

Mudskipper: As Biological indicator of Pollution at Coastal Waters

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Abstract: *Mudskippers are important for biological and ecological studies and recognized as potential bio indicator in environmental monitoring and assessments of coastal waters and intertidal system. Mudskipper are very much sensitive to ambient environment so this potential would be beneficial for new researches on this species specially in detecting pollution levels in coastal water ecosystems. Regular discharge of pollutant have negative effect on flora and fauna of coastal ecosystem especially mangrove ecosystem and mudflats. Abundance and distribution of mudskippers on land as well as in coastal waters could be considered as a direct indicator of habitat health. Protecting and improving the state of coastal waters and mangrove forests ecosystems which are the natural habitat for mudskippers, mudskipper populations can be protected. Controlling garbage, untreated waste waters, pollutants, nutrients directly into the coastal waters will definitely help in protecting mudskippers. The review contains an update on our knowledge of mudskipper species and its related research fields in special reference to their potential use as an ecological indicator in coastal waters. The study was conducted in November-January 2024 ,with 2 observation creek coast, the data results shows that distribution of species and individuals were slightly different in each community .The contents of this review will lead to new researches, methodologies, discussions and efforts to overcome the global problem of coastal water pollution and degradation of coastal ecosystems.*

Keywords: Mudskippers are important for biological and ecological studies and recognized as potential bio indicator in environmental monitoring and assessments of coastal waters and intertidal system.

I. INTRODUCTION

Mudskippers (Teleostei: Gobiidae: Oxudercinae: Periophthalmini) are gobies that are “fully terrestrial for some portion of the daily cycle”. They are investigated for their biological and eco-toxicological studies, to determine its potential use as a bio-indicator in environmental assessments of coastal waters, tropical or subtropical soft bottom intertidal systems. This potential would be beneficial for new researches on this species especially for its ecological importance in detecting pollution levels in coastal water ecosystems. Bio-ecological knowledge of this group is essentially required to evaluate its possible use as an ecological indicator for coastal pollution . Mudskippers are entirely different from many other fishes as they can breathe comfortably, in water as well as in air .

The species is usually cultured and studied ecologically because of their considerable tolerance to environmental stress, organic and inorganic contaminants . If they are used as food source, it is highly recommended that they should be carefully and periodically monitored for contaminants to assess the health risk to consumers of this species. An urgent implementation to maintain the sustainability of natural resource is necessary and prompt environmental remediation measure and ecosystem rehabilitation is also urgently required,

In polluted coastal areas mudskippers are the potential bioindicators and bio-accumulators of pollutants and directly or indirectly related with human health issues, as they are consumed in different regions. Mudskippers absorb and accumulate many different pollutants released into the coastal environment by industrial, agricultural, domestic and transportation activities. The physiological, histological, and embryological changes in mudskippers are considered as strong indicators of water quality parameters. Mudskippers can accumulate very high concentrations of toxic



compounds in their tissues . Their robustness to environmental stressors and tolerance against many contaminants give them the capacity to be exposed to toxicants without significant effects, and to biomagnifying toxicants in their body tissues.

The previous researches on mudskipper fish in two of different creek of Uran city is not yet done ; so this study needed as part of research.

II. METHODS

The study was conducted in November-January 2024 on coast of Uran city. the research consists of 2 stations based on different region, station 1 was at mouth of govathane village where recent karanja jetty is been built at distance of 6-7 km away by sea route and 13 km away by road. plus the work of coastal road Gujrat- Goa highway is yet to be constructed near this region; also karanja port is hardly 3-4 km away, station 2 was at mouth of Dongri village where Uran city is 6 km and Uran railway station is 3-4 km away.

Fishing was done at low tide. In both the region, sample of water and mudskippers where collected by using both hands , The fishes caught were then analyzed at T.H Wajekar A.S.C college Phunde.

III. RESULTS AND DISCUSSIONS

Type of Diversity

According to results of research of 3 months, the study found 3 species of mudskipper types in station 1 while in station 2 there were 4 species of mudskipper types (table 1).

TABLE 1. Type of diversity found in creek waters of Uran city

No.	Species Names	Station I (Gov. Creek)	Station II (Don. Creek)
1	<i>Boleophthalmus pectinirostris</i>	√	√
2	<i>Periophthalmus takita</i>	---	---
3	<i>Boleophthalmus boddarti</i>	√	√
4	<i>Periophthalmus argentilineaus</i>	---	√
5	<i>Scartelaos histophorus</i>	√	√
6	<i>Oxuderces dentatus</i>	---	---

Different habitat conditions will affect the adaptation patterns and structure of different fins in the Mudskipper. Mangrove is utilized by mudskipper as a place to find food, breed, and other activities by using the roots of mangroves. The existence of mangroves as breeding grounds supports a large number of species found in the area. Genisa (2003) and Nontji (1987) in Endrawati (2012) , carnivorous fishes have swift movements in shallow water and utilize mangroves as a place to look for food

Environmental parameters

According to results, measurements of environmental parameters in creek waters of uran city , seen in following table.

Table 2. Value of environmental parameters

Environmental Parameters	Station I (Gov. Creek)	Station II (Don. Creek)
Temperature (celcius)	27	28
Salinity (ppt)	25	29.8
pH	6.7	8.3
DO mg/L	9.2	9.6
BOD mg/L	9	7



COD mg/L	28.7	23.2
Suspended solids mg/L	33	28
General appearance	Floating matter	Less floating matter
Transparency	No transparency	No Transparency
Substrate	Clay(mud)	Clay(mud)
Smell	Agreeble	Agreeble

Environmental parameters can influence the diversity of an organism as support of aquatic biota life. Mudskipper is an organism that has an overall tolerance level so that it can survive on fickle conditions. The mudskipper diversity index in the both creek waters of Uran city was in the medium category. Moderate diversity indicates that the aquatic environment in the area is in good condition. Environmental parameters become one of the supporting factors that can affect the survival of organisms that exist in seawater ecosystems is environmental quality. Generally, environmental parameters of the creek waters of both govathane village as well as Dongri village still support mudskipper life. Panjaitan (2013) stated that the temperature of the waters suitable for mudskipper is 29°C, so it can be said the temperature at both stations is still ideal for mudskipper life. Animals that live in the tidal zone, such as the shoddy fish at certain times experiences drought have an enormous tolerance to temperature changes.

The appropriate pH value for mudskipper is 8.2 . While the ideal pH value is 7 . the perfect salinity for mudskipper is 30 ppt . Brackish waters have very diverse salinity values because they are influenced by the presence or absence of freshwater and seawater. The mudskippers prefer clear water environment with a muddy sand base which is used as a spawning ground and other activities. Mudskipper can survive in the tidal area with muddy substrate because it has adapted to breathe through the skin of the body and mucous membranes in the mouth and esophagus

IV. CONCLUSION

Based on the results of study, it can be concluded that there are various species diversity of mudskippers found in creek waters of Uran city .the study also indicates that species diversity can be vary according to types of habitat. Though Mudskipper has very less economic importance but they play a significant role as bio-indicator in coastal water ecosystems. Level of pollution in coastal ecosystems can be determined by measuring the density, size, deformities and some other morphological, anatomical, physiological and genetic parameters of mudskippers. Some specific physiological and behavioral changes made them important as bio-indicators to detect and determine the changes in coastal environment.

Both the creeks have variety of mudskipper species but due to constant development, land fillings and water pollution the species can decline in faster rate in future. Hence constant check must be kept on such places and further research must be conducted.

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