A Note On The Blue-Spotted Mudskipper - *Boleophthalmus Boddarti* (Pallas, 1770) Mudskipper Observed From The Mangroves Of Cauvery Estuary Basin, Tamil Nadu, India.

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ABSTRACT
Mudskippers (Gobiidae: Oxudercinae) burrow and reside in the intertidal mudflats or mangrove swamps of the Indo-West Pacific region. Boleophthalmus boddarti (Pallas, 1770) was observed from the Muthupet mangroves of the Cauvery River basin. The present report is based on a survey conducted to the Nagapattinam dist of Tamil Nadu as a part of the lesser known fauna of Cauvery River basin during 2016- 2017 by the Southern Regional Centre, Zoological survey of India. The present observation was made among the mangroves. Molluscan species were also observed along with Mudskippers. The Northern and Western boarders of Muthupet lagoon are occupied by muddy silt ground where mangroves are not found.
Keywords: *Mudskipper, Mangroves, Cauvery River basin, Nagapattinam, Lagoon.*

INTRODUCTION

Estuaries forms an integral part of the coastal environment. They are the outfall regions of the river, making the transitional zone between fluvial and marine environs. Estuaries are the lower tidal reaches of the river. Most of the great cities of the world have been developed around estuaries. Estuaries are semi-enclosed and sheltered coastal bodies of water. Estuaries are the best settling places for clams and oysters and also act as the nursery ground for a variety of shrimps and some fin fishes. A coastal lagoon is a shallow coastal waterbody separated from the ocean by a barrier connected at least intermittently to the ocean by one or more inlets and usually oriented parallel to the shore. A number of lagoons are present in the east and west coast of India. There are nearly 17 lagoons in the Indian coasts. The lagoons on the east coast are Chilka, Pulicat, Pennar, Bendi, Nizampatanam, Muthukad, Muthupet and Gulf of Mannar.

The present report is based on a survey conducted to the Nagapattinam dist of Tamil Nadu as a part of the lesser known fauna of Cauvery River basin, Tamil Nadu during 2016- 2017 by the Southern Regional Centre, Zoological survey of India. This area includes the Tidal swamp, mangroves, creek and evergreen forests. The present observation was made among the mangroves. Molluscan species were also observed along with Mudskippers. Photographs of the birds observed there were also provided.

Fish forms a primary source of food to a number of species of aquatic birds. Fishes are also excellent indicators of health of wetland ecosystem. The fish fauna of marsh is a part of extensive meta population. There is a considerable amount of dispersal during the rainy season, especially when there is excessive runoff and floods. In summer the population get fragmented into smaller and isolated pools known as lagoons.

DESCRIPTION OF OBSERVATION SITE

The mudskippers were observed at the Muthupet Mangroves (District Thiruvarur: Thiruthuraipoondi) where the co-ordinates are Latitude N- 10° 33835', E - 79°54028' Altitude: 14.5m situated about 80 kms Thanjavur (Tamil Nadu). Vast mangrove forest exists near Muthupet along interconnected canals of Cauvery estuarine areas. Muthupet mangrove forest is located at the southern end of Cauvery delta. The river Koraiaar and Pamaniyar join near Muthupet. The rivers such as Koraiaar, Kalaithankiyar, Marakkakoraiaar and other tributaries of River Cauvery flow through Muthupet and adjacent Villages. At the tail end they form a lagoon before meeting the sea which is known as Muthupet lagoon. The Northern and Western boarders of lagoon are occupied by muddy silt ground where mangroves are not found.


Photographs showing the mangroves at Muthupet.


Blue-spotted Mudskipper - *Boleophthalmus boddarti* (Pallas) **Basking of mudskipper for regulating the body temperature**

***Boleophthalmus boddarti* (Pallas, 1770)**

Mudskippers belongs to the family Osteichthys (bony fish) class Actinoptergii and Family Oxudercidae, subfamily Oxudercinae. Mudskippers can be defined as Oxudercine gobies that are "fully terrestrial for some portion of the daily cycle". They are amphibious and can survive long periods out of water (Richmond, 1997). They are semi terrestrial fishes which shows their presence in mangroves. Their gills are suited to atmospheric respiration. Their locomotion method separates them from other fishes. They are commonly seen on the seaward edge (bar mouth) of mangroves, extending into mangroves where it is inundated daily and seen climbing on mangrove roots. Their pectoral fins are modified for mobility out of water (Gillikin and Verheyden, 2002).

Out of 10 genera, of Mudskippers except the genus *Zappa*, nine are found in India, in the east and west coasts. Thirteen species of mudskippers under four genera are so far known from the east coast of Indian mangrove ecosystem where they are found flagging at each other (Mukherjee, 1995).

GENERAL CHARACTERS

Mudskippers can grow up to 30 cm (12 in) long, and most are a brownish green colour that ranges anywhere from dark to light. During mating seasons, the males will also develop brightly coloured spots in order to attract females, which can be red, green or blue. Unlike other fish, the mudskipper's eyes protrude from the top of its flat head. Another notable feature is that their side pectoral fins are located more forward and underneath their elongated bodies. These fins are jointed and function similarly to limbs, which allow the mudskipper to crawl from place to place. Although they have the typical body form of any other gobiid fish, pectoral fins allow the mudskipper to actively "skip" across muddy surfaces. They are highly territorial and if one infringes on another's patch. Their body is having an attractively colored dorsal fin and also luminescence. Mudskipper fauna of Indian coastal ecosystem are predominant their behavioral study in this aqua-terrestrial ecosystem is very essential. These amphibian fishes can adapt to challenging environments, offering insights into the complexities of evolutionary biology. They are equipped with specialised pectoral fins that function as limbs, allowing them to move efficiently across mudflats and mangrove roots. This adaptation is crucial for navigating the intertidal zones where they reside. Mudskippers bask in the sun during low tides to regulate their body temperature and prevent dehydration. This helps them maintain their physiological functions and avoid desiccation (drying out), which is crucial for survival in the intertidal zone. Basking allows them to absorb moisture from the environment, particularly through their skin, helping prevent dehydration (Mahadevan and Ravi, 2018).

To select the basking sites, they choose elevated locations such as rocks or mangrove roots. These spots offer exposure to sunlight and facilitate effective thermoregulation. Basking sites can also become areas for social interactions. Mudskippers may gather in these locations, displaying behaviours related to territoriality, courtship and communication. The timing and duration of basking vary based on environmental conditions. Basking can also be part of courtship rituals, where males display their vibrant colours to attract potential mates. Some mudskipper species engage in intricate mating dances which involve specific movements and patterns that serve as a form of communication between potential mates. Males prepare and defend nests for the deposition of eggs. Females may inspect potential nesting sites and successful courtship is often followed by the female depositing her eggs in the chosen nest. After the female's deposit eggs in burrows, the males guard the nests, providing protection against predators and ensuring a higher chance of offspring survival. Male parental care varies among mudskipper species but generally extends until the eggs hatch (Larson and Lim, 2005).

From the mangroves of Bhitarkanika, Odisha, east coast of India Das and Palita (2015) recorded Six species of Mudskippers (Gobiidae: Oxudercinae). Two species of Mudskippers viz.. *Boleophthalmus dussumeiri*, and *Scartelaos histophorus* were recorded from Hathab coast (Kanejiya et. al., 2017). Length-weight relationship of two mudskippers (Gobiidae: Oxudercinae) *Boleophthalmus boddarti* (Pallas, 1770) and *Periophthalmusm novemradiatus* (Hamilton, 1822) from Vellar estuary was studied by (Mahadevan and Ravi, 2018).

List of mudskippers recorded from India

1. *Beleophthalmus boddarti* (Pallas, 1770)
2. *Beleophthalmus dussumieri* (Valenciennes, 1837)
3. *Beleophthalmus sculptus* Gunther, 1861
4. *Scartelaos histophorus* (Valenciennes, 1837)
5. *Periophthalmus chrysospilos* Bleeker, 1853
6. *Periophthalmus barbarous* (Linnaeus, 1766)
7. *Periophthalmus kalolo* Lesson, 1831
8. *Periophthalmus malaccensisa* Eggert, 1935
9. *Periophthalmus pearsei* Hamilton, 1822
10. *Oxuderces dentatus* Eydoux & Souleyet, 1850
11. *Periophthalmus novemradiatus* (Hamilton)
12. *Periophthalmodon schlosseri* (Pallas, 1770)
13. *Periophthalmodon septumradiatus* (Hamilton, 1822) (Source: T.K. Chattergee, 2010)

FEEDING HABITS

They feed on small invertebrates and fish larvae (Richmond, 1997). Mudskippers are the most fascinating of intertidal life of mangrove and mudflat habitats. For the purpose of feeding they crawl out of water and feed on small animals especially flies, small crabs as well as algae. These gobies are adapted for an amphibious mode of lifestyle and are common among the mudflats of tropical Africa, Asia and Australasia.

IUCN STATUS

Least Concern (LC) ; Date assessed: 02 November 2020, Harmless. (IUCN. List of Threatened Species. Version 2013. 3).

ECOLOGICAL IMPORTANCE

They play a crucial role as ecosystem engineers, influencing sediment composition and promoting nutrient cycling in intertidal zones. Due to their sensitivity to environmental changes, mudskippers serve as indicator species, reflecting the health of intertidal habitats. They play a key role in between benthic fauna and avifauna. They are dependent on small crustaceans and various algae such as diatoms and are also an important food source for avifauna, particularly coastal birds, including the migratory bird species. The burrows they construct provide shelter for other small organisms in the intertidal environment. In mangrove habitats, their burrows help the mangrove roots receive oxygen. Monitoring mudskipper populations can provide insights into the impacts of climate change and habitat degradation. Understanding the nuances of mudskipper biology not only contributes to scientific knowledge but also emphasises the importance of preserving intertidal habitats for the diversity of life they support. Mudskippers can absorb and concentrate many different pollutants released into the environment by industrial, agricultural, domestic and transportation activities, which cause physiological, histological, and embryological damage. In particular, mudskippers are known to accumulate higher concentrations of some toxic compounds (e.g. DDT and some heavy metals) in their tissues, relative to other aquatic and benthic species (Polgar and Lim, 2011).

ECONOMIC IMPORTANCE

In Gujarat and Maharashtra, mudskippers are called levata fish and are consumed by rural coastal communities. During the lockdown due to the Covid-19 pandemic, the demand of levata suddenly increased due to the myths surrounding the medicinal properties in the flesh of this fish (Kannan & Ingle, 2024).

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