

Incidence of pregnant endangered devil rays (Elasmobranchii: Mobulidae) from the Gulf of Mannar and Palk Bay, southeast coast of India

L. Remya^{1,*}, Sujitha Thomas², M. Muktha³ and Shoba Joe Kizhakudan¹

¹ICAR-Central Marine Fisheries Research Institute (CMFRI), Kochi 682 018, India

²Mangalore Regional Centre of ICAR-CMFRI, Mangaluru 575 001 India

³Vizag Regional Centre of ICAR-CMFRI, Pandurangapuram, Visakhapatnam 530 003, India

Out of the nine valid extant mobulid species confirmed globally, seven have been reported in India. All mobulids are vulnerable due to anthropogenic pressure, i.e. commercial fisheries, for their gill plates, which are traded on the international market. Information on their reproductive biology including, the seasons of mating, pupping, and nursery grounds are still largely unknown from Indian waters. The present study reports the occurrence of pregnant endangered devil rays, longhorned pygmy devil ray *Mobula eregoodoo*, oceanic manta ray *Mobula birostris* and Bentfin devil ray *Mobula thurstoni* in Indian waters, off the south-east coast. All three species were observed to have a single pup each. Our observations of mobulid catch from 2020 to 2022 indicates a predictable occurrence of pregnant devil rays either for feeding or for pupping (July to November), with a peak during November in the Gulf of Mannar and Palk Bay. The size-at-birth was in the order of 33.3 cm disc width (DW), 125.8 cm DW and 40.5–60.5 cm DW for *M. eregoodoo*, *M. birostris* and *M. thurstoni* respectively. *Mobula thurstoni* chiefly consumed needle squid and *Acetes* spp., while the gut contents of the other two species were completely digested. The observations on *M. thurstoni* suggests a pupping/nursery/feeding ground off the Gulf of Mannar, probably assist to develop area-based management interventions.

Keywords: Conservation, mobulidae, pupping ground, reproductive biology, spatial management.

THE manta and devil rays are presently placed under a monotypic genus *Mobula* based on certain morphological characters such as shape and position of spiracle, phylogenetic analysis and genetic evidences^{1–4}. Currently, there are nine extant valid species of *Mobula* confirmed globally out

of which seven species have been reported from the Indian Ocean. These species include, *Mobula birostris* (oceanic manta ray), *Mobula alfredi* (reef manta ray), *Mobula mobular* (spinetail/giant devil ray), *Mobula tarapacana* (sicklefin devil ray), *Mobula thurstoni* (bentfin devil ray), *Mobula kuhlii* (shortfin pygmy devil ray) and *Mobula eregoodoo* (longhorned pygmy devil ray)^{6,7}. Mobulids are pelagic elasmobranchs that occupy the second level of the marine trophic system as filter feeders, serving as important consumers^{8,9}. However, they are highly vulnerable to overexploitation due to their conservative life history traits such as slow growth, late maturation (5–15 years), prolonged gestation period (12–15 months) and inter-birth intervals (2–7 years), minimum litter size (one pup per litter), low population growth rates, etc.^{7,10–12}. Larger size, slow movement and predictable assemblage of devil rays in specific location for feeding, courtship, breeding and cleaning increase the likelihood of targeted fishing^{8,9,13,14}. Moreover, the international trade of dried gill rakers has intensified the anthropogenic pressure on mobulids, leading to targeted or bycatch fishing by artisanal and commercial fishing gears^{15–17}. To address these threats with the exception of *M. alfredi* (vulnerable), all other mobulids are categorised as Endangered in the IUCN Red List of Threatened Species.

The Gulf of Mannar (GoM) and Palk Bay (PB) are two distinct eco-regions located in the south eastern coast of India between maritime state of Tamil Nadu and the west coast of Sri Lanka. PB extends from Tiruvavur district to Dhanushkodi in Ramanathapuram district, while the GoM encompasses the area from Dhanushkodi in the Ramanathapuram district to Kanyakumari in the Kanyakumari district. The major landings in both regions are brought by mechanised single day trawlers, which account for 59.3% of the landings, followed by motorised gillnets at 32.49% (ICAR-CMFRI¹⁸). Since both crafts types set out and make landing within 24 h, the entire catch is undoubtedly from these eco-regions¹⁹. Mobulids are occasionally landed by both types of fishing fleets in GoM and PB^{20–22}.

*For correspondence. (e-mail: lremya9@gmail.com)