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Short Communication

Iran's elasmobranch diversity gets a new member: First report of *Neotrygon indica* from the northern Gulf of Oman

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Introduction

Elasmobranchs (sharks and rays) constitute a vital component of marine biodiversity, functioning as key mesopredators and apex predators across both coastal and oceanic ecosystems (Ferretti *et al.*, 2010; Bornatowski *et al.*, 2018; Dulvy *et al.*, 2024). Their diversity and distribution patterns have major top-down effects on food webs. These can cause strong cascading impacts in sensitive areas like the Persian Gulf and Gulf of Oman (Rastgoo and Navarro, 2017; Navarro *et al.*, 2024). In these basins, intensifying anthropogenic pressures have profoundly altered marine community structures (Valinassab *et al.*, 2006). Despite their recognized ecological importance, the elasmobranch assemblage inhabiting Iranian waters remains relatively understudied, and ongoing faunistic investigations continue to enhance the national species inventory. A notable example is the recent rediscovery and redescription of the tentacled butterfly ray (*Gymnura tentaculata*) in southern Iranian coastal waters of the Persian Gulf and Gulf of Oman, a species previously considered possibly extinct (Rezaie-Atagholipour *et al.*, 2021; Rezaie-Atagholipour *et al.*, 2023).

The genus *Neotrygon* (family Dasyatidae), commonly referred to as maskrays, has undergone extensive taxonomic revision in recent years. This genus is distinguished from other genera in the family Dasyatidae by having the pattern of a dark band in the interorbital region, a black-and-white lateral stripe on the posterior half of the tail, and two papillae in the mouth (Last *et al.*, 2016b; Hata and Motomura, 2024). Until 2017, this genus was considered to comprise 16 valid species (Pavan-Kumar *et al.*, 2018). This limited diversity reflected the long-standing

taxonomic confusion surrounding the *N. kuhlii* species complex, in which numerous morphologically cryptic lineages were erroneously lumped under a single nominal species (Panithanarak *et al.*, 2025). However, subsequent taxonomic revisions and newly described taxa have significantly expanded its diversity. From 2017 onward, nevertheless, an intensive series of taxonomic revisions—integrating molecular phylogenetics, morphometrics, and meristic analyses—led to a dramatic increase in species diversity. Subsequent discoveries in later years, including *N. yakkoei* (Hata and Motomura, 2024) and *N. romeoi* (Glaus *et al.*, 2025), have raised the total number of recognized species in the genus to approximately 20. This nearly threefold increase in less than a decade reveals significant previously underestimated cryptic diversity within the Indo-West Pacific dasyatids and underscores the critical importance of integrative taxonomy in resolving species boundaries among morphologically conservative marine fishes. (Puckridge *et al.*, 2013; Last *et al.*, 2016c; Panithanarak *et al.*, 2025). Among these, the Indian Ocean blue-spotted maskray was formally described as a distinct species based on specimens from eastern India. This species is distinguished by its dorsal coloration, featuring a moderate number of small ocellated blue spots, numerous dark speckles, occasional dark spots, and a conspicuous occipital mark, along with diagnostic meristic and morphometric (Last *et al.*, 2016b; Pavan-Kumar *et al.*, 2018; Glaus *et al.*, 2025).

This study reports the first record of the Indian Ocean blue-spotted maskray, *Neotrygon indica*, in Iranian waters of the northern Gulf of Oman, representing a significant addition to the known elasmobranch diversity of the region. A detailed morphological examination was conducted on four specimens, incorporating 65 morphometric measurements and 4 meristic counts to evaluate intraspecific variation and potential differentiation among them.

Specimens were collected from the Abkouhi fish landing in eastern Hormozgan Province (approximate coordinates 25° 24' N, 59° 07' E), northern Gulf of Oman. This area is situated in proximity to Rapch (Karati) estuary and is characterized by a rocky and sandy seabed. The continental shelf in this region is extremely narrow, and depth increases rapidly with distance from the shoreline, creating unique ecological conditions that support diverse elasmobranch assemblages (IUCN, 2023; Cochran *et al.*, 2026).

The sampling was carried out in April 2025 as part of the elasmobranch monitoring survey in the Hormozgan Province project organized under the Department of Environment of Hormozgan Province (DOE/Grant No. 1061/L/1404). Specimens were obtained from a single local fishing boat, which was operating a gillnet with a 20 cm mesh size targeting rays. Specimens were transferred to the laboratory of DOE for morphometric, meristic, and photographic analyses. Species identification was carried out according to the descriptions provided by Pavan-Kumar *et al.* (2018), recommended for first records. In addition, some morphological measurements of other genera within this family were examined

for supplementary information (Last *et al.*, 2016c; Glaus *et al.*, 2025).

Four of the eight mature male specimens of *N. indica* observed aboard the fishing vessel during the survey were transferred to the laboratory for further examination. All four specimens (Fig. 1) were unequivocally identified as *N. indica* based on a suite of morphologically diagnostic characters: on the dorsal surface, a moderately large number of small ocellated blue spots, a low number of medium-sized ocellated blue spots, no large ocellated blue spots, numerous dark speckles, a few dark spots, and a conspicuous occipital mark; in addition to a dark band in the interorbital region, a black-and-white lateral stripe on the posterior half of the tail, and the presence of either two (three specimens) or three (one specimen) oral papillae (Fig. 2).

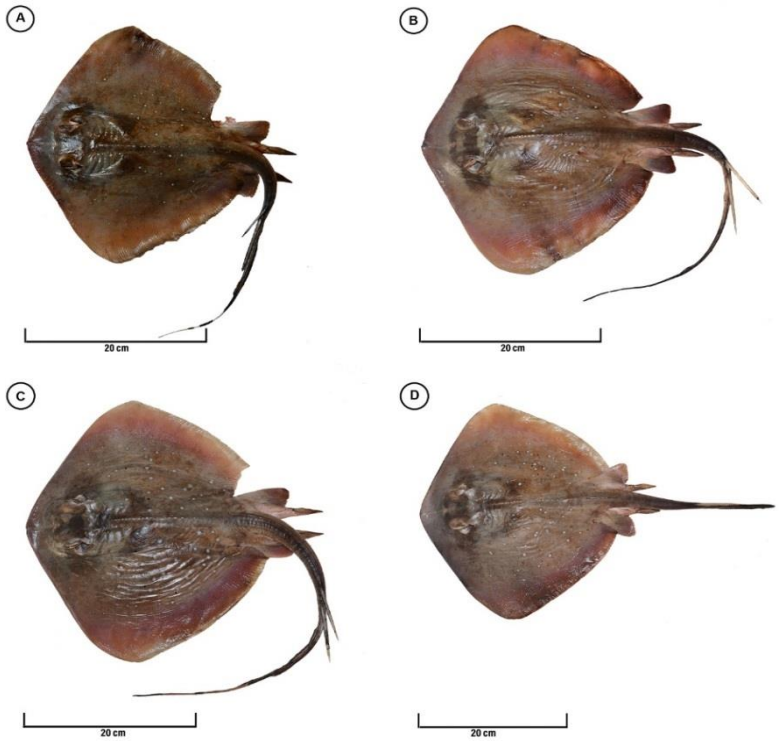

Figure 1: Dorsal views of four captured *N. indica* from northern Gulf of Oman, Iran: (A) No. 1 adult male 282 mm DW, (B) No. 2 adult male 280 mm DW, (C) No. 3 adult male 304 mm DW and (D) No. 4 adult male 306 mm DW

Full biometric data of the recorded specimens are provided in Table 1, where biometry expressed as a percentage of disc width resulted quite similar to the measurements reported for individual caught in the Bay of Bengal in India (Pavan-Kumar *et al.*, 2018) and other measurements reported for *N. romeoi* from Fiji (Glaus *et al.*, 2025).

Until now, the presence of the Indian Ocean blue-spotted maskray (*Neotrygon indica*) in Iranian waters had not been officially documented. The present study fills this knowledge gap by reporting the first confirmed record of this species from the northern Gulf of Oman. This finding is discussed in relation to the size range, known distribution patterns, and the urgent need for bycatch monitoring in the Gulf of Oman, where ray fisheries are expanding.

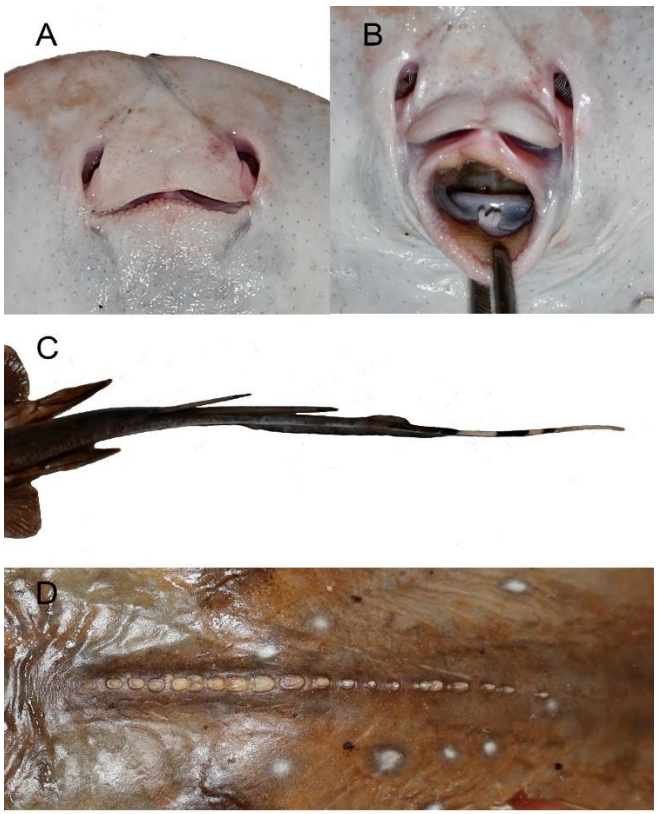

Figure 2: Major morphologically diagnostic features of *N. indica* captured in the northern Gulf of Oman: (A) ventral view of the nasal region, (B) three papillae in the mouth, (C) black-and-white lateral stripe on the posterior half of the tail and (D) dorsal denticles

Table 1: Morphometric measurements of four *N. indica* specimens from the northern Gulf of Oman, expressed as a percentage of disc width except number of caudal stings, number of papillae, number of thorns and number of spots on medial strip

Parameter	No. 1	No. 2	No. 3	No. 4
Disk width (mm)	282	280	304	306
Disk length	86.1	82.8	86.5	88.2
Total length	190.4	196.4	200.6	152.6
Distance from tip of snout to pectoral fin insertion	74.8	72.1	74.6	72.2
Distance from tip of snout to eye	17.2	15.1	15.5	15.5
Mouth width	7.7	7.7	8.3	9.2
Nostril length	3.0	3.4	3.3	3.5
Distance between nostrils	8.8	8.0	8.4	8.4
Head length	38.5	37.8	35.4	35.5
Eye length	8.0	7.0	7.0	8.2
Orbit diameter	10.4	10.1	10.7	10.7
Interorbital width	8.5	8.7	8.9	7.5
Interocular width	15.5	16.2	16.2	15.2
Spiracle length	7.2	7.3	7.5	6.5
Interspiracular width	16.8	16.3	16.0	15.5
Orbit and spiracle length	10.5	10.5	10.5	10.7
Orbit to pectoral fin insertion	58.5	57.1	57.3	57.6
Nasal curtain length	4.5	3.7	4.1	4.9
Nasal curtain width	10.1	9.7	9.9	10.1
Width of 1st gill slit	2.6	2.6	2.5	2.6
Width of 3rd gill slit	3.2	3.0	3.3	2.7
Width of 5th gill slit	1.8	1.8	2.1	1.6
Distance between 1st and 5th gill slits (left)	17.3	15.7	15.7	15.2

Table 1 (contunued):

Parameter	No. 1	No. 2	No. 3	No. 4
Distance between 1st and 5th gill slits (right)	16.9	15.3	15.2	15.2
Distance between 1st gill slits	17.4	18.2	17.2	18.5
Distance between 5th gill slits	10.3	10.3	10.3	9.9
Pre-nasal length of snout	11.6	10.7	10.3	10.6
Distance from tip of snout to cloaca origin	72.7	69.9	73.3	72.5
Distance from pectoral fin insertion to base of 1st sting	39.7	40.8	42.9	43.1
Cloaca length	7.9	7.2	8.2	8.0
Tail width at axil of pelvic fin	8.2	7.2	8.1	7.4
Tail width at base of 1st sting	3.1	2.9	3.2	2.1
Tail height at axil of pelvic fin	5.2	5.6	5.7	5.6
Tail height at base of 1st sting	3.0	3.0	3.0	2.7
Pelvic fin length	20.5	19.8	22.1	22.0
Width across pelvic fin base	17.7	19.1	17.5	17.9
Greatest width across pelvic fin	35.6	34.2	35.2	32.1
Clasper length from pelvic axil	18.6	18.1	18.9	18.0
Clasper length	23.3	21.0	22.9	20.4
Post-cloacal clasper length	26.6	25.5	26.3	23.7
Disc thickness	12.4	13.9	14.1	14.3
Number of caudal stings	2	2	2	1
Length of 1st sting	16.4	21.6	19.5	20.9
Length of 2nd sting	25.1	23.1	21.9	-
No. spots on medial strip	4	4	6	1
Snout angle (°)	125.7	125.8	119.7	119.0
Pectoral angle (°)	95.3	94.0	98.4	98.8
Number of thorns	17	21	19	20
Number of papillae	2	3	2	2
Dorsal tail fold				
Length	7.8	6.5	9.3	-
Height	1.1	1.0	1.2	-
Ventral tail fold				
Length	48.6	57.7	56.6	38.1
Origin to sting origin	2.8	3.6	3.6	3.5
Posterior end to tail tip	25.3	24.5	28.8	1.5
Tail width at origin	2.4	2.4	2.7	2.5
Tail height at origin	2.3	3.0	2.8	2.7
Tail width at 1/4 fold length	1.4	0.8	1.5	1.8
Tail height at 1/4 fold length	1.6	1.5	1.6	2.0
Tail fold height at 1/4 fold length	0.9	1.2	0.8	0.8
Tail width at 1/2 fold length	1.0	0.9	1.0	1.3
Tail height at 1/2 fold length	1.5	1.2	1.4	1.6
Tail fold height at 1/2 fold length	1.0	1.1	1.0	1.3
Tail width at 3/4 fold length	0.7	0.2	0.6	1.0
Tail height at 3/4 fold length	1.5	0.9	0.9	1.7
Tail fold height at 3/4 fold length	0.7	0.8	1.0	1.2
Tail width at end of fold	0.7	0.5	0.5	1.1
Tail height at end of fold	1.1	0.6	0.7	1.9
Largest spot diameter 1 (including ocelli)	1.6	2.2	2.2	2.3
Largest spot diameter 2 (including ocelli)	1.5	2.1	2.0	2.2
medial strip 1 (diameter of first spot in strip)	0.6	0.2	0.8	1.4
medial strip 2 (diameter of first spot in strip)	0.8	0.7	1.0	-

The adult male specimens of *N. indica* examined in the present study (n=4) ranged from 280 to 306 mm disc width (DW). These measurements are generally consistent with previously reported size ranges for the species. According to the original description by Pavan-Kumar *et al.* (2018), the holotype of *N. indica* measured 236 mm DW, while paratypes ranged from 213 to 314 mm DW, with the maximum recorded size for the species being 314 mm DW in males. The upper range observed in our study (306 mm DW) falls within 8 mm of this maximum, suggesting that our specimens represent fully mature adults. Furthermore, comparative data from congeneric species indicate interspecific variation in body size; for instance, *N. australiae* reaches up to 383 mm DW in adult males (Last *et al.*, 2016c), while *N.picta*, *N. kuhlii* and *N. annotata* attain 360, 440 and 265 mm DW, respectively (Jacobsen and Bennett, 2010). The maximum disc width documented across the genus *Neotrygon* is 470 mm DW, as observed in *N. caeruleopunctata* (Last *et al.*, 2016a), positioning *N. indica* as a medium-sized species within the genus. Overall, the size range of specimens collected in the present study aligns well with the published data for *N. indica*, confirming that all captured individuals were adult males approaching the maximum reported size for the species. Moreover, all specimens were male, indicating habitat segregation by sex. This pattern aligns with previous findings in other elasmobranchs, where sexual segregation is a common phenomenon (Clarke *et al.*, 2014); however, confirming whether this pattern holds true for *N. indica* requires targeted sampling across different depth strata and life stages in future research.

The *N. indica*, was originally described from the Gulf of Mannar in India (Pavan-Kumar *et al.*, 2018). According to the original description by Pavan-Kumar *et al.* (2018), the known distribution of the species includes the Indian coast of the Bay of Bengal, the Laccadive Sea, as well as Tanzania. Subsequent records have formally extended the range to Sri Lanka (Fernando *et al.*, 2019). This study significantly expands the known distribution range of *N. indica* to include the Gulf of Oman and its northern coastlines within Iranian waters, suggesting either the existence of favourable habitats for the species. The present findings indicate that the northern Gulf of Oman may represent an important habitat for this species, which reflects biogeographic patterns shaped by historical connections between the Indo-West Pacific and northern Indian Ocean ecosystems.

The present record of the *N. indica* in the northern Gulf of Oman, confirms that gillnet fisheries can impact mature specimens of medium-sized species. Similar gillnet selectivity that captures both juvenile and adult specimens have been documented in Mexican coastal waters (Ramírez-Amaro and Galván-Magaña, 2019). The Gulf of Oman, particularly Abkouhi, is indeed recognized as a hotspot for elasmobranch diversity, also playing a key role as a parturition/nursery ground (Midaf Nature Conservation Society, 2025; Cochran *et al.*, 2026). Consequently, urgent species-specific conservation assessments and revisions to gillnet fishery management

are necessary to prevent overexploitation of *N. indica* across all life stages.

Monitoring the bycatch of the *N. indica* in the northern Gulf of Oman is essential to address critical gaps in our understanding of its life history and susceptibility to exploitation. Currently, the population status of *N. indica* within the Arabian Sea region, specifically in the Gulf of Oman, remains poorly characterized, and available data are restricted solely to the findings of this study. Of particular concern, ecological risk is intensifying owing to a recent transition in regional fishing strategies; numerous local fisheries that previously targeted teleost finfish have increasingly shifted toward the targeted capture of batoid rays. This shift in fishing pressure presents a severe and potentially irreversible threat to all sympatric ray and guitarfish populations, with direct implications for the long-term conservation of *N. indica*.

Given that *N. indica* operates under these intense regional pressures, its specific conservation status urgently requires formal evaluation under IUCN Red List criteria. Furthermore, considering the cryptic nature of these lineages, morphological identifications should be used alongside molecular evidence, such as DNA barcoding, for accurate species verification. Consequently, updating regional fishery databases and landing records to reflect this taxonomic correction is a critical management step for the long-term conservation and sustainable stock monitoring of *N. indica*.

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Conflicts of interest

The authors declare that there is no conflicting issue related to this short communication.

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