



Checklist of serranid and epinephelid fishes (Perciformes: Serranidae & Epinephelidae) of India

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Abstract

We provide an updated checklist of fishes of the families Serranidae and Epinephelidae reported or listed from India, along with photographs. A total of 120 fishes in this group are listed as occurring in India based on published literature, of which 25 require further confirmation and validation. We confirm here the presence of at least 95 species in 22 genera occurring in Indian marine waters. The majority of the species belong to the grouper genus *Epinephelus* (41%), followed by *Pseudanthias* (15%) and *Cephalopholis* (13%). Most species (92%) found in India have been assessed globally either as Data Deficient (DD) or Least Concern (LC) on the IUCN Red List of Threatened Species. Since information on groupers from India is limited, there is an urgent need to document the diversity, ecology, life history, population status, and fisheries status of this group of fishes from the country.

Key words: ichthyology, tropical marine fishes, groupers, seabasses, Indian Ocean, Andamans, conservation, threatened, endangered species.

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The percoid fishes of the families Serranidae and Epinephelidae, often called groupers, rock cods, seabasses, creolefish, coney, hinds, hamlets, anthias, and soapfishes, are a large group of predatory fishes, especially important in fisheries for food and sport, aquaculture, and the main predatory component of the ichthyofauna in undisturbed tropical marine ecosystems (Smith & Craig 2007, Craig et al. 2011, Ma et al. 2016, Ma & Craig 2018, Rimmer & Glamuzina 2019). The group consists of at least 597 species in 72 genera, occurring in all oceans, but most species are from tropical and subtropical waters (Parenti & Randall 2020, Fricke et al. 2021).

In India, serranids and epinephelids constitute a relatively minor component of the large mixed-species fisheries operating at a wide range of depths and habitats. Groupers especially form a minor but valuable component in the fishery and contributed around 51,433 tons (1.5% by weight) to the country's fisheries landings in 2018 (excluding Andaman and Nicobar Islands) (CMFRI 2019). The estimated annual grouper landings have been sharply increasing, from the range of 12,000 to 25,000 tons per annum from 1995–2010 (decadal average of ca. 13,000 tons from 1991–2000 vs. ca. 20,000 tons from 2001–2010) up to ca. 40,000 tonnes from 2011–2019 (<http://eprints.cmfri.org.in/>). The northern Arabian Sea coastal states, such as Gujarat, Karnataka, and Maharashtra, accounted for more than 60% of the estimated total of mainland grouper landings. The grouper fishery is dominated by the spinycheek grouper, *Epinephelus diacanthus* (Valenciennes, 1828). Other members of the group do not contribute to a large degree in the commercial trade, except in unusual circumstances (see Kishore et al. 2019) or in localized fisheries. We aim here to compile and update the list of serranid and epinephelid fishes occurring in India.

Our checklist was compiled based on observations made by the authors at multiple landing centers across India. The species list was updated and assessed after extensive review of published and grey literature and photographs and reports shared by colleagues, including divers along the coasts of India, and valid sources on social media. We cross-checked our assessments with recent reviews and databases: including Craig et al. (2011), Parenti & Randall (2020), Froese & Pauly (2021), and Fricke et al. (2021). The IUCN Red List assessment status for each species was retrieved from the IUCN Red List of Threatened Species™ (2019) and the species list was updated for the IUCN Grouper Fishery Monitoring and Assessment Workshop planned for Hong Kong, subsequently held online on May 10–11, 2020 due to the pandemic. AKV, BKK, and MM were invited and participated in the assessment workshop.

Along with many other fish groups, India's serranid and epinephelid diversity remains poorly known. The earliest detailed account of these fishes in India was provided by Russell (1803) which illustrated several groupers from Visakhapatnam (Bay of Bengal) classified under *Perca*, i.e. 'bontoo', 'madinawa bontoo', 'rahtee bontoo' and 'Sugualatoo bontoo' (see Russell (1803) plates 20–23). *Epinephelus marginalis* Bloch, 1793 was likely the first epinephelid described from Indian waters (type locality listed as East India); that species is now under the synonymy *Epinephelus fasciatus* (Forsskål, 1775). Since then, only 34 species have been described from India (up to 2020) (Table 1), compared to 72 species of serranids and epinephelids described globally between 2012 and 2021 alone (Fricke et al. 2021). The oldest known valid Indian species is the orange-spotted grouper *Epinephelus coioides* (Hamilton, 1822) described as *Bola coioides* from the Ganges River. The original description mentions it to be the same as the 'bontoo' of Russell (1803). Many early researchers contributed to the grouper diversity of India (Bloch & Schneider 1801, Shaw 1812, Hamilton 1822, Valenciennes 1828, 1830, Kner 1864, Bleeker 1875, Day 1868a, b, 1878, Alcock 1890).

Compilations of grouper species for the whole of India (Day 1888, Misra 1962, Talwar & Kacker 1984, James et al. 1996) are now outdated; and more recent publications focus on commercially important groupers (Basheer et al. 2017, Rajan et al. 2017) and are also limited to regional checklists (Jones & Kumaran 1980, James et al. 1996, Rajan 2002, Sluka & Lazarus 2010, Kandula et al. 2015). There is a lack of a comprehensive assessment of the overall diversity and distribution of serranids and epinephelids in India. Our assessment considers 120 species reported from India (see Appendix Table 3 and Appendix color plates), with 25 of them requiring additional confirmation due to unverifiable or doubtful listings, questionable images, and/or inadequate descriptions, and/or the records being outside of the currently known range of distribution, and/or pending confirmations (Craig et al. 2011). We anticipate the diversity of this group in India will prove to be higher than we have confirmed, due to potentially new species descriptions pending, new records from India, and some known species in the fishery requiring taxonomic appraisal and revalidation.

TABLE 1

Serranid & epinephelid species of fishes described from India

Species described from India	Current status	Type locality *
<i>Sciaena formosa</i> Shaw in Shaw & Nodder 1812	<i>Cephalopholis formosa</i> (Shaw 1812)	Visakhapatnam
<i>Serranus homfrayi</i> Day 1871	<i>Cephalopholis leopardus</i> (Lacepède 1801)	Port Blair, Andaman Islands
<i>Serranus sonnerati</i> Val. in Cuvier & Valenciennes 1828	<i>Cephalopholis sonnerati</i> (Valenciennes 1828)	Puducherry
<i>Centropristis investigatoris</i> Alcock 1890	<i>Chelidoperca investigatoris</i> (Alcock 1890)	Off Madras coast
<i>Chelidoperca maculicauda</i> Bineesh & Akhilesh 2013	<i>Chelidoperca maculicauda</i> Bineesh & Akhilesh, 2013	Off Quilon
<i>Serranus glaucus</i> Day 1871	<i>Epinephelus areolatus</i> (Forsskål 1775)	Andaman Islands
<i>Epinephelus dayi</i> Bleeker 1875	<i>Epinephelus bleekeri</i> (Vaillant 1878)	Madras
<i>Serranus coromandelicus</i> Day 1878	<i>Epinephelus bleekeri</i> (Vaillant 1878)	Madras
<i>Serranus dermochirus</i> Val. in Cuvier & Valenciennes 1830	<i>Epinephelus coeruleopunctatus</i> (Bloch 1790)	Coromandel coast
<i>Bola coioides</i> Hamilton 1822	<i>Epinephelus coioides</i> (Hamilton 1822)	Ganges River
<i>Serranus suillus</i> Val. in Cuvier & Valenciennes 1828	<i>Epinephelus coioides</i> (Hamilton 1822)	Coromandel coast, Puduchery, Visakhapatnam
<i>Epinephelus dayi</i> Bleeker 1874	<i>Epinephelus diacanthus</i> (Valenciennes 1828)	Cochin
<i>Serranus diacanthus</i> Val. in Cuvier & Valenciennes 1828	<i>Epinephelus diacanthus</i> (Valenciennes 1828)	Malabar
<i>Serranus erythrus</i> Val. in Cuvier & Valenciennes 1828	<i>Epinephelus erythrus</i> (Valenciennes 1828)	Malabar
<i>Epinephelus marginalis</i> Bloch 1793	<i>Epinephelus fasciatus</i> (Forsskål 1775)	East India
<i>Holocentrus marginatus</i> Shaw 1803	<i>Epinephelus fasciatus</i> (Forsskål 1775)	East India
<i>Serranus bontoo</i> Val. in Cuvier & Valenciennes 1828	<i>Epinephelus faveatus</i> (Valenciennes 1828)	Visakhapatnam & Madras
<i>Holocentrus caeruleus</i> Shaw 1803	<i>Epinephelus flavocaeruleus</i> (Lacepède 1802)	Indian seas

TABLE 1 cont.

Serranid & epinephelid species of fishes described from India

Species described from India	Current status	Type locality *
<i>Priacanthichthys maderaspatensis</i> Day 1868	<i>Epinephelus latifasciatus</i> (Temminck & Schlegel 1843)	Madras
<i>Serranus grammicus</i> Day 1868	<i>Epinephelus latifasciatus</i> (Temminck & Schlegel 1843)	Madras
<i>Serranus longispinis</i> Kner 1864	<i>Epinephelus longispinis</i> (Kner 1864)	Madras
<i>Holocentrus malabaricus</i> Bloch & Schneider 1801	<i>Epinephelus malabaricus</i> (Bloch & Schneider 1801)	Tranquebar
<i>Serranus semipunctatus</i> Val. in Cuvier & Valenciennes 1828	<i>Epinephelus malabaricus</i> (Bloch & Schneider 1801)	Puducherry
<i>Serranus radiatus</i> Day 1868	<i>Epinephelus radiatus</i> (Day 1868)	Near Madras
<i>Serranus lineatus</i> Val. in Cuvier & Valenciennes 1828	<i>Epinephelus undulosus</i> (Quoy & Gaimard 1824)	Puducherry
<i>Liopropoma randalli</i> Akhilesh, Bineesh & White 2012	<i>Liopropoma randalli</i> Akhilesh, Bineesh & White 2012	Off Mangalore
<i>Holanthias perumali</i> Talwar 1976	<i>Odontanthias rhodopeplus</i> (Günther 1872).	Off Kollam
<i>Plectranthias alcocki</i> Bineesh, Gopalakrishnan & Jena 2014	<i>Plectranthias alcocki</i> Bineesh, Gopalakrishnan & Jena 2014	Off Kollam
<i>Plectropoma leopardinus</i> Cuvier in Cuvier & Valenciennes 1828	<i>Plectropomus leopardus</i> (Lacepède 1802)	Indian sea
<i>Pseudanthias pillai</i> Heemstra & Akhilesh 2012	<i>Pseudanthias pillai</i> Heemstra & Akhilesh 2012	Off Chavakkadu
<i>Anthias bitaeniatus</i> Kotthaus 1973	<i>Pseudanthias conspicuus</i> (Heemstra 1973)	Off Mumbai
<i>Anthias conspicuus</i> Heemstra 1973	<i>Pseudanthias conspicuus</i> (Heemstra 1973)	Off Diu
<i>Pseudanthias vizagensis</i> Krishna, Rao & Venu 2017	<i>Pseudanthias pillai</i> Heemstra & Akhilesh 2012	Visakhapatnam
<i>Pseudogramma cernunnos</i> Prokofiev 2019	<i>Pseudogramma cernunnos</i> Prokofiev 2019	North of Great Nicobar Island
<i>Serranus oxyrhynchus</i> Val. in Cuvier & Valenciennes 1828	? <i>Serranus cabrilla</i> (Linnaeus 1758)	Malabar

* Madras [= Chennai], Puduchery [= Pondichery], Tranquebar [=Tharangambadi], Quilon [=Kollam], Visakhapatnam [= Vizagapatam]

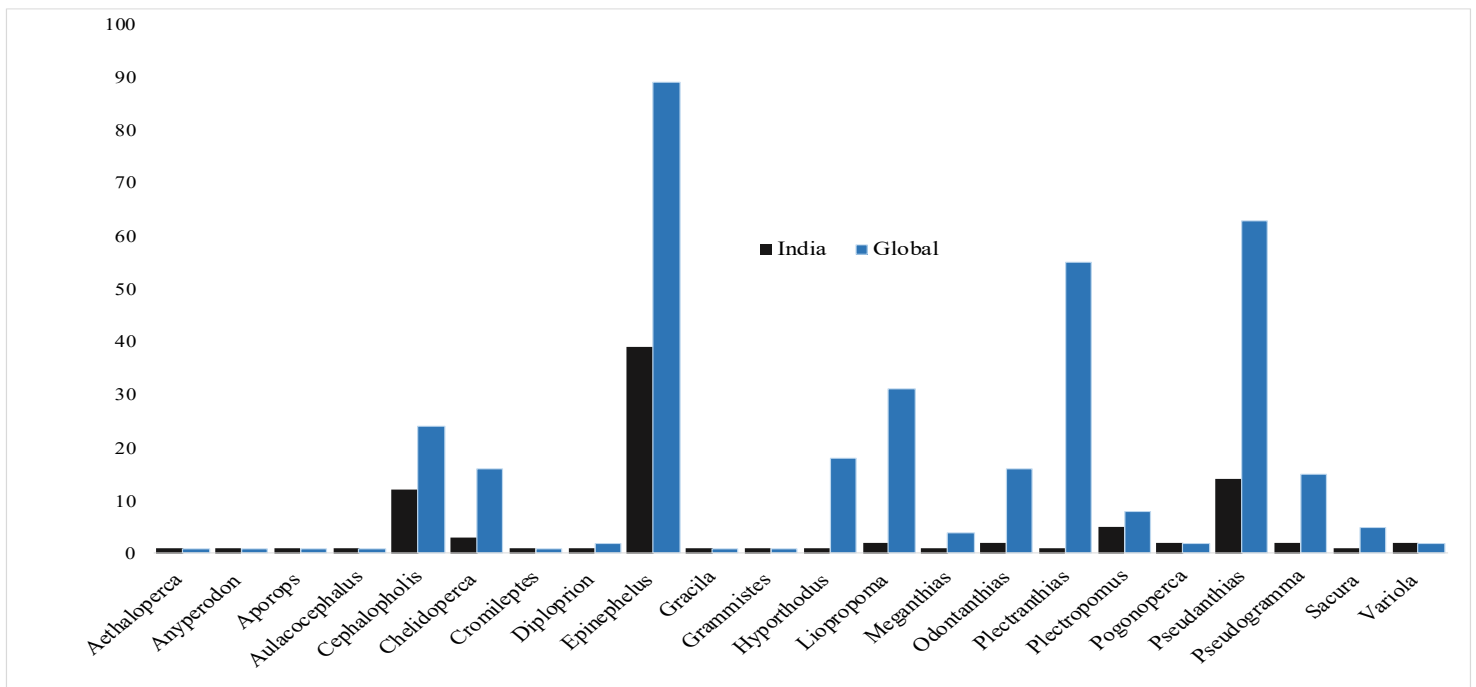


Figure 1. Relative diversity of serranid and epinephelid fishes in India and worldwide.

TABLE 2
Numbers of confirmed species in genera of serranid & epinephelid fishes

Genus	Species reported from India	Global Species
<i>Aethaloperca</i>	1	1
<i>Anyperodon</i>	1	1
<i>Aporops</i>	1	1
<i>Aulacocephalus</i>	1	1
<i>Cephalopholis</i>	12	24
<i>Chelidoperca</i>	3	16
<i>Cromileptes</i>	1	1
<i>Diploprion</i>	1	2
<i>Epinephelus</i>	39	89
<i>Gracila</i>	1	1
<i>Grammistes</i>	1	1
<i>Hyporthodus</i>	1	18
<i>Liopropoma</i>	2	31
<i>Meganthias</i>	1	4
<i>Odontanthias</i>	2	16
<i>Plectranthias</i>	1	55
<i>Plectropomus</i>	5	8
<i>Pogonoperca</i>	2	2
<i>Pseudanthias</i>	14	63
<i>Pseudogramma</i>	2	15
<i>Sacura</i>	1	5
<i>Variola</i>	2	2
total	95	357

A total of 95 species belonging to 22 genera were confirmed by our criteria to occur in Indian waters, accounting for 16% of the known serranids and epinephelids in the world (597). The diversity of genera is similar to that for the group from the entire Indo-Pacific region (Table 2). The genus *Epinephelus* is the most speciose, with 41% of total Indian species of this group, followed by *Pseudanthias* (15%) and *Cephalopholis* (13%) (Fig. 1).

The maximum species richness of this group documented in India occurs in Southern India and Andaman and Nicobar Islands. The lowest number of species was recorded for Lakshadweep, which could be a result of limited studies. In the northern part of the subcontinent, species diversity was low. The total was well higher than reported for neighboring countries including Pakistan (at least 24 species) and Myanmar (at least 50 species) (Psomadakis et al. 2015, 2019), likely due to India's large area of coastal waters and EEZ, diverse habitats, and broad latitudinal range.

Of the 95 species considered, 90 have been assessed in the global IUCN Red List with 9% categorized as Data Deficient (DD), 88% as Least Concern (LC), and 3% as Vulnerable (VU). In addition to these global assessments, there is an urgent need to undertake regional assessments, especially of the long-lived, highly exploited and clearly threatened species in Indian waters. Those groupers in the threatened category have a maximum reported size greater than 50 cm TL and include *Epinephelus polyphekadion* (Bleeker, 1849), *Epinephelus fuscoguttatus* (Forsskal, 1775) and *Plectropomus areolatus* (Ruppell, 1830) (Fig 2). The total of 92% of Indian species listed as DD or LC is similar to the global situation, where the majority of species are in these categories. In general, DD species are poorly documented, making it difficult to assess their true extinction risk (Sadovy et al. 2013, 2020).

In India, there is limited information on much of the marine fauna, including several exploited fish groups (Akhilesh et al. 2014, Tripathy & Mukhopadhyay 2015). Although groupers are a relatively small component of India's multi-species fishery, certain local grouper fisheries (Fig. 3) are significant (Advani et al. 2013), and the high rate of exploitation of juveniles in some species, like the Spinycheek grouper, are matters of conservation concern (Fig. 3D) (Dineshbabu & Radhakrishnan 2009). In the Andaman and Nicobar Islands, an export-oriented targeted fishery for reef fishes has developed (Advani et al. 2013) and high-intensity fishing in reef areas such as the Gulf of Mannar, Malvan, and a seasonal reef fishery in Lakshadweep region, are potential threats to these populations. With increased fishing effort, there is evidence of mean-length reduction in exploited fish populations (Akhilesh et al., in prep.). In the Indian groupers list, the largest species is *Epinephelus lanceolatus* (Bloch, 1790) with a

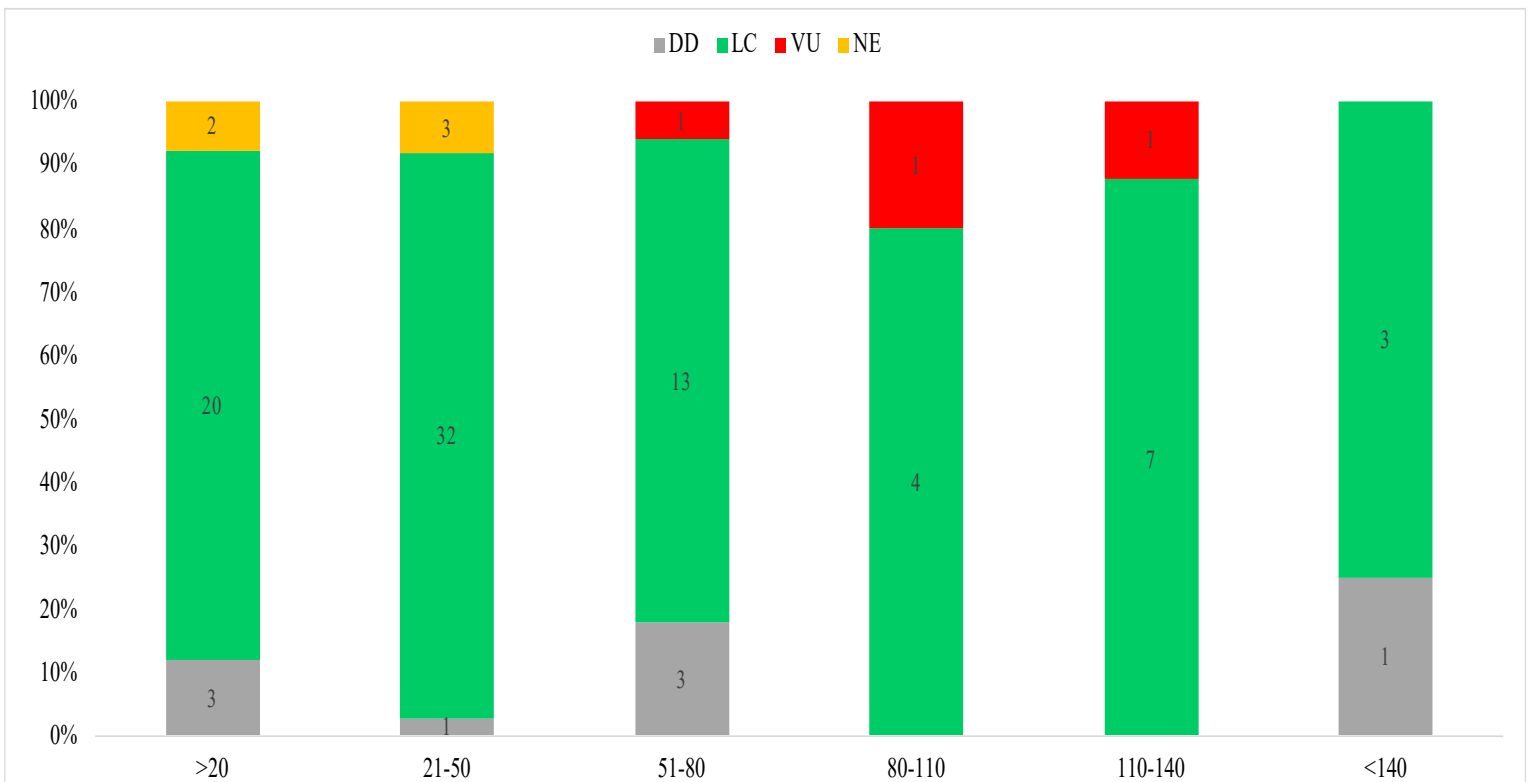


Figure 2. Proportion of serranid and epinephelid fishes in various IUCN Red List categories (93 species): DD= data deficient, LC= Least Concern, VU= Vulnerable.



Figure 3. Landings of groupers in India, A & B: Kerala; C: Andaman & Nicobar Islands; D: Maharashtra.

maximum reported size of 270 cm TL. The grouper fishery of India is dominated by medium-sized groupers with a maximum TL of 50 cm and even among these there is a predominance of juveniles. This exploitation of juveniles is a particular threat to many grouper species which have protogynous mating systems, potentially leading to population crashes. With increasing international and domestic demand for fish consumption, the exploitation of these fishes is likely to increase sharply, underscoring the urgent need for baseline assessments and intensive monitoring (Sadovy et al. 2020). The trade of the live reef fishes (including serranids) for the aquarium trade has received little attention, although this component is highly localized (Prakash et al. 2017). We recommend a regional and national status-assessment of serranids and epinephelids: it is likely many of the species currently assessed as DD or LC globally may fall in a higher threat category and lead to increased conservation efforts.

The giant grouper, *E. lanceolatus* is the only grouper being legally protected by inclusion in Schedule I (Part II A) of the Wildlife (Protection) Act 1972 of India since 2001. Globally the species has been assessed as DD by the IUCN Red List (Fennessy et al. 2018). Schedule I inclusion gives the species a highly protected status in India, similar to that for tigers and sawfishes.

In the Indian EEZ, there is a uniform fishing ban applicable to vessels (other than non-motorized) mostly from 15 April to 14 June for the east coast of India, and between 1 June to 31 July for the west coast. Coastal fisheries within 12 nm are managed by their respective coastal states. General fisheries-management measures like mesh-size regulation and fishing zones are also in place for different states under their Marine Fisheries Regulation Acts (MFRA). For example, the minimum legal size (MLS) for capture and trade of *E. diacanthus*, has been enacted by coastal states such as Kerala and Karnataka (at 18 cm TL). Besides these measures, community-based management and co-management measures are present in the Lakshadweep Islands, Andaman and Nicobar Islands, and Tamil Nadu (Sivadas & Godwin 2006, Jaini et al. 2018).

Marine faunal conservation in India has received very limited attention compared to terrestrial fauna. In addition, natural history collections in India give little attention to fishes, including serranids and epinephelids, and most fish species reported from India are not available in any single collection. Most of India's natural history collections, including fishes, are housed in the National Museum at Zoological Survey of India, Calcutta. The recent disasters, including the fire that destroyed the National Museum of Natural History (Delhi, India) in 2016 and the National Museum of Brazil in 2018 are a rationale to increase collections and promote dispersal of scientific materials across several institutions.

In summary, the effectiveness of management and conservation measures for serranid and epinephelid fishes in India is compromised by a general lack of species-specific information on key aspects of life history and population biology, fishery pressure, and poaching (e.g. Kirubasankar et al. 2019). Future efforts should be oriented towards critical information gathering, especially fishery monitoring, identification of breeding grounds and nursery areas, and, especially for groupers, potential spawning aggregations with the aim of implementing science-based conservation measures.

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TABLE 3

	Species	IUCN RList	Common name	OBS	Remarks	Arabian Sea/ West coast	Lakshadweep Islands	Bay of Bengal E.coast & GOM	Andaman & Nicobar Islands
1	<i>Aethaloperca rogaa</i> (Forsskål 1775)	LC	Redmouth grouper	Y		13, 18, 93	43, 47, 48, 92	58, 79	76, 85, 86
2	<i>Anyperodon leucogrammicus</i> (Valenciennes 1828)	LC	Slender grouper	Y				79	56, 76, 86
3	<i>Aporops bilinearis</i> Schultz 1943	LC	Blotched podge	N			46 as <i>A. allfreei</i>	49	
4	<i>Aulacocephalus temminckii</i> Bleeker 1855	LC	Goldribbon soapfish	N				49	81
5	<i>Caprodon longimanus</i> (Günther 1859)	LC	Pink maomao	N	NC	09			
6	<i>Cephalopholis argus</i> Schneider 1801	LC	Peacock hind	Y		13, 34, 93	44, 47, 92	79, 105	24, 76, 86
7	<i>Cephalopholis aurantia</i> (Valenciennes 1828)	LC	Golden hind	Y		13, 34		49	76, 90
8	<i>Cephalopholis boenak</i> (Bloch 1790)	LC	Chocolate hind	Y		14, 34	40, 43, 47 as <i>C. pachycentron</i>	12, 77, 79, 106	25, 76, 86
9	<i>Cephalopholis cyanostigma</i> (Valenciennes 1828)	LC	Bluespotted hind	N				79	76, 85, 86
10	<i>Cephalopholis formosa</i> (Shaw 1812)	LC	Bluelined hind	Y		13, 18, 22, 93		11, 51, 57, 58, 60, 79	76, 86, 100
11	<i>Cephalopholis leopardus</i> (Lacepède 1801)	LC	Leopard hind	Y		14	92	49	24 as <i>Serranus homfrayi</i> , 25
12	<i>Cephalopholis microprion</i> (Bleeker 1852)	LC	Freckled hind	Y				? 28	71, 85, 86
13	<i>Cephalopholis miniata</i> (Forsskål 1775)	LC	Coral hind	Y		13, 34, 93	44, 47	13, 58, 79, 106	24 as <i>Serranus cyanostigmatoides</i> , 25, 86
14	<i>Cephalopholis nigripinnis</i> (Valenciennes 1828)	LC	Blackfin grouper	Y		13	8 as <i>C. urodeta nigripinnis</i>	61	76
15	<i>Cephalopholis oligosticta</i> Randall & Ben-Tuvia 1983	LC	Vermilion hind	N	Q (see 40)			30	
16	<i>Cephalopholis polleni</i> (Bleeker 1868)	LC	Harlequin hind	N	(26) but NAR			49	

TABLE 3 cont.

	Species	IUCN RList	Common name	OBS	Remarks	Arabian Sea/ West coast		Lakshadweep Islands		Bay of Bengal E.coast & GOM		Andaman & Nicobar Islands	
17	<i>Cephalopholis polyaspila</i> Randall & Satapoomin 2000	LC	Polyspila hind	Y								05, 76	
18	<i>Cephalopholis sexmaculata</i> (Rüppell 1830)	LC	Sixblotch hind	Y		14, 34, 50						76, 78	
19	<i>Cephalopholis somnerati</i> (Valenciennes 1828)	LC	Tomato hind	Y		13, 18, 34, 93	43, 44, 47	06, 12, 51, 60, 79				32, 76, 86	
20	<i>Cephalopholis urodeta</i> (Forster 1801)	LC	Darkfin hind	N	NC	14, 18	92	58, 79				86	
21	<i>Chelidoperca investigatoris</i> (Alcock 1890)	LC	Investigator perchlet	Y		15, 16		04, 15, 16					
22	<i>Chelidoperca maculicauda</i> Bineesh & Akhilesh 2013	DD	Indian perchlet	Y		15, 16							
23	<i>Chelidoperca occipitalis</i> Kothaus 1973	LC	Arabian perchlet	Y		15, 16							
24	<i>Chelidoperca pleurospilus</i> (Günther 1880)	NE	Arafura perchlet	N	NAR				21, 63				
25	<i>Cromileptes altivelis</i> (Valenciennes 1828)	DD	Humpback grouper	Y		14, 34			79			25, 76, 86	
26	<i>Diploprion bifasciatum</i> Cuvier 1828	LC	Barred soapfish	Y			70		63			74	
27	<i>Epinephelus amblycephalus</i> (Bleeker 1857)	LC	Banded grouper	N									07
28	<i>Epinephelus albomarginatus</i> Boulenger 1903	VU	White-edged grouper	N	NC	20, 50			06				
29	<i>Epinephelus andersoni</i> Boulenger 1903	NT	Catface grouper	N	NC	50, 67							
30	<i>Epinephelus areolatus</i> (Forsskål 1775)	LC	Areolate grouper	Y	Comment 1*	13, 18, 34, 93	70	06, 12, 51, 57, 58, 79, 106			24 as <i>Serranus glaucus</i> , 25 as <i>S. angularis</i>		
31	<i>Epinephelus bleekeri</i> (Vaillant 1878)	DD	Duskytail grouper	Y		13, 34	01	06, 51, 57, 58, 77, 106				71, 76, 100	

* Comment 1: Deepti et al. (2014) suggested *E. angularis* as a valid species

TABLE 3 cont.

	Species	IUCN RList	Common name	OBS	Remarks	Arabian Sea/ West coast		Lakshadweep Islands		Bay of Bengal E.coast & GOM		Andaman & Nicobar Islands	
32	<i>Epinephelus bontoides</i> (Bleeker 1855)	DD	Palemargin grouper	N	NC	09			30				
33	<i>Epinephelus chabaudi</i> (Castelnau 1861)	DD	Moustache grouper	N	(66) but NAR	14, 98 as <i>E.modestus</i>							
34	<i>Epinephelus chlorostigma</i> (Valenciennes 1828)	LC	Brownspotted grouper	Y		13, 18, 34				06, 49, 51, 58, 101		71, 76, 100	
35	<i>Epinephelus coeruleopunctatus</i> (Bloch 1790)	LC	Whitespotted grouper	Y		22, 93		43, 47		06, 57, 58, 79, 104		59, 76	
36	<i>Epinephelus coioides</i> (Hamilton 1822)	LC	Orange-spotted grouper	Y	Comment 2*	13, 93		01		51, 58, 108		24 as <i>Serranus suillus</i> , 86	
37	<i>Epinephelus corallicola</i> (Valenciennes 1828)	LC	Coral grouper	Y		Pers. obs.		43, 47, 48, 82, 92		?105		71, 76	
38	<i>Epinephelus cyanopodus</i> (Richardson 1846)	LC	speckled blue grouper	N	(65) but NC								
39	<i>Epinephelus diacanthus</i> (Valenciennes 1828)	LC	Spinycheek grouper	Y		13, 22, 93				06, 77, 106			
40	<i>Epinephelus epistictus</i> (Temminck & Schlegel 1842)	LC	Dotted grouper	Y		13, 18, 34				51		73, 76	
41	<i>Epinephelus erythrurus</i> (Valenciennes 1828)	LC	Cloudy grouper	Y		13, 22, 42, 93				57, 79		76, 85	
42	<i>Epinephelus fasciatus</i> (Forsskål 1775)	LC	Blacktip grouper	Y	Comment 3*	13, 18, 34, 93		43, 44, 47		06, 57, 58, 77		25, 76	
43	<i>Epinephelus fasciatomaculosus</i> (Peters 1865)	DD	Rock grouper	N	NC					37, 61			
44	<i>Epinephelus faveatus</i> (Valenciennes 1828)	LC	Barred-chest grouper	Y		22, 93				58, 103 as <i>Serranus bontoo</i>		24 as <i>Serranus bontoo</i>	
45	<i>Epinephelus flavocaeruleus</i> (Lacepède 1802)	LC	Blue and yellow grouper	Y		18, 13, 22, 93		43, 47		06, 58		25, 76	
46	<i>Epinephelus fuscoguttatus</i> (Forsskål 1775)	VU	Brown-marbled grouper	Y		14, 18, 34		43, 47		58		25, 76	

* Comment 2: Possibly often misidentified as *E. tauvina** Comment 3: “*E. fasciatus*” a complex (Randall & Heemstra 1991, Gill & Kemp 2002); *Epinephelus marginalis* Bloch 1793 is possibly a valid species (Fricke et al. (2011))

TABLE 3 cont.

	Species	IUCN RList	Common name	OBS	Remarks	Arabian Sea/ West coast	Lakshadweep Islands	Bay of Bengal E.coast & GOM	Andaman & Nicobar Islands
47	<i>Epinephelus heniochus</i> Fowler 1904	LC	Bridled grouper	Y				30, 31, 95 as <i>E. hata</i>	73
48	<i>Epinephelus hexagonatus</i> (Forster 1801)	LC	Starspotted grouper	Y		34	43, 47, 82	94	24, 76
49	<i>Epinephelus irroratus</i> (Forster 1801)	LC	Marquesan grouper	N	Q (65)				
50	<i>Epinephelus itajara</i> (Lichtenstein 1822)	VU	Atlantic goliath grouper	N	Q (see 40)				88
51	<i>Epinephelus lanceolatus</i> (Bloch 1790)	DD	Giant grouper	Y		22, 93	108		24, 76
52	<i>Epinephelus latifasciatus</i> (Temminck & Schlegel 1842)	LC	Striped grouper	Y		13, 18, 34	06, 51, 108		
53	<i>Epinephelus lebretonianus</i> (Hombron & Jacquinot 1853)	DD	Mystery grouper	N	NC			21	
54	<i>Epinephelus longispinis</i> (Kner 1864)	LC	Longspine grouper	Y		13, 34, 93	43, 47 as <i>E. fario</i> , 82	51, 57, 58	25 as <i>Serranus macu-</i> <i>latus</i> , 76, 100 as <i>E. fario</i>
55	<i>Epinephelus macrospilos</i> (Bleeker 1855)	LC	Snubnose grouper	Y		13			76, 86
56	<i>Epinephelus maculatus</i> (Bloch 1790)	LC	Highfin grouper	N	NC	14		30	
57	<i>Epinephelus magniscuttis</i> Postel, Fourmanoir & Guézé 1963	LC	Speckled grouper	N	NC			31, 51, 57, 87, 97	
58	<i>Epinephelus malabaricus</i> (Bloch & Schneider 1801)	LC	Malabar grouper	Y		13, 34, 93	70	06, 51, 58, 108	25 as <i>Serranus</i> <i>salmoides</i> , 76
59	<i>Epinephelus marginatus</i> (Lowe 1834)	VU	Dusky grouper	?Y	NAR			?33 as <i>E. guaza</i> , 89	
60	<i>Epinephelus melanostigma</i> (Schultz 1953)	LC	One-blotch grouper	Y		13	44, 47		76, 86
61	<i>Epinephelus merra</i> Bloch 1793	LC	Honeycomb grouper	Y		34	43, 44, 47	58, 101	25, 76
62	<i>Epinephelus miliaris</i> (Valenciennes 1801)	LC	Netfin grouper	Y		13	70		71, 100

TABLE 3 cont.

	Species	IUCN RList	Common name	OBS	Remarks	Arabian Sea/ West coast	Lakshadweep Islands	Bay of Bengal E.coast & GOM	Andaman & Nicobar Islands
63	<i>Epinephelus morrhu</i> (Valenciennes 1833)	LC	Comet grouper	Y		13, 34	43, 47		78, 84
64	<i>Epinephelus multinotatus</i> (Peters 1876)	LC	White-blotched grouper	N	65				
65	<i>Epinephelus ongus</i> (Bloch 1790)	LC	White-streaked grouper	Y		34	01		24 as <i>Serranus summana</i> , 86
66	<i>Epinephelus poecilnotus</i> (Temminck & Schlegel 1842)	LC	Dot-dash grouper	Y		13, 18			
67	<i>Epinephelus polylepis</i> Randall & Heemstra 1991	LC	Smallscaled grouper	Y		13	55		
68	<i>Epinephelus polyphekadion</i> (Bleeker 1849)	VU	Camouflage grouper	Y		13	92		24 as <i>Serranus dispar</i> , 76
69	<i>Epinephelus polystigma</i> (Bleeker 1853)	LC	White-dotted grouper	Y					71, 76
70	<i>Epinephelus quoyanus</i> (Valenciennes 1830)	LC	Longfin grouper	Y		13, 34	69		53, 76
71	<i>Epinephelus radiatus</i> (Day 1868)	LC	Oblique-banded grouper	Y		13, 18		23 as <i>Serranus radiatus</i> 06, 21, 51, 57	72, 76
72	<i>Epinephelus retouti</i> (Bleeker 1868)	LC	Red-tipped grouper	Y					76
73	<i>Epinephelus rivulatus</i> (Valenciennes 1830)	LC	Halfmoon grouper	N	NAR	34		06,	
74	<i>Epinephelus sexfasciatus</i> (Valenciennes 1828)	LC	Sixbar grouper	Y		22 as <i>Serranus sexfasciatus</i>		57	76, 83
75	<i>Epinephelus spilotoceps</i> Schultz 1953	LC	Foursaddle grouper	Y		13	92		76, 86
76	<i>Epinephelus stoliczkae</i> (Day 1875)	LC	Epaulet grouper	N	NC		44	10	
77	<i>Epinephelus summana</i> (Forsskål 1775)	LC	Summan grouper	N	Q (see 40)		82		07

TABLE 3 cont.

	Species	IUCN RList	Common name	OBS	Remarks	Arabian Sea/ West coast	Lakshadweep Islands	Bay of Bengal E.coast & GOM	Andaman & Nicobar Islands
78	<i>Epinephelus tauvina</i> (Forsskål 1775)	DD	Greasy grouper	Y	Comment 4*	13, 34	43, 47 as <i>E.elongatus</i> , 82	06, 51, 101	41, 71, 100
79	<i>Epinephelus tukula</i> Morgans 1959	LC	Potato grouper	Y		34, 93			75, 76
80	<i>Epinephelus undulosus</i> (Quoy & Gaimard 1824)	LC	Wavy-lined grouper	Y		13, 34		06, 51, 58, 101, 103 as <i>Serranus lineatus</i>	76, 86
81	<i>Gracila albomarginata</i> (Fowler & Bean 1930)	LC	Masked grouper	Y			08, 92		
82	<i>Grammistes sexlineatus</i> (Thunberg 1792)	LC	Goldenstriped soapfish	Y			43, 47		41, 86
83	<i>Hyporthodus octofasciatus</i> (Griffen 1926)	LC	Eightbar grouper	Y		13, 54			
84	<i>Liopropoma lunulatum</i> (Guichenot 1863)	LC	Lunulatum basslet	?Y		68			
85	<i>Liopropoma randalli</i> Akhilesh, Bineesh & White 2012	DD	Randall's basslet	Y		03			
86	<i>Meganthias filiferus</i> Randall & Heemstra 2008	DD	Filamentous anthiine	Y	Comment 5*	02			
87	<i>Odontanthias perumali</i> (Talwar 1976)	NE	Indian swallowtail (newly proposed)	Y	Comment 6*	19, 99			
88	<i>Odontanthias rhodopeplus</i> (Günther 1872)	NE	Indonesian swallowtail (newly proposed)	Y	Comment 7*	19, 99			
89	<i>Plectranthias alcocki</i> Bineesh, Gopalakrishnan & Jena 2014	DD	Alcock's deep-reef basslet	Y		17			
90	<i>Plectranthias winniensis</i> (Tyler 1966)	LC	Redblotch basslet	N	NC				07
91	<i>Plectropomus areolatus</i> (Rüppell 1830)	VU	Squaretail coral grouper	Y		13, 18, 93	92		71, 76

* Comment 4: Possibly often misidentified as *E. coioides*

* Comment 5: Needs comparison with *Meganthias natalensis*, see Zajonz et al. (2020)

* Comment 6: Currently a synonym of *Odontanthias rhodopeplus*, possibly a valid species, see Bineesh (2015)

* Comment 7: Needs comparison of additional material from a wide geographic range

TABLE 3 cont.

Species	IUCN RList	Common name	OBS	Remarks	Arabian Sea/ West coast	Lakshadweep Islands	Bay of Bengal E.coast & GOM	Andaman & Nicobar Islands
92 <i>Plectropomus laevis</i> (Lacepède 1802)	LC	Black-saddled coral grouper	Y		13, 68	92		76, 83
93 <i>Plectropomus leopardus</i> (Lacepède 1802)	LC	Leopard coral grouper	Y	Comment 8*	13, 18, 34	44, 92	06, 96	91
94 <i>Plectropomus maculatus</i> (Bloch 1790)	LC	Spotted coral grouper	Y		14, 34	43, 47	06	76, 86, 100
95 <i>Plectropomus pessuliferus</i> (Fowler 1904)	LC	Roving coral grouper	Y	Comment 9*	Pers. obs.	20, 40		71, 76, 85
96 <i>Pogonoperca ocellata</i> Günther 1859	LC	Indian soapfish	Y	Comment 10*	Pers. obs.		105	
97 <i>Pogonoperca punctata</i> (Valenciennes 1830)	LC	Spotted soapfish	Y	Comment 10*	Images		63	
98 <i>Pseudanthias bimaculatus</i> (Smith 1955)	LC	Two-spot basslet	N					78
99 <i>Pseudanthias cichlops</i> (Bleeker 1853)	LC	Yellow anthias	Y			43, 45		
100 <i>Pseudanthias conspicuus</i> (Heemstra 1973)	LC	N/A	N		38			
101 <i>Pseudanthias cooperi</i> (Regan 1902)	LC	Red-bar anthias	N			43, 47		78
102 <i>Pseudanthias evansi</i> (Smith 1954)	LC	Yellowback anthias	Y			92		Images
103 <i>Pseudanthias fasciatus</i> (Kamohara 1955)	NE	One-stripe anthias	N	Comment 11*	14, 36			
104 <i>Pseudanthias gibbosus</i> (Klunzinger 1884)	LC	Red-stripe anthias	Y					Images
105 <i>Pseudanthias hypselosoma</i> Bleeker 1878	LC	Stocky anthias	Y					78

* Comment 8: Often confused with *Plectropomus pessuliferus*

* Comment 9: Often misidentified as *Plectropomus leopardus*. Regional reports need confirmation.

* Comment 10: Needs detailed genetic and morphometric comparisons for the genus *Pogonoperca*

* Comment 11: Needs comparison of additional material from Indian and Pacific Oceans, see Heemstra & Akhilesh (2012)

TABLE 3 cont.

Species	IUCN RList	Common name	OBS	Remarks	Arabian Sea/ West coast	Lakshadweep Islands	Bay of Bengal E.coast & GOM	Andaman & Nicobar Islands
106 <i>Pseudanthias ignitus</i> (Randall & Lubbock 1981)	LC	Flame anthias	Y			Pers. obs.		78
107 <i>Pseudanthias marcia</i> Randall & Hoover 1993	LC	Marcia's anthias	Y		64		Pers. obs	
108 <i>Pseudanthias pillai</i> Heemstra & Akhilesh 2012	NE	Pillai's anthias	Y		39		52 as <i>P. vizagensis</i> , 63	
109 <i>Pseudanthias pulcherrimus</i> (Heemstra & Randall 1986)	LC	Resplendent goldie	Y					Images, 27
110 <i>Pseudanthias rubrizonatus</i> (Randall 1983)	LC	Red-belted anthias	Y					Images
111 <i>Pseudanthias squamipinnis</i> (Peters 1855)	LC	Sea goldie	Y			45, 47, 92	106	86
112 <i>Pseudanthias taeniatus</i> (Klunzinger 1884)	LC	Striped anthias (newly proposed)	N	NC			30	
113 <i>Pseudanthias townsendi</i> (Boulenger 1897)	LC	Townsend's anthias	?Y	NAR	Image/Gujarat			
114 <i>Pseudogramma cernunnos</i> Prokofiev 2019	NE	Bengal podge (newly proposed)	N					109
115 <i>Pseudogramma polyacantha</i> (Bleeker 1856)	LC	Honeycomb podge	N		107	45, 47, 62		
116 <i>Sacura boulengeri</i> (Heemstra 1973)	LC	Boulenger's anthias	Y		102			
117 <i>Sacura margaritacea</i> (Hilgendorf 1879)	NE	Cherry anthias	N	NC	50			
118 <i>Serranus cabrilla</i> (Linnaeus 1758)	LC	Comber	N	NC *comment 12				
119 <i>Variola albimarginata</i> Baissac 1953	LC	White-edged lyretail	Y		13			71, 76
120 <i>Variola louti</i> (Forsskål 1775)	LC	Yellow-edged lyretail	Y		13, 34	43, 44, 47, 92		76, 86, 100

* Comment12: *Serranus oxyrhynchus* Valenciennes, 1828 described from Malabar is a junior synonym (Parenti & Randall 2020)

TABLE 3 cont.

Pers. obs.- Observed by authors; Q- Questionnaire; NAR- Needs additional reports for confirmation, possibly occurs in Indian waters; NC- Needs confirmation, current distribution range does not include Indian waters; NE- Not evaluated; GoM- Gulf of Mannar; NA- Not available; DD- Data Deficient; LC- Least Concern; VU- Vulnerable

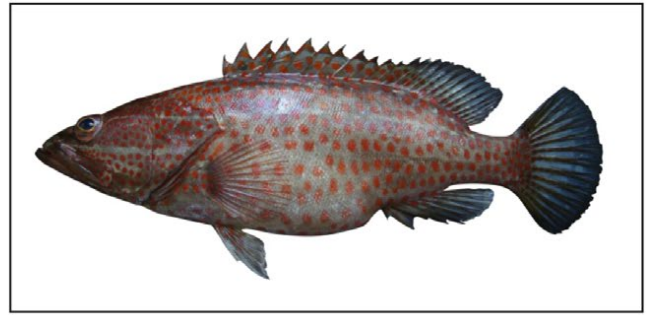
Abbreviations

01. Ajith Kumar et al. 2012; 02. Akhilesh et al. 2009; 03. Akhilesh et al. 2012; 04. Alcock 1890; 05. Allen & Erdmann 2012; 06. Anrose et al. 2007; 07. AqGRISI 2020; 08. Arthur 2004; 09. Bajju et al. 2016; 10. Balachandran & Nizar 1991; 11. Barik et al. 2018; 12. Barman et al. 2011; 13. Basheer et al. 2017; 14. Bijukumar & Raghavan 2015; 15. Bineesh et al. 2013; 16. Bineesh et al. 2014a; 17. Bineesh et al. 2014b; 18. Bineesh et al. 2014c; 19. Bineesh et al. 2011; 20. Craig et al. 2011; 21. Devarapalli et al. 2017; 22. Day 1865; 23. Day 1868; 24. Day 1871; 25. Day 1875; 26. Day 1888; 27. Debelius 2007; 28. Deepti et al. 2013; 29. Deepti et al. 2014; 30. Deepti et al. 2017; 31. Deepti et al. 2018; 32. Dhandapani & Mishra 1998; 33. Dutt & Sujatha 1984; 34. Fischer & Bianchi 1984; 35. Fricke et al. 2011; 36. George et al. 2010; 37. Govindan & Ravichandran 2016; 38. Heemstra 1973; 39. Heemstra & Akhilesh 2012; 40. Heemstra & Randall, 1993; 41. Herre 1941; 42. Idu et al. 2017; 43. Jones 1969; 44. Jones & Kumar 1959; 45. Jones & Kumar 1966; 46. Jones & Kumar 1968; 47. Jones & Kumar 1980; 48. Jones et al. 1981; 49. Joshi et al. 2016; 50. Joshi et al. 2018; 51. Kandula et al. 2015; 52. Krishna et al. 2017; 53. Krishnan & Mishra 1994; 54. Kumar et al. 2012; 55. Kumar et al. 2015; 56. Luther 1972; 57. Mahavidyalaya et al. 2020; 58. Manojkumar et al. 2019; 59. Menon & Talwar 1973; 60. Mishra & Krishnan 2003; 61. Mogalekar et al. 2017; 62. Murty et al. 1989; 63. Murugan & Namboothri 2012; 64. Nair 2008; 65. Nair 2017; 66. Nair & Kuriakose 2014; 67. Nair et al. 2012; 68. Nair et al. 2013; 69. Noushad et al. 2014; 70. Prabhakaran et al. 2013; 71. Rajan 2002; 72. Rajan 2003; 73. Rajan 2015; 74. Rajan & Sreeraj, 2015; 75. Rajan et al. 2016; 76. Rajan et al. 2017; 77. Ramaiyan et al. 1987; 78. Ramakrishna et al. 2010; 79. Ramesh et al. 2008; 80. Randall & Heemstra, 1991; 81. Rangarajan 1967; 82. Rao 1991; 83. Rao 2003; 84. Rao 2009; 85. Rao et al. 1992; 86. Rao et al. 2000; 87. Ray & Mohapatra, 2020; 88. Ray et al. 2013; 89. Reddy 1984; 90. Sachithanandam & Mohan 2014; 91. Sachithanandam et al. 2015; 92. Sluka & Lazarus 2006; 93. Sluka & Lazarus 2010; 94. Sujatha 2004; 95. Sujatha & Dutt 1986; 96. Sujatha & Shrikanya 2012; 97. Sujatha et al. 2008; 98. Talwar & Kacker 1984; 99. Talwar 1976; 100. Talwar 1990; 101. Talwar & Sen 1971; 102. Thomas et al. 2008; 103. Valenciennes 1828; 104. Valenciennes 1830; 105. Varghese et al. 2011; 106. Venkataraman et al. 2002; 107. Williams & Viviani 2016; 108. Yennawar et al. 2011; 109. Prokofiev 2019

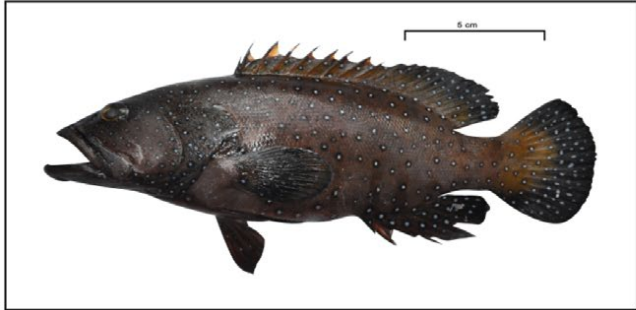
References



1. *Aethaloperca rogae*
SW India



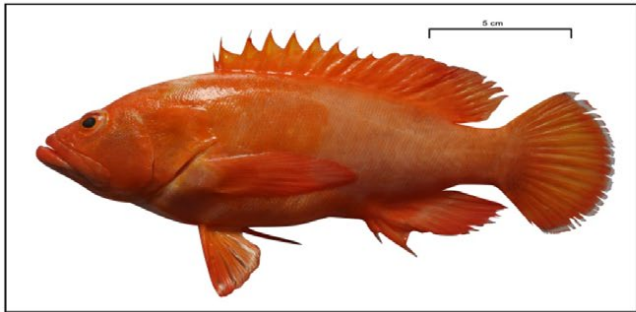
2. *Anyperodon leucogrammicus*
A&N Islands



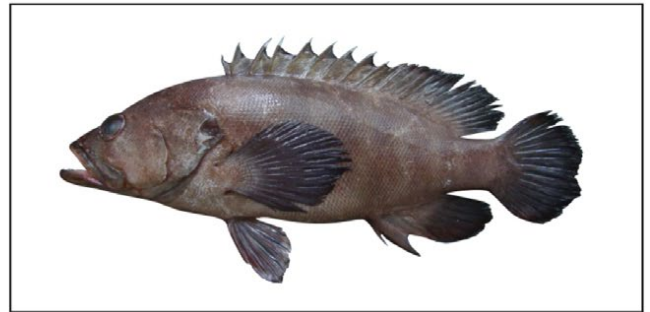
3. *Cephalopholis argus*
Lakshadweep Islands



4. *Cephalopholis argus*
A&N Islands



5. *Cephalopholis aurantia*
A&N Islands



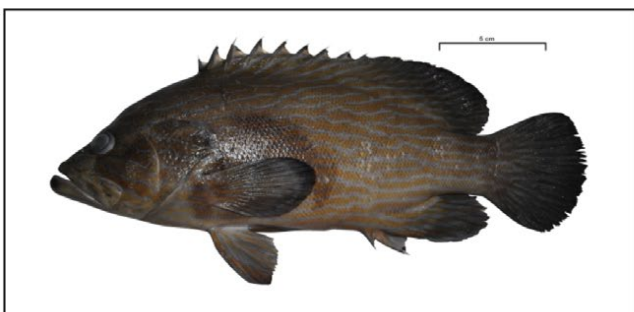
6. *Cephalopholis boenak*
A&N Islands



7. *Cephalopholis boenak*
SE India



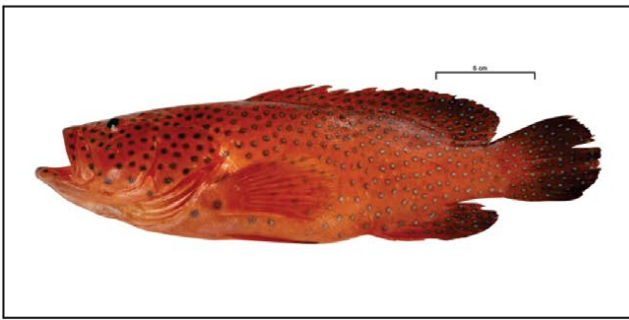
8. *Cephalopholis formosa*
NW India



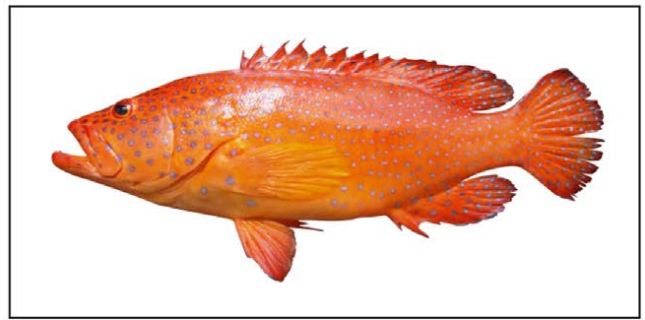
9. *Cephalopholis formosa*
A&N Islands



10. *Cephalopholis leopardus*
A&N Islands



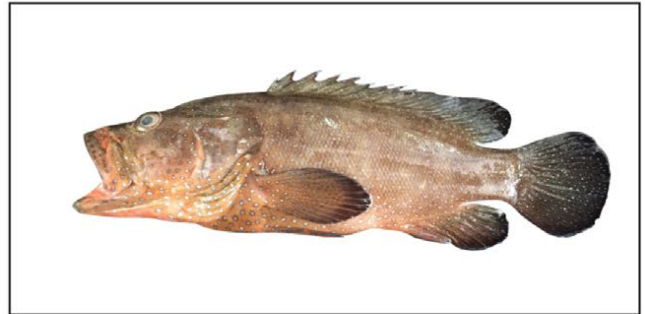
11. *Cephalopholis miniata*
Lakshadweep Islands



12. *Cephalopholis miniata*
A&N Islands



13. *Cephalopholis nigripinnis*
SW India



14. *Cephalopholis polyspila*
A&N Islands



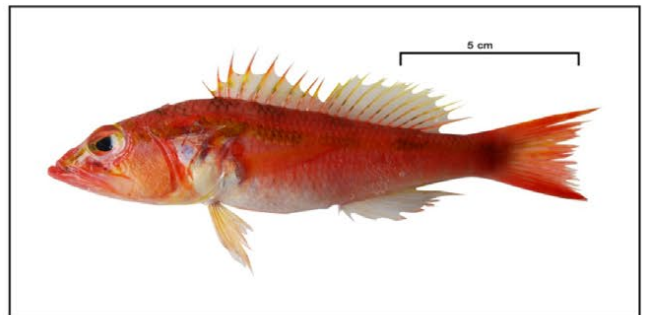
15. *Cephalopholis sexmaculata*
A&N Islands



16. *Cephalopholis sonnerati*
SW India



17. *Cephalopholis sonnerati*
A&N India



18. *Chelidoperca investigatoris*
SW India



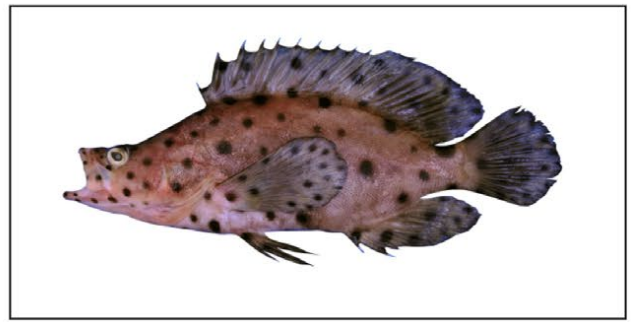
19. *Chelidoperca maculicauda*
SW India



20. *Chelidoperca occipitalis*
SW India



21. *Chelidoperca* sp A.
A&N Islands (Silesh. M/CMLRE)



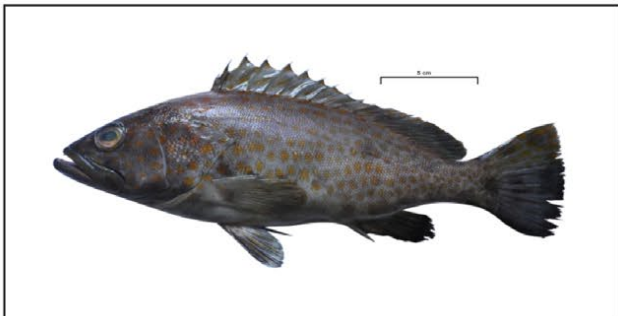
22. *Cromileptes altivelis*
A&N Islands



23. *Diploprion bifasciatum*
NE India



24. *Epinephelus areolatus*
SW India



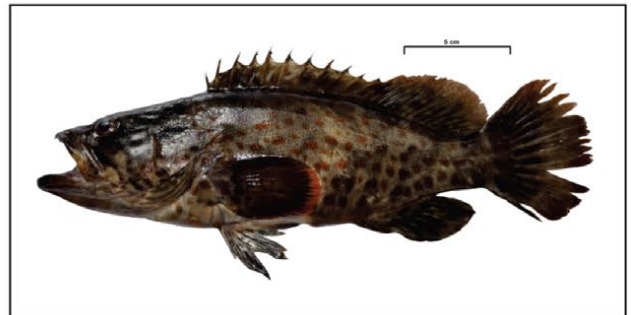
25. *Epinephelus bleekeri*
SW India



26. *Epinephelus chlorostigma*
SW India



27. *Epinephelus coeruleopunctatus*
Lakshadweep Islands



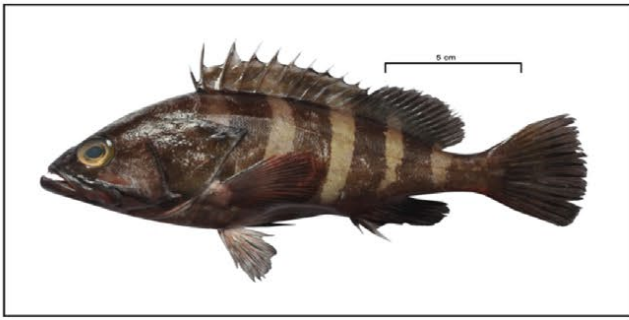
28. *Epinephelus coioides*
SW India



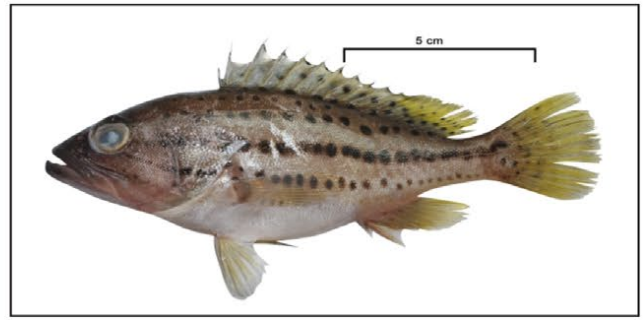
29. *Epinephelus coioides*
NW India



30. *Epinephelus corallicola*
A&N Islands



31. *Epinephelus diacanthus*
SW India



32. *Epinephelus epistictus*
SW India



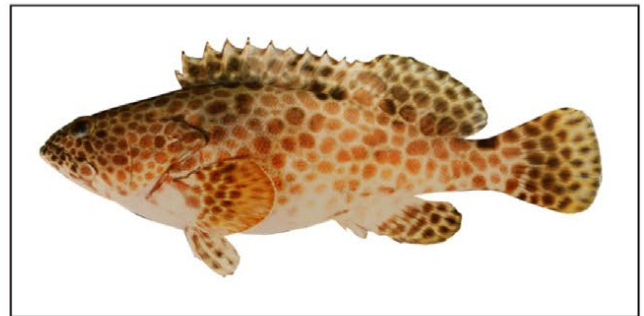
33. *Epinephelus epistictus*
SW India



34. *Epinephelus erythrurus*
NW India



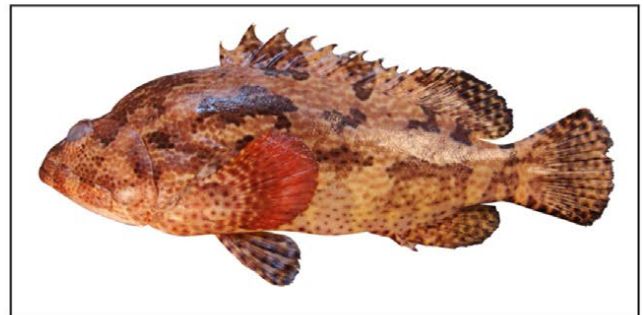
35. *Epinephelus fasciatus*
SW India



36. *Epinephelus faveatus*
SW India (J.E. Randall)



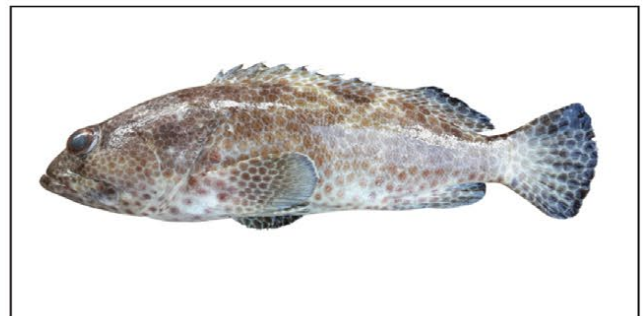
37. *Epinephelus flavocaeruleus*
SW India



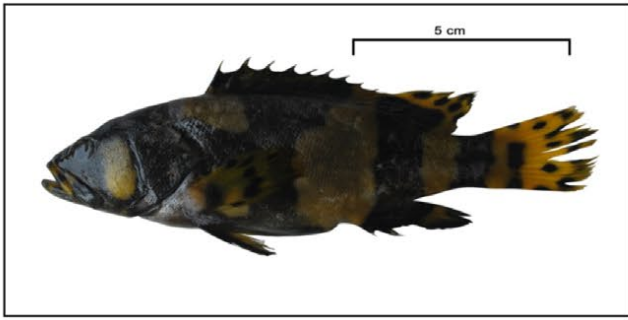
38. *Epinephelus fuscoguttatus*
A&N Islands



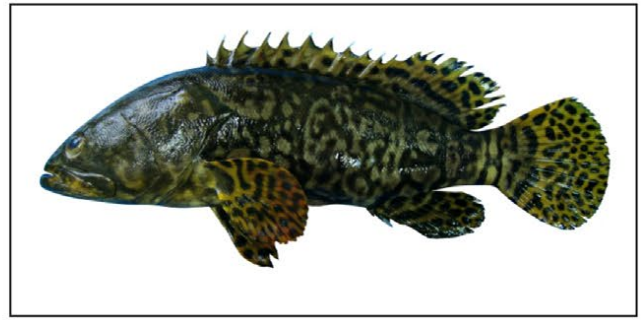
39. *Epinephelus heniochus*
A&N Islands



40. *Epinephelus hexagonatus*
A&N Islands



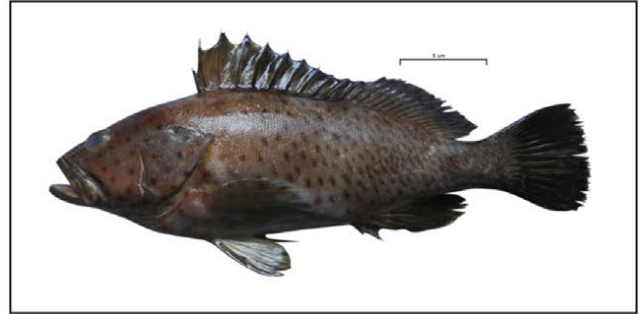
41. *Epinephelus lanceolatus*
SW India



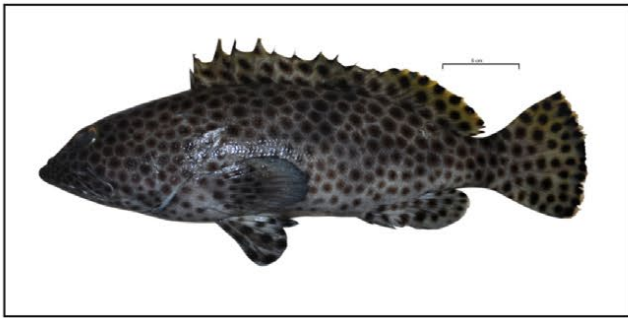
42. *Epinephelus lanceolatus*
A&N Islands



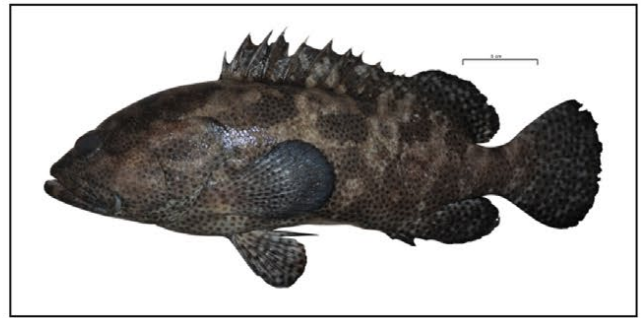
43. *Epinephelus latifasciatus*
NW India



44. *Epinephelus longispinis*
SW India



45. *Epinephelus macrospilos*
SW India



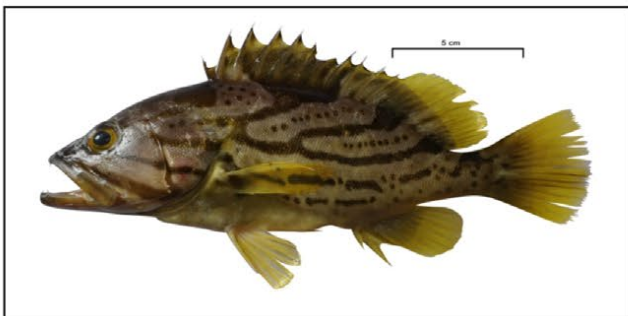
46. *Epinephelus malabaricus*
SW India



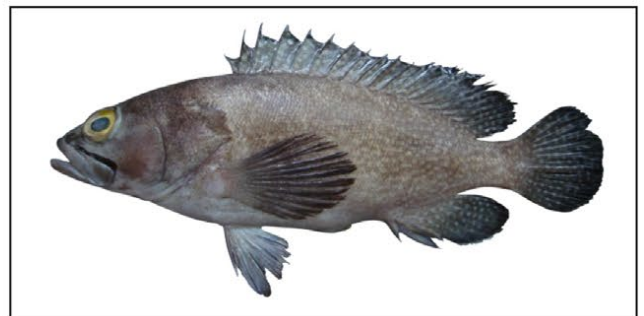
47. *Epinephelus merra*
A&N Islands



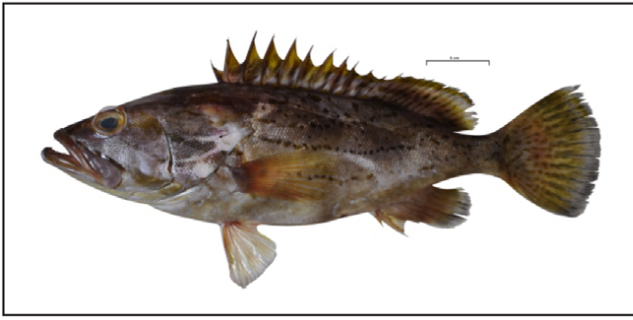
48. *Epinephelus miliaris*
SW India



49. *Epinephelus morrhua*
SW India



50. *Epinephelus ongus*
A&N Islands



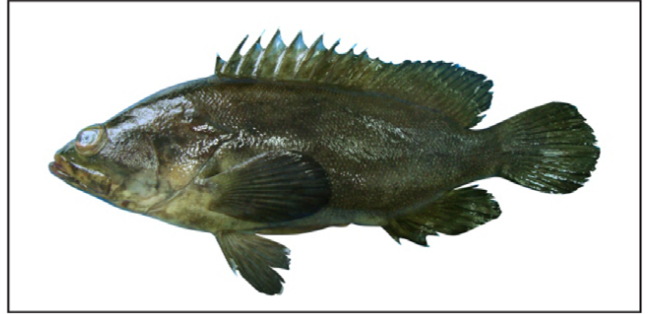
51. *Epinephelus poecilonotus*
SW India



52. *Epinephelus polyphkadion*
SW India



53. *Epinephelus polylepis*
SW India (J.E. Randall)



54. *Epinephelus polystigma*
A&N Islands



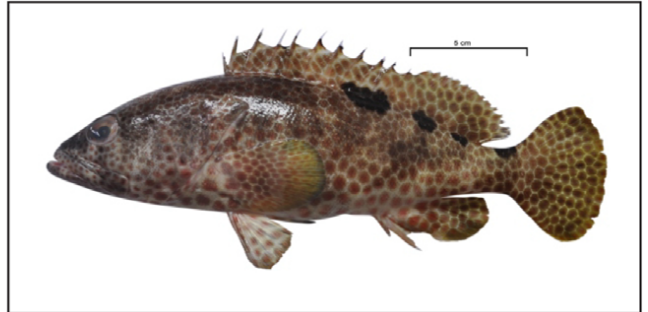
55. *Epinephelus radiatus*
A&N Islands



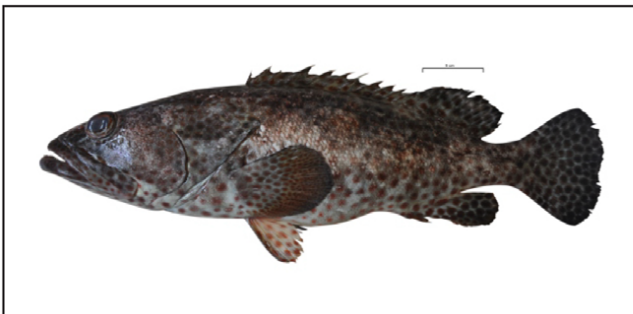
56. *Epinephelus retouti*
A&N Islands



57. *Epinephelus sexfasciatus*
NE India (D. Ray)



58. *Epinephelus spilotoceps*
SW India



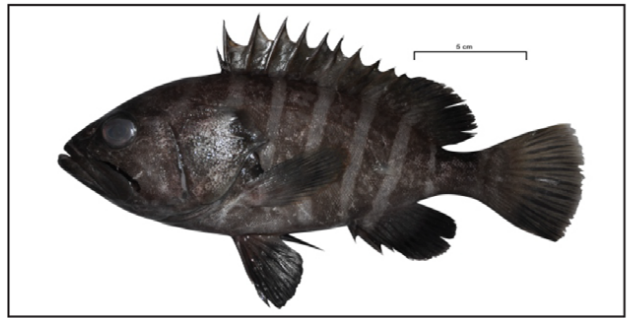
59. *Epinephelus tauvina*
SW India



60. *Epinephelus tukula*
NW India



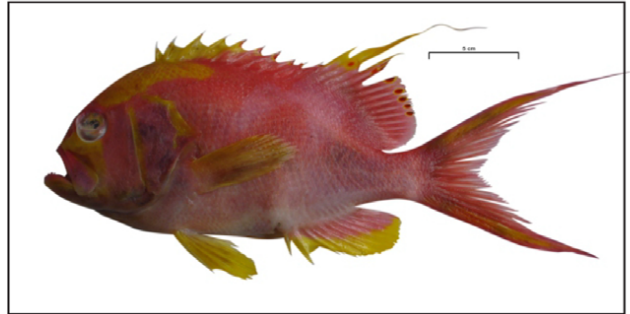
61. *Epinephelus undulosus*
SW India



62. *Hyporthodus octofasciatus*
SW India



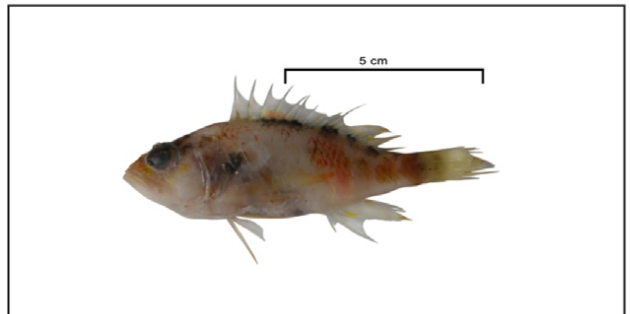
63. *Liopropoma randalli*
SW India



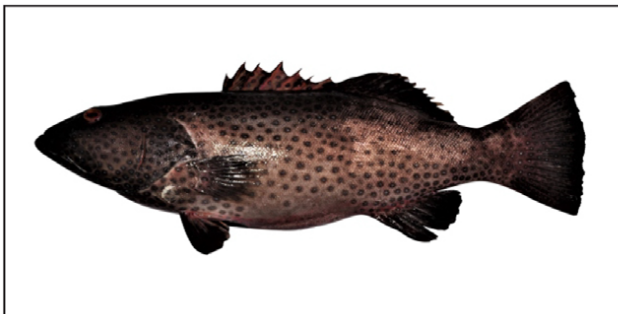
64. *Meganthias filiferus*
SW India



65. *Odontanthias rhodopeplus*
SW India



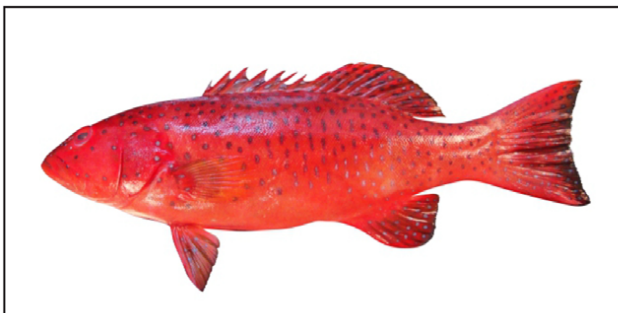
66. *Plectranthias alcocki*
SW India



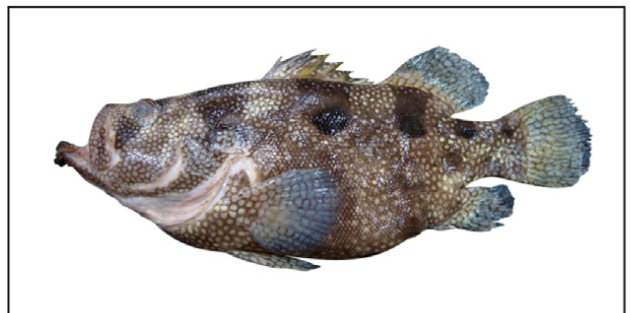
67. *Plectropomus areolatus*
SW India



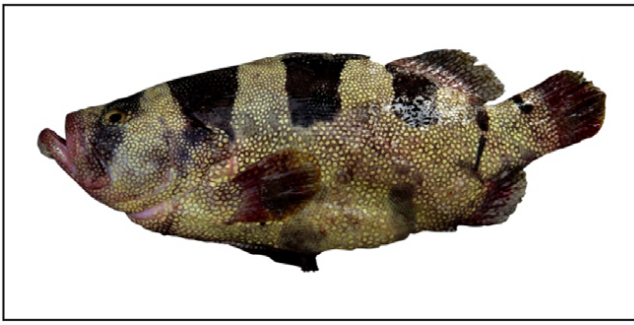
68. *Plectropomus laevis*
A&N Islands



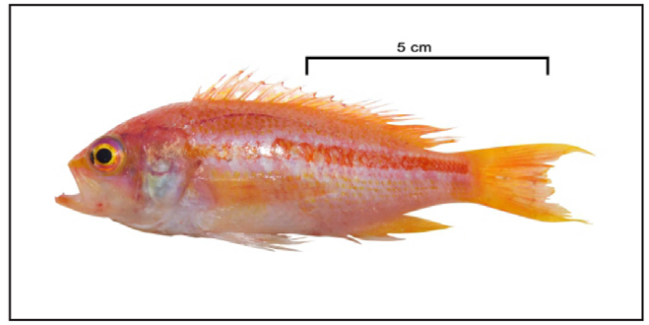
69. *Plectropomus pessuliferus*
A&N Islands



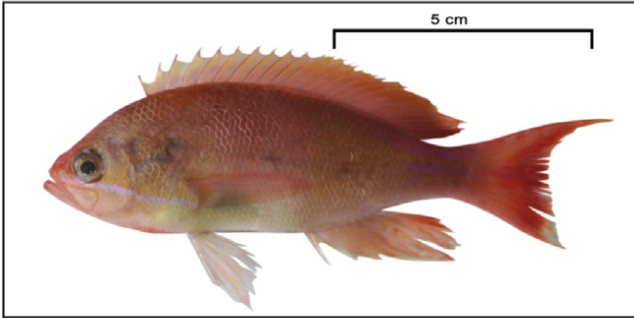
70. *Pogonoperca ocellata*
A&N Islands



71. *Pogonoperca punctata*
SE India



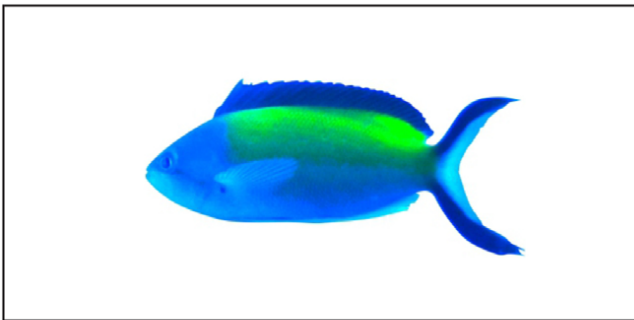
72. *Pseudanthias gibbosus*
off A&N Islands



73. *Pseudanthias marcia*
SW India



74. *Pseudanthias pillai*
SW India



75. *Pseudanthias ignitus*
A&N Islands



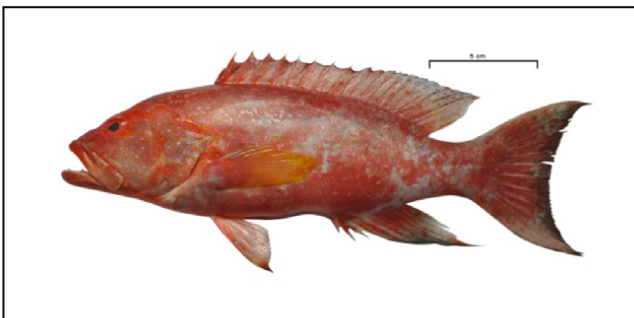
76. *Pseudanthias squamipinnis*
A&N Islands



77. *Pseudanthias squamipinnis*
A&N Islands



78. *Sacura boulengeri*
SW India



79. *Variola albimarginata*
SW India



80. *Variola louti*
Lakshadweep Islands