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Archival sea turtles in National Zoological Collections of Zoological Survey of India

Shantanu Kundu[1], Vikas Kumar[1*], B. H. C. K. Murthy[2] and Kailash Chandra[1]

[1]Zoological Survey of India, M - Bolck, New Alipore, Kolkata – 700053, West Bengal, India; vikaszsi77@gmail.com
[2]Western Ghat Regional Centre, Zoological Survey of India, Kozhikode – 673006, Kerala, India

Abstract

The archival zoological collections are the foundation of taxonomic nomenclature and systematics research. Name-bearing zoological collection of a species or subspecies and their comparative data often resolved many ambiguities in systematics, distribution patterns and other biological information. In this study, we revisited the sea turtles collections available at Zoological Survey of India and Indian Museum Gallery. The aimed study may reconcile the previous and present range distribution of this oldest faunal component in Indian waters. The detailed collateral data of the studied species would substantiate to know the actual range distribution, estimate the anthropogenic threats, and effect of climate change in estuarine eco-system, which helps in better conservation strategies.

Keywords: Conservation, Distribution, Marine turtle, Museum Collections, Sea turtles, Threatened species

Introduction

Sea turtles represent one of the oldest fauna of the world's biological diversity (Pritchard, 1979). These air-breathing reptiles are well adapted in the sea with streamlined body and flippers for moving inside the water. The sea turtles act as an ecologically important species by connecting food web of the ocean and can migrate long for foraging and breeding. The populations of sea turtles are dramatically decreasing due to the large scale poaching of adults for bushmeat, shell, oil, leather and commercial exploitation of eggs (Venkataraman and John Milton, 2003). Further, due to the development and destruction of nesting beaches, general pollution of the oceans by ingestion of plastic materials and using of small mesh size gear by fisherman, the sea turtles often accidentally caught. The migrations of sea turtles in Indian waters are decreasing and thus the populations are in the face of extinction. Indian water and adjacent beaches in several states was regarded as a paradise of sea turtles (Hejmadi, 2000).

Five species of sea turtles are recorded in the Indian waters with distinct morphological characters: (i) The Leatherback (*Dermochelys coriacea*): Carapace elongate with seven prominent longitudinal ridges; scutes absent; adults with smooth skin, but hatchlings covered with small bead-like scales; plastron relatively small; head shape broadly triangular; forelimbs extremely long and all limbs clawless; color predominantly black or deep gray dorsally, light pigment predominating on plastron with white spotting, bluish spots on neck and base of flippers, (ii) The Green Sea turtle (*Chelonia mydas*): Carapace broadly oval, four pairs of costal scutes; head anteriorly rounded, one pair of prefrontal scales and four pairs of postorbital scales; single claw on each flipper; dorsally black in hatchlings, becoming brown with radiating streaks in juvenile stages, brown or buff in adults; ventrally white in hatchings, yellowish in adults, (iii) The Hawksbill (*Eretmochelys imbricata*): Carapace oval, with a strongly serrated posterior margin and sometimes overlapping scutes; four pairs of costal scutes; Plastron with four pairs of inframarginal scutes; head relatively narrow with a straight bird-like beak; two pairs of prefrontal scales; front flippers are medium length; two claws on each flipper; dorsally brown in hatchlings, boldly marked with amber and brown in juveniles and younger adults; ventrally light yellow to white, sometimes with black markings, (iv)

* *Author for correspondence*

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The Loggerhead (*Caretta caretta*): Carapace moderately broad; lightly serrated posterior margin in juveniles; five pairs of costal scutes; plastron with three pairs of inframarginal scutes; head large and broadly triangular in shape with two pairs of prefrontal scales; Front flippers relatively short and two claws on each flipper; dorsally light to dark brown in hatchlings, unmarked reddish-brown in juveniles and adults; ventrally brown in hatchlings, yellow to orange in juveniles and adults and (v) The Olive Ridley (*Lepidochelys olivacea*): Carapace short and wide; high vertebral projections in juveniles; carapace smooth but elevated and tent-shaped in adults; five to nine pairs of costal scutes; carapace scutes slightly overlapping in juveniles and non-overlapping in adults; Plastron distinct, small pore near rear margin of each of the four inframarginal scutes; Head relatively large, triangular from above with two pairs of prefrontal scales; two claws on each flipper; dorsally grey in juveniles, mid to dark olive-green in adults; ventrally white in juveniles, cream-yellow in adults.

Due to the shrinkage of nesting beach in various coastal areas of Indian states in the last few decades, the attention in sea turtles in Indian waters has continuously increased, and encouraged mainly by the conservation agencies. Many organizations are adopting conservation and research activities on sea turtles in India. The marine turtle specialist group (IUCN/SSC) established a successful network among members working in most countries, contributing or exchanging information on sea turtle. Thus, adequate knowledge about their distribution in Indian waters, threats, biological and ecological factors are vital for their conservation (Pandav *et al*., 1998). The Zoological Survey of India (ZSI) is the largest repositories of zoological specimens in India, holding a huge number of chelonians including both freshwater and sea turtle collections. The collections and preservation of sea turtle was made by the naturalists during the scientific expeditions. However, the contents of the sea turtles collections of the ZSI had remained unknown to the outside world due to non-availability of a catalogue. Although, Murthy and Das in 2009 documented a checklist of chelonian collection of ZSI, which however lack a complete information on sea turtles. The information, especially the collection locality of archival turtles further provide a scope of revisiting the distribution range in Indian waters and facilitating the reassessment of sea turtles (Lehn *et al*., 2007; IUCN, 2016).

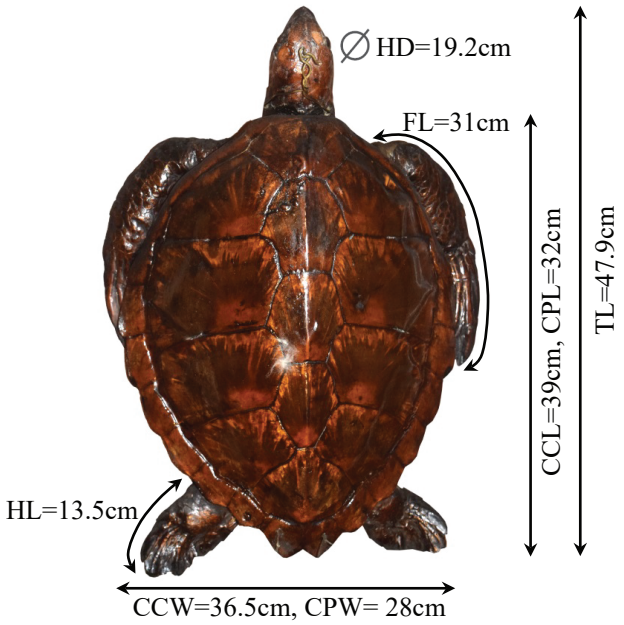

Figure 1. Representatives of the archival Sea turtle specimens (the Hawksbill Sea Turtle, *Eretmochelys imbricata*) preserved in Amphibia and Reptilia gallery of Indian museum, Kolkata and morphometric measurements. HD= Head diameter, FL= Forelimb length, HL= Hindlimb length, CCL=Curved carapace length, CPL= Curved plastron length, CCW= Curved carapace width, CPW= Curved plastron width, TL= Total length.

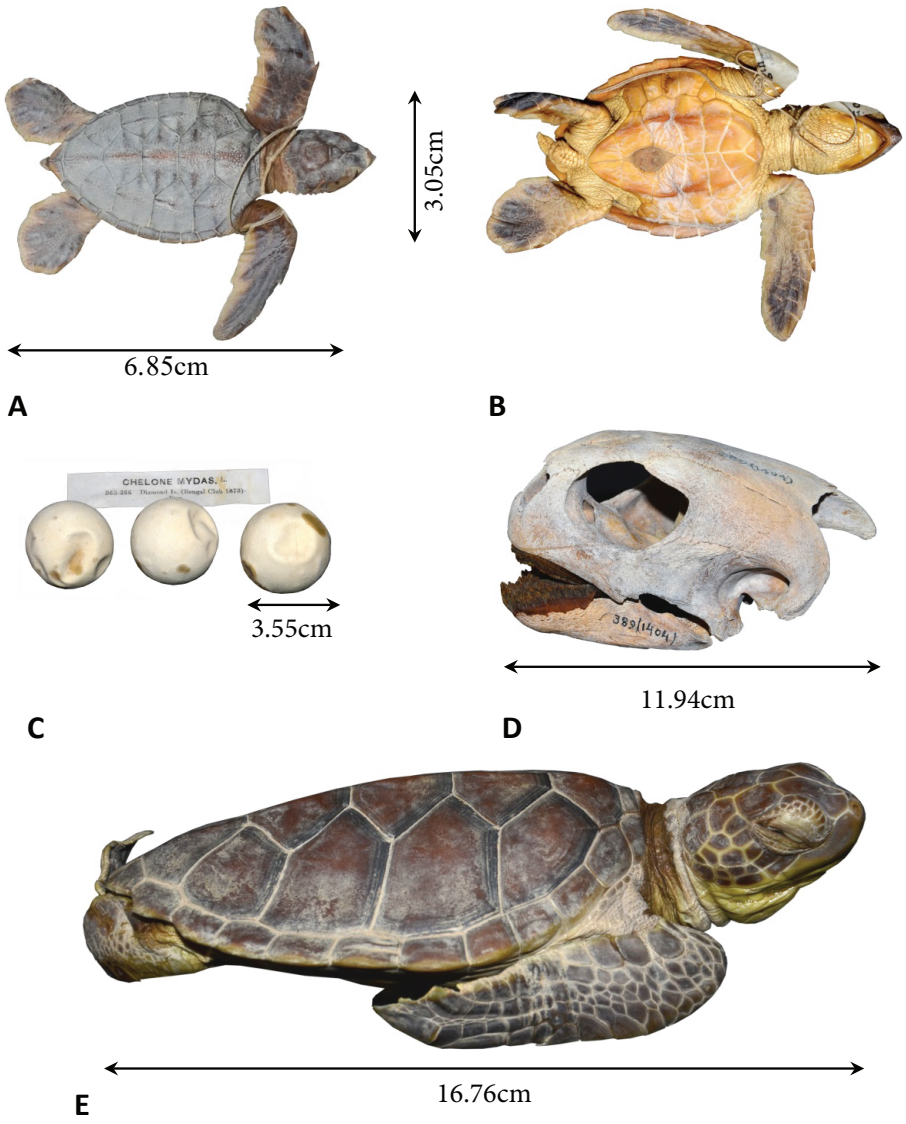

Figure 2. Representatives of the archival Sea turtle specimens (the Green Sea Turtle, *Chelonia mydas*) preserved in Zoological Survey of India, Kolkata. A. Hatchling of *C. mydas*, Reg. No. ZSI 14544 (dorsal view, wet collection). B. Hatchling of *C. mydas*, Reg. No. ZSI 14543 (ventral view, wet collection). C. Eggs of *C. mydas* (wet collection). D. Skull of *C. mydas*, Reg. No. ZSI 389 (1404) (lateral view, dry collection). E. Adult individuals of *C. mydas,* Reg. No. ZSI 22489 (lateral view, wet collection).

This research notes present a list of all sea turtles collections in the Zoological Survey of India, Kolkata. The study encompasses 45 registration nos. of sea turtles from the archival collections of ZSI. The collateral data were collected from the 'Species Card', 'Species Register' and from the tag of the available specimens and compared with the previous literatures. The figures represent the representative of exotic chelonian species preserved in National Zoological Collections of ZSI and Amphibia-Reptilia Gallery of Indian Museum. The morphometric measurement of carapace, plastron and flippers were taken by Vernier slide calipers and photographs of *Eretmochelys imbricata* were taken by Nikon D3300 (AF-S Nikkor 8-55 mm lens). The bellow list represents the species name

and authority, IUCN status, registration numbers and collection localities and locality information of sea turtles recorded so far in Indian waters:

The Leatherback turtle *Dermochelys coriacea* (Vandelli, 1761)

Family DERMOCHELYIDAE

IUCN status: Vulnerable (A2bd ver 3.1)

Recorded so far in Indian waters: Indian Ocean, Gulf of Kutch, Okha coast, Goa coast, Tangasseri reef near Calicut, Gulf of Mannar and Palk Bay.

Registration Number and collection localities: 887 (34a Asiatic Society of Bengal) - Tenasserim, Myanmar.

The Green Sea turtle *Chelonia mydas* (Linnaeus, 1758)

Family CHELONIIDAE

IUCN status: Endangered (A2bd ver 3.1)

Recorded so far in Indian waters: Gulf of Kutch, Okha coast, coasts of Maharashtra, entire Kerala coast, entire eastern coast of Tamil Nadu, Gulf of Mannar and Palk Bay.

Registration Number and collection localities: 22489- Great Nicobor; 307 (510) - Yangon, Myanmar; 308 (508)- Yangon, Myanmar; 310- Andaman; 3881- Kyaikkami, Myanmar; 295- Bay of Bengal; 18989- South East Satpura Peninsula Channel; 363 to 366 - Diamond Island, Burma; 389 (1404)- Atlantic Ocean; 25988- Port Blair, Andaman; 1068 to 1072 - Andaman; 14543 to 14545, 26087 - Great Nicobor; 1073- No locality information.

The Hawksbill turtle *Eretmochelys imbricate* (Linnaeus, 1766)

Family CHELONIIDAE

IUCN status: Critically Endangered (A2bd ver 3.1)

Recorded so far in Indian waters: Coastal parts of southern Tamil Nadu, Kerala, Andaman and Nicobar Islands, Gulf of Kutch, Gulf of Mannar, Palk Bay and Lakshadweep Islands.

Registration Number and collection localities: 316 (1421) - Andaman; 386 (1408) - Atlantic Ocean; 14705- Bangkok, Thailand; 1768 (226) - Andaman; 20924 - Konamie, Little Andaman; 22488 - Great Nicobor; 23425 - North West Campbell Bay; 1422- Venezuela.

The Loggerhead turtle *Caretta caretta* (Linnaeus, 1758)

Family CHELONIIDAE

IUCN status: Vulnerable (A2b ver 3.1)

Recorded so far in Indian waters: Southern Tanlil Nadu coast, Gulf of Mannar and Palk Bay.

Registration Number and collection localities: 387 (1404) - Atlantic Ocean; 3858- Atlantic Ocean.

The Olive Ridley turtle *Lepidochelys olivacea* (Eschsholtz, 1829)

Family CHELONIIDAE

IUCN status: Vulnerable (A2bd ver 3.1)

Recorded so far in Indian waters: Coastal areas of Maharashtra, Goa, Kerala, South Tamil Nadu, Andhra Pradesh, Odisha, Andaman Islands, Gulf of Mannar and Lakshadweep Islands.

Registration Number and collection localities: 23972 - Chandbali sea coast, Balasore, Orissa; 23982 - Konarak sea coast, Puri, Orissa; 24134 - Digha, West Bengal; 24536 - North Andaman; 24713, Visakhapatnam sea shore - 24972; 13567 to 13569 - Trivandrum beach, Kerala; 895 (36c A.S.B.) - Bay of Bengal; 23785 - Mandapam.

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