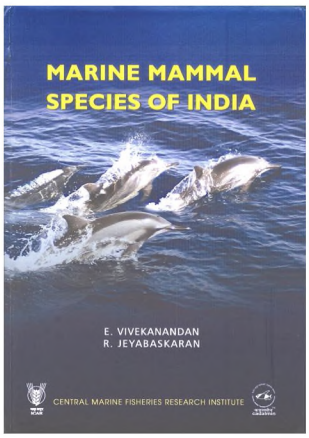

Marine Mammal Species of India. E. Vivekanandan and R. Jeyabaskaran. Central Marine Fisheries Research Institute (ICAR), Kochi. 2012. 228 pp. Price: Rs 750.

This book is a source of collective information on the marine mammal species found in the Indian seas. It is the outcome of a nine-year study (2003–2011) funded by the Centre for Marine Living Resources and Ecology, Ministry of Earth Sciences, Government of India, and the Central Marine Fisheries Institute, Kochi, Kerala.

The book starts with a brief introduction on the order Cetacea being the most diverse, having evolved from land-dwelling ancestors around 50–60 million years ago. More information regarding the evolution of cetaceans could have been provided by the authors. Cetaceans originated about 50 million years ago in South Asia. Fossils of an ancestor of the cetaceans, *Indohyus* were discovered from a 50 m thick bone bed from the middle Eocene at Sindkhatudi in Kalakot, Kashmir[1]. Stable isotope data indicate that *Indohyus* spent most of its time in water coming to land only to feed on vegetation or invertebrates found on the shore. Many palaeontological records support the theory of cetaceans originating from an *Indohyus*-like ancestor that later evolved to a more aquatic lifestyle due to change in diet. Over time, modern-day cetaceans have evolved from their ancestors with many adaptations specialized to suit their aquatic lifestyle[1]. Out of the 130 species of marine mammals reported from all over the world, stranding and sighting records show that the Indian seas are a habitat of 25 species of cetaceans and one species of sirenian, and this book provides information about the 25 species of cetaceans. Five species belong to the sub-order Mysticeti (Baleen or toothless whales) and the rest 20 belong to sub-order Odontoceti (toothed whales).

Chapters 2–4 deal with the methodology used to conduct the survey, information on the cetacean species and suggestions on designing and conducting marine mammal surveys. Chapter 2 deals with the survey methodology. The survey was done in the exclusive economic zones (EEZs) and the contiguous seas within the Indian territory. A major part of the 7500 km of the country's coastline falls under the 2,305,143 sq. km of the EEZ. This survey covered northeastern Arabian Sea, southeastern Arabian Sea, northern Bay of Bengal, southern Bay of Bengal, Andaman Sea and the southern Sri Lanka Sea. The data were collected by conducting single-observer surveys on an oceanographic research vessel. However, the surveys were not systematically planned due to logistic constraints. An observer was positioned at a height of 17 m above sea level and the area was scanned in a 180° arc with the naked eye and interspersed with scans using binoculars for an average of 8 h/day. The cetaceans that were spotted were identified to lowest taxonomic level possible and were compared with the photographs and morphological identifications available. Out of a total of 1068 days on which surveys were conducted, cetaceans were spotted on 430 days. A record of 626 sightings comprising 8674 individuals was made with 65% of the sightings in oceanic waters (>200 m depth) and the remaining 35% on the continental shelf (<200 m depth). High-

est number of sightings (31%) was between 1500 and 1800 h. The survey team recorded 18 cetacean species (six species of whales and 12 species of dolphins). Out of the total 626 sightings, 57.7% was identified to either generic or species level. However, the rest of the 42.3% could not be identified. The team sighted and recorded during the surveys whale and dolphin pods varying from 1 to 10 individuals and 1 to 100 individuals respectively. They found sightings to be highest during January and lowest during August. This variation might be because of bad visibility due to choppy sea conditions during the monsoon season. Indo-Pacific Bottle Nose dolphin (*Tursiops aduncus*), Spinner dolphin (*Stenella longirostris*) and Long-beaked Common dolphin (*Delphinus capensis*) were the species that were commonly sighted by the team. The authors also tried to identify the habitat preference of the cetaceans by measuring distance from the shore, depth, temperature and salinity of the sea water. Chinese white dolphin (*Sousa chinensis*) was sighted nearest to the shore, ~100 km from the shore, whereas Long-beaked Common dolphin, Spinner dolphin and Indo-Pacific Bottle Nose dolphin were sighted at ~199, ~499 and ~599 km respectively, from the shore. Most of the cetacean sightings were in the 26°–32°C temperature range where salinity ranged between 26 and 36 parts per thousand. The authors, however, are not sure of these data, as it is known that the temperature of the sea water does not have much effect on the use of an area by cetaceans especially in tropical area.

Chapter 3 provides information on each of the 25 species. The taxonomic status, common name, identification characters, distribution, abundance, habitat, behaviour, food, exploitation, and threats and conservation status are the categories under which the available information is divided. Information provided in the book on Pygmy sperm whale (*Kogia breviceps* and *K. sima*), Melon-headed whale (*Peponocephala electra*), Cuvier's beaked whale (*Ziphus cavirostris*), Pygmy killer whale (*Feresa attenuate*) and Rough toothed dolphin (*Steno bredanensis*) are based on stranding records and previous sighting records as these species were not sighted during the survey.

Acrobatic leap of *Stenella longirostris* sighted off Dwaraka, Gujarat on 23.03.2009.

The authors mention four cetaceans, the Irrawady dolphin (*Orcaella brevirostris*), Gangetic dolphin (*Platanista gangetica gangetica*), Sperm whale (*Physeter macrocephalus*) and Dugong (*Dudong dugong*) to be under Schedule 1 of the Wildlife (Protection) Act (WPA) of 1972. Though Sperm whale does not come under Schedule 1, it is included in Schedule 2 of the WPA. However, the Little Indian porpoise (*Neophocaena phocaenoides*) is included in Schedule 1 of the WPA. The authors have overlooked this mistake in the book.

In chapter 4 titled 'Future directions', the authors provide many suggestions on conducting research and survey on marine mammals. They support and highlight the need for the establishment of Marine Mammal Stranding Network and Marine Mammal Conservation Network which will be helpful in documenting cetacean stranding reports and also help in preparing an action plan for conservation of marine mammals in India. They also highlight the importance of conserving sea grass beds, the much needed amendment to the Marine Fishing Regulation Act, and the need to educate and spread awareness among fishermen on the basic functioning of marine ecosystems and the need to conserve them. The inclusion of a glossary section in the book provides definitions for the technical terms used throughout, making comprehension easy.

Very few studies or surveys on marine mammals have been conducted in India until now. Most of the information available is based on incidental catches and on individuals that were stranded or beach cast. This study has contributed significant knowledge on the country's marine mammal diversity and the effort of the authors is commendable as identification of marine mammals in open sea is a difficult task. Good identification guides and trained observers are essential to conduct such surveys. This was one of the handicaps in the survey in addition to non-availability of a survey vessel entirely dedicated to the study and sufficient financial backing. This book presents consolidated information of the species and its ecology. Records of sightings, stranding and incidental catches have been complied in the book. Information on a species found in Indian waters from other parts of its distributional range has also been provided. In conclusion, the book is a much needed pictorial guide for marine mammal identification in India and will be helpful for those working in marine ecology. We hope better financial backing and support will help the authors improve the quality and contents of the book in its future editions.

1. Thewissen, J. G. M., Cooper, L. N., Clementz, M. T., Bajpai, S. and Tiwari, B. N., *Nature*, 2007, **450**, 1190–1194.

R. K. SINHA

Environmental Biology Laboratory,
Department of Zoology,
Patna University,
Patna 800 005, India
e-mail: rksinha.pu@gmail.com