FishTaxa (2022) 23: 30-41
Journal homepage: www.fishtaxa.com

Range extension of *Pomadasys andamanensis* McKay and Satapoomin 1994 (Perciformes: Haemulidae) to Bangladesh, the north-eastern Bay of Bengal with the indication of a cryptic sibling species from Bali, Indonesia

Mohammad Eusuf HASAN[1,2,*], Sahat RATMUANGKHWANG[3], Jean-Dominique DURAND[4]
[1]*Institute of Marine Sciences, University of Chittagong, Chattogram 4331, Bangladesh.*
[2]*Marine Fisheries Survey Management Unit, Department of Fisheries, Cox's Bazar 4700, Bangladesh.*
[3]*Andaman Coastal Research Station for Development, Faculty of Fisheries, Kasetsart University, Suksamran, Ranong 85120, Thailand.*
[4]*MARBEC, Université de Montpellier, IRD, IFREMER, CNRS, cc093, Place E. Bataillon, 34095 Montpellier Cedex 05, France.*
*Corresponding author: *hasaneusuf@gmail.com*

Abstract

We document a ~700 km northward range extension of the rare Andaman grunt, *Pomadasys andamanensis* McKay and Satapoomin 1994, to the Bangladesh coast of the north-eastern Bay of Bengal. Sixteen specimens (82–129 mm SL) were collected from fishermen catches in Ukhia, Teknaf and Zinjira Island, south-eastern Bangladesh, during 2014–2019 and their counts, measurements and descriptions are provided in detail. In addition, underwater videography (near Zinjira Island), shows an individual swimming over sand-gravel-rock bottom covered with a dense bed of brown algae, predominantly *Padina* and *Dictyota*. Using the Cytochrome Oxidase subunit I (COI) region sequence variation of mitochondrial DNA, four specimens were found genetically indistinguishable from the topotype (Andaman Sea coast of Thailand) specimens collected in this study. Long regarded as an endemic species to the Andaman Sea (type locality), the distribution range of *P. andamanensis* now extends from Phuket Island in the south to the Inani Coast in Cox's Bazar, Bangladesh in the north, spanning roughly 1500 km in the Andaman Sea and eastern Bay of Bengal. Comparison between published COI barcode data of *P. andamanensis* and the barcodes generated in this study indicates the presence of a cryptic sibling species from southern Bali, Indonesia, in the south-western end of the Coral Triangle. A deeper phylogenetic and taxonomic investigation covering more *Pomadasys* spp. in the Bay of Bengal and neighboring region is suggested to resolve species level ambiguities.

Keywords: Range extension, Zinjira Island, DNA barcoding, Cryptic diversity, Sibling species, Coral Triangle.

Citation: Hasan, M.E., Ratmuangkhwang, S., Durand, J-D. 2022. Range extension of *Pomadasys an*damanensis McKay and Satapoomin 1994 (Perciformes: Haemulidae) to Bangladesh, north-eastern Bay of Bengal with indication of a cryptic sibling species from Bali, Indonesia. FishTaxa 23: 30-41.

Introduction

Haemulid fishes of the genus *Pomadasys* are widely distributed in inshore bays, and estuaries of the tropical Indo-West Pacific (Iwatsuki et al. 1999; McKay 2001). They are characterized by having two anterior pores and a median pit (McKay 2001) on the chin. Currently, 30 species of *Pomadasys* are considered valid (Fricke et al. 2021) of which 12, including the Andaman grunt *P. andamanensis* McKay and Satapoomin 1994, are reported to occur in the Andaman Sea coast of the Eastern Indian Ocean (Fricke et al. 2021, Froese and Pauly 2021).

The Andaman grunt, *P. andamanensis*, is characterised by having a silvery-white body with four horizontal black or dark brown stripes on the dorsal half of the body, and with a dark brown blotch on the anterior two-thirds of the anal fin soft-rayed portion (McKay and Satapoomin 1994; Iwatsuki et al. 1999). It was originally described based on a single individual from Phuket Island, Thailand (McKay and Satapoomin 1994) and later redescribed from another four individuals taken from the same locality (Iwatsuki et al. 1999). The species has long been considered as an Andaman Sea endemic species (Satapoomin in Motomura et al. 2009; Satapoomin 2011). However, it has recently been included in the FAO marine species identification guide to the living marine resources of Myanmar (Psomadakis et al. 2019). Surprisingly, another couple of specimens were recorded from Kedonganan, southern Bali, Indonesia nearly a decade ago (White et al. 2013). This discovery, however, remained unnoticed by the scientific community, and *P. andamanensis* is still regarded as an Andaman Sea endemic species (Froese and Pauly 2021; Fricke et al. 2021).

During investigations on fisherman catches (2014–2019) from the surrounding rocky coasts in the Cox's

Accepted: 10 June 2021; Published: 11 February 2022

Bazar–Teknaf region of south-eastern Bangladesh, the first author collected specimens of *P. andamanensis* from this part of north-eastern Bay of Bengal. This paper summarizes these findings and provides updated distribution information for this species. Genetic differentiation, in respect of Cytochrome Oxidase subunit I (COI) region of mitochondrial DNA, among known specimens including topotypes is also discussed.

Materials and Methods

Specimens of *P. andamanensis* (n=16) were collected from fishermen's catches in Ukhia, Teknaf, and Zinjira Island (St. Martin's Island), all from the Cox's Bazar District, south-eastern Bangladesh (Fig. 4), during March 2014–November 2019. For genetic analysis a piece of muscle (or pelvic-fin) tissue was cut from selected specimens (four from Cox's Bazar, Bangladesh, and two from Ranong, Thailand), and preserved in 95% ethanol until DNA extraction. Specimens were then fixed in 10% formalin, placed either in 10% formalin or 70% ethanol for permanent preservation, and deposited in the Fish Collections of Marine Fisheries Survey Management Unit, Department of Fisheries-Bangladesh, Cox's Bazar (MFSU), and Andaman Coastal Research Station for Development, Kasetsart University, Ranong, Thailand (ACRSD). The phylogenetic analysis includes COI sequences of two specimens (CSIRO KD) identified as *P. andamanensis* and housed in CSIRO Hobart Museum, Australia collected from Kedonganan Fish Market, Southern Bali, Indonesia (White et al 2013, W. White, pers. Comm.).

Morphometric measurements. Counts and measurements follow McKay and Randall (1995) and Hubbs and Lagler (2004) with the following exceptions: pored lateral-line scales were counted excluding the pored scales in the scaly sheath on proximal part of caudal fin; gill rackers were counted including the rudiments; body depth was measured as the vertical greatest dimension, excluding the scaly sheath along the base of the dorsal fin; body width as the maximum width at the level of the pectoral-fin base; snout length includes the upper lip tip; caudal peduncle length was measured from the posterior end of the anal-fin base to the end of the hypural plate; the caudal-fin length was measured as the distance between the middle of the caudal-fin base and the posterior tip of the upper lobe. Snout length, head length, and predorsal length include the upper anteriormost tip of the jaw. All measurements were made with a Vernier caliper to the nearest 0.1 mm. Standard length is abbreviated as SL.

Molecular methods. Genomic DNA was extracted from muscle or fin tissue using G-Spin Total DNA extraction mini kit (iNtRON biotechnology, Korea) following the standard protocol provided by the manufacturer. Amplifications were performed in 40 µl volumes containing 2 µl of genomic DNA, 3 mM of forward and reverse primers (see below), 20 µl of FastStart PCR Master mix (Roche), 0.8 µl of Bovine Serum Albumin 2% (Euromedex) and water. Amplification of all fragments was carried out in 35 cycles according to the following temperature profile: 3 min at 92°C (initial denaturation), 45 sec at 92°C, 45 sec at 52°C, 60 sec at 72°C, and finally 5 min at 72°C. Primers used to amplify the 652 bp the cytochrome oxidase 1 (COI) were FishF1+FishF2/FishR1 (Ward et al. 2005). Amplified fragments were sequenced using the FishR1 primer using MACROGEN (Korea) services.

The phylogenetic relationships among selected *Pomadasys* spp. were inferred using the Neighbor-Joining (NJ) method (Saitou and Nei 1987). The evolutionary distances were computed using the Kimura 2-parameter method (Kimura 1980) while branch support was assessed using the bootstrap test (500 replicates). Codon positions included were 1st+2nd+3rd+Noncoding. All ambiguous positions were removed for each sequence pair. Evolutionary analyses were conducted in MEGA7 (Kumar et al. 2016). The phylogenetic tree was rooted using a sequence of *Diagramma pictum* (Thunberg, 1792) from Bangladesh. Details of *P. andamanensis*

Table 1. Details of *Pomadasys andamanensis* specimens and specimens labeled as *P. andamanensis* in BOLD, used for genetic analysis in this study including their GenBank Accession Numbers (CO1). Bangladesh denotes north-eastern Bay of Bengal, Thailand denotes eastern Andaman Sea, and Indonesia denotes southern Bali.

Country/locality	Voucher or museum ID	Standard length (mm)	Collection date	GenBank(CO1) Accession No.	Reference
Bangladesh: Ukhia (Inani Coast)	MFSU 5003	119	2015-04-09	MW128368	this study
Bangladesh: Teknaf (Zinjira Island)	MFSU 5004	106	2018-05-13	MW057162	this study
	MFSU 5005	113	2018-05-13	MW057161	this study
	MFSU 5007	118	2018-05-13	MW057160	this study
	F1803SM-19	unknown	2018-05-13	MK340687	GenBank
Thailand: Ranong (Suksamran)	ACRSD-F64	159	2016-04-01	MW128367	this study
	ACRSD-F179	138	2016-02-10	MW057159	this study
Indonesia: Bali (Kedonganan)	CSIRO KD285	147	2009-03-02	GU674283	BOLD
Indonesia: Bali (Kedonganan)	CSIRO KD313	128	2009-10-01	GU673984	BOLD

specimens used for molecular analysis in this study are provided in Table 1.

Materials examined (n=18, 82-159 mm SL), (*=morphometric data not taken)**: Bangladesh:** MFSU 5001–2, 2, 95–127 mm SL, Afternoon Fish Market, Teknaf, Cox's Bazar (20° 52.03' N, 92° 17.91'E), bottom-set gill-net catch presumably off Zinjira Island, Teknaf, 27 March 2014 and 12 April 2014. MFSU 5003, 119 mm SL, Baharchora Fish Market, Cox's Bazar, bottom-set gill-net catch presumably off Inani Rocky Coast (*ca.* 21°15'N, 92°00'E), 09 April 2015. MFSU 5004–10, 7, 106–118 mm SL, Afternoon Fish Market, Teknaf, Cox's Bazar (20°52.03'N, 92°17.91'E), bottom-set gill-net catch presumably off Zinjira Island, Teknaf, 13 May 2018. MFSU 5011, 129 mm SL (Fig. 1A), Zinjira Island, Teknaf, Cox's Bazar (20°37.96'N, 92°19.75'E), hand-line, 25 November 2018. MFSU 5012–13, 2, 104–123 mm SL, Morning Fish Market, Teknaf, Cox's Bazar (*ca.* 20°51.92'N, 92°18.06'E), bottom-set gill-net catch presumably off Zinjira Island, 13 December 2018. MFSU 5014–15, 2, 82.0–82.5 mm SL (Fig. 1B), Zinjira Island, Teknaf, Cox's Bazar (20°38.17'N, 92°19.35'E), hand caught from tide-pools, 23 December 2018. MFSU 5016, 101.7 mm SL, Afternoon Fish Market, Teknaf, Cox's Bazar (20°52.03'N, 92°17.91'E), bottom-set gill-net catch presumably off Zinjira Island, 21 November 2019. All Bangladesh specimens were collected by M Eusuf Hasan. **Thailand:** ACRSD-F64*, 159 mm SL (Fig.

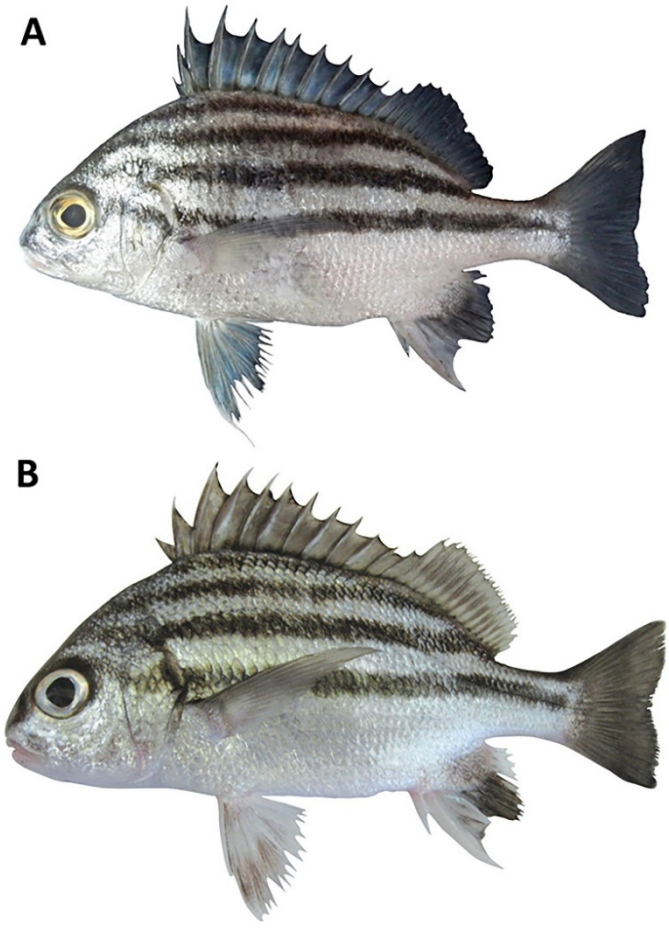

Figure 1. *Pomadasys andamanensis*, A—Topotype, ACRSD-F64, 159 mm SL, Andaman Sea coast of Thailand, Kampuan Market, Suksamran, Ranong (Photo: S. Ratmuangkhwang); B—Cryptic species, CSIRO KD285, 177 mm, Kedonganan Fish Market, Southern Bali, Indonesia (Photo: CSIRO Australian National Fish Collection).

2A), Kampuan Market, Suksamran, Ranong, Andaman Coast of Thailand (9°22.56' N, 98°25.12'E), 04 January 2016. ACRSD-F179*, 138 mm SL, Kampuan Market, Suksamran, Ranong, Andaman Coast of Thailand (9°22.56'N, 98°25.12' E), 10 February 2016. All Thailand specimens were collected by Sahat Ratmuangkhwang.

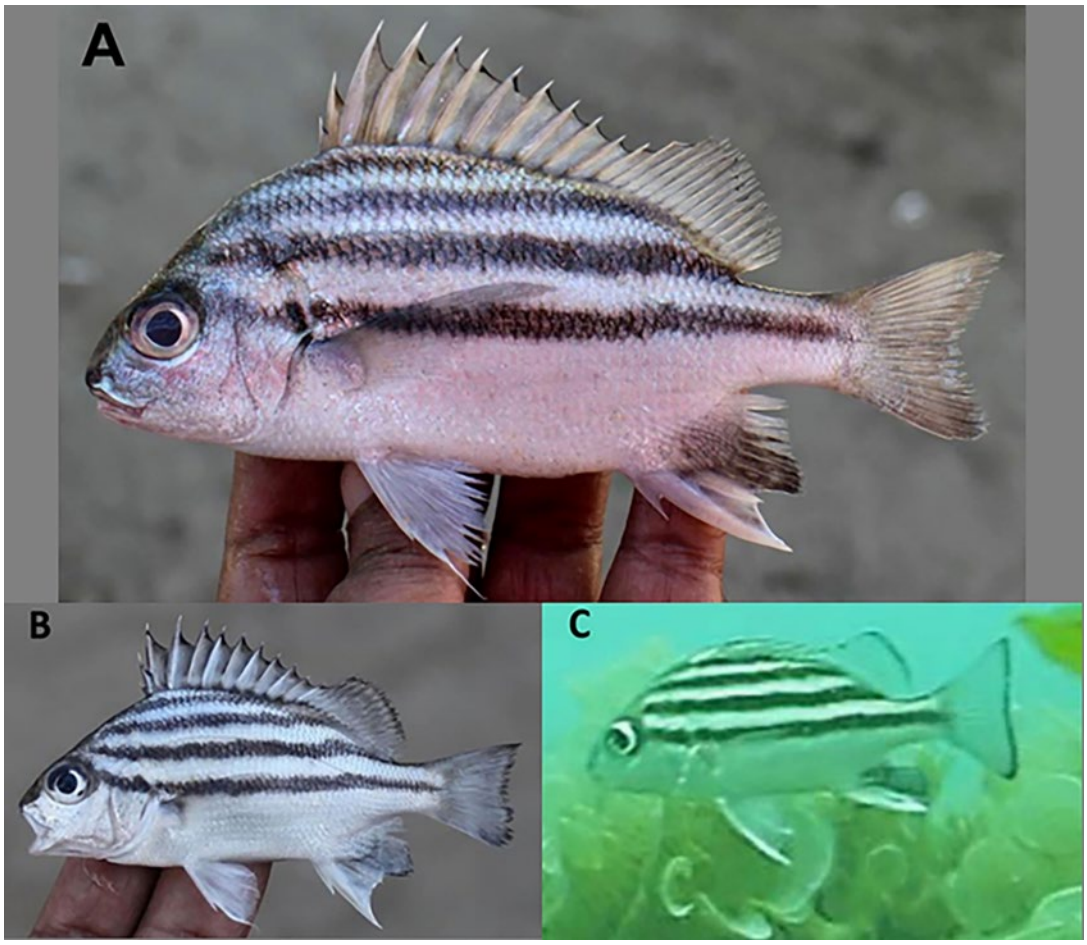

Figure 2. *Pomadasys andamanensis* in the vicinity of Zinjira Island (St. Martin's Island), Teknaf, Bangladesh. **A**—Adult, 129 mm SL (MFSU 5011); **B**—Young, 82.5 mm SL (MFSU 5015); **C**—Frame from an underwater video clip. (Photo: A, B—M. Eusuf Hasan, C—S.M. Atiqur Rahman.)

Results

Systematic ichthyology: The present paper follows the classification provided by Laan et al. (2014) and Nelson et al. (2016):

Class: Actinopterygii
Division: Teleostei
Order: Perciformes
Family: Haemulidae Gill 1885
Genus: *Pomadasys* Lacepède 1802
Pomadasys andamanensis McKay and Satapoomin 1994 (Fig. 1, Table 2)

Common name: Andaman grunt

Table 2. Counts and proportional measurements of *Pomadasys andamanensis* specimens from the Bangladesh coast compared with other published data.

	Bangladesh (this study) n=16 (mean)	Holotype PMBC 10068 (McKay and Satapoomin 1994)	Thailand (Iwatsuki et al. 1999) n=4
Standard length (mm)	82–129	154	134–178
Counts			
Dorsal-fin rays	XII, 13–14	XII, 14	XII, 13–14
Anal-fin soft rays	III, 7–8	III, 8	III, 7–8
Pectoral-fin rays	17	17	16–20
Pelvic-fin soft rays	I, 5	I, 5	I, 5
Pored lateral-line scales	49–51	53	50–53
Scales above and below lateral line	7/14	7/14	7–8/14–16
Caudal peduncle scales	22	22	22
Gill rakers	5+12	5+13	5+12–13
Measurements (%SL)			
Body depth (maximum)	40.4–44.2 (41.9)	42.1	41.2–44.4
Body depth at 1st anal-fin origin	32.1–35.8 (33.6)	34.5	33.5–35.3
Head length	32.1–35.8 (34.2)	31.7	30.0–36.5
Body width at pectoral fin base	15.2–17.9 (16.5)	15.9	17.2–19.6
Snout length	8.6–10.7 (9.9)	9.0	9.0–11.7
Orbit diameter	8.7–11.3 (10.1)	9.9	9.2–11.8
Preorbital depth	5.9–7.6 (6.4)	6.3	6.5–6.9
Interorbital width (*bony)	6.8–8.5 (7.9)*	8.3	8.3–9.5
Upper jaw length	8.9–10.5 (9.6)	8.5	8.4–10.3
Caudal-peduncle depth	11.5–12.6 (12.2)	11.4	11.3–12.0
Caudal-peduncle length	16.8–18.8 (17.6)	17.8	17.7–20.1
Predorsal length	39.7–43.0 (41.8)	42.3	41.2–45.1
Preanal length	69.8–71.7 (71.1)	63.1	64.3–65.2
Prepelvic length	36.3–41.5 (37.8)	35.1	34.4–38.8
Dorsal-fin base length	54.4–60.2 (57.7)	56.3	56.0–57.9
Anal-fin base length	15.7–18.3 (17.0)	16.7	15.7–17.0
Caudal-fin length	24.6–28.0 (26.1)	20.1	20.9–26.4
Pelvic-fin spine length	13.8–16.9 (15.0)	13.2	12.9–14.9
First pelvic-fin ray length	23.1–27.4 (25.1)	28.7	24.9–29.9
Pectoral-fin ray length	28.6–32.3 (30.3)	30.2	31.7–34.3
First dorsal-fin spine length	3.6–7.4 (5.7)	5.3	3.7–6.4
Second dorsal-fin spine length	9.1–12.7 (10.5)	9.8	9.8–10.4
Third dorsal-fin spine length	15.8–18.6 (17.4)	17.5	15.5–18.9
Fourth dorsal-fin spine length	17.1–19.9 (18.5)	18.0	16.9–19.3
Fifth dorsal-fin spine length	15.7–18.1 (17.0)	–	–
Last dorsal-fin spine length	7.5–10.8 (9.5)	8.2	8.1–10.2
First dorsal-fin ray length	11.6–15.9 (13.7)	13.6	13.0–22.5
First anal-fin spine length	8.0–10.2 (9.2)	9.5	8.8–9.9
Second anal-fin spine length	19.5–23.4 (21.3)	22.2	20.3–23.1
Third anal-fin spine length	9.6–14.3 (12.5)	13.1	13.6–14.2
First anal-fin ray length	10.9–16.5 (14.4)	17.8	16.6–20.1

***Pomadasys andamanensis*,** McKay and Satapoomin 1994: 1,
(Fig. 1)

Type locality: Kata Bay, Phuket, Thailand); Iwatsuki et al. 1999: 80 (Phuket Island and adjacent waters, Andaman Sea, Thailand); McKay 2001: 2962 (Andaman Sea, Thailand); Satapoomin in Motomura et al. 2009:154 (Andaman Sea, Thailand); Satapoomin 2011: 38, 41, 59 (Andaman Sea, south-western Thailand);

Parenti 2019: 166 (listed with incorrect distribution location, Gulf of Thailand); Psomadakis et al. 2019: 470, Pl. XXXV, Fig. 268 (Myanmar coast).

Diagnosis: A species of *Pomadasys* distinguished from other members of the genus by the following combination of characters: dorsal-fin rays XII, 13–14, anal-fin rays III, 7–8; pectoral-fin rays 17; pored lateral-line scales 49–51, gill rakers 5+12; scales above lateral line 7, scales below lateral line 14; circumpenducular scales 22; greatest body depth 40–44% SL; second anal spine length 19.5–23.4% SL; dorsal and anal fins with basal scaly sheath; silvery-white body with 4 black or dark brown stripes horizontally on dorsal half of body; a black or dark brown blotch on anterior two-thirds of soft-rayed portion of anal fin.

Description of Bangladesh specimens (Fig. 1): Counts and proportional measurements of Bangladesh specimens, expressed as percentages of standard length (SL), are shown in Table 2. Body deep, compressed, covered with ctenoid scales. Body depth greater than head length, deepest (2.3–2.5 in SL) at origin of fourth or fifth dorsal-fin spine, subsequently gently sloping to caudal-fin base. Snout round, dorsal profile of head straight. Mouth small, sub-terminal, without fleshy lips; posterior tip of maxilla just crossing anterior margin of orbit. Chin with 2 pores followed by central longitudinal groove. Snout tip located ventral to horizontal line drawn through lower margin of orbit. Eye and pupil round, eye diameter larger than bony interorbital width. Nostrils close to each other, slit-like, anterior to orbit.

All dorsal, anal, and pelvic-fin soft rays branched. Dorsal fin slightly notched at end of dorsal-fin spines, posterior margin rounded. Dorsal-fin origin just above level of posteriormost point of opercle and anteriormost point of pectoral-fin base/origin. Posterior end of dorsal-fin base above level of anal-fin base. First dorsal-fin spine very small, ~55% in length of second spine. Second dorsal spine~60% in length of third spine. Third dorsal-fin spine subequal to fourth. Fourth spine longest. Upper point of pectoral-fin insertion level with posteriormost point of opercle. Lower point of pectoral-fin insertion almost above level of pelvic-fin origin. Uppermost ray of pectoral fin reduced. Posterior tip of pectoral fin just reaching to level of eleventh dorsal spine, and that of anus. Pelvic-fin axillary scale present. Posterior tip of depressed pelvic-fin spine just reaching to level of eighth dorsal-fin spine. First pelvic-fin ray distally filamentous. Anal-fin origin level in between origin of third and fourth dorsal-fin ray. First anal-fin spine very small, 40–50% in length of second spine. Second anal-fin spin every strong and much longer than third. Posterior end of anal-fin base level with posterior end of dorsal fin base. Caudal fin slightly forked. Lateral line continuous, running parallel with contour of back, straightening along caudal peduncle. Posterior margin of preopercle serrated. Scales covering body, pectoral-fin base, thoracic region, caudal-fin base, opercular bones, cheek, and head. Scales absent in anterior part of snout, lips, and chin. Scales on top of head extending anteriorly just behind eye. Dorsal and anal fins each with a low scaly sheath, rows of small inter-radial scales in soft portions. No canine teeth in jaws, small conical teeth present in narrow bands anteriorly, outermost row much enlarged.

Colour when fresh (Fig. 1 A, B). Overall silvery white with 4black or dark brown stripes horizontally on dorsal half of body; first stripe along spiny dorsal-fin base from nape to base of 10th dorsal spine, second stripe from nape to mid base of soft dorsal fin, third stripe from above eye to posterior end of soft dorsal fin base, continuing up to upper caudal fin base, fourth stripe falling obliquely from dorsal margin of eye to upper-middle part of opercle, then straight to mid-base of caudal fin; three faint stripes present on soft part of dorsal fin, uppermost stripe forming a black margin; inter-spinous membrane of dorsal fin narrowly black-edged; anterior two-thirds of soft anal fin dark brown or black; pelvic fin with some anterior dusky markings; upper margin of pectoral fin darkish, reminder semi-transparent; caudal fin dusky with a blackish margin; snout silvery-white with black or dark stripe dorsally; iris silvery-white to yellowish or dusky brownish.

Remarks: Morphological characters of the Bangladesh specimens closely match those given for *P. andamanensis* by McKay and Satapoomin (1994) and Iwatsuki et al. (1999), including four horizontal dark

brown stripes, 22 circumpeduncular scales, XII,14 dorsal-fin rays, and a dark brown blotch on anterior two-thirds of soft anal-fin rays. Meristic data for the Bangladesh specimens (Table 2) are within the range of those of the topotype specimens of *P. andamanensis* from the Andaman Sea coast of Thailand (Fig. 2A). Consequently, the Bangladesh specimens are identified here as *P. andamanensis*.

Habitat and biology. In Bangladesh *P. andamanensis* occasionally appears in catches of hand-lines and bottom-set gill-nets operated on sandy-rocky bottoms surrounding the rocky reefs of Zinjira Island (St. Martin's Island), during winter and summer months (November to May). Young individuals appear in the tide pool areas. Rarely, this species occurs northward up to the Inani rocky coast of Ukhia, Cox's Bazar. In an underwater video, a single individual of *P. andamanensis* (Fig. 1C) was observed to swim over sand-gravel-rock bottom covered with a dense bed of brown algae, predominantly *Padina* and *Dictyota*. It is a purely marine species and has not been encountered in the neighboring estuarine areas (e.g. Naf Estuary).

The occurrence of juveniles/sub-adults in Zinjira Island (St. Martin's Island), Teknaf, and the appearance of larger individuals in the Teknaf market indicate that there is a viable spawning population of *Pomadasys andamanensis* in the south-eastern corner of Bangladesh (north-eastern Bay of Bengal) (See Fig. 4). Spawning probably occurs in the early monsoon since juveniles/sub-adults (~80 mm SL) were found to occur in tide pools during winter (December).

Distribution. *Pomadasys andamanensis* is currently known from the Andaman Sea coast of south-western Thailand (type locality) (McKay and Satapoomin 1994, Iwatsuki et al. 1999), from the south-eastern Indian Ocean coast at southern Bali, Indonesia (White et al. 2013), and the western Ayeyarwady coast of Myanmar (Psomadakis et al. 2019; P. Psomadakis, pers. comm.). The present study extends its range northward to the northeastern Bay of Bengal. The species, however, may be present in the neighboring Andaman and Nicobar Islands as well.

Phylogenetic analysis (Genetic divergence). The topology of the NJ tree revealed that all *P. andamanensis* sequences generated from Bangladesh specimens in this study clustered with the sequences from the topotype specimens from the Andaman Sea coast of Thailand, Sequences of this clade have been assigned by BOLD to the Barcode Index Number (BIN): BOLD:ADR0579 (Fig. 2). No significant level of divergence was observed between the Bay of Bengal (Bangladesh) and Andaman Sea (Thailand) specimens identified morphologically as *P. andamanensis* in this study. All haplotypes belonging to the BIN BOLD: ADR0579 presented with a mean level of K2P divergence of 0.8% and nearly null if the sequence MK340687, obtained from Genbank, is excluded. This confirms the morphological identification of the Bangladesh specimens as *P. andamanensis.* The Indonesian samples of *P. andamanensis*, however, belong to another well-supported clade, BIN BOLD:AAH7890 (Fig. 3) which presents 3.9% of K2P divergence with the topotype specimens. The other *Pomadasys* species are separated by 13.3% (*P. guoraca*) to 20% (*P. stridens*) from *P. andamanensis*.

In contrast, the only available COI sequence labeled as *P. andamanensis* in Genbank (MN623876), generated from a specimen collected in Odisha, India, belongs to a clade (BIN BOLD:ADL5891) consisting exclusively of specimens identified as *P. guoraca* (Fig. 3). Similarly, specimens from Bangladesh and Myanmar identified as *P. argenteus* have been misidentified with *P. kaakan* (BIN BOLD: AAD6593) considering their phylogenetic position (Fig.2).

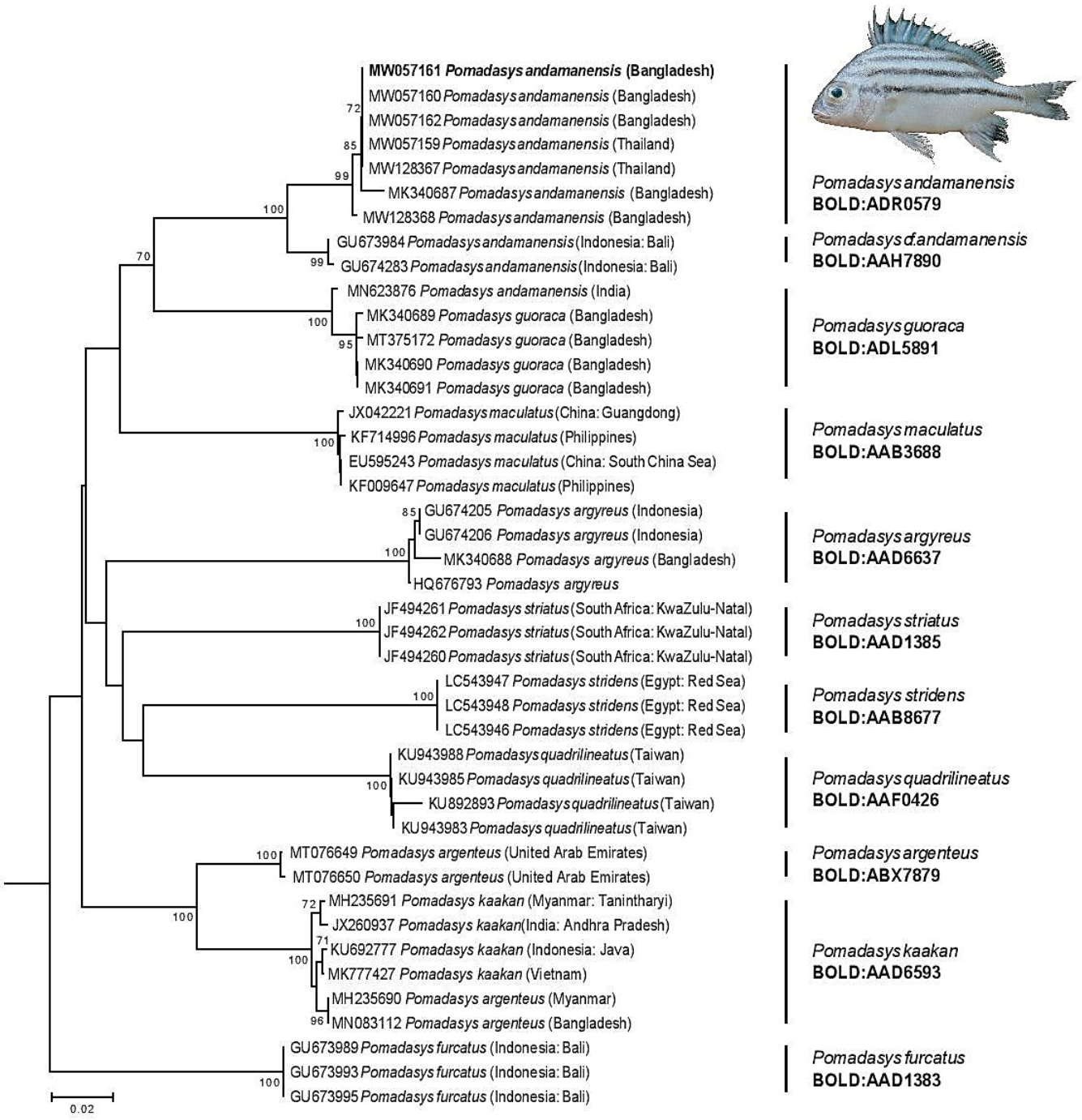

Figure 3. Neighbour-Joining (NJ) tree showing phylogenetic relationships among *Pomadasys* specimens examined in this study. The *Pomadasys andamanensis* specimens from the Andaman Sea and northern Bay of Bengal clustered together in a single clade, while Bali, Indonesia specimens formed a separate clade.

Discussion

Range extension: *Pomadasys andamanensis* is a poorly known species with only 5–7 specimens recorded in previous studies since its description. Initially, it was described from a single specimen from Phuket Island, Thailand, Andaman Sea (McKay and Satapoomin 1994), and subsequently redescribed from four additional individuals from the same locality (Iwatsuki et al. 1999). A recent record from Myanmar (Psomadakis et al.

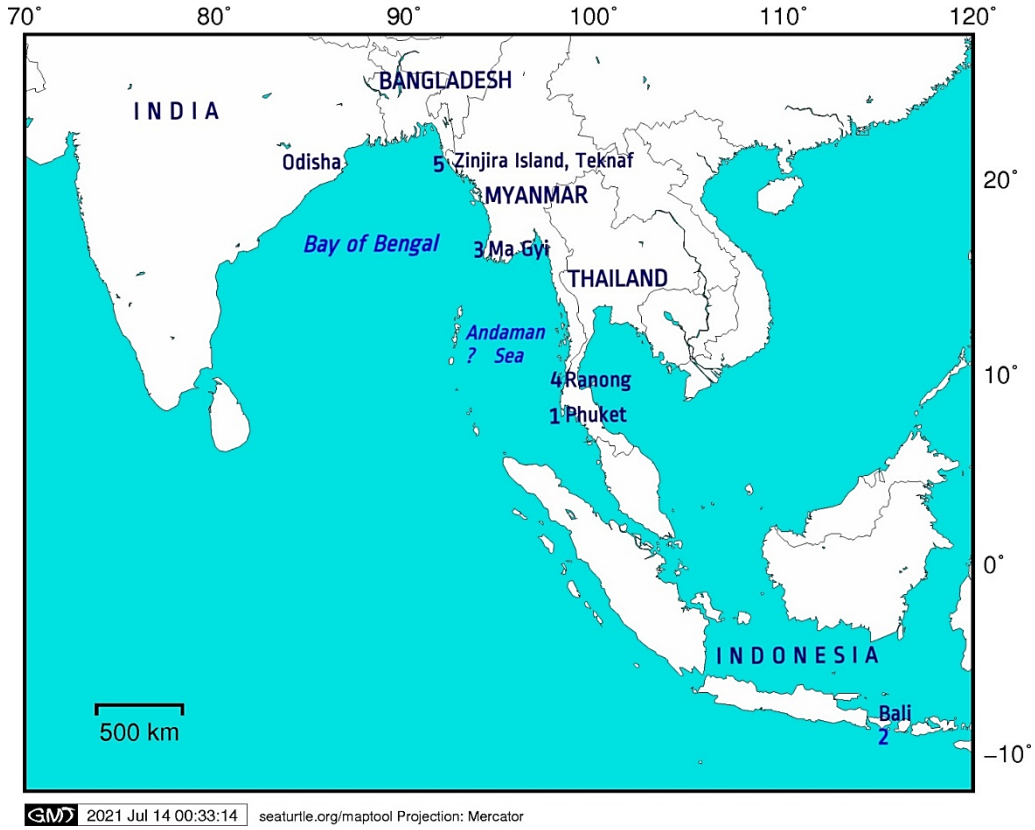

Figure 4. *Pomadasys andamanensis*, known distribution in the Eastern Indian Ocean: **1**—Phuket Island, type locality (McKay and Satapoomin 1994); **2**—Southern Bali, Indonesia, location of a cryptic sibling species (White et al 2013); **3**—Ma Gyi, western Ayeyarwady coast, Myanmar (P. Psomadakis, pers. comm.); **4**—Ranong, Thailand (topotypes, this study); **5**—Zinjira Island (Teknaf, Bangladesh), the north-eastern Bay of Bengal (this study).

2019) was from Ma Gyi, the western coast of the Ayeyarwady region in Myanmar (P. Psomadakis, pers. comm.). Our morphological and molecular analyses show that the 16 specimens from Zinjira Island (St. Martin's Island) are *P. andamanensis* and represent the first documented record of the species for the north-eastern Bay of Bengal and Bangladesh. Based on our results the distribution range of *P. andamanensis* is extended northward up to *ca.* 700 km from the previously known geographic range of the species (Ma Gyi, western Ayeyarwady coast, Myanmar (Fig. 4). The report of *P. andamanensis* in southern Bali, Indonesia (White et al. 2013) indicates the presence of a closely related cryptic species (Fig. 2B, see below). Altogether the distribution of *P. andamanensis* covers *ca.* 2500 km, broadly within the Eastern Indian Ocean, from Ukhia coast of Bangladesh to southern Bali, Indonesia (Fig. 4).

Habitat: The bottom topography of Zinjira Island (St. Martins Island) and adjacent area is predominantly sandy-rocky with moderate seaweed cover and patchy distribution of Scleractinian corals (e.g. *Favia* spp. *Favites* spp. *Acropora* spp. etc. See Tomascik 1997). The water is shallow (<10 m) and relatively turbid (Tomascic 1997). *Pomadasys andamanensis*, therefore, appears to inhabit shallow water habitats mainly on sandy bottoms covered with seaweed and coral patches (Satapoomin in Motomura et al. 2009; this study).

Morphometric differences: The majority of morphometric measurements and meristic counts conform to those in McKay and Satapoomin (1994), Iwatsuki et al. (1999) and Psomadakis et al. (2019), except that pectoral-fin ray counts, interorbital width, pelvic-fin ray length and first anal-fin ray length are relatively smaller (see Table 2). These slight differences may be due to differences in measurements or to specific variation among geographic areas.

Other morphologically similar species are *P. furcatus* (Bloch and Schneider 1801) and *P. taeniatus* McKay and Randall 1995. The former has 6–7 dark longitudinal and anteriorly bifurcated stripes on the body, while the latter has 7 dark brown stripes without anterior bifurcation (MaKay and Randall 1995) (vs 4 black stripes on dorsal half of body in *P. andamanensis*).

Cryptic sibling species: Although overlooked in recent online databases (Froese and Pauly 2021, Fricke et al. 2021), *Pomadasys andamanensis* was also reported from southern Bali (Kedonganan), Indonesia (Fig. 2B, White et al. 2013) which extends its range further south-east in the Indian Ocean. However, contrary to genetic homogeneity between Bangladesh and Andaman coast specimens of *P. andamanensis*, the evolutionary independent position of the Indonesian specimens in the phylogenetic tree presented here (see Fig. 3) questions their taxonomic identity. The level of genetic divergence between the two *P. andamanensis* clades largely exceed 1%, a threshold usually considered as an intraspecific limit as demonstrated by Ward et al. (2009) who estimated an average intraspecific differentiation of 0.35% for 294 fish species. The Indonesian specimens of *P. andamanensis* are thus highly likely to be a cryptic, sibling species of the true *P. andamanensis* present in the Andaman Sea and Bay of Bengal.

The presence of cryptic species in marine fishes is not surprising especially in species with large distribution ranges (Zemlak et al. 2009, Hubert et al. 2012, Durand and Borsa 2015). One third of the species with distribution ranges spanning throughout the Indian Ocean (from Southern Africa to Western Australia) actually represent two taxa (Zemlak et al. 2009). Despite the distribution range of *P. andamanensis*, considering either Bangladesh or Indonesian specimens seems very limited, several phylogeographic studies have flagged strong and geographically sharp genetic discontinuity in Indonesia for Indo-Pacific species (for details see Carpenter et al. 2011, Hubert et al. 2012). The complex geological history of Sunda shelf during the glacial periods may have promoted allopatric speciation events such as in the pomacentrid fish *Dascyllus trimaculatus* (Leray et al. 2009).

The present phylogenetic investigation stressed several mislabelled sequences in BOLD and Genbank libraries due to misidentification of specimen collected in India, Bangladesh and Myanmar. A deeper phylogenetic and taxonomic investigation of *Pomadasys spp.* in the Bay of Bengal and neighbouring region with more new specimen would help to resolve species level ambiguities within this commercially important group of fishes.

Acknowledgments

First Author thanks Dr. Md. Sharif Uddin (Principal Scientific Officer, Marine Fisheries Survey Management Unit, Department of Fisheries, Chattogram, Bangladesh) and Mr. Zahedur Rahman Chowdhury (Former Director, Institute of Marine Sciences, University of Chittagong, Bangladesh) for providing field and laboratory support. William T. White (CSIRO, Hobart) for providing standard length data of two Indonesian specimens. IRD France arranged funds for molecular analysis. Lastly we thank Peter Psomadakis (FAO) and Barry C. Russell (Museum & Art Gallery of the Northern Territory, Australia) for constructive suggestions to improve the manuscript and help with English.

Literature cited

Carpenter K.E., Barber P.H., Crandall E.D., Ablan-Lagman M.A., Ambariyanto A., Mahardika G.N., Manjaji-Matsumoto B.M., Juinio Meñez M.A., Santos M.D., Starger C.J., Toha A.H. 2011. Comparative phylogeography of the Coral Triangle and implications for marine management. Journal of Marine Biology, Article ID 396982.

Durand J.D., Borsa P. 2015. Mitochondrial phylogeny of grey mullets (Acanthopterygii: Mugilidae) suggest high proportion of cryptic species. Comptes Rendus Biologies 338: 226-277.

Fricke R., Eschmeyer W.N., van der Laan R. 2021. Eschmeyer's Catalog of Fishes: Genera, Species, References. Electronic Version: July 2021. Available from:http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp. Retrieved 14/07/2021.

Froese R., Pauly D. 2021. FishBase. World Wide Web electronic publication. Version 06/2021. Available from: www.fishbase.org. Retrieved 14/07/2021.

Gill T.N. 1885. Sub-class II. Teleostei. In: J.S. Kingsley (Ed.), The Standard Natural History, Volume III, Lower vertebrates. Cassino and Company, Boston. pp: 98-298.

Hubbs C.L., Lagler K.F. 2004. Fishes of the Great Lakes Region. Revised Edition. The University of Michigan Press, Michigan. 276 p.

Hubert N., Meyer C.P., Bruggemann H.J., Guerin F., Komeno R.J.L., Espiau B., Causse R., Williams J.T., Planes S. 2012. Cryptic diversity in Indo-Pacific coral-reef fishes revealed by DNA barcoding provides new support to the Centre-of-Overlap hypothesis. PLoS ONE 7: e28987.

Iwatsuki Y., Satapoomin U., Matsuura K. 1999. The rare haemulid fish, *Pomadasys andamanensis* McKay and Satapoomin, 1994, and comparisons with other striped species of *Pomadasys* (Teleostei, Perciformes). Bulletin of the National Science Museum Series A (Zoology) 25(1): 79-86.

Kimura M. 1980. A simple method for estimating evolutionary rate of base substitutions through comparative studies of nucleotide sequences. Journal of Molecular Evolution 16: 111-120.

Kumar S., Stecher G., Tamura K. 2016. MEGA7: Molecular Evolutionary Genetics Analysis version 7.0 for bigger datasets. Molecular Biology and Evolution 33: 1870-1874.

Lacepède B.G.E. 1802. Histoire Naturelle des Poissons. Tome Quatrième. Chez Plassan, Imprimeur-Libraire, Paris. 728 p.

Laan R. van der, Eschmeyer W.N., Fricke R. 2014. Family-group names of recent fishes. Zootaxa 3883(2): 1-230.

Leray M., Beldade R., Holbrook S.J., Schmitt R.J., Planes S., Bernardi G. 2009. Allopatric divergence and speciation in Coral Reef Fish: The three-spot *Dascyllus*, *Dascyllus trimaculatus,* species complex. Evolution 64(5): 1218–1230.

McKay R.J. 2001. Family Haemulidae. In: K.E. Carpenter and V.H. Niem (Eds.) FAO species identification guide for fishery purposes. The living marine resources of the Western Central Pacific. Volume 5. Bony fishes part 3 (Menidae to Pomacentridae). Rome, FAO. pp: 2961-2989.

McKay R.J., Randall J. 1995. Two new species of *Pomadasys* (Pisces: Haemulidae) from Oman, with a redescription of *P. punctulatus* (Rüppell). Memoirs of the Queensland Museum, Brisbane 38(1): 251-255.

McKay R.J., Satapoomin U. 1994. *Pomadasys andamanensis*, a new species of haemulid fish from Thailand. Phuket Marine Biological Center Research Bulletin 59: 1-4.

Motomura H., Shibukawa K., Satapoomin U. 2009. HAEMULIDAE Sweetlips (Grunts). In: Kimura S., Satapoomin U. Matsuura K. Fishes of Andaman Sea, west coast of southern Thailand. National Museum of Nature and Science, Tokyo. pp: 152-155.

Nelson J.S., Grande T.C., Wilson M.V.H. 2016. Fishes of the World. Fifth edition. John Wiley and sons, Hoboken, N.J. 707 p.

Parenti P. 2019. An annotated checklist of the fishes of the family Haemulidae (Teleostei: Perciformes). Iranian Journal of Ichthyology 6 (3): 150-196.

Psomadakis P.N., Thein H., Russell B.C., Tun M.T. 2019. Field identification guide to the living marine resources of Myanmar. FAO species identification guide for fishery purposes. Food and Agriculture Organization of the United Nations, Rome, and Department of Fisheries, Ministry of Agriculture, Livestock and Irrigation, Republic of the Union of Myanmar. 694 p.

Saitou N., Nei M. 1987. The neighbor-joining method: A new method for reconstructing phylogenetic trees. Molecular Biology and Evolution 4: 406-425.

Satapoomin U. 2011. The Fishes of South-western Thailand, the Andaman Sea–a review of research and a provisional checklist of species. Phuket Marine Biological Central Research Bulletin 70: 29-77.

Tomascik T. 1997. Management Plan for Coral Resources of Narikel Jinjira (St. Martin's Island). Final Report (Draft for Consideration). National Conservation Strategy Implementation Project, Ministry of Environment and Forest,

Government of Bangladesh. 125 p.

Ward R.D., Hanner R., Hebert P.D.N. 2009. The campaign to DNA barcode all fishes, FISH-BOL. Journal of Fish Biology 74: 329-356.

White W.T., Last P.R., Dharmadi, Faizah R., Chodrijah U., Prisantoso B.I., Pogonoski J.J., Puckridge M., Blaber S.J.M. 2013. Market Fishes of Indonesia (= Jenis-jenis ikan di Indonesia). ACIAR Monograph No. 155. Australian Centre for International Agricultural Research, Canberra. 438 p.

Zemlak T.S., Ward R.D., Connell A.D., Holmes B.H., Hebert P.D.N. 2009. DNA barcoding reveals overlooked marine fishes. Molecular Ecology Resources 9(Supplement 1): 237-242.