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A Review of Recent Status on Mudskippers (Oxudercine Gobies) in Indonesian Waters



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Abstract

The status of valid species and distributional range of mudskippers (oxudercine gobies) in Indonesian waters are reviewed here. There are 24 species of mudskippers recently recorded. Referred to seven largest islands region in Indonesia, Sumatra has largest number of mudskippers (14 species), following Java (12 species, Lesser Sundas (11 species), Kalimantan (9 species), West Papua (9 species), Sulawesi (8 species) and Moluccas (8 species). Further research is required to clarify distributional range and to adress conservation challenge of mudskippers in Indonesian waters.

Keywords: Review; Mudskipper; Oxudercine gobies; Oxudercidae; Indonesian waters; Diversity

Introduction

Mudskippers or oxudercine gobies are amphibious fishes native to the Indo-West Pacific and tropical western Africa [1]. Ten mudskipper genera are recognized [2]; and of these, four genera, *Boleophthalmus*, *Periophthalmodon*, *Periophthalmus* and *Scartelarios*, conspicuously emerge out of water to display, forage and defend territories during ebb tides [3]. The mudskippers provide a rich source for comparative studies in adaptation to the littoral habitat. Within the Indo-Pacific, mudskippers are distributed longitudinally from the Red Sea (East Africa, 40° E) to Samoa (Tonga, 165° W) and latitudinally from Japan (35° N) to Australia (20° S) [2,4]. Indonesia archipelagos are the main regions of the Indo-West Pacific which have the richest marine life. The Indonesian

coastal zone is rich in tropical marine ecosystems such as estuarial beaches, mangroves, coral reefs, seagrass and algal beds and small island ecosystems which are homes of different varieties of living communities with various types of mode association as well as richness in species diversity [5]. Most of Indonesian mangrove-associated fish species are widely distributed throughout the central Indo-west Pacific region, including mudskippers [6]. Recent phylogenetic studies, supported by morphological data, have provided evidence that the oxudercine gobies treat as family Oxudercidae [7], but further discussions still running to facilitate their taxonomical status. In this paper, we review and summarize update current knowledge of the mudskippers in Indonesian waters.

Mudskippers in Indonesian Waters

Table 1: List of mudskippers in Indonesian waters.

No.	Species	Distribution						
		S	K	J	S	M	L	P
1	<i>Apocryptodon madurensis</i> (Bleeker, 1849)			+				
2	<i>Boleophthalmus boddarti</i> (Pallas, 1770)	+	+	+	+	+	+	
3	<i>Boleophthalmus pectinirostris</i> (Linnaeus, 1758)	+						
4	<i>Oxuderces nexipinnis</i> (Cantor 1849)	+		+				+
5	<i>Parapocryptes serperaster</i> (Richardson, 1846)			+				
6	<i>Periophthalmodon freycineti</i> (Quoy & Gaimard, 1824)				+	+	+	+
7	<i>Periophthalmodon schlosseri</i> (Pallas, 1770)	+	+	+	+	+	+	+
8	<i>Periophthalmodon septemradiatus</i> (Hamilton, 1822)	+	+					

9	<i>Periophthalmus argentilineatus</i> Valenciennes, 1837	+	+	+	+	+	+	+
10	<i>Periophthalmus chrysopilus</i> Bleeker, 1853	+	?	+				
11	<i>Periophthalmus gracilis</i> Eggert, 1935	+	+	+	+	+	+	+
12	<i>Periophthalmus kalolo</i> Lesson, 1831	+	+	+	+	+	+	+
13	<i>Periophthalmus malaccensis</i> Eggert, 1935				+	+	+	+
14	<i>Periophthalmus minutus</i> Eggert, 1935	+					+	
15	<i>Periophthalmus novaeguineensis</i> Eggert, 1935							+
17	<i>Periophthalmus pusing</i> Jaafar, Polgar & Zamroni, 2016							+
18	<i>Periophthalmus spilolus</i> Murly & Takita, 1999	+						
19	<i>Periophthalmus variabilis</i> Eggert, 1935	+	?	+				
20	<i>Periophthalmus weberi</i> Eggert, 1935							+
21	<i>Pseudapocryptes borneensis</i> (Bleeker, 1855)		+					
22	<i>Pseudapocryptes elongatus</i> (Cuvier, 1816)	+	+	+				
23	<i>Scartelaos histophorus</i> (Valenciennes, 1837)	+	+	+	+	+	+	?
24	<i>Zappa confluentus</i> (Roberts 1978)							+
	TOTAL	14	9	12	8	8	11	9

Distribution abbreviations, S = Sumatera, K = Kalimantan (Indonesian Borneo), J = Java, S = Sulawesi, M = Moluccas, L = Lesser Sunda, P = Papua (West Papua, Indonesian Papua), + = recorded, ? = presumed, but need confirmation

There are 24 species of mudskippers recently recorded in Indonesian waters (Table 1). This checklist was compiled and shortlisted from recent major references of oxudercine gobies [2,4,8-20]. The fishes were divided within seven largest islands region of Indonesia, where faunal regions match administrative boundaries and has no political significance [21]. Referred to seven largest islands region in Indonesia, Sumatra has largest number of mudskippers (14 species), following Java (12 species, Lesser Sunda (11 species), Kalimantan (9 species), West Papua (9 species),

Sulawesi (8 species) and Moluccas (8 species). We presumed the low number of mudskippers species in Sulawesi and Moluccas are correlated with lacking of local researchers and ichthyologists on the both islands. For the example, recent field work in Sumatra revealed that *Periophthalmodon septemradiatus* recorded further to the southern Sumatra (Figure 1) [22]. If number of local researchers and ichthyologists increasing interest in mudskippers, more number of species could be also add to regional islands list.



Figure 1: *Periophthalmodon septemradiatus* (Hamilton, 1822) found on 16 September 2017 in Musi drainage, South Sumatra province. This record increases this species known distribution southwards 200 km from previous known range (photograph by Muhammad Iqbal).

Conservation Challenge in the Future

The conservation of the mangrove ecosystem is important especially for an archipelagic area such as Indonesia. In recent decades, mangrove habitats have been rapidly reduced and degraded, to current global estimates of less than 138,000 km² of mangrove forests remaining [23]. In Indonesia, 2,548,209.42 hectares (27%)

are in good conditions, 4,510,456.61 hectares (48%) are in poor conditions and 2,146,174.29 ha (23%) are in damaged conditions [24]. Like mudskippers, mangrove plants are adapted to different environments in the coastal zone, and display distinct community zonation from low to high water or topography (Figure 2), based on changes in inundation and salinity [25]. The status of all mudskippers species are not listed as threatened under the International

Union for the Conservation of Nature's (IUCN) Red List of Threatened Species [26]. Nor species also listed as one of protected fish by Government of Indonesia [27]. However, yet mangrove areas con-

tinue to be deforested at unprecedented rates, we propose mudskipper as bioindicator of conservation challenge for focal faunistic species that associated with mangrove forests.



Figure 2: Mudskippers are adapted to different environments in the coastal zone and display distinct community zonation from low to high water or topography. Mudskippers at mudflats in Banyuasin peninsular, South Sumatra, 18 March 2018 (photograph by Muhammad Iqbal).

Conclusion

The valid species and distributional range of mudskippers in Indonesian waters are presented here. This review reflects that further research is required to justify distributional range and to address conservation challenges of mudskippers in Indonesian waters, especially in the area where mangrove forests are concentrated and rarely visited by ichthyologists.

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