

Notes on the Moray Eels (Anguilliformes: Muraenidae) of Malaysia with Two New Records

(Nota Mengenai Belut Laut (Anguilliformes: Muraenidae)
di Malaysia dengan Dua Rekod Baru)

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ABSTRACT

Two new records of moray eels (Muraenidae), Gymnothorax margaritophorus Bleeker, 1864 and Strophidon sathete (Hamilton 1822), are reported for Malaysia. They are represented by two specimens each, all collected from Sabah waters. The present study also provides the current taxonomic and distributional information of the Malaysian moray eels. To date, there are 33 species belonging to six genera of the Muraenidae in Malaysian waters based on the published records.

Keywords: Anguilliformes; moray eels; Muraenidae; new records; taxonomic revision

ABSTRAK

Dua rekod baru belut laut (Muraenidae), Gymnothorax margaritophorus Bleeker, 1864 dan Strophidon sathete (Hamilton 1822), dilaporkan untuk Malaysia. Kedua-duanya diwakili oleh dua spesimen bagi setiap spesies dan semua spesimen diperolehi dari perairan Sabah. Kajian ini juga memberikan maklumat terkini mengenai taksonomi dan taburan belut laut di Malaysia. Setakat ini perairan Malaysia mempunyai 33 spesies daripada enam genus Muraenidae berdasarkan rekod-rekod yang telah diterbitkan.

Kata kunci: Anguilliformes; belut laut; Muraenidae; rekod baru; semakan taksonomi

INTRODUCTION

Moray eels belong to a diverse family of eels (Muraenidae) found around the world, with 15 genera and 197 species (Smith 2012). They are locally called *belut-laut*, *belin* or *malong* in Malay. This group of fishes is distinguished from other eel families by the absence of pectoral and pelvic fins. Some species of the moray eels are commercially exploited and contribute as food fish in fish markets worldwide, e.g. in Okinawa, Japan (Hatooka & Randall 1992), Taiwan (Tsai et al. 2009), Portugal and Vietnam (Loh et al. 2011), but these fish are not similarly used in Malaysia.

The past studies of muraenid fauna in Malaysia are sparse. The earliest records of moray eels from the Malay Archipelago are from Bleeker (1853) which included *Muraena dizona*, *M. venosa*, *M. prosopeion* and *Thaerodontis reticulata*. Maxwell (1921) listed *Muraena undulata* in his book 'Malayan Fishes'. Herre (1940) further added another species, *Uropterygius concolor* in his book 'Additions to the Fish Fauna of Malaya'. Mohsin and Ambak (1996) reported *Gymnothorax thyrsoideus* in their book 'Marine Fishes and Fisheries of Malaysia and Neighbouring Countries' (p. 697, figure 80). More recent records of the moray eels are reported by Atan et al. (2010) who listed three genera and 17 species of moray eels in their book 'Ikan Laut Malaysia, Glosari, Nama Sahih Spesies Ikan' and Ambak et al. (2010) who listed three genera and 18 species of muraenids in their book

'Fishes of Malaysia' (p. 35). However, five genera with 16 species of the family Muraenidae are listed as present in Malaysia by Chong et al. (2010).

Thus, the records from the sparse information suggest that the total number of moray eels in Malaysia is 16-18 species. However, given the recent taxonomic revisions of the moray eels of the world (Smith 2012), it is expected that the Malaysian species lists also include misidentifications and synonyms.

The present study aimed to describe two new records of moray eels and to update the current moray eel species list in Malaysia after correcting the scientific names of the moray eels so far recorded.

MATERIALS AND METHODS

A total of four moray eels were collected by long lines in Udar Island and Sepangar Island, Sabah. The specimens were fixed in 10% formalin, then transferred into 70% ethanol solution for long term preservation. The methods of measurements followed Böhlke and Randall (2000). Proportional measurements for the specimens of moray eels were expressed as percentage of the total length (TL) or the head length (HL). Body depth was measured at the gill openings (DGO) and at the anus (DA); both measurements did not include the fins. Preanal length (PAL), snout length (S), eye diameter (E) and upper jaw length (UI) were also measured. All specimens were deposited

records are recorded and a previously reported species *G. pseudothyrsoides* (Bleeker 1853) is actually the first collected from Malaysia. Thus, the present tentative record of Malaysia's moray eel diversity is at a total of six genera with 33 species. This update, however, assumes that the moray eels have been correctly identified by the original authors. The corrections to species names in the present update are, however, necessary to stabilize the names so far listed by the published texts in order to prevent the perpetuation of wrong species names being used in future reports, publications and texts. The next step is to improve the list of Malaysian moray eels is to check the validity of the species given by these authors, either by re-examination of the voucher specimens or if unavailable, re-sampling of specimens in the said locality of collection.

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REFERENCES

- Ambak, M.A., Isa, M.M., Zakaria, M.Z. & Ghaffar, M.A. 2010. *Fishes of Malaysia*. Terengganu: Penerbit Universiti Malaysia Terengganu.
- Atan, Y., Jaafar, H. & Abdul Majid, A.R. 2010. *Ikan Laut Malaysia: Glosari Nama Sahih Spesies Ikan*. Kuala Lumpur: Dewan Bahasa dan Pustaka. pp. 142-144.
- Bleeker, P. 1853. Diagnostische beschrijvingen van nieuwe of weinig bekende vischsoorten van Sumatra. *Natuurkundig Tijdschrift voor Nederlandsch indie* 4: 243-302.
- Böhlke, E.B. 1997. Notes on the identity of elongate unpatterned Indo-Pacific morays, with description of a new species (Muraenidae, subfamily Muraeninae). *Proceedings of the Academy of Natural Sciences of Philadelphia* 147: 89-109.
- Böhlke, E.B. & Randall, J.E. 2000. A review of the moray eels (Anguilliformes: Muraenidae) of the Hawaiian Islands, with descriptions of two new species. *Proceedings of the Academy of Natural Sciences of Philadelphia* 150: 203-278.
- Böhlke, E.B. & Smith, D.G. 2002. Type catalogue of Indo-Pacific Muraenidae. *Proceedings of the Academy of Natural Sciences of Philadelphia* 152: 89-172.
- Böhlke, E.B., McCosker, J.E. & Smith, D.G. 1999. Family Muraenidae, In *FAO Species Identification Guide for Fishery Purposes. The Living Marine Resources of the Western Central Pacific*, edited by Carpenter, K.E. & Niem, V.N. Vol. 6, Batoid fishes, chimaeras, bony fishes part 1. pp. 1643-1657.
- Castle, P.H.J. & McCosker, J.E. 1986. Family No. 41: Muraenidae. In *Smiths' Sea Fishes (Smith & Heemstra)*. pp. 165-176.
- Chen, J.T.F. & Weng, H.T.C. 1967. A review of the Apodal fishes of Taiwan. *Biological Bulletin Tunghai University Ichthyology* 6(32): 1-86.
- Chen, H.M., Shao, K.T. & Chen, C.T. 1994. A review of the muraenid eels (Family Muraenidae) from Taiwan with descriptions of twelve new records. *Zoological Studies* 33(1): 44-64.
- Chong, V.C., Lee, P.K.Y. & Lau, C.M. 2010. Diversity, extinction risk and conservation of Malaysia fishes. *Journal of Fish Biology* 76: 2009-2066.
- Department of Fisheries Malaysia. 2009. Valid local name of Malaysian marine fishes. Department of Fisheries Malaysia. Ministry of Agriculture and Agro-based Industry. p. 180.
- Hatooka, K. & Randall, J.E. 1992. A new moray eel (*Gymnothorax*: Muraenidae) from Japan and Hawaii. *Japanese Journal of Ichthyology* 39(3): 183-190.
- Hatooka, K. & Yoshino, T. 1982. Moray eels (Pisces, Muraenidae) in the collection of the University of the Ryukyus. *Galaxea* 1: 87-109.
- Herre, A.W.C.T. 1940. Additions to the fish fauna of Malaya and notes on rare or little known Malayan and Bornean fishes. *Bulletin of the Raffles Museum* 16: 27-61.
- Loh, K.H., Shao, K.T. & Chen, H.M. 2011. Length-weight relationships for 39 species of moray eel from the waters around Taiwan. *Journal of Applied Ichthyology* 27: 945-948.
- Maxwell, C.N. 1921. *Malayan Fishes*. Singapore: Methodist Publishing House. pp. 104.
- Mohsin, A.K.M. & Ambak, M.A. 1996. *Marine Fishes and Fisheries of Malaysia and Neighbouring Countries*. Terengganu: Penerbit Universiti Malaysia Terengganu.
- Myers, R.F. 1991. *Micronesian Reef Fishes. A Practical Guide to the Identification of the Inshore Marine Fishes of the Tropical Central and Western Pacific*. 2nd ed. Barrigada, Guam: Coral Graphics. p. 298.
- Randall, J.E. & Lim, K.K.P. 2000. A checklist of the fishes of the South China Sea. *The Raffles Bulletin of Zoology* 8 (Supplement): 569-667.
- Randall, J.E. & Golani, D. 1995. Review of the moray eels (Anguilliformes: Muraenidae) of the Red Sea. *Bulletin of Marine Science* 56(3): 849-880.
- Schultz, L.P., Herald, E.S., Lachner, E.A., Welander, A.D. & Woods, L.P. 1953. *Fishes of the Marshall and Marianas Islands. Vol. 1*. United States National Museum Bulletin 202. p. 685.
- Smith, D.G. 2012. A checklist of the moray eels of the world (Teleostei: Anguilliformes: Muraenidae). *Zootaxa* 3474: 1-64.
- Smith, J.L.B. 1962. The moray eels of the western Indian Ocean and the Red Sea. *Ichthyological Bulletin* 23: 421-444.
- Tanaka, S. 1918. Two new species of Japanese fishes. *Zoological Magazine Tokyo* 30(352): 51-52.
- Tsai, W.L., Chen, H.M., Hsieh, C.H., Lin, W.F. & Hwang, D.F. 2009. A potential methodology for differentiation of ciguatera-carrying species of moray eel. *Food Control* 20: 575-579.
- Zhang, C.G., Tang, W.Q., Liu, D., Zhang, Z.L. & Zhang, S.Y. 2010. *Fauna Sinica. Osteichthyes. Anguilliformes, Notacanthiformes*. Beijing: Science Press. p. 453.
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