	I, 12	I, 12 (1, 11-12)
Anal fin	I, 10	I, 12 (I, 10-12)
Pectoral fin	12	10 (10-13)
Segmented caudal fin	16	17 (12-17)
Lateral row scales	50	58 (48-60)
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 interradiial 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).

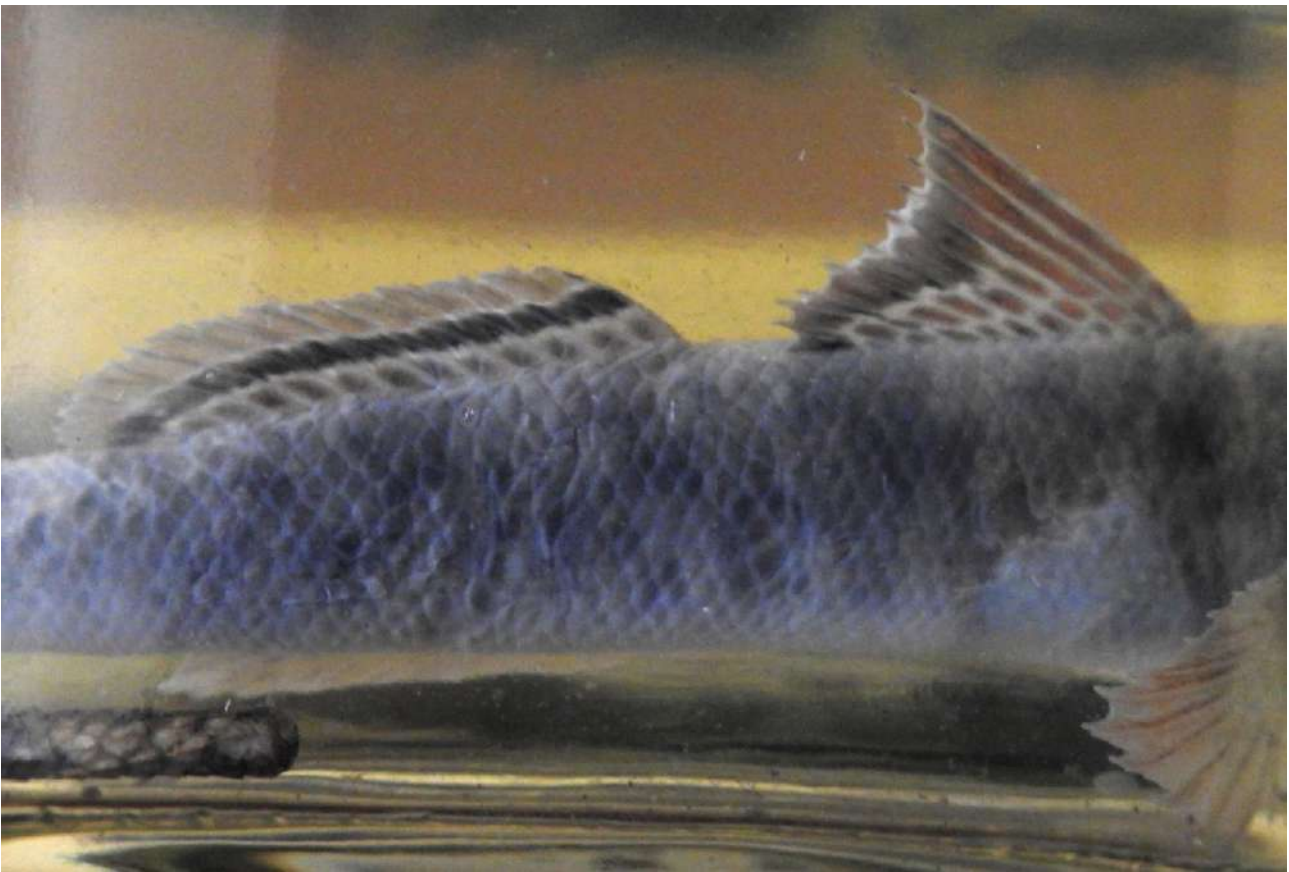


Figure 5. Raised first and second dorsal fins of *P. variabilis* with characteristic pigmentation (© M. Iqbal).

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 a correspondance 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.

References

- Clayton, D.A. (1993) Mudskippers. *Oceanography and Marine Biology Annual Review* 31: 507–577.
- Eggert, B. (1935) Beitrag zur Systematik, Biologie und geographischen Verbreitung der Periophthalminae. Ergebnisse einer durch die Notgemeinschaft der Deutschen Wissenschaft ermöglichten Reise nach Niederländisch-Indien 1926–1927 und der Sundaexpedition der Notgemeinschaft der Deutschen Wissenschaft 1929–1930. *Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere* 67: 29–116.
- Iqbal, M., Halim, A., Adriani, D., Pormansyah. & Saputra, R.F. (2018a) Range extension of *Periophthalmodon septemradiatus* (Gobiidae) in southern Sumatra, Indonesia. *Cybium* 42(4): 376–378. <http://doi.org/10.26028/cybium/2018-424-009>
- Iqbal, M., Setiawan, A., Aprilia, I., Isa, M. & Yustian, I. (2017a). First record of *Lobocheilos ixocheilos* Kottelat and Tan, 2008 (Cypriniformes, Cyprinidae) in South Sumatra province, Indonesia. *Check List* 13(6): 931–933. <http://doi.org/10.15560/13.6.931>
- Iqbal, M., Setiawan, D. & Ajiman. (2017b) Presence of *Fluivtrygon oxyrhynchus* in Sumatra, Indonesia (Chondrichthyes: Dasyatidae). *Ichthyological Exploration of Freshwaters* 28(1): 83–86.
- Iqbal, M., Setiawan, D. & Ajiman. (2018b) New data on the distribution and conservation status white-edge freshwater whipray *Fluivtrygon signifer* (Chondrichthyes: Dasyatidae). *Ichthyological Exploration of Freshwaters* 28(2): 171–176.
- Iqbal, M. & Yustian, I. (2016) Occurrence of the giant freshwater stingray *Urogymnus polylepis* in Sumatra, Indonesia (Chondrichthyes: Dasyatidae). *Ichthyological Exploration of Freshwaters* 27(4): 333–336.
- Jaafar, Z., Perrig, M. & Chou, L.M. (2009) *Periophthalmus variabilis* (Teleostei: Gobiidae: Oxudercinae), a valid species of mudskipper, and a re-diagnosis of *Periophthalmus novemradiatus*. *Zoological Science* 26: 309–314. <https://doi.org/10.2108/zsj.26.309>
- Mulyadi., Ulqodry, T.Z., Aryawati, R., Isnaini. & Surbakti, H. (2019) Karakteristik Sebaran Fitoplankton di Perairan Muara Sungai Sugihan, Sumatera Selatan. *Jurnal Kelautan Tropis* 22(1): 19–26. [in Indonesian]
- Murdy, E.O. (1989) A taxonomic revision and cladistic analysis of the oxudercine gobies (Gobiidae: Oxudercinae). *Records of the Australian Museum Supplement* 11: 1–93. <https://doi.org/10.3853/j.0812-7387.11.1989.93>
- Murdy, E.O. & Jaafar, Z. (2017) Taxonomy and systematics review. In: Jaafar Z, Murdy EO (Eds) *Fishes Out of Water: Biology and Ecology of Mudskippers*. CRC Press, Florida, pp.1–390.
- Polgar, G. (2014) The mudskipper www.mudskipper.it. Accessed on: 2019-5-30.
- Ramadoni., Surbakti, H., Ulqodry, T.Z., Isnaini. & Aryawati, R. (2018) Karakteristik massa air dan tipe estuari di perairan muara Sugihan Provinsi Sumatera Selatan [The characteristics of water mass and estuary type at Sugihan estuary, South Sumatra Province]. *Maspari Journal* 10(2):169-178. [in Indonesian]
- Takita, T., Agusnimar. & Ali, A.B. (1999) Distribution and habitat requirements of oxudercine gobies (Gobiidae: Oxudercinae) along the Straits of Malacca. *Ichthyological Research* 46(2): 131–138. <https://doi.org/10.1007/BF02675431>
- Tomascik, T., Mah, A.J., Nontji, A. & Moosa, M.L. (1997) The ecology of Indonesian sea. Part two. Periplus Editions, Singapore, 643-1388 pp.
- Tran, D.D., Shibukawa, K., Nguyen, P.T., Ha, H.P., Tran, L.X., Mai, H.V. & Utsugi, K. (2013) *Fishes of Mekong Delta, Vietnam*. Can Tho University Publishing House, Can Tho, 174 pp.



Ads by Google

Stop seeing this ad

Why this ad?

Ecologica Montenegrina

7

H Index

Country [Montenegro](#) - [SJR Ranking of Montenegro](#)

Subject Area and Category [Agricultural and Biological Sciences](#)
[Animal Science and Zoology](#)
[Ecology, Evolution, Behavior and Systematics](#)
[Insect Science](#)
[Plant Science](#)

Publisher

Publication type Journals

ISSN 23370173, 23369744

Coverage 2014-2020

Scope Ecologica Montenegrina (ISSN 2336-9744 (online) | ISSN 2337-0173 (print)) is peer-reviewed journal in which scientific articles and reports are quickly published. The papers are in the fields of taxonomy, biogeography and ecology (for example: new taxa for science, taxonomic revision, and/or fundamental ecology and biogeography papers). Open access publishing option is strongly encouraged for authors with research grants and other funds. For those without grants/funds, all accepted manuscripts will be published but access is secured for subscribers only.

[Homepage](#)

[How to publish in this journal](#)

[Contact](#)

[Join the conversation about this journal](#)

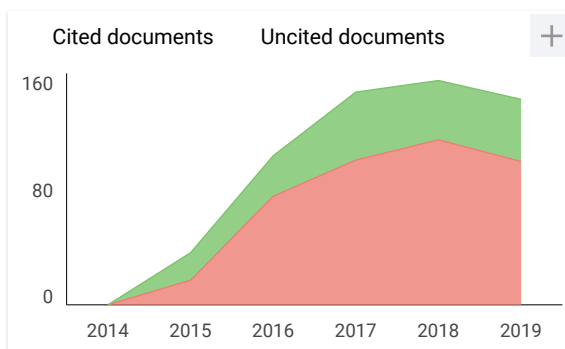
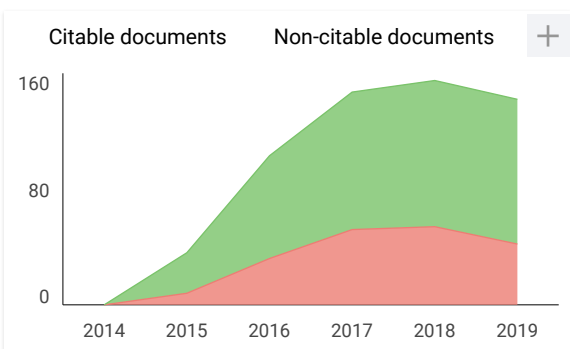
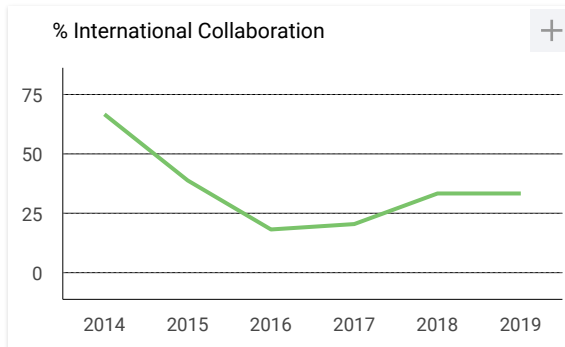
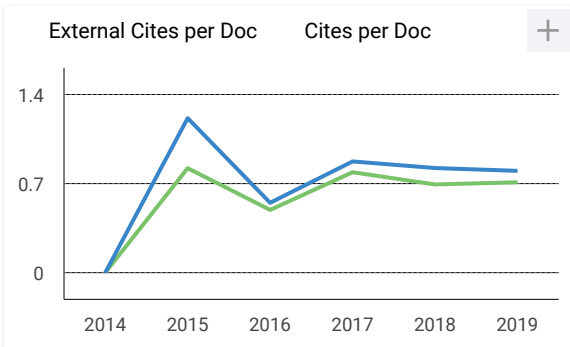
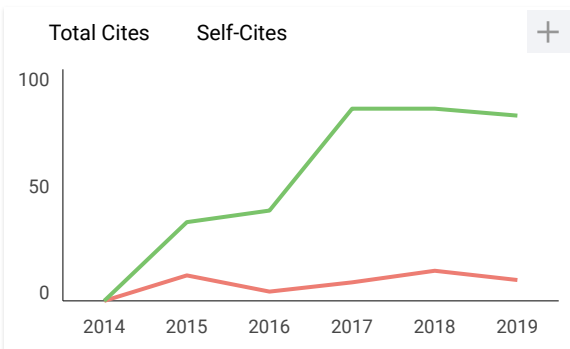
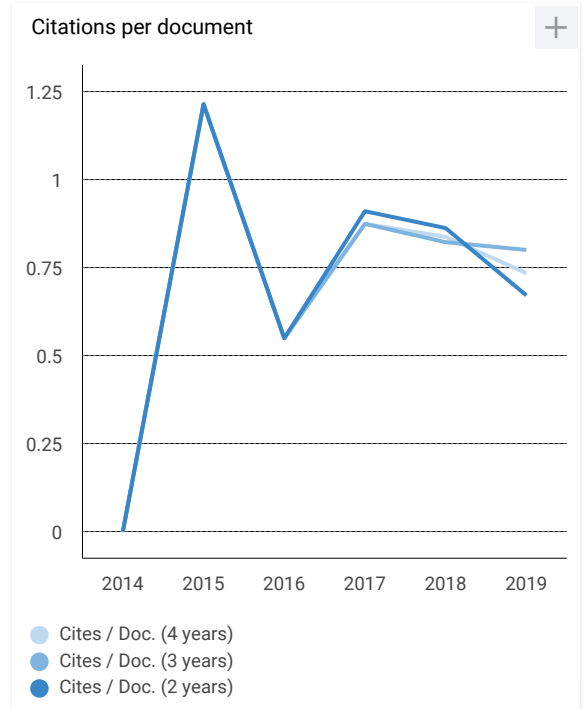
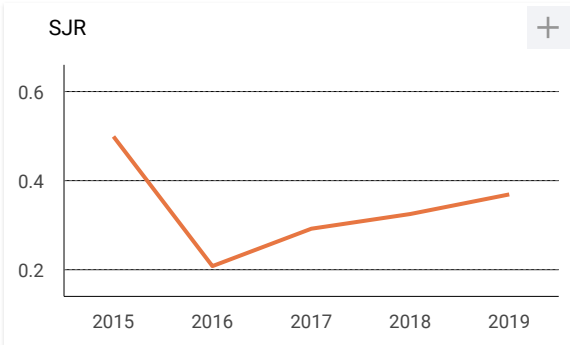
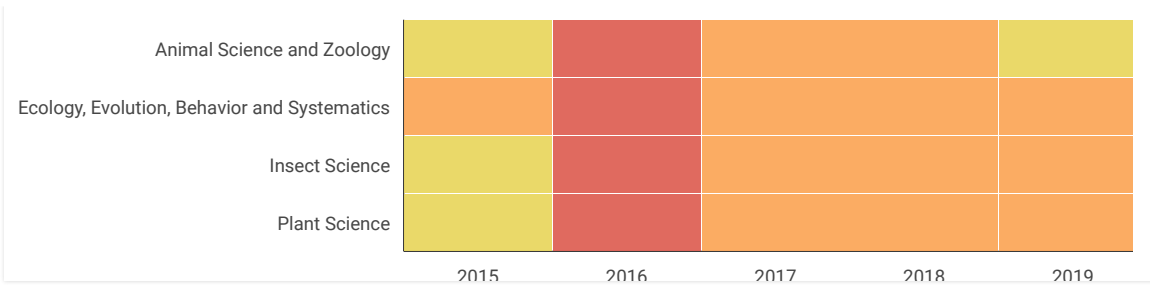


Ads by Google

Stop seeing this ad

Why this ad?





Ecologica Montenegrina

Q2 Animal Science and Zoology
best quartile

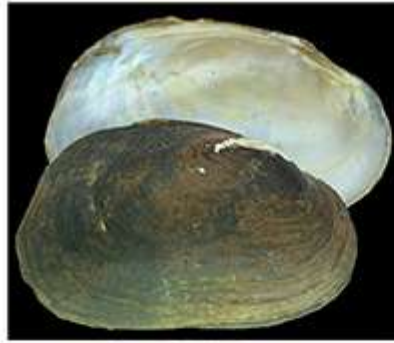
SJR 2019
0.37

powered by scimagojr.com

← Show this widget in your own website

Just copy the code below and paste within your html code:

```
<a href="https://www.scimaç
```

ECOLOGICA MONTENEGRO



ISSN

[Ukraine](#), [biodiversity](#), [checklist](#), [distribution](#), [diversity](#), [ecology](#), [faunistics](#), [female](#), [identification](#), [key](#), [jumping](#), [spiders](#), [leeches](#), [morphology](#), [nematode](#), [new](#), [description](#), [new genera](#), [new record](#), **[new](#)**, **[species](#)**, [new](#), [species](#), [oribatid](#), [mite](#), [pragmatic](#), [classification](#), [pseudoscorpion](#), [redescription](#), [systematics](#), [taxonomy](#), [the](#), [Black Sea](#), [water mite](#)

CURRENT ISSUE

ATOM	1.0
RSS	2.0
RSS	1.0

Volume 24
2019

ISSN: 2336-9744

Ecologica Montenegrina

HOME	ABOUT	LOGIN	REGISTER	SEARCH
CURRENT	ARCHIVES	ANNOUNCEMENTS		

Home > Archives > **Vol 24 (2019)**

Vol 24 (2019)

Table of Contents

Articles

A Description of a new *Valvata* (Mollusca: Valvatidae) from Armenia

Frank Walther, Peter Glöer

PDF
1-5

First photographic inland record of blacktip reef sharks *Carcharhinus melanopterus* (Carcharhiniformes: Carcharhinidae) in Indonesian waters

Muhammad Iqbal, Rio Firman Saputra, Arum Setiawan, Indra Yustian

PDF
6-10

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

Arum Setiawan, Muhammad Iqbal, Bela Priscillia, Pormansyah ., Doni Setiawan, Indra Yustian

PDF
11-16

The first investigation record of threatened horseshoe crabs in the Banyuasin estuarine, South Sumatra, Indonesia

Fauziyah ., Anna I.S. Purwiyanto, Wike A.E. Putri, Fitri Agustriani, Apon Z. Mustopa, Fatimah .

PDF
17-24

A new *Contradens* from Laos (Bivalvia: Unionidae: Contradentini)

Ekaterina S. Konopleva, Ivan N. Bolotov, Vitaly M. Spitsyn, Alexander V. Kondakov, Mikhail Yu. Gofarov, Ilya V. Vikhrev

PDF
25-31

A new *Najadicola* species (Acari: Hydrachnidia: Pionidae) from Asia

Yulia E. Chapurina, Ilya V. Vikhrev, Alexander V. Kondakov, Kitti Tanmuangpak

PDF
32-37

The morphometric variability of the mangrove horseshoe crab (*Carcinoscorpius rotundicauda*) from Banyuasin estuarine of South Sumatra, Indonesia

Fauziyah ., Wike A.E. Putri, Anna I.S. Purwiyanto, Fitri Agustriani, Apon Z. Mustopa, Fatimah .

PDF
38-46

First record *Neostethus bicornis* (Phallostethidae: Atheriniformes) for Sumatran waters, Indonesia

Laila Hanum, Muhammad Iqbal, Yuanita Windusari, Winda Indriati, Indra Yustian

PDF
47-51

First inland record of bull shark *Carcharhinus leucas* (Carcharhiniformes: Carcharhinidae) in Indonesian Borneo

Muhammad Iqbal, Arum Setiawan, Indra Yustian

PDF
52-57

Comparative Characteristics of the Greek Juniper (*Juniperus excelsa* Beieb.) Populations in the Southeastern Crimea

Viktoria Yu. Letukhova, Irina L. Potapenko

PDF
58-65

[OPEN JOURNAL SYSTEMS](#)

[Journal Help](#)

USER

Username

Password

Remember me

NOTIFICATIONS

- [View](#)
- [Subscribe](#)

LANGUAGE

Select Language

English ▼

JOURNAL CONTENT

Search

Search Scope

All ▼

Browse

- [By Issue](#)
- [By Author](#)
- [By Title](#)
- [Other Journals](#)

FONT SIZE

INFORMATION

- [For Readers](#)
- [For Authors](#)
- [For Librarians](#)

KEYWORDS

[Amphipoda](#) [Black Sea.](#)
[Bythinella](#) [Carabidae](#)
[China](#) [China.](#) [Croatia.](#)
[Cuba](#) [Gastropoda](#)
[Greater Antilles](#) [Greater Antilles.](#) [Halacaroidea](#)
[Hirudinea](#) [Hungary.](#)
[Hydrobiidae](#)
[Hydrphyantidae](#)
[Macedonia](#) [Mollusca](#)
[Montenegro](#)
[Montenegro.](#) [New species](#) [Republic of Adygeya](#) [Salticidae](#)
[Taxonomy.](#) [Turkey.](#)

Invasion of the common percarina *Percarina demidoffii* (Percidae, Perciformes) in the Dnieper River upstream

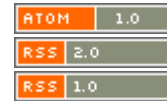
Roman Novitskiy, Leonid Manilo, Viktor Gasso, Nadiia Hubanova

ISSN: 2336-9744

PDF
66-72

[Ukraine](#), [biodiversity](#), [checklist](#), [distribution](#), [diversity](#), [ecology](#), [faunistics](#), [female](#), [identification](#), [key](#), [jumping spiders](#), [leeches](#), [morphology](#), [nematode](#), [new](#), [description](#), [new genera](#), [new record](#), **[new](#)**, **[species](#)**, [new](#), [species](#), [oribatid mite](#), [pragmatic classification](#), [pseudoscorpion](#), [redescription](#), [systematics](#), **[taxonomy](#)**, [the](#), [Black Sea](#), [water mite](#)

CURRENT ISSUE



Ecologica Montenegrina

HOME	ABOUT	LOGIN	REGISTER	SEARCH
CURRENT	ARCHIVES	ANNOUNCEMENTS		

Home > About the Journal > **Editorial Team**

Editorial Team

Editor in Chief

[Vladimir Pešić](#), Department of Biology, University of Montenegro, Montenegro

Editorial Board

[Badamdorj Bayartogtokh](#), National University of Mongolia, Mongolia

[Holger Braun](#), Museo de La Plata, Argentina

[Dr Patricio De los Rios Escalante](#), Universidad Católica de Temuco, Chile

[Sergey G. Ermilov](#), Tyumen State University, Tyumen, Russia, Russian Federation

[Igor Dovgal](#), A. Kovalevsky Institute of Marine Biological Research, Russian Federation

[Thibault Datry](#), Irstea, UR MALY, Centre de Lyon-Villeurbanne, France

[Zoltán Fehér](#), Natural History Museum Vienna 3rd Zoology Department, Austria

[Dilian Georgiev](#), University of Plovdiv, Bulgaria

[Reinhard Gerecke](#)

[Wolfram Graf](#), University of Natural Resources and Life Sciences, Vienna, Austria

[Michał Grabowski](#), Department of Invertebrate Zoology and Hydrobiology, University of Lodz, Poland

[Clemens Grosser](#), Germany

[Borislav Gueorguiev](#), National Museum of Natural History, Sofia, Bulgaria

[Sead Hadžiablahović](#), Environmental Protection Agency of Montenegro, Montenegro

[Dr Laith A. Jawad](#), Flat Bush, Manukau, Auckland, New Zealand, New Zealand

[Dr Roman Yakovlev](#), Altai State University, Russian Federation

[Max Kasperek](#), Zoology in the Middle East, Germany

[Gordan S. Karaman](#), Montenegrin Academy of Sciences, Montenegro

[Jeno Kontschán](#), Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, Hungary

[Andrey Kostianoy](#), P.P.Shirshov Institute of Oceanology, Russian Academy of Sciences, Moscow, Russia, Russian Federation

[Katarina Ljubisavljević](#), Montenegro

[Dr Andrzej Zawal](#), Department of Invertebrate Zoology & Limnology, University of Szczecin, 71-415 Szczecin, Waska 13, Poland, Poland

[Slobodan Evgenije Makarov](#), University of Belgrade Faculty of Biology, Serbia

[Dávid Murányi](#), Hungarian Natural History Museum Department of Zoology Baross u. 13, H-1088 Budapest, Hungary, Hungary

[Momir M Paunović](#), Institute for Biological Research "Sinisa Stankovic" University of Belgrade Republic of Serbia Bulevar despota Stefana 142, 11000 Belgrade, Serbia, Serbia

[Radmila Petanović](#), University of Belgrade - Faculty of Agriculture Department of Entomology and Agricultural Zoology Nemanjina 6, P.O. BOX 127 11080 Belgrade - Zemun SERBIA, Serbia

[Prof. Alireza Saboori](#), University of Tehran, Iran, Islamic Republic of

[Zoltán Sándor Varga](#), University of Debrecen, Hungary

[Dr Anton V. Volynkin](#), Altai State University

[Paul Selden](#), University of Kansas, United States

[Nelli Grigoryevna Sergeeva](#), Institute of Marine Biological Researches RAS, Russian Federation

[Harry Smit](#), Naturalis Biodiversity Center, Netherlands

[Boris Sket](#), Univerza v Ljubljani, Slovenia

[Vesna Vukasinovic Pesic](#), Department of Technology, University of Montenegro, Podgorica, Montenegro

[OPEN JOURNAL SYSTEMS](#)

[Journal Help](#)

USER

Username

Password

Remember me

NOTIFICATIONS

- [View](#)
- [Subscribe](#)

LANGUAGE

Select Language

English ▼

JOURNAL CONTENT

Search

Search Scope

All ▼

Browse

- [By Issue](#)
- [By Author](#)
- [By Title](#)
- [Other Journals](#)

FONT SIZE

INFORMATION

- [For Readers](#)
- [For Authors](#)
- [For Librarians](#)

KEYWORDS

[Amphipoda](#) [Black Sea](#).
[Bythinella](#) [Carabidae](#)
[China](#) [China](#). [Croatia](#).
[Cuba](#) [Gastropoda](#)
[Greater Antilles](#) [Greater Antilles](#). [Halacaroidae](#)
[Hirudinea](#) [Hungary](#).
[Hydrobiidae](#)
[Hydroyphantidae](#)
[Macedonia](#) [Mollusca](#)
[Montenegro](#)
[Montenegro](#). [New species](#) [Republic of Adygeya](#) [Salticidae](#)
[Taxonomy](#). [Turkey](#).

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

By Arum Setiawan

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

ARUM SETIAWAN¹, MUHAMMAD IQBAL^{2*}, BELA PRISCILLIA³, PORMANSYAH⁴,
DONI SETIAWAN¹, INDRA YUSTIAN¹

¹Department of Biology, Faculty of Science, Sriwijaya University, Jalan Raya Palembang-Prabumulih km 32, Indralaya, Sumatera Selatan 30662, Indonesia.

²Biology Program, Faculty of Science, Sriwijaya University, Jalan Padang Selasa 524, Palembang, Sumatera Selatan 30129, Indonesia.

³Community of Conservation, Faculty of Science, Sriwijaya University, Jalan Raya Palembang-Prabumulih km 32, Indralaya, Sumatera Selatan 30662, Indonesia.

⁴Conservation 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 (Murdy 1989; Takita *et al.* 1999; Polgar & Khaironizam 2008). Ten mudskipper genera are recognized (Murdy 1989); 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 argenteolineatus*, *P. barbarus*, *P. chrysospilos*, *P. darwini*, *P. gracilis*, *P. kalolo*, *P. magnuspinnatus*, *P. malaccensis*, *P. minutus*, *P. modestus*, *P. novaeguineensis*, *P. novemradiatus*, *P.*

pusing, *P. spilotos*, *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/Ich/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 (26-31⁰C), 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 <i>et al.</i> 2009
Number of specimen	1	26
First dorsal fin	IX	X (VIII-XI)
Second dorsal fin	I, 12	I, 12 (I, 11-12)
Anal fin	I, 10	I, 12 (I, 10-12)
Pectoral fin	12	10 (10-13)
Segmented caudal fin	16	17 (12-17)
Lateral row scales	50	58 (48-60)
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 pterygium 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).

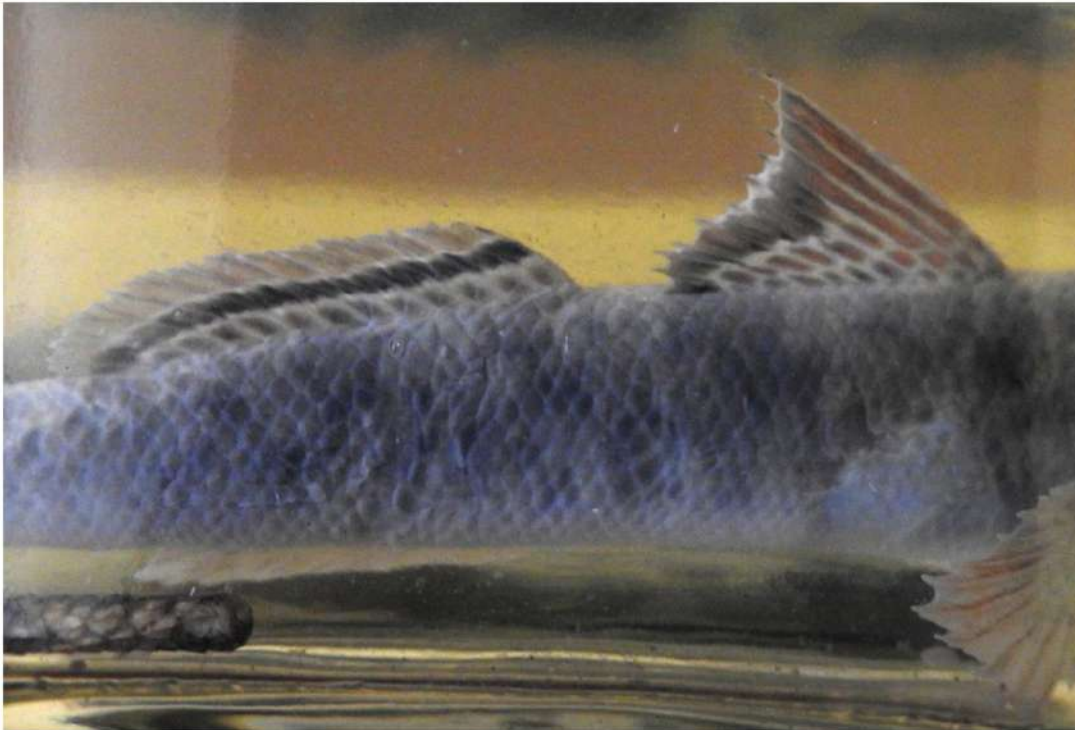


Figure 5. Raised first and second dorsal fins of *P. variabilis* with characteristic pigmentation (© M. Iqbal).

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 a correspondance 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.

References

- Clayton, D.A. (1993) Mudskippers. *Oceanography and Marine Biology Annual Review* 31: 507–577.
- Eggert, B. (1935) Beitrag zur Systematik, Biologie und geographischen Verbreitung der Periophthalminae. Ergebnisse einer durch die Notgemeinschaft der Deutschen Wissenschaft ermöglichten Reise nach Niederländisch-Indien 1926–1927 und der Sundaexpedition der Notgemeinschaft der Deutschen Wissenschaft 1929–1930. *Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere* 67: 29–116.
- Iqbal, M., Halim, A., Adriani, D., Pormansyah, & Saputra, R.F. (2018a) Range extension of *Periophthalmodon septemradiatus* (Gobiidae) in southern Sumatra, Indonesia. *Cybium* 42(4): 376–378. <http://doi.org/10.26028/cybium/2018-424-009>
- Iqbal, M., Setiawan, A., Aprilia, I., Isa, M. & Yustian, I. (2017a). First record of *Lobocheilos ixocheilos* Kottelat and Tan, 2008 (Cypriniformes, Cyprinidae) in South Sumatra province, Indonesia. *Check List* 13(6): 931–933. <http://doi.org/10.15560/13.6.931>
- Iqbal, M., Setiawan, D. & Ajiman. (2017b) Presence of *Fluivetrygon oxyrhynchus* in Sumatra, Indonesia (Chondrichthyes: Dasyatidae). *Ichthyological Exploration of Freshwaters* 28(1): 83–86.
- Iqbal, M., Setiawan, D. & Ajiman. (2018b) New data on the distribution and conservation status white-edge freshwater whipray *Fluivetrygon signifer* (Chondrichthyes: Dasyatidae). *Ichthyological Exploration of Freshwaters* 28(2): 171–176.
- Iqbal, M. & Yustian, I. (2016) Occurrence of the giant freshwater stingray *Urogymmus polylepis* in Sumatra, Indonesia (Chondrichthyes: Dasyatidae). *Ichthyological Exploration of Freshwaters* 27(4): 333–336.
- Jaafar, Z., Perrig, M. & Chou, L.M. (2009) *Periophthalmus variabilis* (Teleostei: Gobiidae: Oxudercinae), a valid species of mudskipper, and a re-diagnosis of *Periophthalmus novemradiatus*. *Zoological Science* 26: 309–314. <https://doi.org/10.2108/zsj.26.309>
- Mulyadi., Ulqodry, T.Z., Aryawati, R., Isnaini. & Surbakti, H. (2019) Karakteristik Sebaran Fitoplankton di Perairan Muara Sungai Sugihan, Sumatera Selatan. *Jurnal Kelautan Tropis* 22(1): 19–26. [in Indonesian]
- Murdy, E.O. (1989) A taxonomic revision and cladistic analysis of the oxudercine gobies (Gobiidae: Oxudercinae). *Records of the Australian Museum Supplement* 11: 1–93. <https://doi.org/10.3853/j.0812-7387.11.1989.93>
- Murdy, E.O. & Jaafar, Z. (2017) Taxonomy and systematics review. In: Jaafar Z, Murdy EO (Eds) *Fishes Out of Water: Biology and Ecology of Mudskippers*. CRC Press, Florida, pp.1–390.
- Polgar, G. (2014) The mudskipper www.mudskipper.it. Accessed on: 2019-5-30.
- Ramadoni., Surbakti, H., Ulqodry, T.Z., Isnaini. & Aryawati, R. (2018) Karakteristik massa air dan tipe estuari di perairan muara Sugihan Provinsi Sumatera Selatan [The characteristics of water mass and estuary type at Sugihan estuary, South Sumatra Province]. *Maspari Journal* 10(2):169-178. [in Indonesian]
- Takita, T., Agusnimar. & Ali, A.B. (1999) Distribution and habitat requirements of oxudercine gobies (Gobiidae: Oxudercinae) along the Straits of Malacca. *Ichthyological Research* 46(2): 131–138. <https://doi.org/10.1007/BF02675431>
- Tomascik, T., Mah, A.J., Nontji, A. & Moosa, M.L. (1997) The ecology of Indonesian sea. Part two. Periplus Editions. Singapore. 643-1388 pp.
- Tran, D.D., Shibukawa, K., Nguyen, P.T., Ha, H.P., Tran, L.X., Mai, H.V. & Utsugi, K. (2013) *Fishes of Mekong Delta, Vietnam*. Can Tho University Publishing House, Can Tho, 174 pp.

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

ORIGINALITY REPORT

16%

SIMILARITY INDEX

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

★www.mudskipper.it

Internet

12%

EXCLUDE QUOTES ON

EXCLUDE MATCHES < 1%

EXCLUDE
BIBLIOGRAPHY ON

**FORMAT PENILAIAN (VALIDASI & PEER REVIEW)
LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
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 : Jurnal Ilmiah Internasional Bereputasi
 Jurnal Ilmiah Internasional
 Jurnal Ilmiah Nasional Terakreditasi S1, S2
 Jurnal Ilmiah Nasional Terakreditasi S3, S4
 Jurnal Ilmiah Nasional Tidak Terakreditasi

I. Hasil Penilaian Validasi :

No.	ASPEK	URAIAN/KOMENTAR PENILAIAN
1.	Indikasi Plagiasi	16 %
2.	Linearitas	Sudah linier dengan bidang biologi konservasi

II. Hasil Penilaian Peer Review :

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah (isikan di kolom yang sesuai)					Nilai Akhir Yang Diperoleh
	Internasional Bereputasi (Maks 40)	Internasional (Maks 20)	Nasional Terakreditasi S1, S2 (Maks 25)	Nasional Terakreditasi S3, S4 (Maks 20)	Nasional tidak Terakreditasi (maks 10)	
Kelengkapan dan Kesesuaian unsur isi jurnal (10%)	4					4
Ruang lingkup dan kedalaman pembahasan (30%)	12					12
Kecukupan dan Kemutakhiran data/informasi dan metodologi (30%)	12					12
Kelengkapan unsur dan kualitas penerbit (30%)	12					12
Total = (100%)	40					40
Kontribusi Pengusul (Penulis Pertama /Anggota Utama)	Penulis Utama (0,6 x 40) = 24					24

KOMENTAR/ULASAN PEER REVIEW

• Kelengkapan dan Kesesuaian Unsur:	Paper terkait deskripsi ikan <i>Periophthalmus variabilis</i> di perairan Sumatera Selatan. Isi paper sudah memenuhi kaidah-kaidah karya ilmiah dan sudah sesuai dengan bidang biologi konservasi
• Ruang Lingkup dan Kedalaman Pembahasan:	Hasil penelitian dibahas secara komprehensif dengan penyampaian pembandingan 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.
• Kelengkapan Unsur & Kualitas Penerbit:	Penerbit Center for Biodiversity of Montenegro berkualitas baik, tidak termasuk predatory publisher, dan jurnal masuk di Q2.

Surabaya, 13 Mei 2020

Penilai 1

A handwritten signature in black ink, appearing to read 'Hery Purnobasuki', with a large, stylized flourish on the left side.

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

FORMAT PENILAIAN (VALIDASI & PEER REVIEW)
LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
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 : Jurnal Ilmiah Internasional Bereputasi
 (beri \surd pada kategori yang tepat) Jurnal Ilmiah Internasional
 Jurnal Ilmiah Nasional Terakreditasi S1, S2
 Jurnal Ilmiah Nasional Terakreditasi S3, S4
 Jurnal Ilmiah Nasional Tidak Terakreditasi

I. Hasil Penilaian Validasi :

No.	ASPEK	URAIAN/KOMENTAR PENILAIAN
1.	Indikasi Plagiasi	16 %
2.	Linearitas	

II. Hasil Penilaian Peer Review :

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah (isikan di kolom yang sesuai)					Nilai Akhir Yang Diperoleh
	Internasional Bereputasi (Maks 40)	Internasional (Maks 20)	Nasional Terakreditasi S1, S2 (Maks 25)	Nasional Terakreditasi S3, S4 (Maks 20)	Nasional tidak Terakreditasi (maks 10)	
Kelengkapan dan Kesesuaian unsur isi jurnal (10%)	4					3
Ruang lingkup dan kedalaman pembahasan (30%)	12					10
Kecukupan dan Kemutakhiran data/informasi dan metodologi (30%)	12					11
Kelengkapan unsur dan kualitas penerbit (30%)	12					12
Total = (100%)	40					36
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 = $0,6 \times 0,90 \times 40 = 21,6$					21,6
KOMENTAR/ULASAN PEER REVIEW						
• Kelengkapan dan Kesesuaian Unsur:	Ada abstrak singkat. Tidak ada tujuan dan kesimpulan. Acuan lengkap dan sesuai.					
• Ruang Lingkup dan Kedalaman Pembahasan:	Pada Hasil dan Pembahasan diblok merah sehingga tidak bisa dikoreksi. Pembahasan masih dalam bidang ilmunya.					
• Kecukupan & Kemutakhiran Data & Metodologi:	Data cukup, metode biasa dikerjakan peneliti.					
• Kelengkapan Unsur & Kualitas Penerbit:	Penerbit berkualitas.					

Yogyakarta, 11 Juni 2020

Penilai 2

tanda tangan

Prof. Dr. Suwarno Hadisusanto

NIP 195411161983031002

Unit Kerja : Fakultas Biologi UGM

Bidang Ilmu : Biologi/Ekologi

Jabatan/Pangkat : Guru Besar/ Pembina Utama Madya