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Mudskippers in biological and eco-toxicological perspective

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Abstract- Mudskippers are members of the subfamily Oxudercinae (tribe periophtalamini) within the family gobiidae (gobies). They are completely amphibious fish that can use their pectoral fins to walk on land. Being amphibious, they are uniquely adapted to intertidal habitats, unlike most fish in such habitats, which survive the retreat of the tide by hiding under wet seaweed or in tidal pools. Mudskippers are quiet active when they are out of water, feeding and interacting with one another. Mudskippers constitute a group of 25 air-breathing species in four genera which contain periophtalamus, periophtalamodon, Boleophtalmus and Scartielaeos that are the most derived and the most amphibious of the ten genera of the teleost subfamily Oxudercinae (Gobiidae). Mudskippers are important for their biological and eco-toxicological studies and recognized as potential bio-indicator in environmental monitoring and assessments of coastal waters and tropical or subtropical soft bottom intertidal systems. Mudskippers are very sensitive to ambient environment and this potential would be beneficial for new researches on this species especially its ecological importance in detecting pollution levels in coastal water ecosystems. Using these organisms as bio-indicator of pollution, environmental quality programme could be established. Regularly discharged pollutants have imminent detrimental effect on the flora and fauna of coastal ecosystems especially mangrove ecosystems and tropical mudflats. Abundance and distribution of mudskippers on land as well as in coastal waters could be considered as a direct indicator of habitat health.

Keywords : Mudskipper, Pollution, Bio-indicator, Eco toxicology.

INTRODUCTION

Mudskippers (Gobiidae: Oxudercinae: Periophtalmini) are amphibious gobies which are "fully terrestrial for some portion of the daily cycle" (Fig. 1).¹ Together with the other members of the subfamily Oxudercinae, they form a diverse group of species which colonized semi terrestrial habitats in intertidal and supra tidal coastal swamps.²

The subfamily Oxudercinae includes 10 genera and 40 species, distributed in tropical and subtropical belts throughout the Indo-West Pacific region, from East Africa to the Samoa and Tonga Islands, and along the Atlantic coast of Africa, where only one species is found.²

The species is usually cultured and studied ecologically because of their considerable tolerance to environmental stressors, organic and inorganic contaminants.⁴ If they are used as food source, it is highly

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recommended that they should be carefully and periodically monitored for contaminants to assess the health risk to consumers of this species.⁵ An urgent implementation to maintain the sustainability of natural resource is necessary and prompt environmental remediation measure and ecosystem rehabilitation is also urgently required. Basic researches at all organism levels are also needed to understand the ecotoxicology and biology of different fishes especially of mudskipper and their use as ecological indicators of pollution in coastal waters. In particular the toxic dynamics in different fish species and their effects at the community level are needed.^{6,7}

MATERIALS AND METHODS

Fifty six specimens of the mudskippers gobies (temperature range from 75 to 86 degree F and humidity from 60 to 80%) were taken to study. Mudskippers are only active when the temperature is above 55 degree Fahrenheit. All the specimens caught were placed in small polystyrene containers and kept alive in aerated sea water prior to further analysis in the laboratory. Taxonomic identification and confirmation of the species were on description given by Clayton (1993)⁸, who also stated that the proximate mechanism of territorial behavior *Boleophthalmus boddarti*, an amphibious gobiid mudskipper that builds and maintains polygonal mud walled territories provides a good example of the elastic disc concept of territories.

Laboratory studies investigated chronic and sub lethal cytological and biochemical effects of several types of toxicants on mudskippers, in order to use them as biomarker fish models or bio indicators. Studies were made on the effects of heavy metals.

DISCUSSION

Oxudercine species were investigated, and their potential as biomarkers or bio indicators is probably largely underestimated. These fishes are often abundant, easy and inexpensive to maintain, and considerably tolerant to water physico-chemical changes. In polluted coastal areas mudskippers are the potential bio indicators and bio-accumulators of pollutants and directly or indirectly related with human health issues, as they are consumed in different regions.⁹

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 also be determined.

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.

The mudskippers observed in the present study appear to be quite active when they are out of water, feeding and interacting with each other. The present study indicates that *B. pectinirostris* forms a territory a pool of water that encourages diatom growth and enables the fish to engage in surface activity. Although they are found all over Kuwait bay, the most interesting population of *Boleophthalmus* can be seen in sulaibikhat bay where they construct and maintain elaborate continuous network of polygonal walled territories.

The males then fertilize the eggs and takes over responsibility for the eggs. During the mating season, the male's colors become more intense, and they become much more active. they stated that males leap and flip in the air and even stand on their tails, all to attract the females. Chen *et al.* (2007) stated that the mudskipper *B. pectinirostris* maintained territories in farming ponds during the cold season between November and February.

REFERENCES

1. **Murdy EO. 1989.** A taxonomic revision and cladistic analysis of the oxudercine gobies (Gobiidae: Oxudercinae). *Records of the Australian Museum Supplement. 11:* 1-93.
2. **Polgar G, Sacchetti A, Galli P. 2010.** Differentiation and adaptive radiation of amphibious gobies (Gobiidae: Oxudercinae) in semi-terrestrial habitats. *J. Fish Bio. 77:*1645-1664.
3. **Murdy EO, Jaafar Z. 2017.** Taxonomy and Systematics Review. In: Jaafar Z, Murdy EO (Eds) *Fishes Out of Water: Biology and Ecology of Mudskippers*, CRC Press, USA, pp. 1-36.

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4. **Rainboth, W.J., 1996.** Fishes of the Cambodian Mekong. FAO species identification field guide for fishery purposes. FAO, Rome, 265 p.
5. **Ahmed, M., 1991.** A model to determine benefits obtainable from the management of riverine fisheries of Bangladesh. *ICLARM Tech. Rep.* **28**: 133 p.
6. **Aligaen JC, Mangao DD. 2011.** Climate Change Integrated education: A Model for Lifelong Learning System SEAMEO RECSAM Penang, Malaysia, A report, 20.
7. **Polgar, G., Z. Jaafar and P. Konstantinidis, 2013.** A new species of mudskipper, *Boleophthalmus poti* (Teleostei: Gobiidae: Oxudercinae) from the Gulf of Papua, Papua New Guinea, and a key to the genus. *Raffles Bull. Zool.* **61(1)**:311-321.
8. **Clayton DA. 1993.** Mudskippers. *Oceanography and Marine Biology Annual Review.* **31**: 507-577.
9. **Anonymous, 2001.** Fish collection database of the Zoological Museum, University of Copenhagen. Zoological Museum, University of Copenhagen.
