



Short Communication

Occurrence of unusual swarm of soldier crab, *Dotilla myctiroides* (H. Milne Edwards, 1852) in Gulf of Mannar, Southeast Coast of India

C. H. Ramesh, S. Koushik, T. Shunmugaraj, M. V. Ramana Murthy

Abstract

Soldier crab *Dotilla myctiroides* distributed in the Indian coast are usually espied in large numbers of dozens to hundreds on sandy beaches. However, in a rare occurrence, an unusual swarm movement of *D. myctiroides* was observed near shoreward side of Kundukal Bay, Pamban, on the southeast coast of Mandapam area under the Gulf of Mannar region. This swarm represented several thousands of *D. myctiroides* individuals within a 10 m² exposed sandy beach area and occurred in densities of more than 500 per meter square area. Subsequent observations on population of *D. myctiroides* after two months also revealed declined population of few hundreds within a 10 m² area. Further studies are important to understand the key factors involved in population dynamics of *D. myctiroides*.

Keywords *Dotillamyctiroides*, soldier crabs, swarm

Introduction

Soldier crabs are unique group of decapods crustaceans, commonly found in sandy beaches, mangrove areas with silt and clay composition. Ecologically, these crabs facilitate a healthy environment on beach called “bioturbation” by foraging, filtering and cleaning the organic matter, thus by oxygenating the sandy beaches. Soldier crab’s legs have unique membranous windows called tympana, which are capable of trapping the aerial gas into their submerged burrows called “igloos” [1-2]. These crabs reproduce through copulation and females hold fertilized eggs until they are hatched. The common soldier crab, *Dotilla myctiroides* feeds on dinoflagellates, diatoms, algae and other sand pellets such as polyunsaturated FAs and essential FAs [3]. Soldier crabs are scavengers which excavate and feed on organic detritus matter available on shore and eliminate the remaining inorganic sand particles as small sand balls called pseudofaeces. In the absence of these crabs distribution beaches are often found to give bad smell; hence, crabs on sandy beaches are very important to maintain the clean beach. The life span of *D. myctiroides* female and male crabs is 10 and 13 months respectively [4]. They easily hide themselves into air-filled burrows because of their spherical body size [1]. Unlike all other crabs, soldier crabs live in camaraderie and march forward as soldiers; thus, cause illusion of sand particles movement from a distance.


The family Dotillidae comprises of four genera *Dotilla*, *Ilyoplax*, *Lazarocleistostoma* and *Scopimera*, among which the genus *Dotilla* consists of fourteen species [5]. Several studies have reported about the distribution patterns and behavioural studies [1, 6], and the factors limiting *Dotilla* sp. on sandy beaches [7]. Earlier studies also documented the mass wandering of crabs *Mictyris guinotae* [8], *D. myctiroides* [7] and the studies on soldier crabs

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Authors:

C. H. Ramesh , S. Koushik, T. Shunmugaraj
National Centre for Coastal Research (NCCR)
NCCR Field Office, Mandapam-623519,
Tamil Nadu, India

M. V. Ramana Murthy
National Centre for Coastal Research (NCCR)
Pallikaranai, Chennai-600100, Tamil Nadu,
India

 chrameshpu@gmail.com

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are very scarce in Indian continent including only few taxonomic records. The Gulf of Mannar Marine Biosphere Reserve in southeast coast of India is one of the rich marine biodiversity hotspots in Southeast Asia. The Gulf of Mannar region comprises 21 islands with rich diversity of corals. Studies on soldier crabs are very limited in Indian scenario. So far, only one species of soldier crab belonging to family *Dotillidae* is known to be distributed in Gulf of Mannar region. Hence, the present study aimed to report an unusual swarm occurrence of *D. myctiroides* observed from Kundukal jetty, southeast coast of Tamil Nadu, India.

Methodology

The observation were recorded from sandy shore located at Kundukal jetty area, Mandapam region under Gulf of Mannar during a field trip to coral reef survey in Shingle Island on 1st February, 2019. An unexpected and unusual swarm of soldier crab species *D. myctiroides* was recorded during the low tide time, in the morning, near newly being constructed jetty area at Kundukal (09°15' 34" N, 079° 13' 28" E), Akkal Madam, Pamban. The habitat of the observation sites was filled with the fine to medium grade sand. This site was protected by breakwaters connected with a newly being constructed jetty. Specimens were photographed in the field using Nikon Coolpix camera. Taxonomic identification of specimens was confirmed by morphological characteristics and was verified with crab databases (available in WoRMS & Crab Database) and also based on earlier research papers [9]. Taxonomic level was finally confirmed through verification keys [10].

Results and Discussion

D. myctiroides has oval body shape with greyish brown color, elongated brownish eyes; eye stalks are orange in color, short antenna and four pairs of orange to pinkish road legs. More than 500 individuals of *D. myctiroides* were documented for the first time in Mandapam region, Gulf of Mannar. Previously, the same species was recorded in 30 to 50 individuals at Wandoor sandy beach in South Andaman Island. It was observed that within the huge aggregation of sand bubbler crabs, some individuals had jostling using their long pincers. As we tried to approach the swarm, some crabs sought their burrows, some entered near seawater pool and some dig sand and hide themselves immediately in loose sandy bottom (Figure 1 and 2).



Figure 1. (a) Swarm of soldier crabs *D. myctiroides* moving towards pool due to author approach (b) Sand like illusion displayed by *D. myctiroides* (c) Closer view of *D. myctiroides* individuals



They covered their burrows with small cap like sand particles during burrowing near the pool or on sandy shore, and removed the sand after the predator goes away from burrow. These crabs vigilantly came out of the burrows after 20 to 30 seconds as carefully as soldiers do in the battlefield. In the study area, part of the shore was enclosed by new jetty constructed in parallel, thus entry of seawater was restricted in the enclosed shore. Therefore, soldier crabs have aggregated near seawater pools for getting moisture and to avoid the over exposure to intense sunlight.

Taxonomic classification of *D. myctiroides*

Kingdom: Animalia

Phylum: Arthropoda

Subphylum: Crustacea

Superclass: Multicrustacea

Class: Malacostraca

Subclass: Eumalacostraca

Superorder: Eucarida

Order: Decapoda

Suborder: Pleocyemata

Infraorder: Brachyura

Section: Eubrachyura

Subsection: Thoracotremata

Superfamily: Ocypodoidea

Family: Dotillidae

Genus: *Dotilla*

Species: *Dotillamyctiroides* (H. Milne Edwards, 1852)

Common name: Soldier Crab or sand bubbler crab



Figure 2. (a) *D. myctiroides* making sandburrow (b) *D. myctiroides* running towards Seawater pool to hiding (c) Stranding of *D. myctiroides*

As indicated in a previous study [8], these crabs showed visual signalling with each individual hiding from predators attack. A small noise or disturbance near the swarm is caused by the digging and hiding in burrows and the spontaneous entry of *D. myctiroides* near pools (Figure 2). This similar observation was previously observed in *Mictyris guinotae* [11]. Whilst, distribution patterns of *D. fenestrata*



was well studied in regard to various parameters such as tidal level, drainage, substrate preference and organic content [6]. It also revealed that the main factors controlling the *D. myctiroides* distribution were the daytime exposure, water-table height and sediment drainage [7].

Whilst, it was suggested that the population densities are not primarily due to the season but due to the anthropogenic influences such as impending construction of resorts and hotels [3]. This might be the reason underlying the observations obtained in the present study, where construction of jetty area might be involved in evoking the unusual swarm of *D. myctiroides*. In the previous studies maximum number of *D. myctiroides* individuals of 40 ± 4.55 [12], 120 [7], and 37.5 to 579 (mean numbers over a year) were reported [4] in a meter square area from different geographical localities. However, the present study documented an unusual swarm of *D. myctiroides* in Mandapam, south east coast of India. The distribution and abundance patterns of *D. myctiroides* in other localities of Gulf of Mannar should be further examined to understand the coincident variation of swarm in relation to anthropogenic activities and other prominent environmental, nutrient and chemical parameters. The bioactive potentiality of species of *Dotilla* carabs are poorly understood, thus attention may be given to this aspect to investigate the drug potential.

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