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RESEARCH ARTICLE

DISTRIBUTION OF MARINE REPTILES ON THE TAMIL NADU COAST, SOUTHEAST COAST OF INDIA

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ABSTRACT

Distribution of marine reptiles (Family: Hydrophiidae) has revealed that presence of fourteen species included in five genera, in the Tamil Nadu (Southeast Coast of India) coast during 2011-2012. Sea snake species *Hydrophis cyanocinctus* and *Enhydrina schistosa* were frequently recorded and turtles olive ridley (*Lepidochelys olivacea*), green turtle (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) occurred during the study period. A great number of reptiles are slowly disappearing mainly due to the human interference with rapid growth of industrializations and land exploitation. Snakes and turtles are hunted for skin as leather, sometimes for meat. Turtle breeding beaches have also been threatened by sand quarrying, egg poaching and pollution. Sea turtle populations in this area have been reported to have declined due to their over-exploitation for trade and from accidental drowning in fishing gear such as gillnets and trawlers. This study therefore recommends that Government officials should periodically for TEDs (Turtle Excluder Devices) in their trawler nets.

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INTRODUCTION

Biological diversity means the variability among all living organisms from all sources including inter alias, terrestrial, marine and other aquatic ecosystems and biological diversity within a species and of ecosystems. Biodiversity is the degree of variety in nature and not nature itself. India is the seventh largest country of the world with an area of about 32, 67,500 sq km and sixth among the 12 mega biodiversity centers of the world, and is home for an unusually large number of endemic species and rich biological diversity, which includes over 40,000 species of plants and 75,000 species of animals (Negi, 1993). An 518 species of reptiles which includes 3 species of crocodiles, 34 species of turtles and tortoises, 202 species of lizards and 279 species of snakes belonging to 28 families recorded (Murthy 2010). Marine reptiles found in Indian waters fall into three major groups: sea turtles, crocodiles and sea snakes. There are 70 species of sea snakes belonging to 5 sub-families inhabiting the world oceans and estuaries. Of these, 22 species belonging to 3 families and 3 sub-families have been documented from Indian waters (Das, 2003). Marine reptiles are reptiles which have become secondarily adapted for an aquatic or semi-aquatic life in a marine environment. Some marine reptiles, such as ichthyosaurs and mosasaurs, rarely ventured onto land and gave birth in the water. Others, such as sea turtles and saltwater crocodiles, return to shore to lay their eggs. Some marine reptiles also occasionally rest and bask on land (Venkataraman et al., 2012). The marine reptiles come

from ancient terrestrial forms that eventually colonized the sea. The number of true marine species represents only 1% of the all reptile species that exist today, the true marine species are sea turtles, Marine Iguana and sea snakes (Bertolero, et al., 2011). Some other species of turtles, lizards, snakes and crocodiles have estuarine habits, but always need freshwater to some extent. The fossils record tells us that the marine environment became colonized several times by different groups of reptiles. Sea snakes have been accorded insufficient attention thus far. Interest in the sea snakes has grown noticeably in recent years for their most powerful animal toxins (Murthy, 1977) and their role in marine food chain (Voris, 1972, Voris and Voris, 1983). India has ecologically, economically and culturally significant populations of five species of sea turtles nesting and residing within its jurisdiction. Some of the nesting sea turtle populations in India are globally significant and among the largest in the world (Limpus et al., 2003). They are found in all the oceans of the world, mainly in tropical and temperate waters. Only the females come out of the water to lay eggs. They build their nests in tropical and subtropical sandy beaches and can lay over 100 eggs in each clutch. They have many predators, mainly during the egg and hatchling period. Many populations have suffered a dramatic regression due to human causes (Bhupathy and Saravanan, 2002). Three species of crocodile occur in India, the estuarine crocodile or saltwater crocodile (*Crocodylus porosus*) and the freshwater crocodile (*Crocodylus palustris*), gharial (*Gavialis gangeticus*) although only *C. porosus* is found in the marine environment. The Hydrophiidae family contains 57 species and has viviparous

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reproduction. They never leave the water and if they get stranded accidentally, cannot return to the sea. The *Laticudidae* are 4 species and have oviparous reproduction.

MATERIALS AND METHODS

Presence data for diversity of marine reptiles were collected during the survey was conducted during 2011 to 2012 along Tamil Nadu (Chennai to Tuticorin) coast of India (Fig.1).

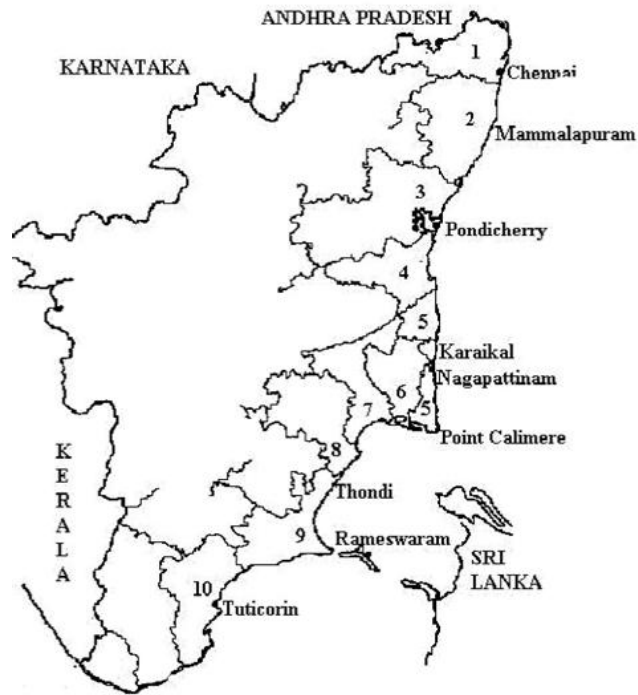


Fig 1. Shows the study sites

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Based on the each study area was divided into 10 km unit and fortnightly monitoring of beaches during the olive ridely turtle nesting season (December-April) were done While operating trawlers, for fishing of prawns, crabs, etc., sea snakes were caught occasionally and brought to the landing centres by thefishermen. Collections were made intensively by visiting landing centers and picking up the dead snakes. Dead snakes were identified with the help of the key characters of given by (Smith, 1926; Murthy 1977, 1988, and 1992; Lneich, 1996; Rasmussen, 1993, 1997 and Warrel, 1994). For identification snakes scales in head, ventral side is very important. Careful counting of scale with hand lens, colour, cross bands herpetologist was studied. Sea turtles surveys were conducted for the nesting areas and mortality along the beaches of Tamil Nadu. Available past data on turtle nesting, mortality and exploitation are compared with the present data. Nesting intensity for the locality studied was calculated based on average nesting during this study This study therefore recommends that Government officials should periodically for TEDs (Turtle Excluder Devices) in their trawler nets.

RESULT

The present observation were made for one year and revealed only 30 individuals (all females), thus indicating sparse occurrence (< 1% in terms of numbers per trawl) of these species in the coastal fishing grounds. Such observations also indicate that sea snakes are subsidiary and non-target organisms occurring in the trawl catches. During the study period five species of sea snakes, three species of sea turtles were recorded. There are five different genus coming under the Subfamily Hydrophiidae was collected from the present study area. i.e. *Enhydrina schistosa* (Fig 2), *Hydrophis cyanocintus* (Fig 4), *Lapemis*, *Pelamis platurus* (Fig 5) and *Laticauda*. And for the sea turtles, *Chelonia mydas* (green turtle), *Lepidochelys olivacea* (Fig 3) and *Eretmochelys imbricate* (hawksbill).



Fig 2. *Enhydrina schistosa*



Fig 3. Olive Ridely



Fig 4. *Hydrophis cyanocintus*



Fig 5. *Pelamis platurus*

During the one year survey, 30 olive ridley nests were recorded during the fortnightly sampling from January to March 2011-2012. Peak nesting was observed in the first fortnight of February and March. Estimated nesting density along this area is about 9 nests/km during January - April 2011. About 60% of the coast had sandy beaches, and are assumed to be suitable for sea turtle nesting. Human habitations and related development activities, and rock and swamps occupied the remaining portion of the coast. Even though majorities of the east coast along were sandy, the area was highly disturbed due to sand mining. Sea walls built to protect the land from sea erosion provided no space for nesting in parts of the west coast. Also, the interface between the sea and human habitation was minimal (<5 m) in parts of this sector. Turtle breeding beaches have also been threatened by sand quarrying, egg poaching and pollution. Sea turtle populations in this area have been reported to have declined due to their over-exploitation for trade and from accidental drowning in fishing gear such as gillnets and trawlers.

DISCUSSION

The sea snakes are distributed in the tropical region of the Indian and Pacific oceans. Of the twelve species of the family Hydrophiidae known from the east coast of Tamil Nadu regions. *Pelamis palturus* (yellow belly) has a wide range of distribution in the coastal and oceanic region. During the present study, *E. schistosa* (> 65%) and *H. cyanocinctus* (< 35%). Among the five species of sea turtles distributed in the Indian region, four of them, the olive ridley (*Lepidochelys olivacea*), green turtle (*Chelonia mydas*), leatherback (*Dermochelys coriacea*) and hawksbill (*Eretmochelys imbricata*) nest within Indian limits (Kar and Bhaskar, 1982). All of these species are distributed in Tamil Nadu (Bhupathy and Saravanan, 2002). Thirteen species of sea snakes were recorded on the coramandal coast region south east coast of Tamil Nadu (Karthikeyan, 2007). The numerical data collected during trawl fishing was grouped under four major categories (teleosts, crustaceans, molluscs and sea snakes) indicating maximum (63%) contribution from crustaceans, followed by teleosts (35%), whereas molluscs and sea snakes contribute much less (1%) each. The seasonal variations in the percentage of sea snakes in the trawl catches reveal that the contribution of sea snakes increased from December to February (post-monsoon). This can be largely attributed to the commencement of fishing at the end of the monsoon ban and subsequent increase in number of fishing boats due to calm conditions in the sea along the east coast of Tamil Nadu.

Another possible reason could be the migration of females to the inshore estuarine waters as only female individuals were captured during the present study. These include a fully gravid *E. schistosa* female captured from the estuarine waters at a depth of about 5-8m. Ansari *et al.* (1995, 2003) suggest that this estuarine complex with mangrove vegetation acts as a potential nursery ground for opportunistic marine species that migrate there either for spawning or for feeding purpose. Turtle nesting along the east coast of Tamil Nadu (Chennai to Tuticorin) occurred during January –March. Hence, sea turtles nested subsequent to the major monsoon season of the areas i.e. the northeast and southwest monsoons respectively. Peak nesting along the east coasts were during February and October

respectively. The intensity of the sea turtle nesting on the Tamil Nadu coasts is sporadic and its density varied from 3 to 15 nests/ km. The reasons for the difference in the number of nests observed during the study period are unclear. Most likely, these differences could be due to certain annual or cyclic changes in the nesting of turtles. The present study suggests that immediate conservation efforts should focus on the marine reptiles in the southeast coast of Tamil Nadu, where the most threatened species are found, and where the causes of severe population declines remain unknown. The remaining threatened species appear to be impacted by localized threats and their restricted ranges make them amenable to spatial conservation tools. More broadly, there is need for basic field research to understand species diversity, abundance and threats to marine reptiles throughout their range, but particularly in southeast coast of Tamil Nadu. Turtle Excluder Devices (TEDs) are hard grids placed in trawl nets to exclude turtles and other large animals and By catch Reduction Devices (BRDs) are escape grids designed to enable smaller animals to swim out of trawl nets. To avoid captures of threatened and protected species such as sea turtles and sea snakes, by using TEDs and BRDs. Marine reptiles as more research is required to fully understand the threats and ecological requirements of the species in order to determine the most appropriate management strategy.

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REFERENCE

- Bhupathy S., M. Vijay, A.M.A. Nixon, J. Subramanean, R. Karunakaran and J. Gokulakrishnan. 2006. The status of sea turtle populations on the Tamil Nadu and Kerala coasts of India. *Towards Integrated and Collaborative Sea Turtle Conservation in India – a UNEP/CMS-IOSEA Project*.
- Bhupathy, S & S. Saravanan. 2002. Status of sea turtles along the Tamil Nadu coast, India. *Kachhapa*. 7: 7-13.
- Das, I. (2003). Growth of knowledge on the reptiles of India, with an introduction to systematics, taxonomy and nomenclature. *Journal of the Bombay Natural History Society* 100 (2&3): 446-501.
- Kar, C.S. and Bhaskar, S. (1981). Status of sea turtles in the Eastern Indian Ocean. In: Bjorndal, K. (Ed.), *Biology and Conservation of Sea Turtles*. Proc. World Conf. Sea Turtle Cons., Smithsonian Institute Press, Washington. Pp. 373-383.
- Karthikeyan, R., and Balasubramanian, T. 2007. Species Diversity of the Sea Snake (Hydrophiidae) Distributed in the Coramandel Coast (East Coast of India) *International Journal of Zoological Research*, 3 (3):107-131.
- Limpus, C. J and D. J. Limpus. 2003. Loggerhead turtles in the Equatorial and southern Pacific Ocean: a species in decline. Pages 199–209 in A. B. Bolten and B. E. Witherington, editors. *Loggerhead sea turtles*. Smithsonian Institution Press, Washington, D.C., USA.
- Lneich, 1996. Geographic distribution –Serpentes. *Hydrophis rorquatusdiadema*. *Herpetol. Rev.*, 27(3):15.

- Murthy, T.S.N., 1977. On sea snake occurring in Madras Waters. *J. Mar. Biol. Ass. India*. 19: 68-72.
- Murthy, T. S. N. and Rama Rao. K. V., 1988. "Snakes of the Chilka lake, Orissa, India." *The Snake* 20: 67-73.
- Murthy. T.S.N. 1992. Marine Reptiles of India; An overview Contribution in Herpetology. P35-38.
- Murthy, T.S.N., 2010. The Reptile Fauna of India. Published by B.R. Publishing Corporation, New Delhi.
- Negi, S. S., 1993. Biodiversity and its Conservation in India, Indus Publications New Delhi, pp. 1-343.
- Rasmussen, A. R. 1993. The status of the Persian Gulf Sea snake *Hydrophis lapemoides* (Gray, 1984) (Serpentes, Hydrophiidae). *BULL. Brit. Mus. Natl. Hist.(Zool. Ser.)*, 59 (2):97-105.
- Rasmussen, A. R., and L. Smith. 1997. The taxonomic status of the Sea snake *Hydrophis ezeblukovi* (kharin, 1984) from north-west Australian waters. *Amphibia-Reptilia*, 18: 419-425.
- Smith, M., 1926. Monograph of the sea snake (Hydrophiidae). Trustees of the British Museum (London), pp. 1-130.
- Venkataraman K., Ragnathan C, Raghuraman R, Seeraj CR. 2012. Marine Biodiversity in India. Zoological Survey of India.
- Voris, H. K., 1972. The role of sea snakes (Hydrophiidae) in the trophic structure of coastal ocean communities. *J. Mar. Biol. Assn. India.*, 14: 1-14.
- Voris, H.K., and Voris, H.H., 1983. Feeding strategies in marine snakes: an analysis of evolutionary, morphological, behavioral and ecological relationships. *American J. Zool*, 23: 411-425.
- Warrel, D. A., 1994. Sea snake bites in the Asia- Pacific region. In *Sea snake toxinology*, edited by P. Gopalakrishnkone. *Singapore University Press*, pp. 1-36.
