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# First Record of the Smoothtail Mobula, *Mobula thurstoni* (Myliobatiformes: Myliobatidae) in Southern Korea

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**ABSTRACT** **Two specimens (1770~1850 mm disc width) of *Mobula thurstoni*, belonging to the family Myliobatidae, order Myliobatiformes, were first collected from the central coast of the Southern Sea of Korea in September 2018. This species is characterized by an anterior margin of disc with double curvature, a white-tipped dorsal fin, and the absence of a caudal spine. This species is morphologically similar to *Mobula kuhlii*, but has an anterior margin of pectoral fins with a double curvature and the dorsal coloration is bluish black rather than white. In addition, *M. thurstoni* was well distinguished from *M. kuhlii* as determined by mitochondrial DNA 16S rRNA sequences with genetic distances ranging from 0.030 to 0.069. The Korean name 'Mae-kkeun-kko-li-jwi-ga-o-li' is proposed for the species *M. thurstoni*.**

**Key words:** *Mobula thurstoni*, Myliobatidae, first record, Southern Korea, Yeosu

## INTRODUCTION

The family Myliobatidae belong to order Myliobatiformes, is comprised of 40 species and seven genera worldwide, 10 species and 6 genera in Japan, and 3 species and 3 genera in Korea (Nakabo, 2013; Nelson *et al*., 2016; MABIK, 2020). The Korean species are *Aetobatus flagellum* (Bloch and Schneider, 1801), *Myliobatis tobijei* Bleeker, 1854, *Mobula japanica* (Müller and Henle, 1841). They are distributed across tropical and temperate regions found both on continental and insular shelves, and offshore (Nelson *et al*., 2016), and their body consist of a rhomboidal disc that is wider than it is long with the head elevated above the disc and the eye and spiracles placed laterally on the head. They also have a whip-like tail that is thin and longer than the overall length of the disc (Nelson *et al*., 2016). The family Mobulidae includes two genera, *Manta* Bancroft, 1829 and *Mobula*. These genera are separated by the position of the mouth, which is located ventrally in *Mobula* and terminally in *Manta* (Townsend and Kyne, 2010). The genus *Mobula* is characterized by a pair of cephalic fins in front of the head that assist in feeding activities.

In the present study, two specimens of *Mobula thurstoni* were collected near Yeosu, Korea in 11 September 2018. Herein, we describe the morphological characteristics of these samples and add *Mobula thurstoni* to the list of Korean fish fauna.

## MATERIALS AND METHODS

Two *Mobula thurstoni* specimens were collected by set net from the coast of Yeondo (34°26′4.91″N 127°49′17.09″

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E), Yeosu, Korea, in 11 September 2018. Counting, measuring, and identification procedures followed those of Notarbartolo-di-Sciara (1987). Each body part was measured to the nearest 0.1 mm using digital Vernier calipers. All proportional measurements are expressed as percentage (%) of disc width (DW, mm). The specimens were deposited at the Marine Biodiversity Institute of Korea (MABIK).

To compare molecular data, total genomic DNA was extracted from muscle tissue using 10% Chelex resin (Bio-Rad, Hercules, CA) and a polymerase chain reaction (PCR) was then performed for mitochondrial DNA 16S ribosomal RNA sequence (16S rRNA) using an MJ Mini Thermal Cycler PTC-1148 (Bio-Rad) in mixtures consisting of 1 μL of genomic DNA, 2 μL of 10 PCR buffer, 1.6 μL of 2.5 mM dNTPs, 0.5 μL of each primer, 0.1 μL of TaKaRa EX-Taq polymerase (TaKaRa Bio Inc., Kyoto, Japan), and distilled water to bring the final volume to 20 μL. PCR products were amplified using universal primers: 16SAR-L (5′-CGC CTG TTT ATC AAA AAC AT-3′) and 16SBR-H (5′-CCG GTC TGA ACT CAG ATC ACG T-3′) designed by (Ivanova *et al*., 2007). The PCR profile consisted of initial denaturation at 95°C for 5 minutes, followed by 35 cycles of denaturation at 95°C for 1 minute, annealing at 50°C, extension at 72°C for 1 minute, and a final extension at 72°C for 5 minutes. The PCR products were purified using a Davinch$^{TM}$ PCR Purification Kit (Davinch-K Co., Ltd., Seoul, Korea). The DNA was sequenced with an Applied Biosystems ABI 3730XL sequencer (Applied Biosystems, Foster City, CA) using an ABI PRISM BigDye$^{TM}$ Terminator Cycle Sequencing Ready Reaction Kit v3.1 (Applied Biosystems). We compared our molecular data with those of the mtDNA 16S rRNA sequences from other *Mobula* species obtained from the National Center for Biotechnology Information. Sequences were aligned using ClustalW (Thompson *et al*., 1994) in BioEdit, version 7 (Hall, 1999). The genetic divergences were calculated using the Kimura 2-parameter (K2P) (Kimura, 1980) model with Mega 6 (Tamura *et al*., 2013). Phylogenetic trees were constructed using the neighbor-joining method (Saitou and Nei, 1987) in Mega 6 (Tamura *et al*., 2013), with confidence assessed based on 1000 bootstrap replications.

## RESULTS AND DISCUSSION

***Mobula thurstoni* (Lloyd, 1908)**

(New Korean name: Mae-kkeun-kko-li-jwi-ga-o-li)

(Figs. 1, 2; Table 1)

*Dicerobatis thurstoni* Lloyd, 1908: 179 (type locality: India).


**Fig. 1.** A, *Mobula thurstoni*; MABIK SQ002885, 1850 mm disc width; B, MABIK SQ002886, 1770 mm DW. A, B, dorsal views; A′, B′, ventral views.

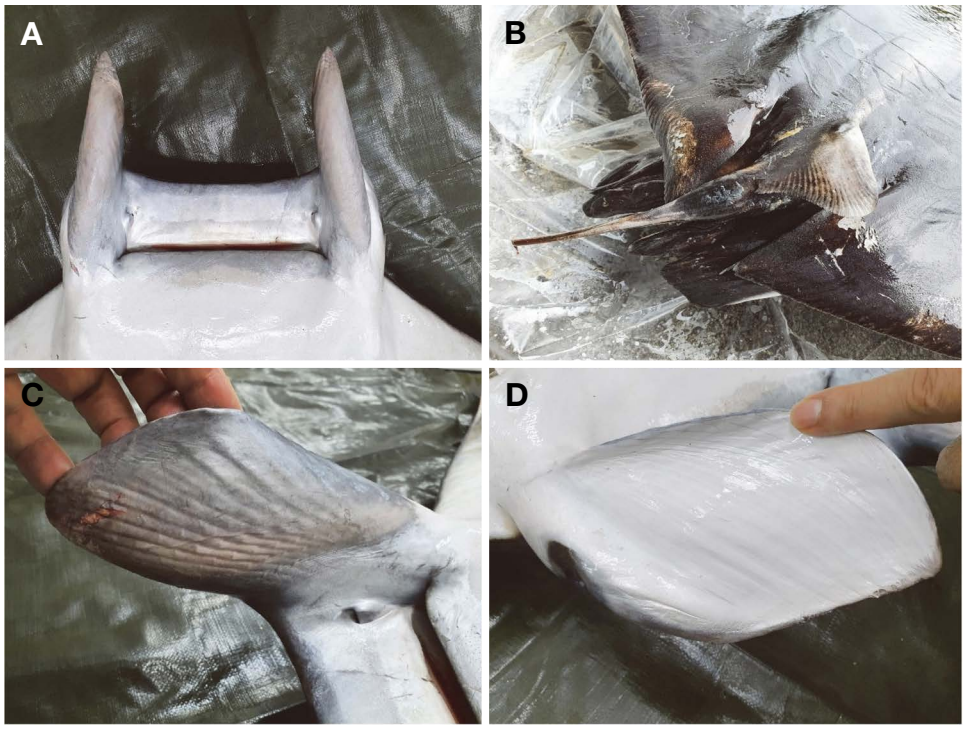


**Fig. 2.** *Mobula thurstoni*, MABIK SQ002885 (1850 mm disc width); A, Ventral view of head; B, Dorsal view of dorsal fin (caudal fin cutting state); C, Inside view of cephalic fin; D, Outside view of cephalic fin.

*Mobula lucasana* Beebe and Tee-Van, 1938: 299 (type locality: San Lucas Bay, Baja California, Mexico).

*Mobula thurstoni*: Notarbartolo-di-Sciara, 1987: 36 (India); Allen and Robertson, 1994: 37 (eastern Pacific); Randall, 1995: 51 (Oman); Thomson *et al*., 2000: 284 (Gulf of California); Ehemann *et al*., 2018: 27 (Mexico); Zajonz *et al*., 2019: 61 (Yemen); Psomadakis *et al*., 2020: 216 (Myanmar).

**Material examined.** MABIK SQ002885, MABIK SQ002886, two specimens, 1770∼1850 DW, collected by set net, coast of Yeondo, Yeosu, Korea (34°26′4.91″N 127° 49′17.09″E), September 2018.

**Description.** Measurements are shown in Table 1. Primary shape broad rhomboidal, wing-like disc, with disc much wider than long. Disc thick towards center and thinner towards edges with head protruding in front of disc. Mouth very broad and located ventrally. Eye and spiracles on both sides (Fig. 2A). Spiracle openings small and located below pectoral fin base. Teeth bands present on both jaws. A pair of nostrils located in front of mouth and can be identified by a very small hole. The nostrils located between corners of the mouth and rostrum. One pair of cephalic fins, relatively short and curled outward, extend about 45 degrees down and forward from anterior margin of disc with double curvature. Dorsal fin small and a white-tip (Fig. 2B). Tail whip-like, thin, long, soft, and begins behind dorsal fin. Length of tail shorter than disc width. Caudal spine completely absent and skin entirely smooth.

**Coloration.** Dark blue to black above, dorsal cephalic fins and pectoral fins tips light gray (Fig. 1). Light gray straight line along spine to tip of dorsal fin running down middle of body behind the head. Light gray from back of head to middle of body to dorsal fin. Dorsal fin with distinct white tip. Ventral surface mostly white and shiny silver color that stretches from middle of disc to end of pectoral fin. Dark blue in front of middle part of pectoral fins and a light gray color around mouth. Inside of the cephalic fins light gray white the outside white (Fig. 2C, D). Tip of rostrum dark blue. Tip of the pelvic fins blue color.

**Distribution.** Yeosu, Korea (present study), Japan (Nakabo, 2013), Indonesia (White *et al*., 2006; Mukharror *et al*., 2018), Philippines (Bessey *et al*., 2019), Mexico (Campbell and Beveridge, 2006; Santillán-Lugo *et al*., 2017), Cape Verde (Ratão *et al*., 2017), Arabian Sea (Di Sciara *et al*., 2017), Andaman Sea (Shirke *et al*., 2017), Atlantic Ocean (Mas *et al*., 2015).

**Remarks.** The two specimens examined in this study belong to the Mobulinae as the disc is much wider than its length as well as the head protruding in front of the disc,

**Table 1.** Morphometric measurements of the smoothtail mobula, *Mobula thurstoni* in comparison with previous records

| Measurements | Present specimens | | Lloyd, 1908 | Mas *et al*., 2015 | Shirke *et al*., 2017 |
|---|---|---|---|---|---|
| | %WD | %WD | %WD | %WD | %WD |
| Disc width (mm) | 1850 | 1770 | 1600 | 955 | 624 |
| % of disc width | | | | | |
| Disc length | 51.4 | 49.7 | 45.6 | 48.0 | 51.0 |
| Eye diameter | 2.6 | 2.3 | – | – | 2.2 |
| Orbit height | 2.3 | 2.0 | – | 1.5 | 2.4 |
| Between antorbitals | 17.6 | 17.6 | – | 16.5 | 21.2 |
| Pre-orbital length | 8.0 | 7.8 | – | 8.4 | 7.9 |
| Spiracle length | 1.0 | 1.0 | – | 0.1 | 0.1 |
| Interspiracle distance | 16.8 | 17.2 | – | 15.9 | 16.9 |
| Tip of cephalic fin to spiracle | 12.2 | 12.4 | – | 13.0 | 13.1 |
| Mouth width | 11.2 | 11.0 | – | 11.1 | 11.2 |
| Upper toothband length | 8.6 | 8.2 | – | 8.8 | 8.3 |
| Lower toothband length | 8.8 | 8.4 | – | 9.1 | 9.0 |
| Preoral length | 4.2 | 4.0 | – | 3.6 | 4.3 |
| Tip of cephalic fin to mouth | 11.0 | 10.7 | – | 11.6 | 11.4 |
| Internarial distance | 10.3 | 9.9 | 10.0 | 10.8 | 9.7 |
| Anterior projection | 35.7 | 36.7 | – | 33.8 | 34.6 |
| Cephalic fin length | 11.1 | 10.9 | – | – | 12.1 |
| Cephalic fin width | 6.4 | 5.8 | – | – | 4.6 |
| Clasper length (left) | 7.2 | 6.8 | – | – | – |
| Clasper length (right) | 8.4 | 8.8 | – | – | – |
| Head length | 13.3 | 11.9 | – | – | 17.8 |
| 1st gill slit length | 5.0 | 4.7 | – | 5.1 | 4.9 |
| 2nd gill slit length | 5.1 | 4.2 | – | 5.0 | 5.0 |
| 3rd gill slit length | 5.3 | 4.1 | – | 5.4 | 5.1 |
| 4th gill slit length | 4.9 | 4.3 | – | 5.0 | 5.1 |
| 5th gill slit length | 3.6 | 3.2 | – | 3.2 | 3.7 |
| Between 1st gill slit | 11.7 | 11.1 | – | 11.7 | 11.5 |
| Between 2nd gill slit | 10.5 | 10.2 | – | 10.8 | 4.4 |
| Between 3rd gill slit | 9.2 | 8.5 | – | 9.0 | 9.3 |
| Between 4th gill slit | 6.9 | 6.5 | – | 6.8 | 7.5 |
| Between 5th gill slit | 4.8 | 4.5 | – | 5.0 | 5.1 |
| Rostrum to pelvic fin | 51.9 | 51.4 | – | 49.7 | 51.0 |
| Rostrum to 1st gill slit | 11.9 | 10.8 | – | – | 18.4 |
| Rostrum to 2nd gill slit | 14.2 | 13.5 | – | – | 10.3 |
| Rostrum to 5th gill slit | 22.7 | 21.2 | – | – | 30.4 |
| Pre-dorsal length | 42.7 | 42.4 | – | – | 43.1 |
| Pre-cloacal length | 43.2 | 41.5 | – | – | 43.3 |
| Dorsal fin base | 5.7 | 5.2 | – | – | 6.3 |
| Dorsal fin height | 4.1 | 3.6 | – | – | 4.3 |
| Pelvic fin length | 10.2 | 9.8 | – | – | 5.8 |
| Tail length | – | 71.8 | 33.1 | – | 65.1 |

eyes and spiracles on both sides, and one pair of cephalic fins (Nelson *et al*., 2016). They also are in the genus *Mobula* by having the position of the mouth located under the head (Yamaguchi *et al*., 2013). Additionally, they matched the original description of *Mobula thurstoni* (Lloyd, 1908) well as follows; anterior margin of disc with double curvature, caudal spine absent, dorsal fin with white tip, dorsal coloration bluish black (Shirke *et al*., 2017; White

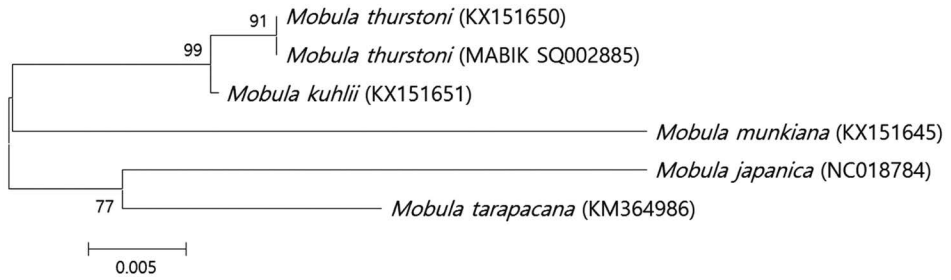


**Fig. 3.** A neighbor-joining tree based on partial mtDNA 16S rRNA region using *Mobula thurstoni* (MABIK SQ002885) and other species of *Mobula*. Numbers at branches indicate bootstrap probabilities in 1,000 bootstrap replications. Scale bar equals 0.005 of Tamura and Nei's distance (1993) with K2 parameter model.

*et al*., 2018). According to the original description of this species, the length of tail is as short as 33.1% of the disc width, whereas the present specimens showed a difference in the tail length (71.8%, Table. 1). The spiracle length of the specimens was also longer (1.0% DW) than the recorded spiracle length (0.1% DW in Shirke *et al*., 2017). In addition, these specimens were shorter (11.9∼13.3% DW) than the recorded head length (17.8% DW in Shirke *et al*., 2017). Such morphological differences require further study of geographic variation. Nevertheless, these specimens were consistent with *M. thurstoni* in primary features, including spiracles opening below the pectoral fin base, no spine behind dorsal fin, an anterior margin of disc with double curvature, and the dorsal side of the disc was dark brown (Lloyd, 1908; Shirke *et al*., 2017; White *et al*., 2018).

*M. thurstoni* is most similar to *M. kuhlii* in external shape (Müller and Henle, 1841), but differs in the shape of the anterior margin of the pectoral fins (with a double curvature for *M. thurstoni* vs. straight or slightly convex for *M. kuhlii*) and disc color of the dorsal side (bluish black vs. greyish brown) (White *et al*., 2018). A single species of *M. japanica* has been known from the Korean waters to date, and the second species of the genus from Korea, *M. thurstoni*, is easily distinguished from the former by the presence of a caudal spine and by tail length (33.1∼71.8% of WD for *M. thurstoni* vs. 120∼171.6% of WD for *M. japanica*) (Paulin *et al*., 1982; Shirke *et al*., 2017). In addition, our specimens also corresponded well with *M. thurstoni* and fell as sister to *M. kuhlii* (99% bootstrap support) compared by mitochondrial DNA 16S rRNA sequences (Fig. 3). *M. thurstoni* was well distinguished from *M. kuhlii* and also well separated from other congeners by genetic distances (*d*) ranging from 0.030 to 0.069. We propose the new Korean name, 'Mae-kkeun-kko-li-jwi-ga-o-li', for *M. thurstoni* because the common name of this species is 'smoothtail mobula'.

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## REFERENCES

Allen, G.R. and D.R. Robertson. 1994. Fishes of the tropical eastern Pacific. University of Hawaii Press, Honolulu, HI, U.S.A., 352pp.

Bancroft, E.N. 1829. On the fish known in Jamaica as the sea-devil. In: Vigors, N.A. (ed.), Zoological Journal. Vol. 4. Phillips Publishing, London, U.K., pp. 444-457.

Bloch, M.E. and J.G. Schneider. 1801. Systema ichthyologiae iconibus ex illustratum. Vol. 2. Berlin, Germany, p. 584.

Bessey, C., S.N. Jarman, M. Stat, C.A. Rohner, M. Bunce, A. Koziol, M. Power, J.M. Rambahiniarison, A. Ponzn, A.J. Richardson and O. Berry. 2019. DNA metabarcoding assays reveal a diverse prey assemblage for *Mobula* rays in the Bohol Sea, Philippines. Ecol. Evol., 9: 2459-2474. https://doi.org/10.1002/ece3.4858.

Campbell, R.A. and I. Beveridge. 2006. Three new genera and seven new species of *Trypanorhynch cestodes* (family Eutetrarhynchidae) from manta rays, *Mobula* spp. (Mobulidae) from the Gulf of California, Mexico. Folia Parasitol., 53: 255-275. https://doi.org/10.14411/fp.2006.033.

Di Sciara, G.N., D. Fernando, S. Adnet, H. Cappetta and R.W. Jabado. 2017. Devil rays (Chondrichthyes: *Mobula*) of the Arabian Seas, with a redescription of *Mobula kuhlii* (Valenciennes in Müller and Henle, 1841). Aquat. Conserv., 27: 197-218. https://doi.org/10.1002/aqc.2635.

Ehemann, N.R., L. del Valle González-González, J.G. Chollet-Villalpando and J. De La Cruz-Agüero. 2018. Updated checklist of the extant Chondrichthyes within the Exclusive Economic Zone of Mexico. Zookeys, 774: 17-39. https://doi.org/10.3897/zookeys.774.25028.

Hall, T.A. 1999. BioEdit: a user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT.

Nucl. Acid. Symp. Ser., 41: 95-98.

Ivanova, N.V., T.S. Zemlak, R.H. Hanner and P.D. Hebert. 2007. Universal primer cocktails for fish DNA barcoding. Mol. Ecol. Not., 7: 544-548. https://doi.org/10.1111/j.1471-8286.2007.01748.x.

Kimura, M. 1980. A simple method for estimating evolutionary rate of base substitution through comparative studies of nucleotide sequences. J. Mol. Evol., 16: 111-120. https://doi.org/10.1007/BF01731581.

Lloyd, R.E. 1908. On two new species of eagle-rays (Myliobatidae), with notes on the skull of the genus *Ceratoptera*. Rec. Zool. Surv. India., 2: 175-180.

MABIK (Marine Biodiversity Institute of Korea). 2020. National List of Marine Species. Namu Press, Seocheon, Korea, 126pp.

Mas, F., R. Forselledo and A. Domingo. 2015. Mobulid ray by-catch in longline fisheries in the south-western Atlantic Ocean. Mar. Freshwater Res., 66: 767-777. https://doi.org/10.1071/MF14180.

Mukharror, D.A., I.T. Baiti, S.A. Harahap, D.J. Prihadi, M. Ichsan and N. Pridina. 2018. First records of bentfin devil ray (*Mobula thurstoni*) and the examination in physical factors of its habitat in the western waters of Morotai Island (North Moluccas). IOP. Conf. Ser. Earth. Environ. Sci., 137: 012048. https://doi.org/10.1088/1755-1315/137/1/012048.

Müller, J. and J. Henle. 1841. Systematische Beschreibung der Plagiostomen. Berlin, Germany, p. 200.

Nakabo, T. 2013. Fishes of Japan with pictorial keys to the species, 3rd ed. Vol. 1. Tokai Univ. Press, Kanagawa, Japan, 864pp.

Nelson, J.S., T.C. Grande and V.H. Wilson. 2016. Fishes of the World, 5th ed. John Wiley and Sons Inc., Hoboken, New Jersey, U.S.A., p. 386.

Notarbartolo-di-Sciara, G. 1987. A revisionary study of the genus *Mobula* Rafinesque, 1810 (Chondrichthyes: Mobulidae) with the description of a new species. Zool. J. Linn. Soc., 91: 1-91. https://doi.org/10.1111/j.1096-3642.1987.tb01723.x.

Paulin, C.D., G. Habib, C.L. Carey, P.M. Swanson and G.J. Voss. 1982. New records of *Mobula japanica* and *Masturus lanceolatus*, and further records of *Luvaris imperialis* (Pisces: Mobulidae, Molidae, Louvaridae) from New Zealand. N. Z. J. Mar. Freshwater Res., 16: 11-17. https://doi.org/10.1080/00288330.1982.9515943.

Psomadakis, P., H. Thein, B.C. Russell and M.T. Tun. 2020. Field identification guide to the living marine resources of Myanmar. FAO species identification guide for fishery purposes. FAO, Rome, Italy, 357pp.

Randall, J.E. 1995. Coastal fishes of Oman. University of Hawaii Press, Honolulu, HI, U.S.A., 439pp.

Ratão, S.S., D. Dias and V. Stiebens. 2017. First record of smoothtail mobula *Mobula thurstoni* (Myliobatidae) in Cabo Verde. Zool. Caboverdiana, 6: 11-14.

Saitou, N. and M. Nei. 1987. The Neighbor-Joining Method: a new method for reconstructing phylogenetic trees. Mol. Biol. Evol., 4: 406-425. https://doi.org/10.1093/oxfordjournals.molbev.a040454.

Santillán-Lugo, B., R. Llera-Herrera, D. Corro-Espinosa, E.C. Oñate-González, G. Rodríguez-Domínguez and N.C. Saavedra-Sotelo. 2017. Complete mitochondrial genome of the Devil Ray, *Mobula thurstoni* (Lloyd, 1908) (Myliobatiformes: Myliobatidae). Mitochondrial DNA B., 2: 868-870. https://doi.org/10.1080/23802359.2017.1407689.

Shirke, S.S., M. Nashad, M.D. Sukham and H.D. Pradeep. 2017. A first record of the bentfin devil ray *Mobula thurstoni* (Lloyd, 1908) (Myliobatiformes: Mobulidae) from the Indian EEZ of the Andaman Sea. J. Threat. Taxa., 9: 11074-11080. https://doi.org/10.11609/jott.3089.9.12.11074-11080.

Tamura, K. and M. Nei. 1993. Estimation of the number of nucleotide substitutions in the control region of mitochondrial DNA in humans and chimpanzees. Mol. Biol. Evol., 10: 512-526. https://doi.org/10.1093/oxfordjournals.molbev.a040023.

Tamura, K., G. Stecher, D. Peterson, A. Filipski and S. Kumar. 2013. MEGA6: Molecular Evolutionary Genetics Analysis version 6.0. Mol. Biol. Evol., 30: 2725-2729. https://doi.org/10.1093/molbev/mst197.

Thomson, D.A., L.T. Findley and A.N. Kerstitch. 2000. Reef fishes of the Sea of Cortez: the rocky-shore fishes of the Gulf of California. University of Texas Press, Austin, TX, U.S.A., p. 44.

Thompson, J.D., D.G. Higgins and T.J. Gibson. 1994. Clustal W: improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position-specific gap penalties and weight matrix choice. Nucl. Acid. Res., 22: 4673-4680. https://doi.org/10.1093/nar/22.22.4673.

Townsend, K.A. and P.M. Kyne. 2010. New records of the Japanese Devilray *Mobula japanica* (Müller & Henle, 1841) for Australian waters. Mem. Queensl. Mus., 55: 225-230.

White, W.T., S. Corrigan, L. Yang, A.C. Henderson, A.L. Bazinet, D.L. Swofford and G.J. Naylor. 2018. Phylogeny of the manta and devilrays (Chondrichthyes: Mobulidae), with an updated taxonomic arrangement for the family. Zool. J. Linn. Soc., 182: 50-75. https://doi.org/10.1093/zoolinnean/zlx018.

White, W.T., J. Giles and I.C. Potter. 2006. Data on the bycatch fishery and reproductive biology of mobulid rays (Myliobatiformes) in Indonesia. Fish. Res., 82: 65-73. https://doi.org/10.1016/j.fishres.2006.08.008.

Yamaguchi, A., N. Yagishita, Y. Aonuma and T. Yoshino. 2013. Myliobatidae. In: Nakabo, T. (ed.), Fishes of Japan with pictorial keys to the species, 3rd ed. Tokai Univ. Press, Kanagawa, Japan, pp. 228-231.

Zajonz, U., E. Lavergne, S.V. Bogorodsky, F.N. Saeed, M.S. Aideed and F. Krupp. 2019. Coastal fish diversity of the Socotra Archipelago, Yemen. Zootaxa, 4636: 1-108. https://doi.org/10.11646/zootaxa.4636.1.1.

# 한국 여수에서 채집된 매가오리과 (Myliobatidae) 어류 첫기록종, *Mobula thurstoni*

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**요 약 :** 매가오리목 매가오리과에 속하는 *Mobula thurstoni* 2개체(1770~1850 mm 체반폭)가 2018년 9월 전라남도 여수시 연도 연안에서 정치망으로 채집되었다. 이 종은 가슴지느러미의 앞부분이 이중 굴곡이고, 등지느러미 바로 뒤 꼬리 시작부분에 가시가 없으며, 등지느러미 끝부분에는 흰색이고, 그리고 등쪽의 체색이 어두운 남색을 띤다. *Mobula kuhlii*와 가장 형태적으로 유사하였지만, 가슴지느러미 앞부분에 이중 굴곡을 가지고 있다는 점(vs. 직선이거나 약간의 굴곡을 가진다)과 등쪽 체색이 어두운 남색을 띤다는 점(vs. 회갈색)에서 잘 구분된다. 또한, 이 종은 *M. kuhlii*와 미토콘드리아 16S rRNA 영역에서 유전적 거리 0.030~0.069의 차이를 보여 구분되었다. 이 종의 새로운 국명으로 '매끈꼬리쥐가오리'를 제안한다.

**찾아보기 낱말 :** 매가오리과, *Mobula thurstoni*, 매끈꼬리쥐가오리, 첫기록종, 여수