

Ecological notes on the Red-eyed reef crab *Eriphia sebana* (Shaw & Nodder, 1803) from the intertidal zone of Kadmat island, Lakshadweep, India

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ABSTRACT

Research on the ecology of macrobenthos is an interesting and a highly complex factor on earth. The red-eyed reef crab *Eriphia sebana* (Shaw & Nodder, 1803), belonging to the family Eriphiidae has a specific ecology within the habitat. Unfortunately, little is known about its distributional behavior with respect to environmental factors. Kadmat Island of Lakshadweep is a highly diversified island with a complex ecosystem. The study was conducted from November 2020 to February 2021. The *E. sebana* provides a key linkage between trophic levels in the marine food chains of the associated ecosystem. It releases bound nutrients into the reef waters by their feeding and excretion activities. These fascinating brachyurans inhabit the rocky coral crevices of the shorelines and other parts of the atoll. The body color of the bright red-eyed crabs reflects the color of their habitat; the greyish to brownish reef flats where many benthos are distributed. The ecology of these shore crabs is important in understanding the island ecosystem and its biodiversity and demands further detailed studies.

INTRODUCTION

With roughly 7,000 described species in 98 families, the infra-order Brachyura is one of the most diverse groups of crustaceans which are found in marine, freshwater, and terrestrial habitats (Tsang *et al.*, 2014). Despite the high morphological diversity of the brachyuran families, little information is known about these groups. The red-eyed reef crab or shore crab *Eriphia sebana* is one of the prominent brachyuran crabs belonging to the family Eriphiidae and are predominant in the reef flats and the intertidal zone of Kadmat island, Lakshadweep. Kadmat island is situated in the Arabian Sea (11.2241° N, 72.7762° E) at a distance of 407km far from Cochin, India. Despite its modest size, the island possesses a diverse ecosystem. Extensive expanses of complex and specialised

habitats such as confined seas and tidal systems, salt marshes, coral reefs, and seagrass beds among others are included. The delicate balance between biodiversity and growth in the atolls of Kadmat, Lakshadweep is primarily reliant on the complex fragile ecosystems, with the natives' livelihoods depending on agriculture, coconut, fishery and coral reefs (Nihal *et al.*, 2021). Data on the ecology and distributional behavior of *E. sebana* within the insular ecosystem are little known. Earlier phylogenetic analysis was conducted from all recognized extant and extinct families of the Xanthoidea resulting in four Xanthoid families being elevated to superfamily status. One of them is the superfamily Eriphioidea, which included the family Eriphiidae with characteristics of carapace hexagonal, wider than long with ridges and granules, especially on the anterior regions (Karasawa & Schweitzer, 2006). Furthermore, *E.sebana* has been previously described as poisonous, with extracts causing illness and a longer exposure leading to fatality (Llewellyn & Endean 1989). The pioneer research on brachyuran crabs and lobsters from Lakshadweep islands was enlightened by Alcock (1895, 1896, 1898, 1899, 1900). The study of Rao *et al.* (1989) confirmed the distribution of large-sized *E.sebana* with 30-60mm carapace width in all islands of Lakshadweep. A total of 18 species under 16 genera and 11 families including *E.sebana* were reported from Kavaratti Island, Lakshadweep (Devi *et al.*, 2014). In a recent study, Devi *et al.* (2019) recorded 53 species of brachyuran crabs from Lakshadweep islands. However, a detailed study of these crabs from the diverse island like Kadmat is not found, and their ecological features are still unscripted. Most earlier studies concentrated on the taxonomic status revisions of particular species. Thus, it is imperative to update the current knowledge on brachyuran crabs, with special reference to *E. sebana* of Kadmat island of Lakshadweep. The study of the habitat and behavior of these crabs from the study area would help generating baseline data for further research works.

MATERIALS AND METHODS

The study area was restricted to 11.2241° N, 72.7762° E in Kadmat island of Lakshadweep (Fig. 1). The study was conducted from November 2020 to February 2021. The specimens were collected from the intertidal zone of Kadmat island at low tide time, and characteristics and features were observed. The shoreline area and intertidal reef flats were observed during daytime and night. The specimen was fixed in 96% ethanol for further analysis. The surface of the carapace, mouth parts, appendages, abdomen, setae, antennae, and antennules were inspected with a magnifying glass as well as a dissecting microscope and identified using appropriate literature (Koh & Ng, 2008).

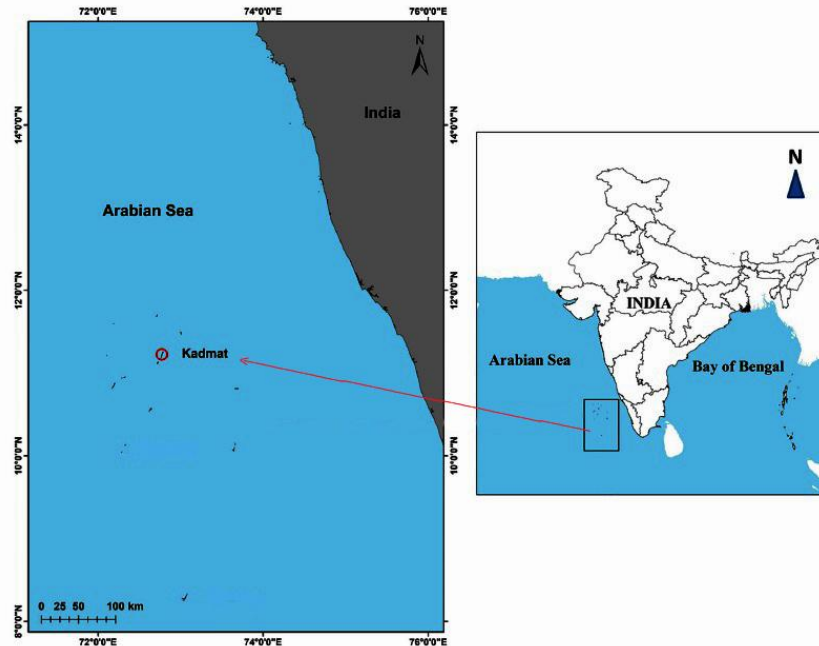


Fig. 1. A map showing the study area

RESULTS AND DISCUSSION

The individuals of brachyuran crab belonging to Eriphiidae inhabited in the reef flats of Kadmat island have specific ecological features and are distributed around the island. The specimen collected from the Lakshadweep waters has a carapace width of 63mm and greyish color on the carapace, pereopod with dark brownish coloration (Fig. 2). Dark brown color are spotted on the serrated areas on the carapace. The adults were robust in girth reaching sizes of approximately 7 cm across the carapace. The right claw was larger than left and the dactyli was whitish in colour. The body colouration of *E.sebana* was in accordance with the colouration of its habitat. The present habitat occupying is reef flats and small tidal pools. The reef flats very near to the shoreline in the intertidal zone exhibited brownish to greyish colour patterns with some algal growth attached. The anterior margin of the carapace was found with a greenish tint. The ecosystem of the crab with rocky reef flats mixed with white sand and the seawater seems bluish beautiful colouration within the lagoon of the island (Fig. 3). The eye of the crab is bright red colour which is illuminated against a spotlight at night. This red-eyed reef crab always creeps and moves through crevices and margins of the reefs and turns into attacking mode with big claw when prompted. The salinity of the water was 33.5 ppt, temperature 27°C and pH of 7.9. The habitat of *E. sebana* is shared with some other brachyuran crabs and hermit crabs. The fauna found near are trigger fishes, butterfly fishes, damsel fishes, lobsters, gastropods and seaweeds. Seagrass ecosystem *Thalassia hemprichii* found near the shorelines but these crabs are mainly occupying in rocky areas. Fragments of gastropods and mollusc shells in the crab's stomach reveal that *E. sebana* appears to be a powerful and opportunistic predator.



Fig. 2. *Eriphia sebana* (Shaw & Nodder, 1803) collected from Kadmat Island

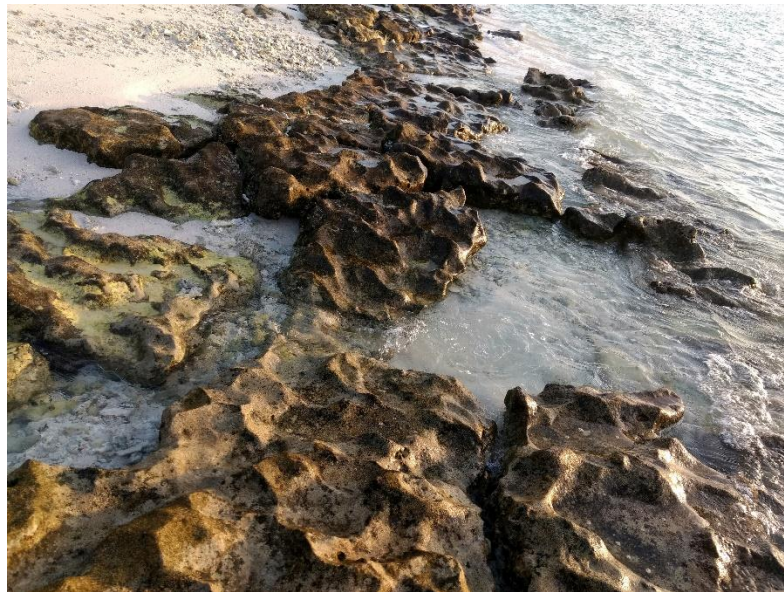


Fig. 3. Ecosystem of Red-eyed reef crab

It could be concluded that their role in the rocky reef ecosystem and food chain is presumably very important. The presence of beach litter in the rocky reefs shows the indirect influence of anthropogenic activities even on an insular island like Kadmat. Plastic wastes are carried from the open sea and coast by the action of waves, currents and winds ultimately impairing the favourable ecological adaptations of reef-associated flora and fauna. The present study area is a fragile and diverse ecosystem where new species of fauna are being reported on every year. The study of brachyuran crab *E.sebana* is still in its virgin state on this island. Therefore this baseline data contributes to the

development of a good biodiversity database, which will give more accurate data in future studies and could serve as an important tool in the conservation of island biodiversity in India.

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