



An updated checklist of Marine Fishes of Bangladesh

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Abstract. A checklist of the marine fishes of Bangladesh is presented with their scientific, common and Bangla or local names. The global IUCN Red List categories of these species are also provided. This inventory of the marine fish species is compiled from different major and valid published scientific papers, reports and books published within last 50 years from 1970 to 2020. The directory covers a total of 740 species belonging to 389 Genera of 145 Families and 30 Orders. Among the fish species, 53.38% are exclusively marine and 46.62% are found in both brackish and marine water. Besides, 296 species of fishes are reef associated and 204 of these are recorded from the Saint Martin's Island. Further, 271 species of brackishwater and/or marine fishes are commonly observed in the Sundarbans mangrove ecosystem and its adjacent sea area. About 7% of the total marine fishes of Bangladesh are identified as threatened as per global IUCN Red List. However, the conservation status of the marine fish species of Bangladesh has not yet been assessed locally by IUCN which is essential. The updated checklist will constitute the reference inventory of marine fishes of the coastal and maritime area of the country.

Keywords: Marine fish, Bay of Bengal, Bangladesh

Introduction

Bangladesh is bestowed with immense coastal and marine resources along its south edge at the northernmost part of the Bay of Bengal. The country has a coastline of about 710 km and 121,110 sq. km of Exclusive Economic Zone (EEZ). The coastal and marine ecosystem of Bangladesh is a part of the Bay of Bengal Large Marine Ecosystem which is one of the 64 Large Marine Ecosystems of the globe. The coastal and marine environment of Bangladesh is blessed with a warm tropical climate and abundant annual rainfall, enriched with nutrients from the land mass, generating one of the world's richest ecosystems and high productivity (Hossain 2001, Islam 2003, Hossain *et al.* 2015b, Shamsuzzaman *et al.* 2017). The country has the third largest aquatic fish biodiversity in Asia, after China and India, with about 800 species in fresh, brackish and marine waters (Hussain and Mazid 2001). As the existing marine fish species of Bangladesh, the number '475' has been mentioned in almost all of the literatures of the country (Islam 2003, Hussain and Haq 2010, Barua *et al.* 2014, Shamsuzzaman *et al.* 2017, DoF 2019). This number basically has come from the list of marine and estuarine fishes of Bangladesh published by Hussain (1970) before the independence of the country during the then East Pakistan which was found after 5 years long field investigations in the Bay of Bengal (Rahman *et al.* 2009). Quddus and Shafi (1983) listed 170 species of marine fishes including 149 bony fishes and 21 cartilaginous fishes. Besides, some other publications including scientific papers, reports (e.g. Rahman *et al.* 1995) and field guides (e.g., Bernacsek 2001) were also published in different times. In 2009, Asiatic Society of Bangladesh published 'The Encyclopedia of Flora and Fauna of Bangladesh', a multi-volume encyclopedia. The volume 24 of this compendium was composed on marine fishes by Rahman *et al.* (2009) after reviewing and compiling all of the previous publications on marine fish species of the country. In this volume, 402 species of

marine fishes under 117 families were compiled and described. Habib *et al.* (2018a) listed and described 169 marine and brackish water fish species found in the Sundarbans mangrove ecosystem of Bangladesh based on about one-and-a-half-year survey. Thompson and Islam (2010) listed 225 species of marine fish from the Saint Martin's Island of the country and most of these species inhabited coral ecosystem. Recently, Fanning *et al.* (2019) listed 343 marine fish species in a report 'Marine fisheries survey reports and stock assessment 2019' published by Department of Fisheries (DoF), Bangladesh. Further, an album of coastal and marine fishes of Bangladesh has been published by Singha *et al.* (2019) from DoF where 232 species of marine fishes were illustrated. Beside these major publications, a number of reports and scientific papers have been published on fish diversity with new distributional records, and also with new species to science from the marine waters of Bangladesh in different years, particularly in the decade 2010 to 2020 (Khan *et al.* 2013, BOBLME 2014, Hoq and Haroon 2014, Hoq *et al.* 2014, Hossain *et al.* 2015, Roy *et al.* 2015, Baki *et al.* 2017, Saha *et al.* 2017, Shamsunnahar *et al.* 2017, Alam *et al.* 2018, Haque and Hossain 2018, Habib *et al.* 2018a,b, Kabir *et al.* 2018, Saha *et al.* 2018, Ahmed *et al.* 2019, Habib *et al.* 2019, Hanif 2019, Ahmed *et al.* 2020, Akash *et al.* 2020, Datta *et al.* 2020, Fuad *et al.* 2020, Habib *et al.* 2020a,b,c; Islam and Habib 2020, Islam *et al.* 2020a,b; Saha *et al.* 2020, Siddik and Hanif 2020, Sarkar *et al.* 2021, Habib *et al.* 2021). Thus, descriptions of various marine fishes of Bangladesh have remained scattered throughout a wide range of scientific publications.

Checklists of species are indispensable for effective management of ecosystems as well as for development of conservation strategies and environmental impact studies (Mace 2004, Hellman and Fowler 1999). Furthermore, comprehensive inventories of a local habitat or a country or region may increase our knowledge of the species' distributional ranges and thus assist to biogeographical and macroecological studies (Silveira *et al.* 2010, Lamas *et al.* 2016). In the present study, we provide an updated checklist of marine fishes of Bangladesh reviewing the valid publications and literature covering about a 50-year span from 1970 to 2020. We also mentioned the families of the respective species with their global IUCN conservation status as per IUCN (2020).

Material and Methods

The compilation of species was made by accumulating the information from the earlier valid literatures and scientific papers including inventory works, faunistic surveys, field guides and taxonomic works. The scientific names of fishes used in the cited literatures have been updated following the World Register of Marine Species (WoRMS), Integrated Taxonomic Information System (ITIS) and Catalog of Fishes (WoRMS Editorial Board 2020, ITIS 2020, Fricke *et al.* 2020). The systematic arrangement of orders and families followed Nelson *et al.* (2016). Species in each family were arranged alphabetically in the checklist. Unbiased and sincere efforts were made in accumulating such a valuable inventory. To prepare this checklist, we emphasized to review and refer those publications which were prepared based on primary study or observations except Rahman *et al.* (2009). All of these references are given in the Table I. A few species have been included from a recent survey made by the authors which were not previously reported in Bangladesh. The habitats (marine, brackish, freshwater and reef associated) of enlisted fishes were assessed based on Froese and Pauly (2019), WoRMS Editorial Board (2020)

and Fricke *et al.* (2020). The native fishes of two important coastal and marine habitats of Bangladesh viz. Sundarbans and Saint Martin's Island were evaluated and counted from Thompson and Islam (2010), Khan *et al.* (2013), Baki *et al.* (2017), Saha *et al.* (2017, 2018, 2020), Alam *et al.* (2018), Habib *et al.* (2018b), Habib *et al.* (2019), Fuad *et al.* (2020), Habib *et al.* (2020 a, b, c), Islam *et al.* (2020b), Islam and Habib (2020), Sarkar *et al.* (2020), Habib *et al.* 2021. As the checklist is intended to be a master reference for the conservation and management of marine fish, we consulted the latest global IUCN Red List status for each species following IUCN (2020).

Results

The marine fish species distributed in the coastal and marine water of Bangladesh have been accumulated and presented in this paper. A total of 740 species of fishes of 389 genera, 145 families under 30 orders have been compiled (**Table I, Supplementary**). Among these enlisted fish, cartilaginous fishes (Chondrichthyes: sharks, skates and rays) contain 81 species of 42 Genera and 17 Families under 8 Orders, whereas 659 bony fishes (Osteichthyes) cover 347 genera, 128 families and 22 orders. More than half of the total species (398) were recorded from the Order Perciformes. Percentage of comprised species for each of the Order is shown in the Fig. 1. In the present study, 9 species of fish viz. *Caranx heberi* (Bennett 1830), *Cheilopogon furcatus* (Mitchill 1815), *Chromis cinerascens* (Cuvier 1830), *Colletteichthys dussumieri* (Valenciennes 1837), *Halichoeres hortulanus* (Lacepède 1801), *Hemiramphus far* (Forsskal, 1775), *Pomacanthus sexstriatus* (Cuvier 1831), *Saurida micropectoralis* Shindo & Yamada, 1972 and *Zanclus cornutus* (Linnaeus 1758) have been provided from the recent study of authors at Saint Martin's Island which are new distributional records from Bangladesh.

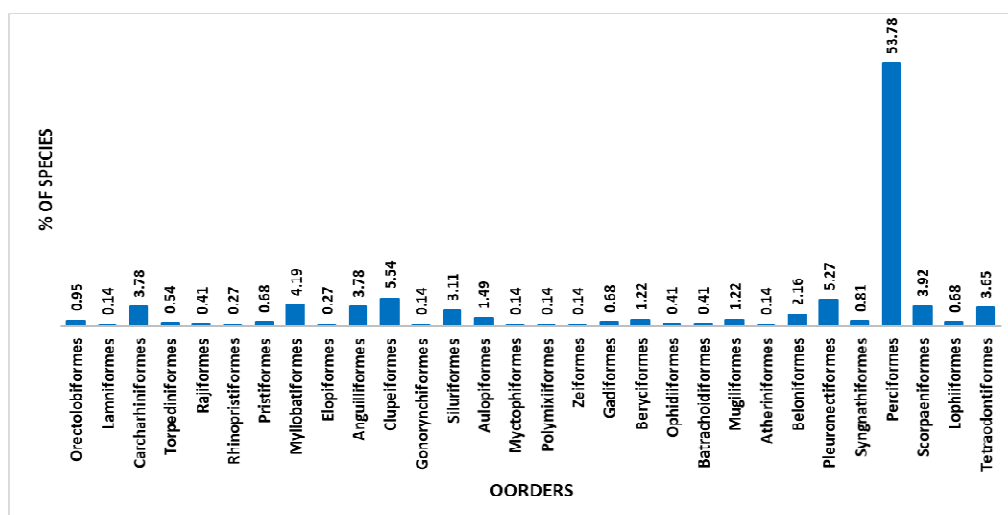


Fig. 1. Order-wise distribution of enlisted marine fishes of Bangladesh.

Among the enlisted marine Ichthyofauna, 395 species are exclusively marine and 345 species belong to both marine and brackish water. One hundred and twenty-four (124) species of these enlisted marine fishes are also found in freshwater. Besides, 296 species of fishes are reef

associated, of which 204 species have been recorded from the Saint Martin's Island, and 271 species are frequently found in the Sundarbans mangrove region and adjacent sea area. According to global IUCN red list status, 50 species of enlisted fishes are globally threatened, of which 10 species are critically endangered (CR), 14 species are endangered (EN) and 26 species are vulnerable (VU). On the other hand, 30 fish species were categorized as near threatened (NT), 405 species were least concern (LC), 54 species were data deficient (DD) and the rest 201 species were not evaluated (NE) globally.

Discussion

Checklists of species are invaluable tools in the fields of natural sciences for assessing biodiversity and conservation. During the period from 2010 to 2019, an average of about 418 new species of fishes have been named and described per year (Fricke *et al.* 2020) and a large amount of new distributional records have been documented in different countries and regions of the world. Ample of this information is scattered across many scientific journals. Accumulating all taxonomic and biogeographical data available for species assist to consolidate our level of knowledge and reveal the areas needed for further investigation (Parenti and Randall 2020).

Until now, very few comprehensive checklists have been published on the marine fishes of Bangladesh. Since the present review paper provides the most recent comprehensive checklist, some taxonomical corrections and revalidations of the status were made during compilation. For example, 11 fish species (*Datnioides polota*, *Dichotomys myctere fluviatilis*, *Gonialosa manmina*, *Lutjanus fuscescens*, *Mystus gulio*, *Microphis cuncalus*, *Pangasius pangasius*, *Rhinomugil corsula*, *Setipinna phasa*, *Silonia silondia*, *Toxotes chatareus*) are excluded from the list of Hussain (1970) due to be majorly inhabitants of freshwater and brackishwater of coastal rivers but they don't dwell frequently in marine habitat. Further, some of the species were in duplication, 5 species were identified up to genus level and some were synonymized with others. Therefore, we omitted these species and used the current accepted scientific names. Besides, the occurrence of 8 species (*Sphyrna tudes*, *Galeorhinus galeus*, *Anguilla celebesensis*, *Polymixia berndti*, *Caranx hippos*, *Chlorurus japanensis*, *Bathyclupea malayana* and *Pterotolithus lateoides*) listed by Hussain (1970) are questionable since they are far-distantly distributed from the maritime area of Bangladesh such as Eastern and Western Atlantic, Baltic Sea, Mediterranean Sea, Eastern, Central and Western Pacific, South and Western Indian Ocean (Froese and Pauly 2019, Fricke *et al.* 2020). In the list of 402 marine fishes of Rahman *et al.* (2009), 3 of above mentioned freshwater and coastal brackishwater species, *D. fluviatilis*, *Minimugil cascasi* and *Toxotes chatareus* were also included that we have discarded. Additionally, 19 species were found as synonyms of others. In this case, we have also used the current accepted name for these species. Thompson and Islam (2010) listed 225 species from the Saint Martin's Island, where 7 species (*Aplocheilichthys panchax*, *Awaous grammepomus*, *Oreochromis mossambicus*, *O. niloticus*, *R. corsula*, *Sicamugil cascasi*) belonged to freshwater-cum-brackish, and 28 species were identified up to genus level.

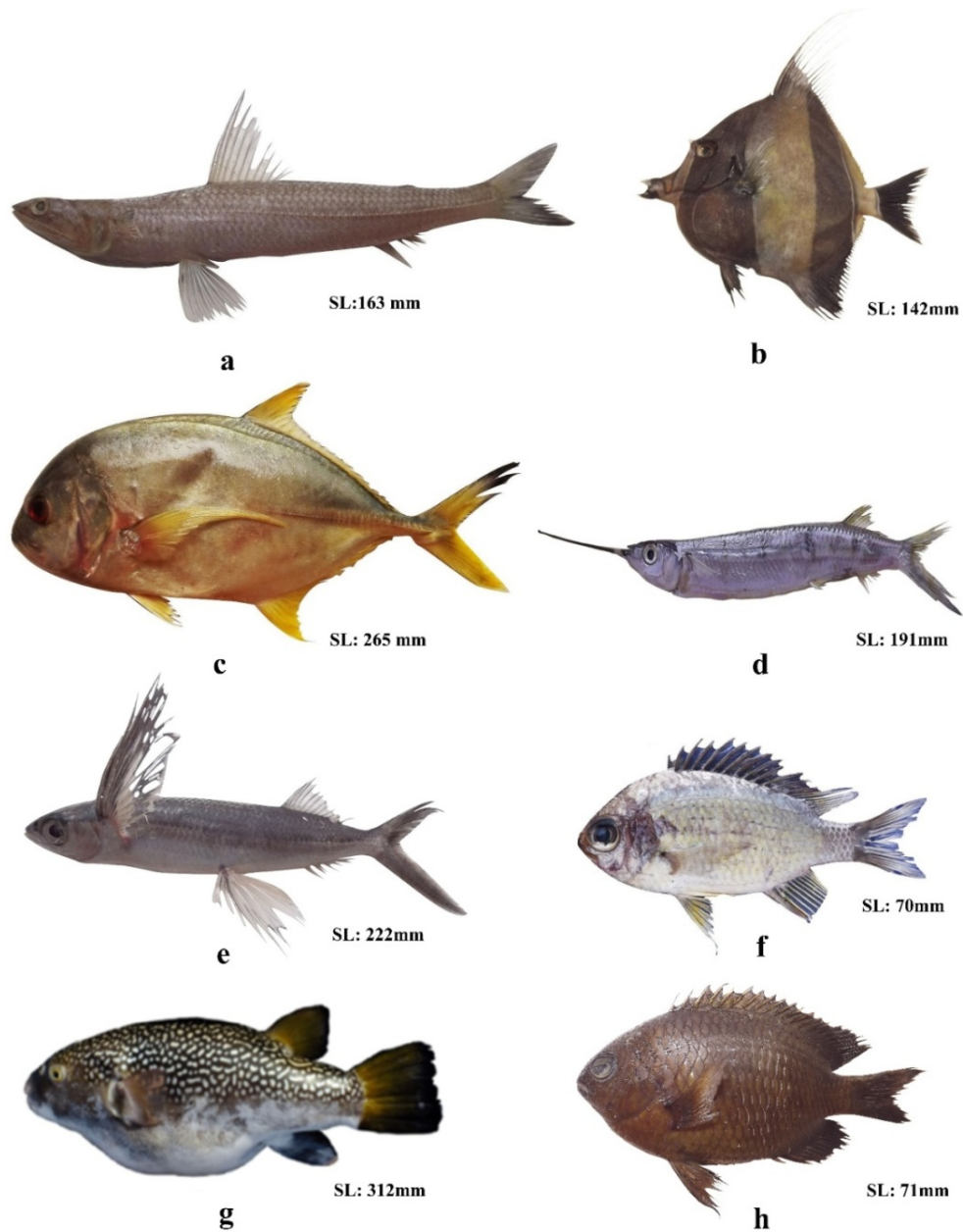


Fig. 2. Photographs of the fish species a) *Saurida micropectoralis*, b) *Zanclus cornutus*, c) *Caranx heberi*, d) *Hemiramphus far*, e) *Cheilopogon furcatus* and f) *Chromis cinerascens* reported as the new distributional records from Bangladesh in this study; and the photographs g) *Chelonodontops bengalensis* and h) *Pomacentrus bangladeshius* are two new species to science recently described by the authors from the Sundarbans and Saint Martin's Island of Bangladesh, respectively.

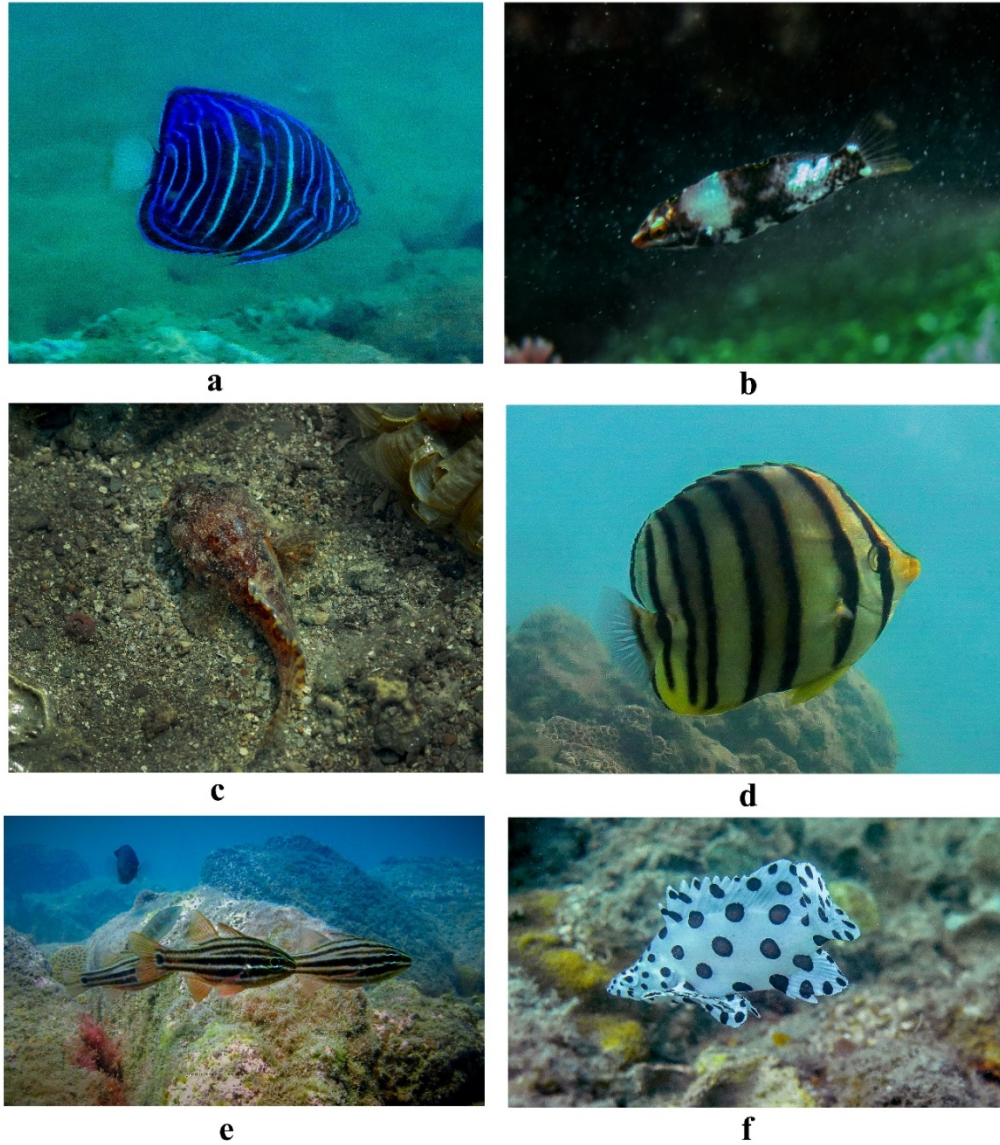


Fig. 3. Underwater photographs of some coral associated fish species captured and identified from Saint Martin's Island of Bangladesh by the authors: a) *Pomacanthus sexstriatus*, b) *Halichoeres hortulanus*, c) *Colletteichthys dussumieri*, d) *Chaetodon octofasciatus*, e) *Ostorhinchus cookie* and f) *Cromileptes altivelis*. The species a, b & c are three new distributional records from Bangladesh reported in this study.

In the list of 169 marine fishes of Sundarbans described by Habib *et al.* (2018a, b), 3 species were also identified up to genus level. Therefore, we excluded all of these species from our checklist. Furthermore, two species of brackish and freshwater (*Upeneus guttatus*, *P. pangasius*) and one sea snake (*Hydrophis platurus*) were included in the inventory of Fanning *et al.* (2019), and 3 species of this list were in duplication and one species was misspelled (*Aulopardia (?) ocellata*). They also enlisted 52 species up to genus level in their report. Likewise, Singha *et al.* (2019) listed *P. pangasius* (Hamilton 1822) as marinewater species, and 4 species were presented up to genus level in their pictorial book. All of these ambiguous species have been excluded from the present compilation of marine fishes. We have assessed the conservation status of marine fishes of Bangladesh as per global IUCN red list categories (IUCN 2020). However, the local conservation status within country has not been evaluated yet. Therefore, local assessment is needed for taking better management strategy for conservation of marine fishes of Bangladesh.

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