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The Ecology of *Ocypode Rotundata* (Miers, 1882) in Qeshm Island Persian Gulf



Mojtaba Naderi^{1*}, Fatemeh Pishevvarzad² and Mariano Lastra³

¹Department of Agriculture, Payame Noor University (PNU), Iran

²Department of Fisheries and Environmental Sciences, Tehran University, Iran

³Department of Ecology and Animal Biology, University of Vigo, Spain

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Corresponding author: Mojtaba Naderi, Department of Agriculture, Payame Noor University (PNU), P.O. Box 19395-3697, Tehran, Iran

Abstract

Ghost crabs inhabit in self-constructed burrows on sandy beaches from backshore to foreshore. *Ocypode rotundata* is one of three species of the genus occurring in the Persian Gulf and Oman Gulf. The males of *O. rotundata* creates sand pyramid exactly in front of the burrow towards the seaward during the breeding season for attraction of female crabs. They play important roles in the ecology of sandy beaches of Qeshm Island.

Keywords: *Ocypode rotundata*; Burrow; Persian Gulf; Ecology

Introduction

Ghost crabs are among the most common burrowing organisms and fastest crustaceans on sandy beach from tropics to temperate latitudes [1,2]. These crabs use self-constructed burrows for variation aims of needs including shelter, mating, egg development phase molting sex-specific signaling and feeding [3-10]. Moreover, ghost crabs have important effect on sediment characteristics and are the great bioturbators of sandy beaches which has important concepts for the biogeochemistry of the soil and soil biodiversity [11]. The genus *Ocypode* comprises 25 species which are globally distributed on tropical and subtropical [1,12-14]. Up to date, 6 species of *Ocypode* have previously been reported from Persian and Oman Gulfs which are, *O. rotundata* (Miers, 1882), *O. sinensis* (Dai, Song & Yang, 1985), *O. jousseaumei* (Nobili, 1905), *O. platytarsis* (Milne Edwards, 1852), *O. cordimanus* (Latreille, 1818), *O. saratan* (Forsk, 1775). The first three species occur on Iranian sandy beaches whist all of five species have distributed along Oman coasts [15-18]. Moreover, distribution of *O. rotundata* occurs on 19 stations around Qeshm Island [19]. Conversely, *O. sinensis* has very low abundance and distribution on Qeshm Island [16].

Matting

Copulation usually occurs on the beach surface [1]. However, *O. rotundata* builds burrows specifically for mating which include 2 shafts: one extended straight down and another turning right

or left contrariwise to the first branch (Figure 1) [20]. Male crabs use two ways for attraction of female crabs during the mating period. One of them is constructed sand mounds and another is slam of sand with both chelae (especially major chelae) [21].



Figure 1: Constructed complex burrow by *O. rotundata* in Qeshm Island.

Gonad Development and Reproduction Period

Warm conditions can induce optimal gonad growth, whereas a low temperature may delay egg development and larval release [6,7,22]. According to Persian Gulf temperature conditions, *O. rotundata* is actively breeding from March to October [23].

Egg Development

The eggs of *O. rotundata* are spherical in shape which includes six developmental stages with different color patterns: yellow, pale orange, orange, dark orange, brownish, brown color [23]. The variation in color during egg development is due to differences in absorption of the yolk reserves. Like other ghost crabs [22,24-26], Ovigerous females of *O. rotundata* usually are scarce on the beach surface [23]. An admissible explanation for the low number of ovigerous female crabs could be the fact that they hide inside their deep burrows, incubating their eggs, until the appropriate time of hatching.

Burrowing Behavior

Increasing size of ghost crabs is accompanied by morphological changes (e.g. shape, diameter, length, and orientation) of burrows [1]. Juvenile crabs of *O. rotundata* construct burrow on upper foreshore due to inability of their gills to tolerate long time of air exposure. Naderi and Pishehvarzad [20] stated that *O. rotundata* individuals excavate single tube, J-shaped and Y-shaped burrows at the different growth stages, on the other hand, spiral and complex burrows only occurred in adult crabs.

Feeding

Feeding behavior of *O. rotundata* divides into three classifications: 1) deposit-feeding, 2) consuming of macroscopic plant detritus, 3) scavenging on animal carcasses (Naderi, unpublished data) (Figure 2).



Figure 2: Feeding behavior of *O. rotundata* in Qeshm Island, A: deposit-feeding, B: consuming of macroscopic plant detritus, C: scavenging on animal carcasses.

Food and Economic Value



Figure 3: Created sand pyramid by *O. rotundata*

Ghost crabs are one of valuable species in Nigeria and west Africa that women catch them [27]. Also, they use as a tool for rapid assessment of human impacts on exposed sandy beaches [28]. On the other hands, tissues of *O. rotundata* include saturated fatty acids, palmitic acid, monounsaturated fatty acid, polyunsaturated fatty acids, two methyl esters of fatty acids, cholesterol which can reduce inflammation and may help to reduce risk of chronic diseases such as heart disease cancer, and arthritis [29-32]. *O. rotundata* does not use as food in Iran but it is a good choice to use as prey for fishing with hook and line (Figure 3).

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