

Integrative Taxonomy Reveals Geographical range expansion of Nine Gobioid species in Indian water

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Abstract

Gobiid diversity in Indian waters varied significantly between mainland India and Andaman & Nicobar Islands (ANI) and Lakshadweep (LK) archipelago. In the present study, new distributional records of nine gobioid species from Indian waters are documented based on live specimens collected across Indian coast and Indian Islands groups during 2022-2026. These are; *Amblyeleotris downingi*, *Amblyeleotris periphthalmus*, and *Ptereleotris zebra* documented for the first time in Indian waters.; *Yongeichthys audax*, *Oxyurichthys omanensis* and *Bathygobius cocosensis* are reported first time from ANI. *Ptereleotris evides*, *Valenciennaea strigata* and *Periophthalmus minutus*, are documented for the first time from mainland India. Morphological examination together with DNA barcode (COI gene) confirmed the new geographic occurrences of these species in India water.

Keywords: Gobioid, new record, distribution, Lakshadweep, Andaman & Nicobar Islands, India

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Introduction

Suborder Gobioid is one of the largest and most diverse teleost fishes, currently comprising over 2300 valid species worldwide and accounting for a substantial proportion of coastal fish biodiversity. The Indo-West Pacific region is widely regarded as the global centre of gobiid diversity and endemism (Allen & Erdmann, 2012; Larson & Murdy, 2001). The Indian subcontinent occupies a key bio geographical position between the Western Indian Ocean and Indo-Pacific provinces, with a coastline exceeding 7,500 km and two major offshore island systems: the Andaman & Nicobar Islands (AND) and Lakshadweep (LK) archipelagos. These regions differ markedly in geological history, oceanographic conditions, and habitat composition, collectively supporting a wide array of marine and coastal ecosystems favorable to gobiid fishes. In India, a total of 253 gobioid species have been documented and about 48 species having uncertain identity (Larson 2026). Recent integrative research in Ashtamudi Lake, Kerala revealed multiple overlooked records and clarified long-standing misidentification including the first Indian record of *Oxyurichthys omanensis* (Sruthi et al., 2025). Additionally, recent records from the Gujarat coast include *Amblygobius semicinctus*, *Istigobius diadema*, and *Yongeichthys nebulosus* (Vadher et al., 2024) contributing to the known gobiid diversity of western India. Similarly, *Gobiopsis macrostomus* from Chilika Lagoon, Odisha (Behera et al., 2024), further expands the documented gobiid diversity in eastern India. These findings suggested that systematic surveys and integrative taxonomy are key to explore distribution and diversity of gobioid fishes in India.

The present study documents nine gobiid species with geographical range expansion in Lakshadweep, Andaman and Nicobar Islands and mainland India. These include, *Amblyeleotris periphthalmus*, *Amblyeleotris downingi* and *Ptereleotris zebra* are documented first time in Indian waters. *Bathygobius cocosensis* (earlier record LK and mainland) and *Oxyurichthys omanensis* (earlier record Kerala, India), *Yongeichthys audax* recorded first time from Andaman and Nicobar Islands. *Periophthalmus minutus*, *Valenciennaea strigata* and *Ptereleotris evides* recorded first time in mainland India (earlier record ANI). All records are documented based on live specimens collected during field surveys from 2022 to 2026 across various habitat of LK, ANI and Indian coast. All the specimens identified with integrative taxonomic approach, which provides robust confirmation of species identities. By expanding the known ranges of these gobiid species, present study contributes to a more comprehensive understanding of gobiid diversity and bio-geography in Indian waters and emphasizes the importance of continued systematic surveys with morphological and molecular taxonomic approaches.

Material and methods

Field studies were carried out in river, estuary and marine habitat of India, LK and AND during 2022-2026. Sampling site includes coral reef and mangrove areas; sampling method includes scuba diving, hand net and gill net catch at various depths. The collected

specimens were photo-documented using Canon EOS 60d with EF-S 18-135mm lens, and 50 mg of tissue sample were collected and preserved in 99% ethanol prior to preserve the specimen in 10% formalin. The collected specimens were deposited at the National zoological collection of the Marine Biology Regional Centre, Zoological Survey of India, Chennai. Measurements were conducted using a Mitutoyo CD- 6"ASX digital calliper, ensuring a precision of 0.1 mm. Morphometric and meristic characters were documented following Hubbs and Lagler (1964).

DNA was extracted from the muscle tissue using Qiagen Dneasy Tissue kit. FishF1 (5'TCAACCAACCACAAAGACATTGGCAC-3') and FishR1 (5'TAGACTTCTGGGTGGCCAAAGAATCA -3') (Ward et al. 2005) was the primer pair used for the PCR amplification of COI fragment. Amplification reactions were carried out in a 25 µL reaction volume which contained 1.5 units of Taq DNA polymerase, 1X PCR buffer, 1.5mM MgCl₂, 0.2mM of each dNTP, 5 pmol of each primer, and 2 µL (25– 50ng) of genomic DNA. The PCR amplification was carried out in a PCR thermal cycler (Eppendorf). Amplification reactions were performed with the initial denaturation at 94°C for 5 min followed by 35 cycles at 94°C for 30 s, annealing at 50°C for 30 s followed by 72°C for 1 min and a final extension of 72°C for 10 min. PCR products were run in 1% agarose gel electrophoresis and purified with Qiagen PCR purification kit. The sequencing reactions were performed on an ABI 377 Genetic Analyzer. The partial COI mtDNA gene sequences of the new species were deposited in GenBank with the accession number. Obtained sequences from tissue samples were aligned using the BioEdit program (Hall, 1999) and checked manually. Sequences were validated through BLASTn (Basic Local Alignment Search Tool) (<https://blast.ncbi.nlm.nih.gov>). For the comparison of obtained sequences with other closely related species, we downloaded the sequences from NCBI GenBank. Phylogenetic analyses were performed by using the Neighbour Joining method and Kimura 2-parameter model using MEGA X. The bootstrap consensus tree inferred from 1000 replicates is taken to represent the evolutionary history of the taxa analyzed.

Result

***Amblyeleotris downingi* Randall, 1994. Common name: Downing's shrimp goby.**

(Figure: 2)

Material examined: Registration number: ZSI/MBRC/F/3158, Off Kakinada, Bay of Bengal, 3ex, 17.12.2022; ZSI/MBRC/F/3625; Lakshadweep, India; 1ex; 06.01.2026; coll. Bineesh K.K and Party.

Habitat. Marine shrimp goby inhabiting silty sand-rubble substrates adjacent to coral reefs, depth range 13-20 m.

Diagnostic characters. First dorsal fin VI, second dorsal fin I+17; anal fin with 1+18; total pectoral fin elements 18-19. Caudal fin rounded, posterior end is pointed; caudal fin procurent rays 8-9; branched rays 15-16. Pelvic fin united, frenum present, forming thin flat pocket; fin count I+5. Lower jaw with 2 or 3 rows of overlapping teeth; teeth are strong, sharp, pointed; a pair of paired canine teeth on each side of the lower jaw; two rows of strong, sharp, pointed teeth on upper jaw. Body covered with minute ctenoid scales posteriorly and anteriorly minute cycloid scales; lateral line scales 119; transverse scales 29; median predorsal region is devoid of any scales. Cheek devoid of any scales; preopercle with minute cycloid scales. Interorbital pore single, snout with single pore at each side, oculoscapular canal well developed, preopercle with three pores and opercle with two pores. Mouth terminal, jaws are extended in vertical line with middle of the eyes; gill opening extended upto mid-half middle of the preopercle. Head papillae is in longitudinal series; cheek with two short longitudinal papillae. Gill membrane is connected to the narrow isthmus. Body slender almost equal in width from anterior to posterior part of body. Inter-dorsal space narrow with 1.69-3.3% of SL. Maximum body depth 11.23-12.08% of SL. Head length 21.85-25.3 % of SL. Inter-orbital space is narrow with 1.26-1.54% of SL. Fresh specimen contains pale whitish body with three vertical orange to brownish color bars including caudal fin base. Anal fin and caudal fin edges with single blue and orange to brownish line. Presence of black spot above the pectoral fin base and opercular margin. Short brownish bar across opercle. Pelvic, anal and caudal fin blackish in colour, second dorsal fin slightly orange in colour. First dorsal fin base with diffuse blackish spot.

Distribution. *A. downingi* is widely distributed in the Indo-West Pacific, originally described from Kubbar Island, Kuwait, in the Persian Gulf. It occurs in the Persian/Arabian Gulf, Oman, western Indian Ocean, Andaman Sea, Bangladesh, Thailand, Indonesia, western Sumatra, Japan, and the western Pacific, indicating a broad Indo-Pacific distribution. In Indian waters, *A. downingi* was previously listed in Andaman Islands (Rajan et.al. 2015), though its occurrence needs for confirmation, because no illustration provided (Larson 2026). Our present study confirms occurrence of *A. downingi* from mainland India and Lakshadweep Archipelago.

Remarks. *A. downingi* is frequently observed in trawl bycatch along with commercial fishes in southeast coast, India. Other Indian congeners of this genus includes *A. aurora*, *A. diagonalis*, *A. fontanesii*, *A. guttata*, *A. gymnocephala*, *A. latifasciata*, *A. steinitzi* and *A. wheeleri*. Present study documents first verified record of *A. downingi* from India and Lakshadweep; as earlier record not illustrated or described (Larson 2026). *A. downingi* can be differentiated with other Indian congeners by pelvic fin united with developed pelvic

frenum (vs pelvic fins separate or connected at base in *A.aurora*, *A.diagonalis*, *A.stenzi*, *A.periophthalma*), dorsal fin I+17 and anal fin count I+18 (vs D-I+13, A-I+14 in *A.aurora* and *A.triguttata*; D-I+12, A-I+12 in *A.wheeleri*; D-I+13, A-I+13 in *A.diagonalis* and *A.latifasciata*); black stripe absent behind the eye (vs present in *A.gymnocephala*). Morphological data of *A.downingi* from present study are analyses with reference data of *A.downingi* from Australia, Allen 2012; to confirm its species identity. Meristic characters of the present material largely agree with earlier descriptions of *A.downingi*; however, slight variations were observed; such as second dorsal fin 17 soft rays, anal fin 18 soft rays in present study (vs earlier record 16 rays in second dorsal and anal 17); other than no additional variation were observed; further DNA analysis shows 99.55% similarities with *A.downingi* from Bangladesh, Islam et.al. 2021; which indicates this variation is intra species and may be attributed to geographic variation or development plasticity across different region. The expanded meristic range documented here refines the species diagnosis and emphasizes the value of comprehensive regional sampling for resolving population-level variation.

***Amblyeleotris periophthalmus* (Bleeker, 1853). Common name.** Periophthalma prawn goby. (Figure: 3)

Material examined: Registration number: ZSI/MBRC/F/3538; Kavarathi Island, Lakshadweep; 1ex; 06.01.2025; coll. Bineesh K.K and Party.

Habitat. Benthic and reef-associated gobiid inhabiting unconsolidated sandy to fine rubble substrates of lagoons, sheltered reef flats, and seaward reef slopes, typically at depths of 10-25 m.

Diagnostic characters. Specimen measuring 77.50 mm in total length and standard length 61.56 mm. Slender elongated body with rounded head and short snout. Mouth terminal. Dorsal fin rays VI+I, 12; anal fin rays I+12; pectoral fin total elements 18; caudal fin procurent rays 8, branched rays 14. Pelvic fins are separated, frenum absent, fins are partially connected at the base of fifth rays by a low membrane, fin count I+5; 4th fin ray of pelvic fin are elongated. Maximum body depth 13.8 % SL; head length 27.67 % SL; central caudal fin rays length 21.31 % SL; snout length 4.17% SL. Scales are cycloid anteriorly and ctenoid posteriorly, lateral line scales 85, transverse scale 22, median predorsal scales absent, pectoral base, cheek and opercle devoid of any scales. Head with well developed pores, interorbital head pore single, snout with single pore at each side, preopercle with 3 pores, opercle with 2 pores. Chin relatively smooth without any mental frenum. Single large papillae in pit on each side of of chin. Tongue is rounded and thick. Gill membranes are narrowly joined to the isthmus. Lower jaw with 3 rows of strong, sharp pointed overlapping teeth, single strong sharp long canine tooth on each side of the lower jaw. Upper jaw with strong sharp pointed overlapping teeth in 3 rows. Eyes are large located dorsolateral side of the head. Caudal fin rounded. Fresh specimens with distinctive pattern of five broad reddish-orange transverse bars on a pale whitish body, first bar crossing above the opercle and succeeding bars located at trunk; in between the bars small orange scattered spots are present across the body (from dorsal to mid half). Head fully covered with red-orange round spots, among them 3 spots on chin are encircled by blue line. Orbit lining also covered by red spots, jaw endings are prominent red in colour. First and second dorsal fins are translucent with 4-5 rows of orange longitudinal line. Anal fin translucent with 2-3 alternative blue and orange longitudinal line. Caudal fin base with dark brown bar with translucent fin rays, caudal fin lining with thin blue and orange lines. Pectoral and pelvic fins are translucent to light orange, without any markings.

Distribution. *A. periophthalmus* is broadly distributed throughout the Indo-West Pacific, occurring from Red Sea, Persian/Arabian Gulf, East Africa, Seychelles, and Madagascar eastward through the Maldives, Southeast Asia, and Australia to Papua new Guinea, Micronesia, Samoa, French Polynesia, Taiwan, and southern Japan. Present study illustrate its first distribution in Indian water (Lakshadweep).

Remarks. *A. periophthalmus* is a shrimp associated goby occurring in reef habitats. *A.periophthalma* differs from its Indian congeners by: five broad reddish-brown transverse bars, a prominent red cheek blotch, dark-edged orange spots on median fins, dorsal fin formula VII+I,12, anal fin I,12, and longitudinal scale counts of 85 with absent of median predorsal scales. Morphological data of *A.periophthalmus* from present study are analysed with reference data of *A.periophthalmus*, *Review of the marine gobiid genus Amblyeleotris* from Taiwan, Chen et.al. 1998; to confirm its species identity. In Indian water, *A.periophthalmus* has been earlier documented from Netrani Island, Karnataka, based on photographic records (Zacharia et al., 2008), without voucher specimens or illustration; and its occurrence remains unverified (Larson 2026). Our present study describes morphological and molecular illustration of *A.periophthalmus*, which confirms distribution in Indian waters. This finding contributes to the understanding of regional gobiid diversity and highlights the need for continued taxonomic and faunal investigations Indian coastal ecosystems.

***Bathygobius cocosensis* (Bleeker, 1854). Common name:** Cocos frill-goby (Figure: 4)

Material examined: Registration number: ZSI/MBRC/F/3379, 1ex; ZSI/MBRC/F/3390, 1ex, Kavaratti, Lakshadweep, India, 04.11.2024, coll. Bineesh K.K.

Habitat. Marine, brackish water, reef associated goby. It typically inhabits in intertidal to shallow subtidal zone, lagoons, where it shelters beneath stones, within rock crevices, or among algal growth, often in areas exposed to wave action; depth range 0-10 m; usually at 0-2 m (Allen & Erdmann, 2012; Larson & Murdy, 2001; Kuiter 2001; Bacchet 2006).

Diagnostic characters. Body is moderately elongate, robust, and subcylindrical, becoming slightly compressed posteriorly; the head is depressed and broader than deep, with a rounded snout and a terminal, slightly oblique mouth bearing small conical teeth in several rows. Dorsal fin VI+I, 9; anal fin I+8. Pectoral fin with four fin rays free and filamentous distally; attached and branched pectoral fin rays 13. Pelvic fins united, with a well-developed frenum, frenum without posterior projection, fin counts I+5. Caudal fin rounded, procurent rays 5-6, branched caudal rays 16-17. Mandibular frenum curved with long free lateral lobes. Eyes are dorsolateral and moderately large. No flap on anterior nostril; oculoscapular canal broken, with detached tube over opercle, and 3 pores above opercle; usually no cheek fold. Ctenoid scales on the posterior body and cycloid on the breast, belly, and nape; predorsal scales number 10-12 and extend forward to above or just behind the posterior margin of the preopercle. Cheek, operculum, and pectoral fin base are naked. Longitudinal scales 36-38, transverse scale rows 11-13. Check sensory papillae are arranged in short longitudinal rows and suborbital region with distinct transverse rows. Body with elongate midlateral blotches and black spot behind eyes. In live specimens, head and body greyish brown, marked by five dark brown broad saddles along the dorsal midline, five to seven rectangular dark blotches along the lower flanks, lower half of the body paler with diffuse to dusky lines following scale rows; numerous small pale or whitish spots on the cheek and operculum; fins are dusky and may show faint barring, fin linings are yellow. Preserved specimens fade to brown but retain the basic blotched pattern.

Distribution. Distributed throughout the Indo-West Pacific from East Africa, the Persian Gulf, Seychelles, Madagascar, and Mascarene Islands eastward to Hawaii and Pitcarin Islands extending north to southern Japan and south to Australia, New Caledonia, and Rapa, with addition records from Micronesia, Indonesia and South China Sea. Within India, Lakshadweep, (Sreeraj 2022), present study extends its distribution to mainland India and the Andaman Islands, indicating a broader northern Indian Ocean distribution.

Remarks. *B.cocosensis* is a benthic gobiid that has been widely overlooked in Indian waters, despite its broad Indo-West Pacific distribution, ranging from the eastern coast of Africa and the Red Sea to Southeast Asia, northern Australia, and western Pacific islands. Other Indian congeneres are *B.coalitus*, *B.cotticeps*, *B.cyclopterus* (present study), *B.fuscus*, *B.laddi*, *B.meggitti*, *B.niger* and *B.petrophilus* (Larson 2026). Morphologically, *B.cocosensis* distinguished from other congeners by body scales ctenoid (vs cycloid in *B.niger*); anterior nostril without flap (vs flap present in *B.cotticeps*); mandibular frenum with lateral lobes (vs no lateral lobes in *B.fuscus* and *B.coalitus*); no cheek fold, 3 pores above opercle (vs presence of distinct cheek fold, 2 pores above opercle in *B.cotticeps*, *B.laddi*, *B.meggitti* and *B.cyclopterus*). Morphological data of *B.cocosensis* from present study are analysed with reference data of *B.cocosensis* from Japan, Akihito & Meguro 1980; to confirm its species identity. Earlier studies indicating occurrence of *B.cococensis* from Gujarat and Gulf of Mannar (Larson 2026), but there is no record of this species from ANI and mainland India. Present study with morphological and molecular analysis, documents its first confirmed occurrence from mainland India and Andaman Islands.

***Valenciennae strigata* (Broussonet, 1782) Common name: Blueband goby. (Figure: 6)**

Material examined: Registration number: ZSI/MBRC/F/3541; Gulf of Mannar, India, 1ex, 06.06.2025, coll. Bineesh K.K and Party

Habitat. Inhabits shallow coastal reef systems, including lagoons, reef flats and outer reef slopes with sandy or rubble substrates (Myers, 1991). Usually found along reef crest in depths of 1-6 m, depth occurrence ranges from 1 to 25 m (Parenti, 2021; Larson, 2022).

Diagnostic characteristic. Elongate body, compressed laterally; head large and rounded, slightly compressed; mouth terminal to slightly oblique. Snout short and directed downward in 45° angle with eye lining. Eyes are large and located dorsolateral side of the head, interorbital space narrow. Dorsal fin VI+I, 17; 2nd and 3rd spine of first dorsal fin filamentous, reaching upto front half of the second dorsal fin; anal fin I+17; total pectoral fin elements 21; caudal fin rounded, procurent caudal rays 8-9, caudal branched rays 15-16. Pelvic fin separated, pelvic frenum absent, fifth fin rays are slightly attached by small membrane at the base, fin counts I+5. Body covered with minuted ctenoid scales; LS -126; TS - 27; predorsal midline is devoid of scales, predorsal side scales extended upto in vertical line with opercular region; cheek devoid of any scales; pectoral fin base and prepelvic area covered with cycloid scales. Oculoscapular canal well developed; interorbital pore single; snout with single pore each side; post orbital pore paired; preopercle with 3 pores and opercle with 2 pores. Sensory papillae is reduced in longitudinal pattern below eyes; prominent cheek papillae absent, only few scattered papillae is present. On snout below the eyes a short transverse papillae is present. Teeth in upper jaw in 1 rows; lower jaw with 2 rows of teeth anteriorly; presence of single canine tooth at each side of lower jaw; jaws are extended below in vertical line with middle of the eyes. Tongue is thick, rounded, flat and broadly attached with the floor of the lower jaw. Chin relatively smooth without any mental frenum; gill opening restricted to pectoral fin base or slightly extended towards opercle. Body is whitish to grey. Snout yellowish. Prominent blue stripes extended from below the eye to posterior margin of opercle. Pectoral base with single broken curved blue line. Lower margin of opercle and preopercle with three broken blue curved line. In between pelvic fin and pectoral fin three lateral blue spots present. Behind the eyes single small blue spot also present. Fins are transparent

without any spots.

Distribution. Indo-Pacific distribution, occurring from African coast and Red Sea, eastward through the Indian Ocean into the western and central Pacific, encompassing the Seychelles, Comoros, Madagascar, and Mascarenes (La reunion, Mauritius, Rodrigues), Line Islands, Society and Marquesas Islands, including locales such as the Tuamotu Islands, northern limits at the Ryukyu Islands to Kagoshima Prefecture (southern Japan), and south to western Australia, extents to Sydney and Lord Howe Island, New Caledonia and Tonga (Fricke et al., 2020; Allen & Erdmann, 2012). In Indian waters, previous records are restricted to the Andaman & Nicobar Islands and Lakshadweep Archipelago (Larson 2026). Our present study record *V.strigata* from Gulf of Mannar, mainland India.

Remarks. In Indian water other *Valenciennae* congeners reported are *V.helsdingenii*, *V.muralis*, *V.puellaris*, *V.sexguttata* and *V.wardii*. In earlier Indian record of *V.strigata* doesn't include any illustration or photo of this species, our present study record first confirmed occurrence of *V.strigata* by integrative taxonomic approach, and extending the distribution of the species within the northern Indian Ocean beyond previously recognized island and insular occurrences. *V.strigata* can be differentiated from other congeners by without black spot on first dorsal fin (vs present in *V.sexguttata* and *V.wardii*), first dorsal fin 2-3 spines are elongated (spinous in other species), caudal fin base without black bar (vs black bar in *V.wardii*), body without any stripes or vertical bars (vs stripes present in *V.helsdingenii*, orange vertical bar in *V.decora*), second dorsal fin soft rays 17 (vs 12 in *V.puellaris*). Morphological data of *V.strigata* from present study are analysed with reference holotype data of *Gobius strigatus* from South Pacific, Broussonet 1782; confirming its identity as *V. strigatus*. Globally, *V.strigata* shows a broad Indo-Pacific distribution extending from the Red Sea and eastern Africa through the Indian Ocean to Japan, northern Australia and central Pacific islands, reflecting both high dispersal potential and ecological specialization for sandy reef habitats (Randall et al., 1997; Allen & Erdmann, 2012). Present reports from mainland Indian reefs along with earlier occurrence from LK and ANI highlight faunal connectivity between Indian oceanic islands and adjacent reef systems.

***Yongeichthys audax* Smith, 1959. Common name Mangrove goby. (Figure: 7)**

Material examined: Registration number: ZSI/MBRC/F/3194; Ashtamudi Lake Kerala, India, 2ex, 29.04.2022; ZSI/MBRC/F/3540; Ograbraij, Andaman and Nicobar Island, 3ex, 09.04.2025, coll. Bineesh K.K and Party

Habitat. Benthic, brackish water goby. Inhabits in shallow waters of mangrove fringes, estuarine creeks with muddy, silty substrates and tidal channels. Depth range 2-16 m.

Diagnostic characters. Body elongate, oval anteriorly and compressed posteriorly. Dorsal fin VI, I+9; anal fin I+9; total pectoral fin elements 16; caudal fin procurent rays 6/7, caudal fin branched rays 13; pelvic fin united, well developed flat frenum present forming pocket, pelvic fin elements I+5. Second and third spine of first dorsal fin elongated. Body covered with large ctenoid scales, preopercle scales are cycloid, predorsal scales extended upto in line with posterior margin of preopercle, lateral line scales 38-40, transverse line scales 9-10, predorsal scales 14-15. Cheek with 3-4 long longitudinal line of sensory papillae, one short line of papillae on cheek. Interorbital pore single. Pore behind the eyes are rounded. Villiform teeth, outer row with strong, sharp and pointed teeth in both jaws, lower jaw outer row contains one pair of canine tooth at each side. Tongue thick and rounded. Snout short, mouth subterminal, jaws opening extended below in line with front part of the eyes. Gill opening restricted to pectoral fin base. Body dusky yellow in colour, presence of 5 brown colour patches along lateral side of the body, small scattered brown spots are present all over the body, presence of black transverse line below eye upto anterior part of snout, opercle with distinct single blue line, few scattered spots present on body and preopercle, fins are creamy white, presence of round brown line on caudal fin base, first dorsal fin with single thick brown line near base, 4 line of brown line on second dorsal fin, anal fin edges are yellow, remaining with three thick brown line.

Distribution. Across the Indo-West Pacific, particularly in the western Indian Ocean, including South Africa, Mozambique, Madagascar, and Seychelles, extending eastward to Indonesia and Japan (Smith 1959; Smith & Heemstra 1986). Present study record includes from Andaman Islands.

Remarks. In India, other *Yongeichthys* congeners recorded are *Y.griseus*, *Y. nebulosus*, *Y.signatus* and *Y.viganensis* (Larson 2026). Originally describes as *Acentrogobius audax* Smith (1969) from Mozambique later synonymized as *Yongeichthys audax*, and recorded from east coast of India by Acharya et al. (2026). *Y. audax* can be differentiated with other Indian congeners by; presence of predorsal scales, (absent in *Y.nebulosus*); second dorsal fin and anal fin I+9 (vs I+10 in *Y.signatus*, I+11 in *Y.viganensis*); pectoral fin elements 16 second dorsal I+9, LS 38-40 (vs second dorsal I+10-11; pectoral 17; LS 42 in *Y.griseus*, LS 28-29 in *Y.viganensis*). Morphological characters of *Y. audax* from present study are analysed with reference data of *Y.audax* from *Coastal fishes of Western Indian Ocean* (Larson et.al. 2022); confirming its identity as *Y. audax*. This finding further emphasizes the importance of continued ichthyofauna surveys in under explored coastal and estuarine ecosystems of India, which may reveal additional cryptic or previously undocumented gobiid species.

***Periophthalmus minutus* (Eggert, 1935). Common name: Minute mudskipper. (Figure:8)**

Material examined: Registration number: ZSI/MBRC/F/3380; Ratnagiri, Maharashtra, India, 1ex, 19.11.2024; ZSI/MBRC/F/3630, Orgabraj, Andaman and Nicobar Islands, India, 1ex, 06.04.2025 coll. Bineesh K.K and Party

Habitat. *P. minutus* inhabits upper inter tidal zones of sheltered estuaries and mangrove forests, favoring fine silty-mud substrates with dense pneumatophore cover.

Distribution. *P. minutus* is widely distributed in Eastern Indian Ocean and Western Pacific, across Southeast Asia and northern Australia, with confirmed records from the Andaman Islands, Thailand, Indonesia (including Java and Sumatra), Philippines, and Queensland, Australia (Murdy, 1989; Takita et al., 2011; Parenti, 2021). Earlier Indian records limited to Andaman and Nicobar Islands; present study documents *P. minutus* from Maharashtra, representing the first verified record from mainland India (west coast of India) and confirmed its occurrence in Western Indian Ocean.

Diagnostic characteristics. D1-XI-XII, D2-I+10-11; A-I+10-11; pelvic fin separated, pelvic fin well separated, pelvic frenum completely lacking, fin counts I+5. Upper caudal procurent rays 7/8, lower caudal procurent rays 9, caudal branched rays 13. Maximum size less than 8 cm. Single row of conical teeth on each jaw. Tongue thick and rounded. Lower eyelid dermal cup present. Body covered with minute cycloid scales, LS-63-64, TS- 17/16, predorsal scales 29-30. D1 without any elongate filamentous spines. Dorsal, anal fins base length and height are very short; in resting condition its fin rays reaching far before caudal fin base, caudal peduncle long. First dorsal fin with white round spots, D2 with single dusky stripe in between two white stripes, D1 and D2 close together. D1 with light brown stripe infra marginally. Anal fin base length 18-23% SL; second dorsal fin base length 20-22% SL. Gill opening restricted to pectoral fin base. Mouth inferior. Opercle covered with cycloid scales. First dorsal fin convex. Mental frenum absent. Pelvic fin length 14.4-14.7% SL. Body colour dark brown to yellowish brown. Presence of 6 dark brown blotches from dorsal surface of the body to mid-lateral half of the body. Eyes are large and located on top of the head. Cheek papillae absent, opercle covered with cycloid scales. Anal fin transparent to yellowish without any pattern or spots. Pelvic fin without any pigmentation.

Remarks. Indian records of *Periophthalmus* group have historically centered on larger taxa along the Bay of Bengal and east coast mangroves, with west coast occurrences poorly known (only *P. waltoni* recorded in western region, Koumans 1941). Comprehensive regional surveys have recorded multiple *Periophthalmus* species in Indian mangrove systems, though *P. minutus* is not recorded. Other than *P. minutus* groups Indian records are *Periophthalmodon septemradiatus*; *Periophthalmus* includes five species: *P. argentilineatus*, *P. chrysophilus*, *P. novemradiatus*, *P. walailakae*, *P. waltoni*; and occurrence of *P. variabilis* is uncertain with possibility for misidentification (Larson 2026). *P. minutus* can be differentiated by its congeners by small size less than 8 cm, single row of teeth in upper jaw, dorsal fin white spots, first dorsal with 11-12 fin spines and pelvic fin separation or absence of pelvic fin; first dorsal with light brown stripes infamarginally. *P. minutus* in present study collected from west coast India and Andaman Islands; both showing morphological similarities of *P. minutus* from *Revision of Oxudercine* (Murdy 1989). DNA barcode of *P. minutus* separate the species as a distinct clade with other *periophthalmus* group, and forming a distinct clade with Andaman *P. minutus* group, whose earlier barcode not recorded in NCBI (study also provide first barcode of *P. minutus* Fig.1). This finding extends the known distribution of the species from Andaman to west coast, India (from Eastern to Western Indian Ocean) and fills an important gap in its previously understood range, indicating a broader bio geographic distribution than earlier recognized.

***Oxyurichthys omanensis* Zarei, Al Jufaili, and Esmaeili 20222**

Common name. Oman's eyebrow goby. (Figure: 9)

Material examined: Registration number: ZSI/MBRC/F/3159; Ashtamudi Lake Kerala, India, 1ex, 27.04.2022; ZSI/MBRC/F/3539; Orgabraj, Andaman and Nicobar Island, 1ex, 06.04.2025, coll. Bineesh K.K and Party.

Habitat. Demersal gobiid inhabiting shallow coastal and estuarine habitats with soft muddy to fine sandy substrates and sheltered in tidal creek margins and mangrove areas.

Diagnostic characteristic. Elongate laterally compressed body. Caudal fin lanceolate, end pointed. head broad and rounded; marked atrophy of cephalic soft tissue exposed portions of the skull and associated cranial structures. Presence of well developed nape crest. First dorsal fin VI, second dorsal fin I+12, anal fin I+13, caudal fin procurent rays 9, caudal fin branched rays 14, total pectoral fin elements 21, pelvic fin united with well developed pelvic frenum, pelvic fin count I+5. Anteriorly the body covered with cycloid scales and posteriorly ctenoid scales, lateral line scales 53-54, transverse scales 14-15, predorsal midline devoid of any scales. Presence of two interorbital pores, below the eye four transverse line of sensory papillae, cheek with 2 longitudinal line of papillae, in between these 2 line presence of some broken transverse line of papillae. A prominent tentacle present above each eyes. Sharp and pointed

teeth in both jaws, upper jaw in a single row; lower jaw two rows, premaxillary symphysis devoid of any teeth, prominent canine tooth absent in both jaws. Tongue thick, rounded slightly long at the edge, attached to the floor of mouth. Chin smooth, mental frenum absent. Jaws are extended below in midway of eyes. Gill opening extended slightly towards operculum base. Second dorsal and anal fin ray end extended upto the one third length of the caudal fin length. Body yellowish grey in colour, presence of brown vertical cross bar along lateral side of the body. Prominent black bar below the eyes and pectoral fin base. Edges of anal, pelvic and caudal fins are whitish. Dorsal fin margin and upper caudal fin margins are yellowish colour. Caudal base with prominent black patch. Fins are translucent yellow in colour, caudal fin midline is slightly reddish, first dorsal fin membrane with light brown spots, second dorsal fin with 4-5 lines of brown dot, caudal and anal fin with line of brown streaks.

Distribution. Mudflat at Yeti near the mouth of Wadi Aday along Gulf of Oman and was long considered endemic to this restricted locality (Zarei et al. 2022). From western Indian Ocean distribution in Kenya, Mayotte, and Madagascar, indicating a wider regional presence (Zarei et al. 2025). In India, earlier recorded from Kerala, southwest coast, India (Sruthi et al. 2025). Present study records from Andaman Islands, India.

Remarks. Previous record of *O.omanensis* from Kerala in Indian water (Sruthi et al. 2025); suggests misidentification of the species from India in last decades. This may be, due to close resemblance of the species with *O.opthalmonema*. Present study record of *O.omanensis* in ANI, also suggest the multiple misidentification of the species and lack of molecular data; which shows a clear distinction of the species from *O.opthalmonema* along with morphological variation. Other congeners recorded from Indian waters are, *O.auchenolepis*, *O.microlepis*, *O.opthalmonema*, *O.papuensis*, *O.paulae* and *O.tentacularis*. *O.omanensis* can be distinguished from its congeners by presence of tentacle over eyes (vs tentacle absent or presence of callus or fleshy knob in *O.microlepis*, *O.auchenolepis*, *O.papuensis*); presence of dark patch on caudal peduncle, body with 4-5 vertical bar along midline of body, and LS-43 in *O.paulae*; dark saddle over caudal peduncle, D1 first spine longest (vs dark saddle absent, D1 first spine shortest in *O.tentacularis*); in between 2 longitudinal cheek papillae row 2 long and 5-6 short transverse line (vs 2 long, 3-4 broken line in *O.opthalmonema*). Morphological and molecular data of *O.omanensis* from present study are analysed with reference data of *O.omanensis* from Oman, Zareia et.al. 2022; confirming its identity as *O.omanensis*. From India, all of the congeners of *Oxyurichthys* are earlier recorded from ANI (except *O.paulae* from Kerala, India); indicating their rich species complex within ANI; and addition of *O.omanensis* suggests a more complex faunal overlap between the Arabian Sea and Bay of Bengal provinces than previously recognized.

***Ptereleotris evides* (Jordon & Hubbs, 1925). Common name.** Blackfin dartfish. (Figure: 5a)

Material examined: Registration number: ZSI/MBRC/F/3626; Gulf of Mannar, India, 1ex, 06.06.2025; coll. Bineesh K.K and Party.

Habitat. Marine, inhabiting rocky reefs and coral reefs. Found over sandy and rubble substrates adjacent to coral reefs, including lagoon areas and outer reef slopes. Depth ranges 0-30 m, usually occurs at 2-15 m (Coleman et al. 2018, Baensch et al. 1997).

Diagnostic characters. Elongate body laterally compressed, body is divided into two colour, from snout to first dorsal fin is creamy white and from mid half to the back is black. First dorsal fin is short, low and is clearly separated from the second dorsal fin. Dorsal fin VI+I, 24; anal fin I+24; pectoral fin total counts 22. Pelvic fins are short and separated, remnant of membrane joining at the base of 5th rays, pelvic frenum absent, pelvic fin elements I+4. Scales are very small, embedded, usually not overlapping, body covered with cycloid scales; lateral line scales 133; transverse scales 27. Check and nape region devoid of scales, prepelvic area covered with cycloid scales, pectoral fin base devoid of scales. Chin without any median barbles, but with low fleshy knob with median fold present posteriorly. Eyes are large and laterally placed, eyes are larger than snout. Mouth small, jaws are extended upto in vertical line with front part of the eyes. Gill openings are extended upto rear edge of the preopercle. Tongue is narrow compressed and pointed. Teeth are villiform arrange in narrow bands. Gill membrane unit to the sides of narrow isthmus. Caudal fin deeply emerginate with lobes are rounded, without any filaments. Body is translucent to pale bluish, grey anteriorly from snout to first dorsal fin, shading to black or purplish black posteriorly; operculum with faint blue markings. Dorsal, anal and caudal fins are without distinct bands, spots, or dark markings. Dorsal and anal fin margins are black, middle portion of fins are creamy white. Upper and lower lobes of caudal fin reddish to blackish, centre of fin whitish, presence of large oval spot on lower edge of caudal peduncle. Body lacking any kind of stripes. Pectoral and pelvic fins are transparent to slightly whitish, blending with the body.

Distribution. Distributed across the Indo-west. In Western Indian Ocean from East and South Africa to Seychelles, Maldives including Red Sea. Southeast Asia to Philippines, Australia, Micronesia, Africa to Japan, Australia, and New Caledonia. Pacific islands including Micronesia and Tahiti. In Indian water, *P.evides* previously reported from Andaman & Nicobar Islands and Lakshadweep Archipelago. The present study documents its first confirmed occurrence from mainland India.

Remarks. In Indian water, other congeners of *Ptereleotris* are *P.caeruleomarginata*, *P.cyanops*, *P.hanae*, *P.heteroptera*, and *P.microlepis*. *P.evides* can be differentiated with other by: having 2nd dorsal fin 26 rays (vs 2nd dorsal fin 29-33 rays in *P.heteroptera*),

head and anterior half of the body pale, posterior half of the body dark, body without vertical orange line, pectoral fin base without narrow black line (vs body and fins pale, narrow black line on pectoral fin base in *P. microlepis*, body with vertical orange line in *P. zebra*), chin without barbules (vs with barbules in *P. zebra*). Morphological data of *P. evides* from present study are analysed with reference holotype data of *P. evides* from Japan, Jordan 1925; to confirm its species identity. The species distributed across Indo-West Pacific region; however, within Indian waters its occurrence has previously been documented only from Andaman and Lakshadweep Archipelago, absence of confirmed records from mainland India may reflect limited sampling or suitable sandy and reef-associated habitats along the continental shelf. The present record from mainland India therefore extended known distribution range of *P. evides* within Indian waters.

***Ptereleotris zebra* (Fowler, 1938). Common name** Chinese zebra goby. **(Figure: 5b)**

Material examined: Registration number: ZSI/MBRC/F/3393; Kavarathi Island, Lakshadweep; 1ex, 06.01.2025; ZSI/MBRC/F/3537, Kavarathi Island, Lakshadweep, 1ex, 06.01.2025; coll. Bineesh K.K and Party

Habitat. Marine, benthopelagic inhabits coral reef ecosystems within sandy to rubble substrates adjacent to reef slopes, channels, and lagoon patch reefs, depth range 2-31 m, usually occur at 2-4 m (Myers 1991).

Diagnostic characters. Slender body laterally compressed, tapering anteriorly, with a highly oblique terminal mouth. distinctive short fleshy chin barbules and median ventral fold on head present. Eyes are large, positioned laterally of the head, interorbital space wide. Dorsal fin separated, interdorsal space narrow, first dorsal fin spines VI, second dorsal fin counts I+28; anal fin I+27; pectoral fin rounded, total pectoral fin counts 24; lateral line scales 128; pelvic fin separated, pelvic frenum absent, pelvic fin counts I+4; caudal fin shape truncate with edges are slightly emarginate, caudal fin procurent rays 10, caudal fin branched rays 17. Upper jaw is slightly protruding, with small conical teeth in 2 rows in lower jaw, upper jaw teeth in 2 rows, outer row teeth conical, inner row of teeth villiform. Body covered with tiny, embedded cycloid scales, nape region devoid of scales, Two interorbital pores, snout with single pore at each sides. Prepelvic area devoid of any scales. Belly covered with minute scales. Body colour pale yellowish to greenish gray, lateral side of the body with 20 narrow orange to pink vertical bars. Presence of a prominent blue-edged dark purple patch below the eyes, opercle with 2-3 blue stripes, pectoral fin base with orange and blue stripes. Both dorsal fin margins are black and blue lines, base of the dorsal fin with blue lines, midline of second dorsal fin with scattered blue dots. Anal fin margins with dark maroon and blue lines, midline of anal fin with scattered blue dots. Chin barble dark purple in colour with blue lines. Pelvic, pectoral and caudal fin yellowish in colour without any markings.

Distribution. *P. zebra* was originally described from Dasol Bay, Luzon, Philippines (Fowler 1938). The species is widely distributed in the Indo-Pacific, occurring from the Red Sea and western Indian Ocean, from East Africa, Mozambique Channel to Marquesas Islands; further range extends to Indo-Pacific north to southern Japan and Ryukyu Islands, and south to Australia and New Caledonia (Randall & Hoesle 1985; Allen & Erdmann 2024; Sergey Bogorodsky & Menachem Goren 2023; Fricke et al. 2019). In India, present study record in Lakshadweep archipelago, which further extending its known distribution into Arabian Sea.

Remarks. *P. zebra* recorded for the first time from Indian waters, extending its known Indo-Pacific distribution. In 2020, Kodeeswaran et.al. describes *P. cyanops* from Tamil Nadu, India; other than *P. cyanops*, all of its congeners are distributed in LK and AND, suggesting that regional diversity is still incompletely documented. Morphologically, the species *P. zebra* is clearly separable from its Indian congeners by having chin with fleshy barbules (vs without barbules but low fleshy knob in *P. heteroptera*, *P. microlepis*, *P. evides*); body with at least 20 vertical bands (vs other congeners without vertical bands); caudal fin truncate without any filaments (vs 5th and 13th branched rays are greatly prolonged as filaments in *P. cyanops*); uniform yellow body colour with band (vs body colour pale bluish anteriorly and shading black posteriorly in *P. evides*); first and second dorsal fin margin with black and blue line (vs absent in other species). Morphological data of *P. zebra* from present study are analysed with reference holotype data of *P. zebra* from Philippines, Fowler 1938; to confirm its species identity. However, in present study individual having anal fin I+27 (vs holotype I+26), whereas description of *P. zebra* from Western Indian ocean shows anal fin I+25-28, Larson 2022; indicating the intraspecific variation among different geographical regions. Present record of *P. zebra* from Lakshadweep extends its known range into the Arabian Sea, suggesting previously undocumented connectivity among reef systems. The present record also highlights the need for intensified ichthyofauna surveys in under explored reef systems of India, where additional cryptic or previously unrecorded species may still remain undiscovered.

Phylogenetic analysis. The phylogenetic tree generated from the analyzed sequences revealed distinct and well supported species-level clade, demonstrating clear genetic differentiation among the examined gobiid taxa. The sequence generated from present study are; *Oxyurichthys omanensis* with accession number PZ117564, PZ117570, PZ117565, PZ117566, PZ117571; *Yongeichthys audax* with accession number PZ120905, PZ120903, PZ120904; *Amblyeleotris downingi* with accession number PZ120899, PQ211268, PQ211266, PQ211267; *Amblyeleotris periphthalmus* with accession number PZ459945; *Valenciennesa strigata* with accession

number PZ385390; *Ptereleotris zebra* with accession number PZ120900, PZ120901; *Ptereleotris evides* with accession number PZ116894; *Bathygobius cocosensis* with accession number PZ117579, PZ117580, PZ117577, PZ117578, PZ117584; *Periophthalmus minutus* with accession number PZ904853, PZ904854, PZ904859, PZ904860, PZ90485; all the submitted sequence are clustered together with their respective reference sequences, indicating strong sequence similarity and conforming their taxonomic placement. The topology showed that individuals assigned to the same species formed monophyletic groups, supported by moderate to high boot straps values. Short branches lengths within species clade reflected low intraspecific genetic variation, whereas longer branches between clade indicated substantial interspecific divergence. The clustering pattern observed in the tree was congruent with species identifications based on sequence similarity, demonstrating the reliability of the molecular marker used in the analysis. Overall, the phylogenetic reconstruction provides robust evidence for the genetic distinctiveness of the examined taxa and confirms the affinity of the newly generated sequences with previously reported conspecific lineages. These data highlights the usefulness of COI data in resolving species boundaries and elucidating evolutionary relationship within gobioid fishes.

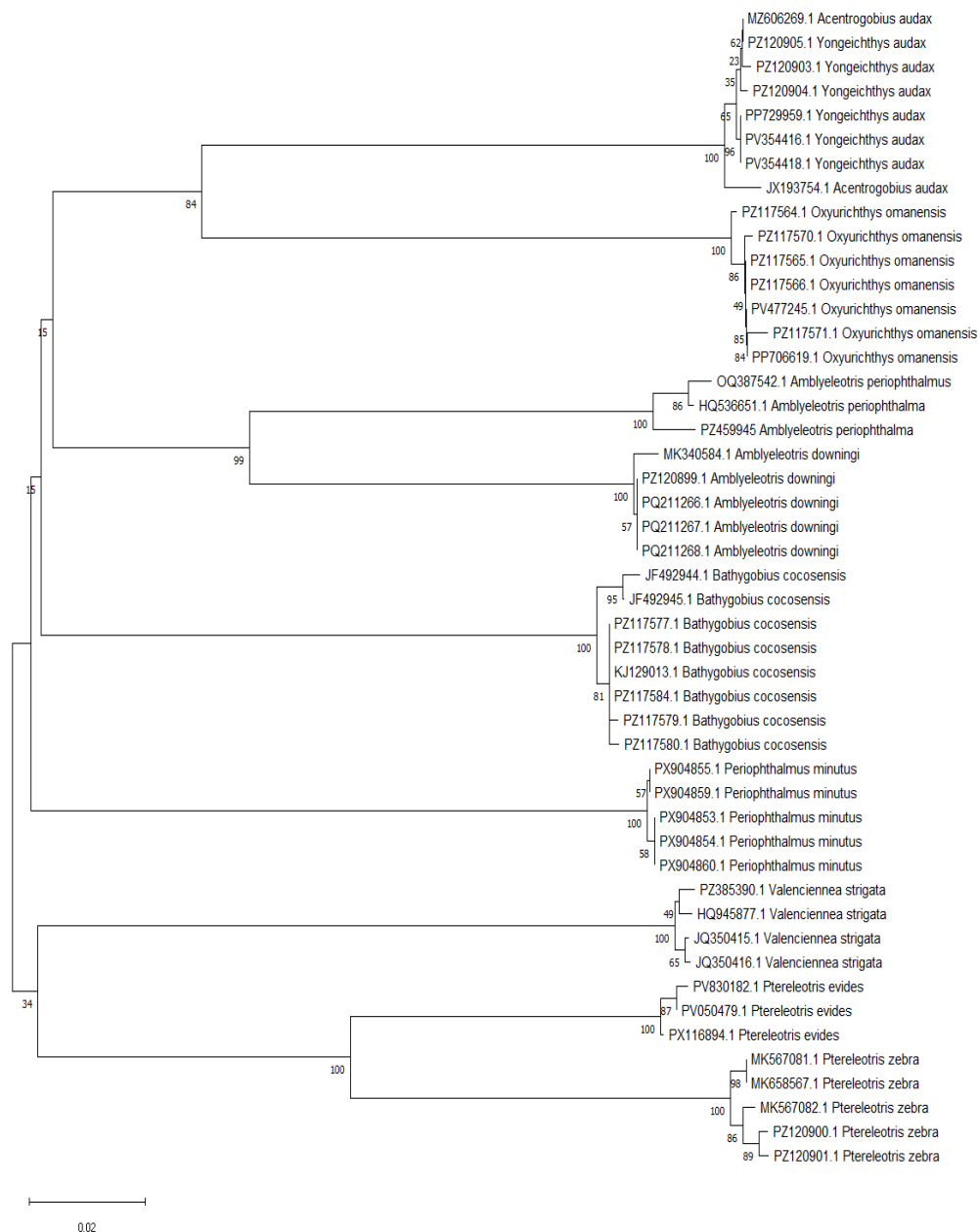


Fig 12. Neighbour-Joining phylogenetic tree of new record gobioid species from India, Lakshadweep and Andaman Islands, tree based on mitochondrial COI sequences using the Kimura 2-parameter mode

Discussion. The Gobioid genera documented in the present paper exhibit diverse ecological adaptations and widespread Indo-Pacific distributions. *Amblyeleotris* (shrimp gobies) are small, burrow-dwelling fishes forming symbiotic relationships with alpheid shrimps, inhabiting sandy bottoms of coral reefs and lagoons from East Africa to Polynesia. *Oxyurichthys* are benthic gobies found in estuaries, mangroves, and soft-bottom coastal habitats across the Indo-West Pacific, including the Indian Ocean and Southeast Asia. *Bathygobius* occupy rocky shores, tidal pools, estuaries, and shallow reefs throughout the Indo-Pacific and eastern Atlantic. *Valenciennea* are sand-shifting reef gobies on sandy lagoon or reef flat substrates, widely distributed across the Indo-West Pacific, and *Ptereleotris* (dart fishes) inhabit sandy slopes and rubble zones near coral reefs, ranging across the Indo-Pacific, occasionally extending to deeper reef areas. Collectively, these genera illustrated the strong faunal connectivity among Arabian Sea, Bay of Bengal, Andaman Sea, and Oceanic islands ecosystems of India. The discovery of several overlooked or previously unrecorded species suggested that the gobioid diversity of Indian waters remains incompletely documented. Continued systematic surveys integrating morphology and molecular approaches are therefore essential for accurately assessing species diversity, distribution patterns of Indian gobioid fishes.

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Conflict of Interests. The authors declare that there is no conflict of interest regarding the publication of this study.

Ethical approval & declaration. Specimens were collected in strict accordance with institutional and national ethical regulations governing the use of animals in research. All sampling procedures were authorized under relevant permits, ensuring minimal ecological disturbance and adherence to internationally accepted standards for the ethical handling of fish in biodiversity studies.

Consent for publication. Not applicable.

Data availability. The datasets generated and analyzed during this study, encompassing detailed morphological measurements and COI DNA barcode sequences, are fully available from the corresponding author upon reasonable request.

Author Contribution. MD and BKK collected the samples. MD and BKK prepared the manuscript, the tables and figures. AVP, SS and RB made molecular analysis of the collected samples. BKK and AM supervised and helped with manuscript correction.

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Fig.2: a) Live specimen of *Amblyeleotris downingi* collected from Lakshadweep India, reg. ZSI/MBRC/F/3625; b) dead specimen of *A.downingi* collected from off Kakinada, east coast India, Bay of Bengal, reg.ZSI/MBRC/F/3158.



Fig.3: Live specimen of *Amblyeleotris periophthalmus* collected from Lakshadweep India, reg. ZSI/MBRC/F/3538.



Fig.4: a) Live specimen of *Bathygobius cocosensis* collected from Andaman Island, reg.ZSI/MBRC/F/3628.



Fig.5: a) Live specimen of *Ptereleotris evides* collected from Gulf of Mannar, South-east coast, India, reg. ZSI/MBRC/F/3626; b) live specimen of *Ptereleotris zebra* collected from Lakshadweep, India, reg.ZSI/MBRC/F/3393.



Fig.6: a) Live specimen of *Valenciennea strigata* collected from Gulf of Mannar, South-east coast, India; reg. ZSI/MBRC/F/3541.

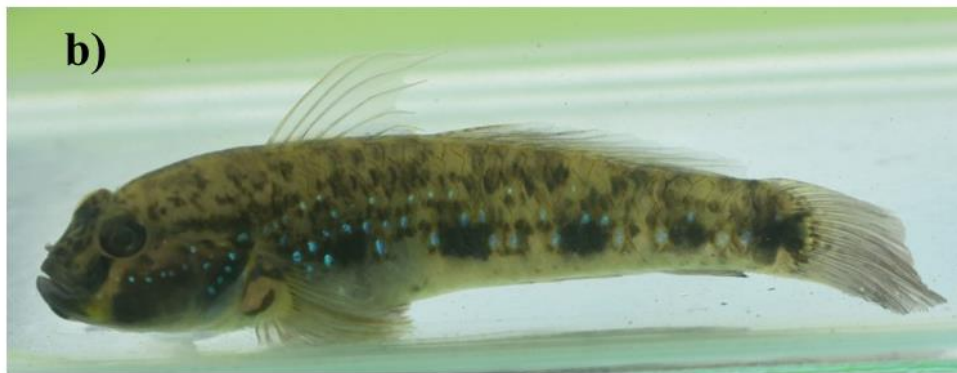


Fig.7: a) Dead specimen of *Yongeichthys audax* collected from Ashtamudi Lake, Kerala, India; reg:ZSI/MBRC/F/3194; b) live specimen of *Y. audax* collected from Ograbraij, Andaman Island, India; reg:ZSI/MBRC/F/3540.

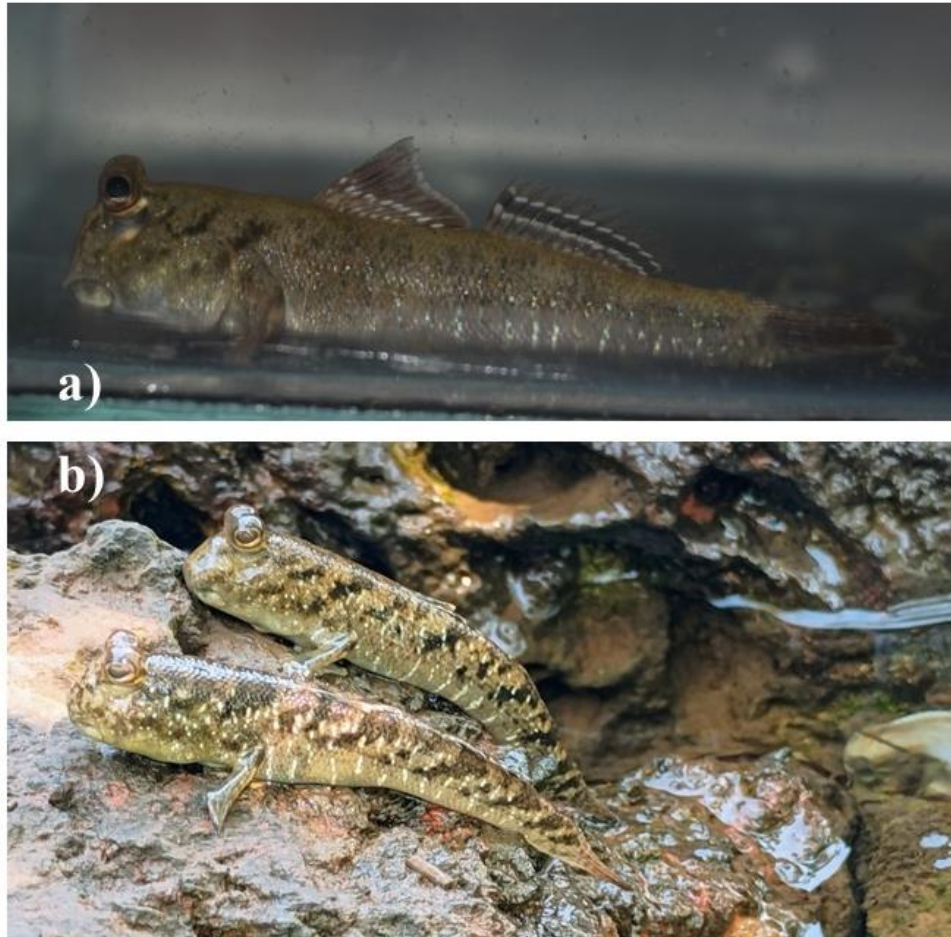


Fig.8: a) Live specie of *Periophthalmus minutus* collected from Andaman Islands, India b) live specimen of *P.minutus* from Ratnagiri mangrove habitat, Mumbai, India (ZSI/MBRC/F/ 3380).