

Identification of MARINE MAMMALS OF INDIA

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FOREWORD

Marine mammals, especially cetaceans are so fascinating that world-wide, considerable attention is now being bestowed on studying their life habits to see how best they could be conserved and managed. Herman Melville's classic *Moby Dick* is sheer nostalgia. We have moved on from an era of slaughter of the great whales to one of conservation and restitution. World-wide considerable interest has been generated on whales, dolphins and porpoises, their behaviour, social structure, feeding and reproductive habits, the under-water sounds and music they produce, the many instances of dolphins coming to the rescue of humans at sea, the deleterious effects of SONAR which may lead to hearing impairment and strandings, and the role these animals play in the marine food chain, occupying an apex position. Today all species are considered endangered and protected, though attempts are being made by some pro-whaling countries to re-start whaling. The International Whaling Commission (IWC) has the formidable task of protecting and managing the resources of the great whales - the baleen whales and the toothed whales. The habits, behaviour and life histories of marine mammals and their next of kin, the river dolphins of the great rivers of Amazon, Yang-tse Kiang, the Indus, Ganges and Brahmaputra are being documented and the visual media is playing a proactive role in creating a greater awareness on the critical status of these species and their habitats. Man and marine mammal interaction had been a tragedy in the past depleting stocks and driving species such as the Stellar's Sea Cow to

extinction and now we seek restitution and restoration.

In the Indian Seas, observations on marine mammals have been far and few, but lately directed efforts have gone into recording visual sightings from research and merchant vessels, and from strandings and incidental catches in fishing operations. The Central Marine Fisheries Research Institute, Cochin had taken a lead in this for developing a data bank on marine mammals from the Indian Seas in the late seventies at its Marine Living Resources Centre. More recently, The Centre for Marine Living Resources and Ecology (CMLRE), under the Ministry of Earth Sciences, Government of India has been a project facilitator for researches on marine mammals, especially from its ocean going facility FORV SAGAR SAMPADA. This has enabled the authors Jayasankar and Anoop to craft this valuable publication, the first of its kind to elucidate and improve on traditional cetacean taxonomy by DNA sequence of samples through GenBank (www.ncbi.nlm.nih.gov) and *DNA surveillance* (www.cebl.auckland.ac.nz:9000/) for precise identification of species. The authors have also successfully standardized PCR-based methods for gender identification of species of marine mammals as well as in forensic identification of commercial products for checking illegal trade of the meat of endangered and protect species.

There are 26 species of marine mammals including the dugong listed from the Indian Seas, but precise identifications are needed for many. The oceanic waters of the Indian Ocean being contiguous with the Southern Ocean, the Bay of Bengal, Andaman Nicobar Seas, Arabian Sea, the Lakshadweep. Sea and the Res Sea, the occurrence of more species of marine mammals from these waters can not be ruled out.

World-wide, the interest in the benign use of marine mammals including ecotourism is growing day by day and India too has a role to play. It becomes imperative that we identify specific areas and seasons for "whale watch" in our coastal waters and develop awareness through *in situ* underwater observations and well equipped and managed oceanariums. We are learning to understand the communication skills and behaviour of marine mammals. The response of dolphins to training is attributed to their big brain and the high intelligence level they possess. The first ever birth of

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This book blends traditional taxonomy with genetics, for species and gender identification and for forensic testing for preventing illegal trade in marine mammal products. Updating will be an ongoing process. The aim is also to bring people closer to marine mammals. This book should elicit interest to enhance our knowledge about the life habits of these remarkable creatures. It should also inspire those in authority to support protection, management and conservation of marine mammals and their diversity and appreciate the services they render to the natural bio-ecosystems.

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Preface

The term 'marine mammal' includes members of 5 different mammalian groups: cetaceans (whales, dolphins, and porpoises), sirenians (manatees and the dugong), pinnipeds (sea lions, the walrus, and seals), sea otters, and the polar bear. They are all warm-blooded animals just like human beings. All marine mammals have undergone major adaptations, which permit them to live in the water. The cetaceans and sirenians spend their entire lives in the water, while other marine mammals come ashore for various reasons, at particular times in their life cycle (most commonly to reproduce, moult, or rest). Major structural modifications to the bodies of cetaceans, sirenians, and pinnipeds involve the loss of hind limbs (cetaceans and sirenians), the adaptation of limbs for propulsion through water (pinnipeds), and the general streamlining of the body for hydrodynamic efficiency (all 3 groups). Structural modifications to the marine and sea otters and the polar bear by a marine existence are less apparent in body form; these animals still closely resemble their terrestrial counterparts.

Interest in wildlife in general, and marine mammals in particular, has increased significantly in recent years, both in the general public and in the scientific and management communities. There has been a marked rise in the number of wildlife enthusiasts taking to educational and adventure expeditions to see marine mammals up close in their natural habitats. Simultaneously, there is also increasing awareness of the integral importance of marine mammals to healthy aquatic ecosystems, and of the growing threats that a variety of anthropogenic activities, such as destruction of habitats, fishery interactions (e.g. gill net fishery), illegal fishing methods and pollution challenge to these animals and their environments. Research and education programmes should try to properly understand and more clearly communicate these threats and recommend appropriate steps to reduce or eliminate their impacts.

In the Indian seas, marine mammals are represented by dolphins, porpoise, whales and dugong. They are one of the most neglected groups

of marine organisms in India. Organized study in the marine mammal research has been lacking in India. Most of the research publications have been based on observations of animals accidentally caught in fishing nets or stranded on the beaches. The authors provided morphological description and photos of such animals. However, species identification was not often ratified and several mistakes could have crept in considering the lack of adequate field keys and reliable inventory. Very recently, a marine mammal network of India has been established (www.marinemammals.in) with support from Whale and Dolphin Conservation Society (WDCS).

Our present book is an attempt to provide morphological field keys of the species of marine mammals reported from India along with the supportive and ratifying molecular taxonomic approach for the unambiguous identification of species. In the latter case, DNA sequences of the samples are submitted in reference databases, such as GenBank (www.ncbi.nlm.nih.gov) and *DNA Surveillance* (www.cebl.auckland.ac.nz:9000/) for identification of species. Followed by the Preface, Foreword, Acknowledgement, List of Tables, Figures and acronyms used there is Introduction. Dichotomous keys form Chapter 2, followed by Chapter 3 containing morphological description of the species along with their conservation status. Chapter 4 deals with GenBank, while Chapter 5 with *DNA Surveillance*. Chapters 6 and 7 describe the pioneering research carried out by CMFRI team on the molecular genetic identification of cetaceans and sirenians of Indian seas and PCR-based gender identification, respectively. The book closes with Remarks, References and Index. We sincerely hope that this book will be of interest to biologists and biodiversity conservationists to know about the latest developments in the identification of vulnerable/endangered marine mammals of India.

27-09-2009

Date

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