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# Additional Freshwater Fishes of Simeulue Island, with Special Reference to the Presence of Sharp-Nosed River Mullet *Cestraeus oxyrhyncus* (Actinopterygii: Mugilidae)

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**Abstract**
This study reports new records of freshwater fish species from Simeulue Island, Aceh Province, Indonesia. A biodiversity survey conducted in July 2021 revealed five additional fish species not previously documented on the island, including *Acentrogobius* sp., *Giuris margaritaceus*, *Cestraeus oxyrhyncus*, *Poecilia reticulata* and *Clarias* sp. The survey also confirmed the presence of introduced species, such as Nile Tilapia *Oreochromis niloticus* and Guppy *Poecilia reticulata*, highlighting the need for monitoring and managing non-native species in the region. The discovery of *C. oxyrhyncus*, currently classified as Data Deficient, accentuates the importance of further research to determine its threats, ecology, population size, and trends. This study contributes to the understanding of freshwater fish diversity on Simeulue Island and emphasises the importance of conservation efforts to protect the biodiversity of small islands in Indonesia.

**Keywords**: Aceh, freshwater fish, Indonesia, Simeulue Island, Sumatra.

## Introduction

Indonesia is home to an incredibly diverse array of freshwater fish species, thanks to its vast archipelago and varied aquatic ecosystems (Hutama *et al*. 2016; Windusari *et al*. 2019). The country's unique geography has created numerous isolated habitats, allowing species to evolve independently and resulting in high levels of endemism (IBSAP 2024; Iqbal *et al*. 2017a, b). Western Indonesia, particularly Sumatra, is a significant contributor to Indonesia's freshwater biodiversity (Kottelat *et al*. 1993; Whitten *et al*. 2000).

Sumatra is home to numerous rivers, lakes, and wetlands that support a wide range of freshwater fish species (Wibowo & Suyatno 1998; Hanum *et al.* 2019). Research has shown that small islands off the coast of Sumatra, particularly the Barusan or West Sumatran Archipelago (?), possess rich freshwater fish diversity (Hadiaty & Sauri 2017; Roesma *et al.* 2024). The region's unique geology and geography have created a multitude of habitats that allow species to evolve independently, resulting in high levels of endemism (Roesma *et al*. 2022).

Simeulue Island, located off the coast of Sumatra, Indonesia, is a region of high biodiversity, including freshwater fishes (Muchlisin *et al.* 2017). Despite its unique geography and ecological significance, the freshwater fish fauna of Simeulue Island remains understudied (Batubara *et al.* 2018). A survey of freshwater fishes on the island would provide valuable insights into the diversity and distribution

of fish species, as well as the ecological characteristics of the island's freshwater ecosystems. Here, we report additional new records of freshwater fishes from Simeulue Island, Aceh Province, Indonesia.

## Methods

In 2 to 21 July 2021, a wide biodiversity survey to asses ecological importance was conducted in Simeulue Island (02°37′N, 96°05′E), nortwestern of Sumatra, Indonesia. Administratively, Simeulue Island is situated in Aceh , Indonesia (Fig. 1). The island is located 150 kilometers off the coast of Sumatra, with a total area of approximately 1,754 square kilometers and has a population of around 93,762 people, according to the 2021 estimate (BPS 2024; Amey *et al.* 2024).

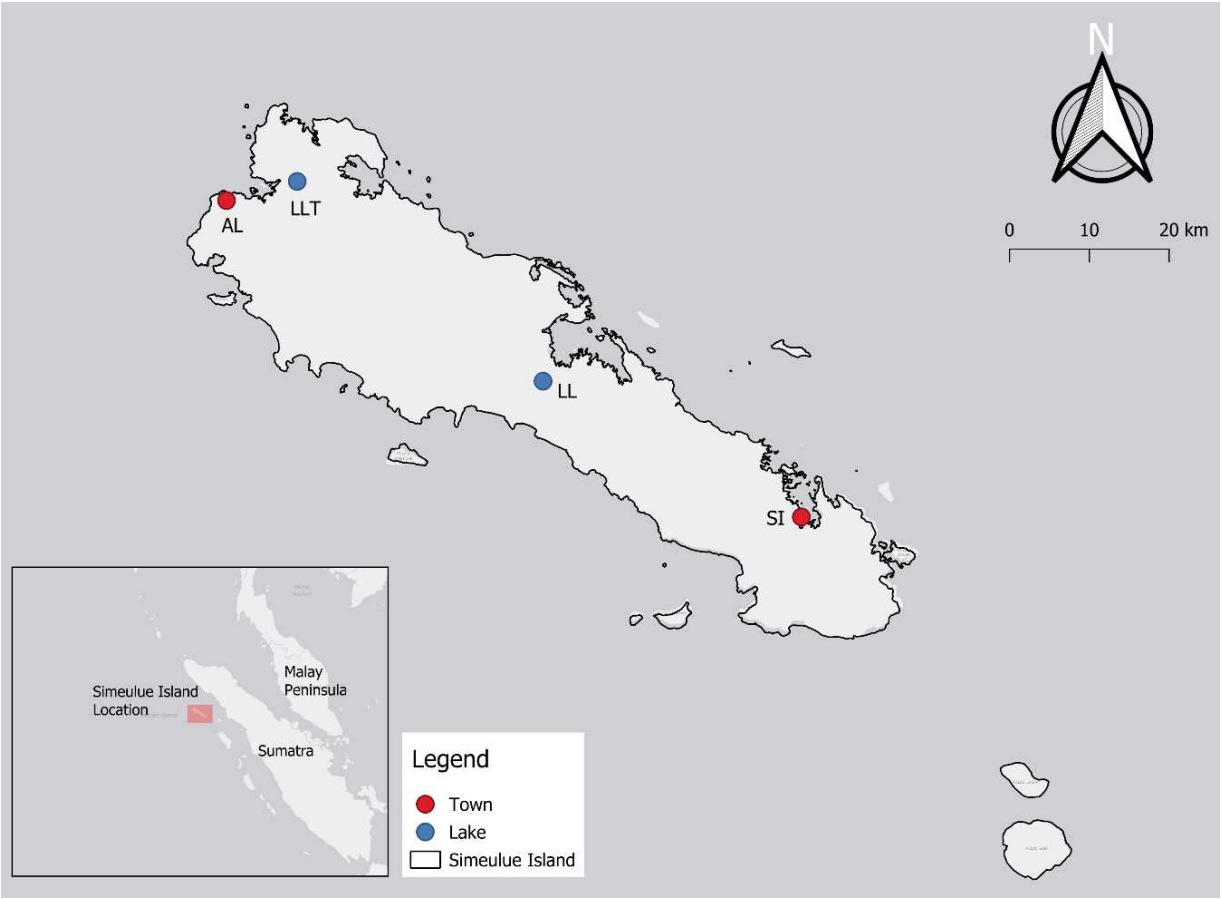


**Figure 1.** Map of Simeulue Island (Aceh Province, Sumatra) with locations mentioned in the table 1. Notes AL = Alafan Subdistrict, LLT = Lake Lauik Tawar, LL = Lake Laso, SI = Sinabang.

During our visit to Simeulue Island, we explored various aquatic locations, including Lake Lawik Tawar and several freshwater rivers. Although our survey wasn't specifically focused on fish, we had opportunities to observe local communities catching fish and see their catches. At Lake Lawik Tawar, for instance, we saw locals using traditional nets and traps called "bubu" to catch fish. In some inland river areas, we observed locals using fishing rods to catch fish.

We attempted to identify the fish species using relevant field guides for freshwater fish in western Indonesia (Kottelat *et al.* 1993; Larson & Lim 2005; Iqbal 2011; Iqbal *et al.* 2018, 2019). Our study revealed that some of the species we encountered were previously unrecorded on the island. We compiled a list of all the freshwater fish species found on the island and added new species based on our observations during the survey.

## Results and Discussion

### Additional Freshwater Fishes

The list of freshwater fish species recorded on Simeulue Island, and additional species recorded during the July 2021 survey are presented in Table 1. This table provides a comprehensive overview of the fish

fauna found on the island, including species previously documented by Muchlisin *et al.* (2017) and new records identified during the recent survey.

**Table 1.** Annotated Cehcklist of the Freshwater Fishes in Simeulue Island, Aceh Province, Indonesia. Notes: AL = Alafan Subdistrict, LLT = Lake Lauik Tawar, LL = Lake Laso, SI = Sinabang, *Pers. Obs* = refer to our survey in July 2021, species in bold are new record from survey in Juli 2021.

| Scientific Name | Family | Location | Sources |
|---|---|---|---|
| *Megalops cyprinoides* | Megalopidae | LL | Muchlisin *et al.* (2017) |
| Gobiidae 1 (*cf. Gobiopterus* sp.) | Gobiidae | LLT | Muchlisin *et al.* (2017) |
| **Gobiidae 1 (*cf. Acentrogobius* sp.)** | Gobiidae | LLT | *Pers. Obs.* |
| *Bunaka gyrinoides* | Eleotridae | LLT | Muchlisin *et al.* (2017) |
| ***Giuris margaritaceus*** | Eleotridae | AL | *Pers. Obs.* |
| *Ambasis miops* | Ambassidae | LLT, LL | Muchlisin *et al*. (2017) |
| ***Cestraeus oxyrhyncus*** | Mugilidae | LLT | *Pers. Obs.* |
| *Oreochromis niloticus* | Cichlidae | LLT, LL | Muchlisin *et al.* (2017), *Pers. Obs* |
| ***Poecilia reticulata*** | *Poecilidae* | SI | *Pers. Obs* |
| *Caranx ignobilis* | Carangidae | LLT | Muchlisin *et al.* (2017) |
| *Anabas testudineus* | Anabantidae | LL | Muchlisin *et al.* (2017) |
| *Osphronemus gouramy* | Osphronemidae | LLT | Muchlisin *et al.* (2017) |
| *Channa striata* | Channidae | LLT, LL | Muchlisin *et al.* (2017) |
| *Clarias batrachus* | Clariidae | LLT, LL | Muchlisin *et al.* (2017) |
| ***Clarias* sp. Simeulue** | Clariidae | LLT | *Pers. Obs.* |
| *Gerres filamentosus* | Gerreidae | LLT | Muchlisin *et al.* (2017) |

The table 1 comprises 16 species of fish from 13 families, with some families represented by multiple species, showcasing the diversity of fish species in the studied area. The previous list of fish from Simeulue Island refers to the fish data from Muchlisin *et al.* (2017), which recorded 11 species of freshwater fish on the island. After this study, five additional fish species were documented, namely goby species (*cf. Acentrogobius* sp.), *Giuris margaritaceus*, *Cestraeus oxyrhyncus*, *Poecilia reticulata* and *Clarias* sp. Simeulue. The notation *Clarias* sp. simeulue suggests that the species' identity is uncertain and requires further research to confirm its taxonomic status. Interestingly, *Clarias batrachus* was previously reported to occur on Simeulue Island (Muchlisin *et al.* 2017). However, recent studies have revealed that the distribution of *C. batrachus* is more limited than previously thought, with populations in the Indian subcontinent reidentified as *Clarias magur* (Ng & Kottelat 2008). It is now believed that *C. batrachus* is only found in Java, and populations from the Greater Sunda Islands and Indochina, including those from Simeulue Island, are likely to represent distinct species (Ng & Kottelat 2008)."

Our survey of freshwater fish found on Simeulue Island, revealed the presence of one introduced species, Guppy *Poecilia reticulata*. The *P. reticulata*, native to the northeastern part of South America, has been widely introduced and established in various countries across Asia, including Indonesia. Despite its popularity and widespread presence in Indonesia, research on *P. reticulata* in the region remains limited (Hariyanto *et al.* 2019). Small islands like Simeulue are particularly vulnerable to introduced species due to their unique and often fragile ecosystems. This finding emphasises the importance of monitoring and managing introduced species in western Sumatra and other small islands in Indonesia to prevent further invasions and protect native species.

In addition, another introduced species, Nile Tilapia *Oreochromis niloticus* was found in Lake Lauik Tawar. The presence of *Oreochromis niloticus* was reported from Lake Lauik Tawar and Lake Laso (Muchlisin *et al.* 2017). This cichlid species has been found to be widely distributed throughout Indonesia, from Sabang in the northwest to Merauke in the southeast, highlighting the need for further research and management of non-native species in the region (Iqbal *et al.* 2024).


**Figure 2.** Four additional freshwater fishes for Simeulue Island based on the survey in July 2021: 2a. *cf. Acentrogobius* sp.; 2b. *Giuris margaritaceus*; 2c. *Poecilia reticulata;* 2d. *Clarias* sp. Simeulue.

### The Presence of Sharp-nosed River Mullet *Cestraeus oxyrhyncus*

The little known freshwater mullet, Sharp-nosed River Mullet *Cestraeus oxyrhyncus***,** was found during our survey in Simeulue Island (Fig. 3?). This species is found in the Indo-West Pacific region, spanning from Indonesia to Philippines, and extending to the Papua New Guinea, Fiji and New Caledonia (Harrison & Senou 1999; Shen & Durand 2016). However, due to potential confusion with Lobed River Mullet *Cestraeus plicatilis*, the actual distribution might be more limited than reported (Hoese *et al.* 2021). Further verification is needed to confirm its presence in Vanuatu, the Solomon Islands and Japan (Hoese 2012; Hoese *et al.* 2021).

**Figure 3.** A Sharp-Nosed River Mullet *Cestraeus oxyrhyncus* found on July 2021 in Lauik Tawar Lake, Simeulue Island, Aceh Province, Sumatra.

The freshwater mullet from Simeulue Island is identified as *C. oxyrhynchus* based on its sharp snout profile, distinguishing it from Lobed River Mullet *Cestraeus plicatilis* and Goldie River Mullet *Cestraeus goldiei*, which have blunt snouts (Harrison & Senou 1999; Kottelat *et al.* 1993). Notably, in Indonesia, *C. plicatilis* is only found in Sulawesi, while *C. goldiei* is distributed in Sulawesi, Moluccas, Lesser Sunda, and West Papua, but neither species occurs in Sumatra. In contrast, *C. oxyrhynchus* has been reported in Sumatra (Padang and Bengkulu), Sulawesi (Manado, Sawangan, Buton, and Klabat), and Molucca (Ambon, Seram, and Bacan) in Indonesia (Weber & de Beaufort 1922; Kottelat *et al.* 1993; Hoose *et al.* 2021a).

The *C. oxyrhyncus* has a relatively wide distribution, but its ecology and distribution are poorly understood due to confusion with *C. plicatilis*. It is considered rare with notable declines reported in the Philippines, where it's a valued food fish, warranting further research to address significant knowledge gaps and potential threats, leading to its classification as Data Deficient (Hoose *et al.* 2021a). There are only few recent records in Indonesia, all from mainland Sumatra, including from Lhok Guci (province of Aceh), Pelangai waters (West Sumatra Province), and a recent record in November 2013 identified as *C. plicatis* from Muko-Muko, Bengkulu, Sumatra (Radarsumbar 2023; Fishbase 2025a, 2025b). The record of *C. oxyrhyncus* is Simeulue Island represent of this species in smaller western Islands chain in Sumatra. There is a significant lack of information on this species in Indonesia, including population data, life history, preferred habitat requirements, and potential threats. As a result, *C. oxyrhyncus* is listed as Data Deficient, highlighting the need for further research to determine its threats, ecology, population size, and trends, and to inform effective conservation.

## Conclusion

This study contributes to the understanding of freshwater fish diversity on Simeulue Island, Aceh, Indonesia, by documenting five additional fish species not previously recorded on the island, including the *C. oxyrhynchus*. The discovery of introduced species such as *Oreochromis niloticus* and *Poecilia reticulata* highlights the need for monitoring and managing non-native species to protect the island's unique ecosystem. Further research is necessary to determine the threats, ecology, population size, and trends of species like *C. oxyrhynchus*, which is currently classified as Data Deficient. This study emphasizes the importance of conservation efforts to protect the biodiversity of Simeulue Island and other small islands in Indonesia.

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## References

Amey, T., Iqbal, M., Tantri, A., Mayasari, R., Kusuma, I., Anasari, S.D., Alim, S.S., Husni, A. & Rheindt, F.E.. 2024. An avifaunal inventory of Simeulue Island, Aceh, Indonesia, and its satellites, with notes on conservation. *Journal of Asian Ornithology* 40: 77–92.

Batubara, A., Abdan, M., Muhammad, Z., Putra, N.F. & Muchlisin, Z.A. 2018. Peripheral fishes in the Estuary of Simeulue Island, Indonesia. *IOP Conference Series: Earth and Environmental Science* 216: 216 012011. DOI: https://doi.org/10.1088/1755-1315/216/1/012011

BPS. 2024. *Statistik Daerah Kabupaten Bengkulu Utara*. Badan Pusat Statistik Kabupaten Bengkulu Utara, Bengkulu, 25 pp.

Fishbase. 2025a. *Cestraeus oxyrhyncus* Valenciennes, 1836. Available at: https://www.fishbase.se/summary/15279. Accesed on 4 May 2025.

Fishbase. 2025b. *Cestraeus plicatilis* Valenciennes, 1836. Available at: https://fishbase.se/summary/Cestraeus-plicatilis. Accesed on 4 May 2025.

Hadiaty, R. & Sauri, S. 2017. Freshwater fish of Enggano Island, Indonesia. *Jurnal Iktiologi Indonesia* 17(3): 273-287. DOI: https://doi.org/10.32491/jii.v17i3.365

Hanum, L., Iqbal, M., Windusari, Y., Indriati, W. & Yustian, I. 2019. First record *Neostethus bicornis* (Phallostethidae: Atheriniformes) for Sumatran waters, Indonesia. *Ecologica Montenegrina* 24: 47–51. DOI: https://doi.org/10.37828/em.2019.24.8

Hariyanto, S., Adro'i, H., Ali, M. & Irawan, B. 2019. DNA Barcoding: A Study of Guppy Fish (*Poecilia reticulata*) in East Java, Indonesia. DOI: http://dx.doi.org/10.15294/biosaintifika.v11i2.20222

Harrison, I.J. & Senou, H. 1999. Order Mugiliformes. Mugilidae. Mullets. In: K.E. Carpenter and V.H. Niem (eds), *FAO species identification guide for fishery purposes. The living marine resources of the Western Central Pacific.*, pp. 2069-2108. FAO, Rome.

Hoese, D. 2012. *Cestraeus goldiei*. *The IUCN Red List of Threatened Species* 2012: e.T196418A2455907. https://dx.doi.org/10.2305/IUCN.UK.2012.RLTS.T196418A2455907.en. Accessed on 03 June 2025.

Hoese, D., Ame, E.C., Angeles, I.J.P., Guino-o, R.S. II & Kesner-Reyes, K. 2021a. *Cestraeus oxyrhyncus*. *The IUCN Red List of Threatened Species* 2021: e.T169362A162163729. https://dx.doi.org/10.2305/IUCN.UK.2021-2.RLTS.T169362A162163729.en. Accessed on 01 June 2025.

Hoese, D., Ame, E.C., Torres, A.G., Kesner-Reyes, K. & Angeles, I.J.P. 2021b. *Cestraeus plicatilis*. *The IUCN Red List of Threatened Species* 2021: e.T196419A162164358. https://dx.doi.org/10.2305/IUCN.UK.2021-2.RLTS.T196419A162164358.en. Accessed on 03 June 2025.

Hutama, A.A., Hadiaty, R.K. & Hubert, N. 2016. Biogeography of Indonesian freshwater fishes: Current progress. *Treubia* 43: 17-30. DOI: https://doi.org/10.14203/treubia.v43i0.2969

IBSAP. 2024. *Strategi dan Rencana Aksi Keanekaragaman Hayati Indonesia (IBSAP) 2025-2045.* Kementerian Perencanaan Pembangunan Nasional/Bappenas, Jakarta, 208 pp.

Iqbal, M. 2011. *Ikan-ikan di hutan Rawa Gambut Merang-Kepayang*. Merang REDD Pilot Project, Palembang, 92 pp.

Iqbal, M., Amey, T., Kusuma, I., Alim, S.S., Setiawan, A., Afri Amin, A. & Yustian, I. 2023a. First record of the Sumatran Forest Gecko *Gekko albomaculatus* (Giebel, 1861) on Babi and Lasia islands, Sumatra, Indonesia. *Herpetology Notes* 16: 301-304.

Iqbal, M., Amey, T., Widayanti, G.A., Aprillia, I., Syafutra, R., Sari, D.K., Arifah, N. & Pattiselanno, F. 2024a. From "Sabang to Merauke", the presence of non-native *Oreochromis mossambicus* and *Oreochromis niloticus* (Cichliformes: Cichlidae) in Indonesia. *Bio Web of Conferences* 136(03007): 1-16. DOI: https://doi.org/10.1051/bioconf/202413603007

Iqbal, M., Setiawan, A. & Yustian, I. 2024. First records of *Stigmatogobius yanamensis* Visweswara Rao, 1971 (Perciformes: Gobiidae) in Indonesian waters. *Bio Palembanica* 1(1): 35–40. DOI: https://doi.org/10.36982/bio.v1i1.4283

Iqbal, M., Setiawan, A., Aprilia, I., Isa, M. & Yustian, I. 2017a. First record of *Lobocheilos ixocheilos* Kottelat & Tan, 2008 (Cypriniformes, Cyprinidae) in South Sumatra province, Indonesia. Check List 13 (6): 931–933. DOI: https://doi.org/10.15560/13.6.931

Iqbal, M., Setiawan, A., Yustian, I., Pormansyah, Indrianti, W., Saputra, R.F. & Salaki, L.D. 2019. *Ikan Ikan Air Tawar Sembilang Dangku*. Zoological Society of London, Jakarta, 56 pp.

Iqbal, M., Yustian, I., Indriati, W., Setiawan, D. & Setiawan, A. 2017b. *Crossocheilus obscurus* Tan & Kottelat, 2009 (Teleostei, Cyprinidae): distribution extension and first record for Musi Basin, South Sumatra, Indonesia. *Check List* 13(6): 1121–1124. DOI: https://doi.org/10.15560/13.6.1121

Iqbal, M., Yustian, I., Setiawan, A. & Setiawan, D. 2018. *Ikan-Ikan di Sungai Musi dan Pesisir Timur Sumatera Selatan*. Kelompok Pengamat Burung Spirit of South Sumatra, Palembang, 249 pp.

Kottelat, M., Whitten, A.J., Kartikasari, S.N. & Wirjoatmodjo, S. 1993. *Freshwater fishes of Western Indonesia and Sulawesi.* Periplus, Hong Kong, 221 pp.

Larson, H.K. & Lim, K.K.P. 2005. *A Guide to Gobies of Singapore*. National Science Centre, Singapore, 164 pp.

Muchlisin, Z.A., Nurfadillah, N., Arisa, I.I., Rahmah, A., Putra, D.F., Nazir, M. & Zulham, A. 2017. Fish fauna of Lake Lauik Tawar and Lake Laulo, Simeulue Island, Indonesia. *Biodiversitas* 18: 752-757. DOI: https://doi.org/10.13057/biodiv/d180242

Ng, H.H. & Kottelat, M. 2008. The identity of *Clarias batrachus* (Linneaues, 1758), with the designation of a neotype (Teleostei: Clariidae). *Zoological Journal of Linnean Society* 153: 725-732. DOI: http://dx.doi.org/10.1111/j.1096-3642.2008.00391.x

Radarsumbar. 2023. *Populasi Ikan Mingkih di Pessel Terancam Punah, Diduga Ini Penyebabnya*. Available at: https://radarsumbar.com/sumbar/pesisir-selatan/56720/populasi-ikan-mingkih-di-pessel-terancam-punah-diduga-ini-penyebabnya/2/. Accesed on 4 June 2025.

Roesma, D.I., Tjong, D.H., Aidil, D.R., Prawira, F.D.L. & Saputra, A. 2024. Freshwater fish diversity

from Siberut Island, a small island in the western part of Sumatra, Indonesia. Biodiversitas 25: 836-845. DOI: https://doi.org/10.13057/biodiv/d250244

Roesma, D.I., Tjong, D.H., Janra, M.N. & Aidil, D.R. 2022. DNA barcoding of freshwater fish in Siberut Island, Mentawai Archipelago, Indonesia. *Biodiversitas* 23: 1795-1806. DOI: https://doi.org/10.13057/biodiv/d230411

Shen, K.N. & Durand, J.D. 2016. The Biogeography of Mugilidae in India, South-East and East Asia. In: D. Crosetti & S. Blabe (ed.), *Biology, Ecology and Culture of Grey Mullets (Mugilidae).* CRC Press, Boca Raton, pp. 63-84.

Weber, M. & De Beaufort, L.F. 1922. *The Fishes of the Indo-Australian Archipelago. IV. Heteromi, Solenichthyes, Synentognathi, Percesoces, Labyrinthici, Microcyprini.* E. J. Brill, Leiden, 410 pp.

Whitten, T., Damanik, S.J., Anwar, J. & Hisyam, N. 2000. *The Ecology of Sumatra.* Periplus, Singapore, 478 pp.

Wibowo, P. & Suyatno, N. 1998. *An Overview of Indonesian Wetland Sites II: An Update Information – Included in Wetland Database.* Wetlands International–Indonesia Programme, Bogor, 146 p.

Windusari, Y., Hanum, L., Setiawan, D. & Iqbal, M. 2019. Photographic evidence of freshwater whipray *Urogymnus dalyensis* (Myliobatiformes: Dasyatidae) in Indonesian waters. *Ecologica Montenegrina* 22: 166–170. DOI: https://doi.org/10.37828/em.2019.22.13