Groupers and Snappers of India: Biology and Exploitation[a]

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Abstract

The fishes of the families Serranidae (groupers) and Lutjanidae (snappers) are an important resource along the Indian coast. They are represented by 79 species in the Indian seas, reach up to 2 m and are abundant in and around rocky outgrowths and coral ridges at depths extending to about 360 m. Their exploitation presently yields an average annual landing of 8 000 t or about 3% of total Indian marine fish landings. This paper summarizes present knowledge on distribution, exploitation, culture and biology of groupers and snappers in India.

Resumen

Los peces de la familia Serranidae (meros) y Lutjanidae (pargos) representan un importante recurso a lo largo de las costas de la India. Están representados por 79 especies dentro de los mares de la India, algunos alcanzan mas de 2 m de longitud y son abundantes dentro y en los alrededores de fondos rocosos y bordes arrecifales a profundidades que se extienden a mas de 360 m. La explotación rinde actualmente un promedio anual de 8 000 t que equivalen al 3% del total de peces marinos descargados en la India. Este trabajo sintetiza el conocimiento actual sobre la distribución, explotación, cultivo y biología de meros y pargos de la India.

[a] This contribution was assembled by the editors based on two submitted manuscripts: "Groupers and snappers of India: their distribution, exploitation and biology" by P.S.B.R. James and V. Sriramachandra Murty, and "Studies on the fishery, biology and cultivation of groupers and snappers along the Indian coast - exploitation and management" by P. Nammalwar, and complemented by a FishBase list of the groupers and snappers of India, also used to update the scientific names of the originals.

Introduction

Groupers belonging to *Epinephelus* and other genera (Family Serranidae) are large-sized marine food fishes reaching up to 270 cm in length and weights of up to 455 kg. Thirty-eight species of groupers have been reported from the seas around India (Appendix I). Most species of groupers inhabit coral reefs and rocky habitats but some show a preference for seagrass beds and muddy or sandy bottoms. Juveniles of some species of groupers are also found in upper reaches of estuaries. Most species are solitary and all are predators on fishes and invertebrates including crabs and lobsters. Usually, groupers are protogynous hermaphrodites, i.e., they first mature as females, then transform into males. Groupers are excellent food fishes and hence have assumed importance for commercial culture in various countries, including India.

Snappers (Family Lutjanidae) are brightly colored, predatory marine fishes reaching 170 cm and weights of up to 57 kg. Forty-one species of lutjanids have been reported from the seas around India (Appendix II). Most of them are demersal, and occur in shallow coastal waters and coral reefs; juveniles of some species of snappers are also found in estuaries. Snappers are predators of fishes and invertebrates, mainly crabs and prawns. Being excellent food fishes, snappers are gaining importance in mariculture.

Distribution

Exploratory and experimental fishing surveys by different agencies in India have generated valuable information on the distribution of groupers and snappers around the country (Gopinath 1954; Menon and Joseph 1969; Silas 1969; Menon et al. 1977; Bapat et al. 1982; Ninan et al. 1984; Somavanshi and Bhar 1984; Philip et al. 1984; Sivaprakasam 1986; Joseph et al. 1987; Sulochanan and John 1988; and Oomen 1989). The Indian coast is divided into four regions: 1) northwest consisting of Gujarat and Maharashtra states; 2) southwest consisting of Goa, Karnataka and Kerala; 3) southeast consisting of Tamil Nadu, Pondicherry and Andhra Pradesh; and 4) northeast consisting of Orissa and West Bengal (Fig. 1).

Northwest. Bapat et al. (1982) conducted a survey in 1977 from 24°N (55-360 m depth) with a 70-m vessel using bottom and pelagic trawls. A total of six cruises were made during which 247 bottom trawl and 542 pelagic trawl hauls were taken.

The highest bottom trawl catch rate, of 88 kg·hour^{-1}, was obtained at 17°N 126-360 m during April-May followed by 69 kg·hour^{-1} at 91-125 m at the same latitude, also in April-May. Among groupers, six species (*Epinephelus areolatus, E. fasciatus, E. malabaricus, E. lanceolatus* and *E. latifasciatus*) contributed to the catches. During the entire bottom trawl survey, the highest catch rate of groupers, of 13.3 kg hour^{-1} was obtained from 91-125 m, followed by 6.1 kg hour^{-1} in 126-360 m and 1.93 kg in the 55-90 m depth zone. The highest catch rate of pelagic trawls was 43.5 kg hour^{-1} in the 126-360 m depth zone, at 19°N during February-April, and next was 9.7 kg hour^{-1} at 20°N, from 55-90 m during November-December. In the pelagic trawl survey as a whole, the highest catch rate of 0.7 kg hour^{-1} was obtained at 126-360 m depth followed by 0.3 kg hour^{-1} at 55-90 m depth and zero in the 91-126 m depth range.

In this survey, the snappers also were represented by six species (*Lutjanus argentimaculatus, L. johnii, L. vitta, L. malabaricus, L. sanguineus* and *L. fulvus*). For bottom trawling, the catch rate of snappers was 4.6 kg·hour^{-1} in the 91-125 m depth range followed by 1.89 kg·hour^{-1} in the 126-360 m and 1.5 kg·hour^{-1} in the 55-90 m depth zones. The highest catch rate of 32.7 kg·hour^{-1} was obtained in April-May in the

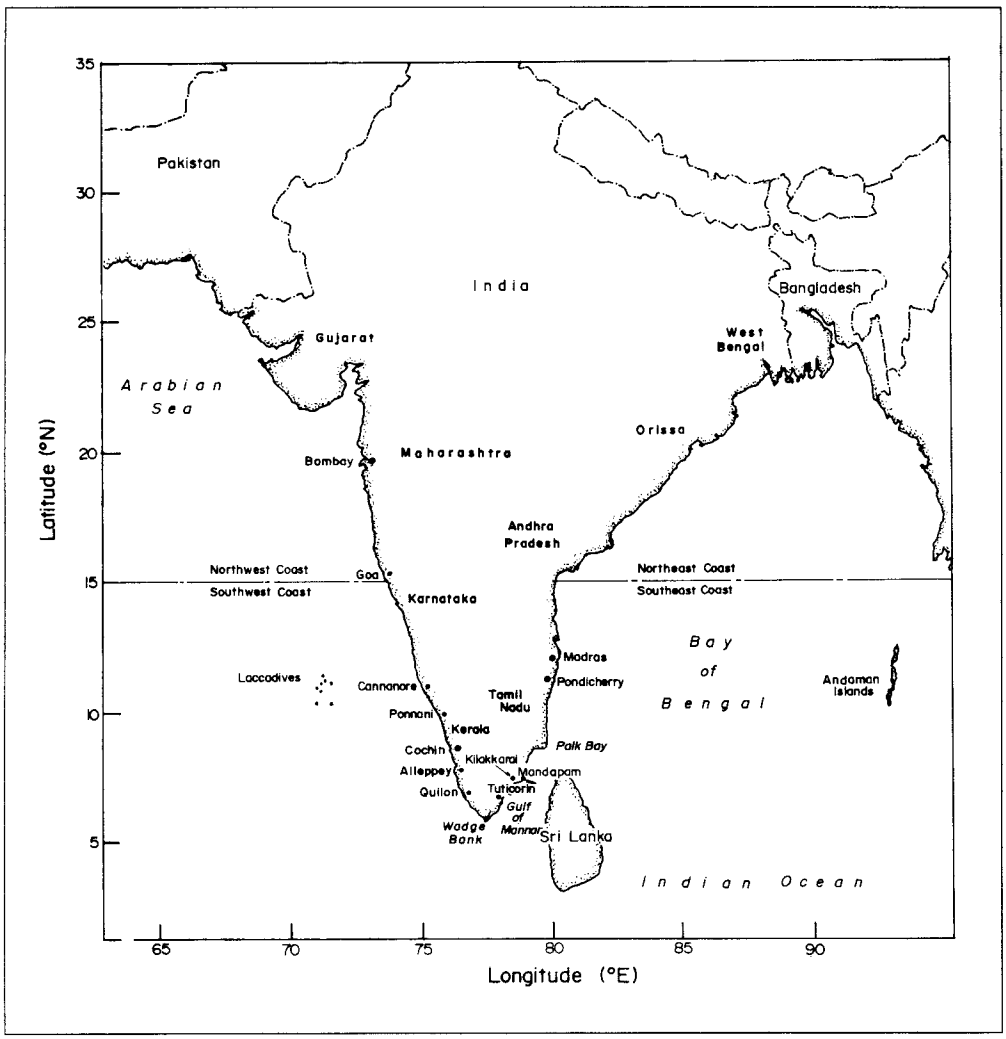

Fig. 1. Map of the Indian coast showing the four regions surveyed and the locations mentioned in the text. [*Mapa de las costas de la India mostrando cuatro regiones exploradas y las áreas mencionadas en el texto.*]

91-125 m depth from 16 to 17°N. Nearby, but in the 55-90 m depth range, a catch rate of 14.3 kg·hour^{-1} was obtained.

For the pelagic trawl, only the area between 55-90 m depth yielded catches of snappers with an average catch rate of 3.3 kg·hour^{-1}; the area between 22 and 23°N yielded the highest catch rate of 16.8 kg·hour^{-1} in April-May followed by 10.6 kg·hour^{-1} in the area between 18 and 19°N.

The results of a survey conducted at 20-23°N and 68-70°E during 1985-88 using a trawl with a 32-m head rope (Vivekanandan et al. 1990) showed that "perches" (of which groupers and snappers are a major component) formed 4.2% of the total catch, with a period of peak abundance extending from October to February. The catch rates varied strongly between years, ranging from zero to about 3 kg·hour^{-1}, being highest between 41 and 70 m.

Southwest. The survey of Philip et al. (1984) conducted in the area between 10-15°N and 72-76°E from 50 to 500 m depth and using 47 m shrimp trawl and 27 m fish trawl showed that groupers and snappers, along with other perches, were most abundant from 14 to 15°N, with catch rates of up to 4.3 kg·hour^{-1}.

In the area between 8 and 13°N at depths of 60-150 m, the bottom is uneven, with rocky outcrops and coralline areas forming extensive ridges reaching up to 5 m from ground level (Silas 1969; Oomen 1989). These areas are rich in groupers and snappers ("kalava") and are therefore called "kalava grounds". According to Silas (1969) these grounds cover nearly 14 000 km^2 in the 75-100 m depth range off the southwest coast of India (8-13°N). The handline fishing trials made by Silas (1969) yielded 200-300 kg·100 hooks^{-1}·hour^{-1} from 8 to 9°N and near 11°N, and 180-190 kg·100 hooks^{-1}·hour^{-1} from 10 to 11°N. The species caught were *Epinephelus chlorostigma, E. diacanthus, E. areolatus, E. tauvina, E. morrhua, Pristipomoides typus*[b] and *Lutjanus gibbus.* Of these, *E. chlorostigma* was the most common species in the catch, and *P. typus*, which was next in abundance, was predominant at 11°N.

Handline trials conducted from 8 to 13°N from 1969-81 with six vessels, yielded 78 561 kg of groupers and snappers with 1 854 hours of fishing, i.e., 42 kg·hour^{-1} (Oomen 1989). Maximum catches and catch rates (60.2 kg hour^{-1}) were obtained during January; the species composition was similar to that obtained by Silas (1969). Another handline survey, conducted from 1967 to 1968 in the shelf extending from Cannanore to southwest of Quilon (8°30'-10°15'N) yielded 87 t of groupers and snappers in 1 280 fishing hours, i.e., 68 kg·hour^{-1} (Menon and Joseph 1969). *E. areolatus, E. chlorostigma, E. diacanthus* and *P. typus* were the main species caught. Highest catch rates were obtained during February. The survey showed that the grounds from 11 to 12°N yielded higher catches of these species than the areas further south.

Menon et al. (1977) conducted experimental fishing using traps (186 x 86 x 86 cm) during 1975-76 using three vessels in the area off 8-11°N, 74-76°E and found the area between Alleppey and Ponnani to be richest in groupers and snappers. The number of fish caught varied from a minimum of 5 per trap in August to a maximum of 48 per trap in April, while the weight per hour of trapping was highest during April-June and October-December. Of the six species caught *E. chlorostigma* was the most abundant.

The ten-year trap survey described by Oomen (1989) was based on the same design as that of Menon et al. (1977) but was conducted from 8 to 13°N. It showed that the average catch rate of the above six species was about 80 kg·hour^{-1}; maximum catch per trap hour (166 kg) was obtained in June.

The trawl survey reported upon by Sulochanan and John (1988) yielded 62-96 kg·hour^{-1} during October-December and 60-78 kg during March-May in the 40-50 m depth zone in an area south of 8°N. The 50-100 m depth zone yielded highest catch rate of 40 kg·hour^{-1} during the same period, and 19 kg·hour^{-1} during October.

Southeast. Joseph et al. (1987) reported on a trawl survey conducted from October 1981 to April 1983 using a 41-m vessel and 34-m two-seam bottom trawl in an area of 3 600 nm^2 of Wadge Bank between 7°00'-8°20'N and 76°30'-78°00'E at depths extending up to 223 m. The bottom was generally hard, covered with dense growth of sea fans and coral, and rich in groupers and snappers.

During the survey, groupers, snappers and pigface breams were found to contribute to 37% of total catches. The northeast part of the Wadge Bank was found to be richest for these fishes followed by the northwest part. A well-defined fishing ground for these fishes was located off 7°40'-8°00'N and 77°20'-78°00'E at depths of 36-64 m.

[b] This species is not listed by Heemstra and Randall (1993) among groupers occurring in India.

The catch rates at different depths showed that the abundance of these fishes decreased with increasing depth.

Well-defined variations in seasonal abundance occurred, with July-September having the greatest catch rates (up to 153.4 kg·hour^{-1}) at depths of 18-45 m (7°N).

The species that contributed to the catches were: *E. diacanthus, E. areolatus, E. malabaricus, E. longispinis* and *E. tauvina* among groupers and *L. argentimaculatus, L. malabaricus, L. lutjanus, L. vitta* and *L. rivulatus* among snappers. The survey allowed the estimation of a standing stock of perches of 10 000 t, of which most (55%) occurred in the 18-45 m depth range.

The trawl survey by Sivaprakasam (1986) on Wadge Bank and Gulf of Mannar at depths ranging from 250 to 500 m during October-March 1985 revealed the dominant species of groupers and snappers in the area to be *Epinephelus diacanthus, E. tauvina, E. lanceolatus, Lutjanus argentimaculatus, L. malabaricus, L. lutjanus, L. rivulatus, Pristipomoides typus* and *Aprion virescens.* The survey also confirmed that groupers and snappers were most abundant in the 20-50 m depth zone in the Wadge Bank area, their abundance decreasing with depth, as also described by Joseph et al. (1987); there was no catch of these fishes in the 200-500 m depth zone. In the Gulf of Mannar as well, maximum catch rates were obtained at depths of 20-50 m, with very poor or no catches in deeper waters. On the Wadge Bank, the peak period of abundance of the fishes was observed to be January-February whereas the same was in May, July, October and December in the Gulf of Mannar.

Somavanshi and Bhar (1984) conducted a brief trawl survey (October 1983-March 1984) in the Gulf of Mannar (8-10°N). Perches (*E. diacanthus* and other serranids, *L. argentimaculatus* and other lutjanids, lethrinids, acanthurids and scolopsids) formed 21% of the catches. Of these, the snappers were found to be dominant, followed by groupers and pigface breams. Depths of up to 50 m were found to be most productive for these fishes.

Northeast: Ninan et al. (1984) conducted a trawl survey during 1983-84 in the region off 14°04'-17°30'N at depths of 45-330 m. The perches (including groupers and snappers) formed 4.4% of the total catch of 176 t obtained during that survey.

Biology

Though groupers form an important component of the perch fisheries in the southwest coast of India, there is little information on the biology of commercially important species. Although many species of groupers have been reported from the seas around India (see Appendix I), only a few of them are represented in commercial catches. Among them, *Epinephelus tauvina, E. malabaricus* and *E. bleekeri* are commonly found. Groupers are predatory fishes feeding on crabs, prawns, polychaetes and other fishes such as *Terapon* and *Ambassis* (Devanesan and Chidambaram 1948). Most groupers are hermaphrodites, first maturing as females, then becoming males with advancing age and size.

Some ecological conditions of areas where groupers and snappers are abundant, i.e., along the east and west coasts of India, and their seasonal variations were studied in successive cruises of *R/V Sagar Sampada* (CMFRI 1985-1992). Depthwise (10-100 m), salinity ranged from 33.05 to 34.57 ppt, temperature from 26.85 to 23.15°C, and dissolved oxygen from 1.85 to 4.85 ml·l^{-1} on the east coast and from 33.50-35.87 ppt, 26.25-29.15°C and 3.63-4.35 ml·l^{-1} in the west coast, respectively.

Only preliminary investigations on the biology of grouper and snapper species have been published, as follows:

1. *Pristipomoides typus*[b]: Oomen (1976) studied food and feeding habits based on samples taken off the Kerala Coast. Fish, cumaceans, mysids, crabs, stomatopods and cephalopods formed the important food items, but 62% of fish examined had everted stomachs. On the basis of 345 specimens of 21.5-34.9 cm, the length-weight relationship was calculated as log W = -5.1002 + 3.0303 logL. Preliminary studies of supraoccipital crest in fishes of 26.0-27.4 cm revealed three growth rings and a fourth under formation in the 27.5-28.9 cm group.

   Premalatha (1989) estimated the length-weight relationship using females ranging from 35-60 cm as log W = -1.4959 + 2.7063 logL. The spawning season was determined to be February-June.
2. *E. diacanthus*: Bapat et al. (1982) observed mature and spent adults in September. Silas (1969) collected juveniles of this species from 30-60 m and 100-160 m depths. In June 1966, 10 kg of juveniles of this species were collected from trawl catches from 160 m depth. Growth and mortality parameters were estimated as L_∞ = 45.5 cm, K=0.45 year^{-1}, M=0.76 year^{-1} and F=0.31 year^{-1} (Anon. 1991). Premalatha (1989) estimated a length-weight relationship for the female of this species (females) as log W = -1.3056 + 2.6117 logL based on specimens ranging from 20 to 55 cm. The spawning period was determined as May-June.
3. *E. areolatus*: Off Kerala State, the spawning season was determined as June-July and length-weight relationship log W = -1.2521 + 2.55772 logL for females and log W = -0.8994 + 2.3287 logL for males were derived based on specimens ranging from 29 to 55 cm (Premalatha 1989).
4. *E. tauvina*: Fish of 45-50 cm length mature as females while fish of more than 74 cm and weighing 11 kg become males having ripe testes. In specimens of 66-72 cm length, transitional gonads contain male and female tissues. Ameer Hamsa and Mohamad Kasim (1992) studied the growth of juveniles in cages (5 x 5 x 2 m) in the Gulf of Mannar starting with juveniles of 14-25 cm. The growth was studied for different periods ranging from about 160 to 334 days; this led to the growth parameter estimates L_∞=67.1 cm and K=0.462 year^{-1}. Also, Selvaraj and Rajagopalan (1973) presented some observations on morphometric and meristic characteristics, and on fecundity and spawning habits of this species.
5. *E. chlorostigma*: length-weight relationships were estimated as log W = -2.7115 + 3.0425 logL in females and log W = -1.7501 + 2.8497 logL in males, using fishes of the length range 32-65 cm. The spawning period is June-July (Premalatha 1989).
6. *Lutjanus kasmira*: This species appears to spawn only once during November-March. Length at first maturity was estimated as 20 cm and fecundity as ranging from 42 100 to 332 620 (Rangarajan 1972b).

Fishery

The groupers and snappers, along with other "perches" are exploited by trawl, hook-and-line and traps. There is however, no targeted fishing for these resources except for hook-and-line fisheries along the Kerala and Tamil Nadu coasts.

During the period from 1985 to 1992, annual landings of groupers ranged from a minimum of about 2 500 t in 1982 to a maximum of about 6 300 t in 1991 (Table 1). Regionally, the highest landings occur off Tamil Nadu followed by Maharashtra, Kerala, Gujarat and Karnataka (Table 2). There were no landings of groupers along West Bengal and only negligible quantities were landed in Orissa.

In the case of snappers, annual landings ranged from about 2 200 t in 1982 to about 4 200 t in 1992 (Table 2). Maximum landings were recorded off Tamil Nadu followed by Andhra Pradesh (Table 2). There were no landings of snappers along the West Bengal coast. In Orissa, landings of lutjanids were highest in 1986 (212 t), and were followed by a collapse in subsequent years.

Table 1. Nominal catch of groupers and snappers along the coasts of India, 1982-1992 (in tons)[c]. [*Captura nominal de meros y pargos de las costas de la India, 1982 - 1992 (toneladas).*]

Year	Groupers	Snappers
1982	2 511	2 202
1983	4 415	3 340
1984	2 635	3 793
1985	3 264	4 098
1986	2 611	2 623
1987	4 807 (4 797)	3 808 (3 783)
1988	5 104	4 136
1989	5 553	3 705
1990	4 718	2 746
1991	6 287 (6 023)	2 257
1992	5 340 (8 548)	4 150 (2 762)

[c]The figures in brackets document differences between the two manuscripts underlying this contribution.

Table 2 also shows that considerable seasonal changes in serranid and lutjanid catches occur in most states.

In Tamil Nadu there is an organized fishery for perches along the Gulf of Mannar and Wadge Bank using hook-and-line, gill nets and traps. There, annual landings of groupers varied from 970 t to 3 124 t, with peak landings usually taken during first and third quarters (Table 2). As for snappers, the yearly catches varied from about 500 t to 1 400 t during 1985-92, with peak landings occurring during the first quarter of the year.

In the Gulf of Mannar, off Tuticorin (8-9°N), the bottom is rocky and also rich in coral reefs. In this region about 250-300 country crafts with hook-and-line and gill nets operated over depths of 35-60 m, targeting perches. Serranids form 23% of that catch; the main species are *E. tauvina* (53% of the grouper catch), *E. malabaricus* (16%), *E. diacanthus* (14%), *E. chlorostigma* (11%) and *E. undulosus* (6%). Peak catches occur during July-October. Lutjanids form 14% of perch catch, and consist of *Lutjanus rivulatus* (42.5% of snappers), *L. argentimaculatus* (27%), *L. malabaricus* (21%) and *Pristipomoides typus* (10%).

In the Gulf of Mannar, off Keelakari (S.E. coast), there is a subsistence trap fishery exploiting groupers and snappers along with other coral reef fishes.

Fishers based in Tuticorin migrate to the Mandapam region during December-March to fish using plank-built boats and hook-and-line over 18-25 m depth off Dhanushkodi (Jayasankar 1990). Lutjanids ranging from 15 to 70 cm and serranids ranging from 20 to 80 cm are targeted. From December 1988 to March 1989, 2 t of serranids, 6 t of lutjanids and 15 t of other fish were caught (Jayasankar 1990).

Hand-lines for perches 30-40 km off the coast have been traditionally used along the southwest coast as well as on Wadge Bank. Hornell (1916) commented on the fishing grounds in the 25-40 fathom depths in Wadge Bank area, while John (1948)

Table 2. Regionwise and statewise average annual landings of groupers and snappers. (Values in parentheses are percentages in the total national catch of the group.) [*Descargas anuales, regionales y estatales, de meros y pargos (valores entre paréntesis son porcentajes del total anual nacional de cada grupo).*]

Region	State	Groupers					Snappers				
		% by quarter				Total	% by quarter				Total
		I	II	III	IV		I	II	III	IV	
Northwest coast	Gujarat	35.3	10.0	1.6	53.1	499 (9.7)	34.1	9.7	5.4	50.8	370 (11.4)
	Maharashtra	28.8	12.8	4.9	53.5	1 416 (27.8)	17.1	9.1	15.8	58.0	658 (20.3)
Southwest coast	Goa	96.3	0	3.7	0	27 (0.5)	0	36.4	9.1	54.5	10 (0.3)
	Karnataka	46.8	9.6	3.4	40.3	293 (5.8)	4.6	2.3	74.4	18.6	45 (1.4)
	Kerala	47.6	2.5	5.9	44.0	1 079 (21.2)	68.3	2.6	1.0	28.2	506 (15.6)
Southeast coast	Tamil Nadu	36.2	18.1	33.3	12.4	1 704 (33.4)	40.4	16.4	25.8	17.4	825 (25.4)
	Pondicherry	16.7	50.0	33.3	0	6 (0.1)	55.6	11.1	33.3	0	18 (0.6)
	Andhra Pradesh	38.5	16.9	24.6	20.0	65 (1.3)	33.2	24.5	19.8	22.5	779 (24.0)
Northeast coast	Orissa	61.6	7.1	14.2	17.1	10 (0.2)	56.4	28.7	4.2	10.6	37 (1.1)
	West Bengal	-	-	-	-	-	-	-	-	-	-

indicated that the depths between 60 and 70 fathoms off Anjengo and Chavara were good for line fishing. Gopinath (1954) gave a preliminary account on perch fishery south of Alleppey and of the Wadge Bank.

Since October 1956, the Indo-Norwegian Project vessels, *M.F.V. Cochin* (Rechristened *M.O. Kristensen*) and other vessels were engaged in hand-line fishing off Cochin. The most successful vessel for this purpose was *R/V Kalava* which, in the course of about 200 fishing days (up to December 1966), landed approximately 75 t of perches, mainly from the grouper grounds between Ponnani and Alleppey. The grouper grounds off the Kerala coast are different from the perch fishing grounds on Wadge Bank, where trawling for perches is possible over large areas. Details of various species of groupers caught from 72 to 114 m during the exploratory survey by *R/V Varuna* on the southwest coast of India were reported by Silas (1969). The species caught were *Epinephelus chlorostigma, Pristipomoides typus, E. diacanthus, E. areolatus, E. morrhua, E. tauvina* and *Lutjanus gibbus.*

In Kerala, the estimated annual landings of serranids varied from 335 t in 1985 to 2 994 t in 1992. Peak catches were obtained during the first and last quarters. An estimated 120 t-1 200 t of lutjanids were landed in different years in Kerala during 1985-92 and the first quarter produced 60% of year's catch (Table 2).

Off Cochin, the hook-and-line fishery starts around December and continues till March (Mathew and Venugopalan 1990). Fishing is conducted by mechanized boats ranging from 7.6 to 9.4 m. Maximum effort is expended during November-March but the highest landings occur in December and January. The estimated yield from these operations was 750 t in 1987 and 530 t in 1988, with perches forming over 90% of the catch (Mathew and Venugopalan 1990). Among perches, serranids and lutjanids were dominant, and formed over 80% of the perch catch. Groupers and snappers were represented by *E. diacanthus* (range: 19-59 cm), *E. chlorostigma* (24-62 cm), *E. tauvina* (42-85 cm), *E. bleekeri* (21-64 cm), *E. areolatus, E. epistictus* and *Pristipomoides typus* (19-69 cm).

Off Quilon (8°20'40"N, 77°02'05"E) at depths ranging from 50 to 150 m, there is a regular fishery by country crafts using hook-and-line from January to April. Of an estimated 18 000 t of perches landed during 1980 and 1981, serranids formed 21% and lutjanids 73% (Madan 1983). A total of 14 species of groupers were caught, among which *E. areolatus* and *E. diacanthus* were dominant. Among snappers, seven species contributed to the fishery. Here *Aprion* sp. and *Aphareus* sp. were dominant, jointly forming 70% of perch catch.

Off the coast of Karnataka, the annual landings of groupers varied from 21 to 839 t and those of snappers from 3 to 254 t during 1985-92, with the first quarter being most productive for groupers and the third quarter for snappers. In Maharashtra, the landings from 1985 to 1992 varied from 280 to 2 450 t for groupers and from 200 to 1 100 t for snappers. In both cases, the peak period was the fourth quarter (Table 2). In 1988, an estimated 4 000 t of perches were landed at Bombay by small trawlers. *E. diacanthus* and *E. tauvina* were the dominant species (Anon. 1989).

In Lakshadweep (=Laccadives), there is no commercial fishery for groupers and snappers except on a sustenance basis. Of the several species occurring there (Jones and Kumaran 1980), *Cephalopholis argus, Aethaloperca rogaa, Lutjanus gibbus, L. kasmira, L. russelli* and *L. bohar* are common in the reef flats of the different islands (Kumaran et al. 1989). From 1975 to 1984 an average annual catch of 230 t of perches

were landed (Alagaraja 1987) in which groupers and snappers were dominant.

From the Andaman Islands, an estimated average of 330 t•year^{-1} of perches were landed in 1975-1984, forming 13% of total landings (Alagaraja 1987), with *Lutjanus kasmira* as the dominant species.

Mariculture

The earliest attempts at culturing groupers (*E. tauvina* and *E. malabaricus*), along with seabass and snappers, occurred in Malaysia, Thailand, Singapore and Hongkong in the 1970s (Teng et al. 1977; Teng and Chua 1978; Chua and Teng 1978, 1979, 1980). In the Philippines, six species of groupers, *E. malabaricus, E. tauvina, E. sexfasciatus* and *E. bleekeri* are farmed (Kohno et al. 1988). *E. suillus* and *E. amblycephalus* are farmed in Taiwan, *E. akaara* in HongKong and Japan, and *E. tauvina* in Malaysia, Indonesia, Thailand, Kuwait and India (Ukawa et al. 1966; Moe 1969; Hussain et al. 1975; Lanjumin 1982; Rahim 1982; Ameer Hamsa and Mohamad Kasim 1992).

Snappers such as *Lutjanus johnii, L. russelli,* and *L. sebae* are farmed in floating netcages in Singapore, Malaysia, Thailand and the Philippines, (Lee 1982; Rahim 1982; Tanomkiat 1982; Anon. 1979).

In India, farming of groupers is in the initial stage of development and entirely supported by the supply of seeds collected from the natural habitat, due to the absence of technology for the mass production of seeds by induced breeding (Bensam 1993). Hence, projects on culture and seed production for these two species of groupers should be taken up on priority basis for implementation in India, as is already the case in Southeast Asia. With the growing interest in aquaculture, the need for seed is increasing. Seeds available from natural sources are usually seasonal, unreliable and not sufficient to meet the demand.

Experiments were carried out by the Central Marine Fisheries Research Institute at Mandapam (Palk Bay) to investigate the possibilities of culturing some economically important marine fishes in fixed netcages made of palmyrah leaf stalks in coastal waters (Ameer Hamsa 1982). *Epinephelus tauvina, E. hexagonatus* along with rabbit fishes (*Siganus canaliculatus* and *S. javus*), and sand whiting (*Sillago sihama*) were cultured in cages (James et al. 1985b). The mean monthly growth was 0.85 cm•3.1 g^{-1} and 0.56-0.62 cm•2-3.05 g^{-1} for *E. tauvina*. Other growth and production estimates for the grouper *E. tauvina* cultured in fixed netcages in Mandapam (Gulf of Mannar) coastal waters are reported by Ameer Hamsa and Mohamad Kasim (1992).

Discussion

The above review shows that the distribution and abundance in space and time of Indian groupers and snappers are generally understood. Rough and untrawlable grounds rich in these resources exist, particularly along the northwest coast, southwest coast (particularly off Kerala), Wadge Bank and in the Gulf of Mannar. Where trawling is possible, groupers and snappers are exploited mainly as a bycatch. Groupers and snappers are abundant, as is clear from the results of different surveys, in rocky and coralline areas beyond 50 m depth and down to 360 m depth in certain areas presently not exploited by commercial fleets. The landing figures show that about 8 000 t only are landed annually whereas on Wadge Bank alone, the standing stock of groupers and snappers along with other perches was estimated to be around 9 400 t (Joseph et al. 1987). Joseph and John (1987) and James et al. (1987) suggested that serranids and lutjanids offer a large scope for increased exploitation along both coasts of India, particularly along the southwest

coast and on Wadge Bank. Fishing by handlines (Silas 1969; Oomen 1989) could yield considerably larger catches. Also, Menon et al. (1977) and Oomen (1989) showed that the rocky and rough grounds off the southwest coast could yield considerable catches of groupers and snappers if exploited using traps. Thus, increase in production of these fishes could be achieved by introducing fish traps and intensifying fishing with hook-and-line in the 75-100 m depth zone off southwest coast, at depths of 35-65 m in the Gulf of Mannar and in the northeast region of the Wadge Bank, and at depths of 91-125 m along the northwest coast where groupers and snappers are known to be abundant.

Planned exploratory fishing programs with *FORV Sagar Sampada* in addition to the exploratory fishing vessels of FSI, INP, IFP and CIFNET, will enable further mapping of the distribution of demersal fish stocks. Moreover, there is an urgent need to utilize the present knowledge on the distribution of the various demersal fishery resources on the continental shelf for simulated commercial fishing operations on these stocks. Such operations will demonstrate the economic feasibility of fishing operations and provide enough data for private entrepreneurs to initiate fishing ventures. The immediate objective is to increase the production of perches, especially groupers and snappers, by tapping the underexploited fraction of conventional fish resources at depths of up to 100 m by adopting diversified fishing methods instead of continuing trawling in shallow inshore waters. Since most of the marine fishing gear capture a multiplicity of fish species which have different growth, mortality and recruitment schedules, management of the fisheries is difficult. Thus, to solve this problem, new approaches for modelling the dynamics of resource species in a multispecies context should be developed. This will require intensifying studies on the growth, food and feeding habits, reproduction and other aspects of the biology of snappers and groupers. Also, in view of the existence of large numbers of species in these two groups and lack of adequate knowledge on the population differences among them, concerted efforts should be made to improve our knowledge of the taxonomy of Indian groupers and snappers.

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Appendix I

FishBase checklist of family Serranidae in India based mainly on Heemstra and Randall (1993). [*Lista revisada de FishBase para la familia Serranidae de la India, basada principalmente en Heemstra y Randall (1993).*]

Perciformes (perch-like) Serranidae	Sea basses, groupers and fairy basslets
Aethaloperca rogaa (Forsskål 1775)	Redmouth grouper, (Fr M) Max. 60 cm TL; SW
Cephalopholis rogaa	(Forsskål 1775) new combination
Aethaloperca rogaa	(Forsskål 1775) new combination
Perca lunaris	Forsskål 1775 junior synonym
Perca rogaa	Forsskål 1775 original combination
Anyperodon leucogrammicus (Valenciennes 1828)	Slender grouper, (Fr M) Max. 52 cm TL.
Serranus leucogrammicus	Valenciennes 1828 original combination
Serranus micronotatus	Ruppell 1838 junior synonym
Serranus urophthalmus	Bleeker 1855 junior synonym
Anyperodon leucogrammicus	(Valenciennes 1828) new combination
Cephalopholis argus Bloch & Schneider 1801	Peacock hind, Balufana, (Fr M Dan) Max. 55 cm TL. Museum: SMF 16354; SW
Serranus immunerur	Thiollière 1856 questionable
Serranus thyrsites	Saville-Kent 1893 other
Cephalopholis argus	Bloch & Schneider 1801 original combination
Serranus myriaster	Valenciennes 1828 junior synonym
Bodianus jacobevertsen	Lacepède 1802 junior synonym
Bodianus guttatus	Bloch 1790 junior synonym
Cephalopholis boenak (Bloch 1790)	Chocolate hind, (Fr M), Ref. 5222 Max. 26 cm TL. Also Ref: 4787. Museum: BPBM 27657; SMF 16351 (Nicobar).
Serranus stigmapomus	Richardson 1846 junior synonym
Serranus boenak	(Bloch 1790) new combination
Serranus nigrofasciatus	Hombron and Jacquinot 1853 junior synonym
Cephalopholis boenacki	(Bloch 1790) misspelling
Serranus boelang	Valenciennes 1828 questionable
Cephalopholis pachycentron	Valenciennes 1828 junior synonym
Bodianus boenak	Bloch 1790 original combination
Cephalopholis boenak	(Bloch 1790) new combination
Serranus pachycentron	Valenciennes 1828 junior synonym
Cephalopholis boenack	(Bloch 1790) misspelling
Cephalopholis formosa (Shaw & Nodder 1812)	Bluelined hind, Bontoo, (Fr M) Max. 34 cm TL. Also Ref: 4787. Museum: ZMB 163; BMNH 1888.11.6.2.4; AMS B.8215; MNHN 7423, 7424; BPBM 27656; NMW 39881.
Sciaena formosa	Shaw and Nodder 1812 original combination
Cephalopholis formosa	(Shaw & Nodder 1812) new combination
Cephalopholis leopardus (Lacepède 1801)	Leopard hind, (Fr M) Max. 20 cm TL.
Labrus leopardus	Lacepède 1801 original combination
Serranus spilurus	Valenciennes 1833 junior synonym
Serranus homfrayi	Day 1870 junior synonym
Epinephelus urodelops	Schultz 1943 junior synonym
Cephalopholis leopardus	(Lacepède 1801) new combination

(continued)

Appendix I (continued)

Perciformes (perch-like) Serranidae	Sea basses, groupers and fairy basslets
Cephalopholis miniata (Forsskål 1775)	Coral hind, (Fr M) Max. 40 cm TL. Museum: SMF 16353 (Nicobar Is.). Also Ref: 5222.
Serranus cyanostigmatoides	Bleeker 1849 junior synonym
Cephalopholis cyanostigma	(non Valenciennes 1828) misidentification
Cephalopholis miniatus	(Forsskål 1775) misspelling
Cephalopholis boninius	Jordan and Thompson 1914 junior synonym
Cephalopholis formosanus	Tanaka 1911 junior synonym
Serranus perguttatus	De Vis 1884 questionable
Cephalopholis miniata	(Forsskål 1775) new combination
Pomacentrus burdi	Lacepède 1802 junior synonym
Perca miniata	Forsskål 1775 original combination
Cephalopholis maculatus	Seale and Bean 1907 junior synonym
Cephalopholis sonnerati (Valenciennes 1828)	Tomato hind, Bontoo, (Fr M) Max. 57 cm TL. Museum: BPBM 20590; MNHN A.5774, A.7686 (paralectotypes of *S. sonnerati* Valenciennes), A.7671 (lectotype); NMW 40813; SMF 22343; SU 41923.
Cephalopholis purpureus	Fourmanoir 1966 junior synonym
Serranus zananella	Valenciennes 1828 junior synonym
Epinephelus janthinopterus	Bleeker 1874 junior synonym
Serranus unicolor	Liénard 1875 junior synonym
Cephalopholis formosanus	(non Tanaka 1911) misidentification
Cephalopholis sonnerati	(Valenciennes 1828) new combination
Serranus sonnerati	Valenciennes 1828 original combination
Cephalopholis aurantius	(non Valenciennes 1828) misidentification
Cromileptes altivelis (Valenciennes 1828)	Humpback grouper, (Fr M) Max. 70 cm TL.
Serranus altivelis	Valenciennes 1828 original combination
Chromileptes altivelis	(Valenciennes 1828) misspelling
Cromileptis altivelis	(Valenciennes 1828) misspelling
Cromileptes altivelis	(Valenciennes 1828) new combination
Epinephelus areolatus (Forsskål 1775)	Areolate grouper, Hontu, (Fr M), Max. 50 cm SL. NW; SW; SE
Epinephelus craspedurus	Jordan & Richardson 1910 junior synonym
Serranus waandersii	Bleeker 1858 junior synonym
Perca areolata	Forsskål 1775 original combination
Epinephelus chlorostigma	(non Valenciennes 1828) misidentification
Bodianus melanurus	Geoffroy St. Hilaire 1809 junior synonym
Serranus angularis	Valenciennes 1828 junior synonym
Serranus celebicus	Bleeker 1851 junior synonym
Serranus glaucus	Day 1870 junior synonym
Epinephelus areolatus	(Forsskål 1775) new combination
Epinephelus angularis	(Valenciennes 1828) junior synonym
Epinephelus bleekeri (Vaillant 1877)	Duskytail grouper, (Fr M) Max. 76 cm TL. Museum: BMNH 1888.12.30.4; NMW 39248; BPBM 23749, 27479; RUSI 16297; SW
Serranus variolosus	(non Valenciennes 1828) misidentification

(continued)

Appendix I (continued)

Perciformes (perch-like) Serranidae	Sea basses, groupers and fairy basslets
Serranus bleekeri	Vaillant 1877 original combination
Serranus coromandelicus	Day 1878 junior synonym
Epinephelus albimaculatus	Seale 1909 junior synonym
Epinephelus bleekeri	(Vaillant 1877) new combination
Epinephelus dayi	(non Bleeker 1873) misidentification
Epinephelus caeruleopunctatus (Bloch 1790)	Whitespotted grouper, (Fr M) Max. 76 cm TL.Museum: SMF uncat. (Nicobar Islands); MNHN 7650 (Holotype of *S. dermochirus*,Valenciennes); FMNH 98053.
Holocentrus caeruleo-punctatus	Bloch 1790 original combination
Serranus alboguttatus	Valenciennes 1828 junior synonym
Serranus flavoguttatus	Peters 1855 junior synonym
Serranus dermochirus	Valenciennes 1830 junior synonym
Serranus hoevenii	Bleeker 1849 junior synonym
Epinephelus hoevenii	(Bleeker 1849) junior synonym
Serranus kunhardtii	Bleeker 1851 junior synonym
Epinephelus caeruleopunctatus	(Bloch 1790) new combination
Epinephelus chabaudi (Castelnau 1861)	Moustache grouper, (Fr M) Max. 137 cm TL.
Epinephelus chabaudi	(Castelnau 1861) new combination
Serranus chabaudi	Castelnau 1861 original combination
Epinephelus modestus	Gilchrist & Thompson 1909 junior synonym
Epinephelus clarkei	Smith 1958 junior synonym
Epinephelus chlorostigma (Valenciennes 1828)	Brownspotted grouper, (Fr M) Max. 75 cm TL. Lakshadweep Islands and Nicobar Islands; SW; SE
Epinephelus chlorostigma	(Valenciennes 1828) new combination
Serranus assabensis	Giglioli 1888 junior synonym
Serranus chlorostigma	Valenciennes 1828 original combination
Serranus tauvina	(non Forsskål 1775) misidentification
Serranus areolatus japonicus	Temminck and Schlegel 1842 junior synonym
Serranus reevesii	Richardson 1846 junior synonym
Serranus geoffroyi	Klunzinger 1870 junior synonym
Serranus celebicus var. *multipunctatus*	Kossman and Räuber 1877 questionable
Serranus geoffroyi	(Klunzinger 1870) junior synonym
Epinephelus coioides (Hamilton 1822)	Orange-spotted grouper, (Fr Br M) Max. 100 cm SL. Museum: MNHN 7289, 7288, A.7710; NMW 40924, 39457, 40923; RUSI 11413, 11407-8, 11410, 11379,26040; BPBM 27509, 30596,20591; SU 41928; ZMB 191. Nicobar Islands, SMF 16349.
Homalogrystes guntheri	Alleyne & Macleay 1877 junior synonym
Serranus suillus	Valenciennes 1828 junior synonym
Bola coioides	Hamilton 1822 original combination
Epinephelus tauvina	(non Forrskål 1775) misidentification
Epinephelus malabaricus	(non Bloch & Schneider 1801) misidentification
Epinephelus suillus	(Valenciennes 1828) junior synonym
Epinephelus coioides	(Hamilton 1822) new combination
Serranus nebulosus	Valenciennes 1828 junior synonym
Serranus waandersi	(non Bleeker 1858) misidentification

(continued)

Appendix 1 (continued)

Perciformes (perch-like) Serranidae	Sea basses, groupers and fairy basslets
Epinephelus diacanthus (Valenciennes 1828)	Spinycheek grouper, Hekaru, (Fr M) Max. 52 cm TL. Museum: SMF 605; CAS 29595; RUSI 11414, 11406; ANSP 145517, 145522, 145544; MNHN 7157, 7158, 1989-1018, 1981-1118; BPBM 27494, 27537; CMFRI uncat; SW; SE
Epinephelus diacanthus	(Valenciennes 1828) new combination
Epinephelus dayi	Bleeker 1873 misidentification
Serranus diacanthus	Valenciennes 1828 original combination
Serranus sexfasciatus	(non Valenciennes 1828) misidentification
Epinephelus epistictus (Temminck & Schlegel 1842)	Dotted grouper, (Fr M) Max. 80 cm TL. Museum: Kerala, Cochin, BPBM 27483; SW
Epinephelus heniochus	(non Fowler 1904) misidentification
Epinephelus stigmogrammacus	Cheng & Yang 1983 junior synonym
Epinephelus epistictus	(Temminck & Schlegel 1842) new combination
Epinephelus praeopercularis	(Boulenger 1887) junior synonym
Epinephelus sp.	(not applicable) misidentification
Serranus praeopercularis	Boulenger 1887 junior synonym
Serranus epistictus	Temminck & Schlegel 1842 original combination
Epinephelus magniscuttis	(non Postel, Fourmanoir & Guézé 1963) misidentification
Epinephelus erythrurus (Valenciennes 1828)	Cloudy grouper, (Fr Br M) Max. 43 cm TL.Museum: Gulf of Kutch, N side of Okha Pt., ANSP 159277. Dwarka, BMNH 1912.5.2.11. Bombay, BPBM 31301. Malabar, MNHN 7545 (Holotype of *S. erythrurus*). Travancore, BMNH 1912.7.20.14.
Serranus erythrurus	Valenciennes 1828 original combination
Epinephelus townsendi	Boulenger 1898 junior synonym
Epinephelus erythrurus	(Valenciennes 1828) new combination
Epinephelus fasciatus (Forsskål 1775)	Blacktip grouper, Teda, (Fr M) Max. 40 cm TL. Museum: Tuticorin, BPBM 20669. Also occurs in Lakshadweep Islands; NW
Serranus geometricus	De Vis 1885 junior synonym
Serranus cruentus	De Vis 1884 junior synonym
Epinephalus alexandrinus	(Valenciennes 1828) misspelling
Epinephelus alexandrinus	(Valenciennes 1828) junior synonym
Epinephelus fasciatus	(Forsskål 1775) new combination
Epinephelus spiramen	Whitley 1945 junior synonym
Epinephelus zapyrus	Seale 1906 junior synonym
Serranus subfasciatus	De Vis 1885 junior synonym
Perca fasciata	Forsskål 1775 original combination
Cerna alexandrina	(Valenciennes 1828) junior synonym
Holocentrus marginatus	Lacepède 1802 other
Epinephelus marginalis	Bloch 1793 junior synonym
Epinephelus goreensis	(non Valenciennes 1830) misidentification
Plectropoma fasciata	(Forsskål 1775) new combination
Perca maculata	Forster 1844 junior synonym
Epinephelus zaslavskii	Poll 1949 junior synonym
Holocentrus forskael	Lacepède 1802 other

(continued)

Appendix I (continued)

Perciformes (perch-like) Serranidae	Sea basses, groupers and fairy basslets
Cerna chrysotaenia	(non Doderlein 1882) misidentification
Holocentrus rosmarus	Lacepède 1802 junior synonym
Holocentrus oceanicus	Lacepède 1802 junior synonym
Serranus alexandrinus	Valenciennes 1828 junior synonym
Epinephelus emoryi	Schultz 1953 junior synonym
Serranus variolosus	Valenciennes 1828 junior synonym
Serranus tsirimen-ara	Temminck and Schlegel 1842 junior synonym
Holocentrus erythraeus	Bloch and Schneider 1801 junior synonym
Epinephelus faveatus (Valenciennes 1828)	Barred-chest grouper, (Fr M) Max. 32 cm TL. Museum: Kerala, Trivandrum, Travancore, BMNH 1912.7.20.11-13. Kovalam, BPBM 27633, 30641; MNHN 1981-1185. Vizhinjam CMFRI uncat. Tuticorin, BPBM 20593; RUSI 11381. Mandapam, RUSI 11383. Madras, BMNH 1888.11.6.1.
Serranus faveatus	Valenciennes 1828 original combination
Serranus bontoo	Valenciennes 1828 junior synonym
Epinephelus quoyanus	(non Valenciennes 1830) misidentification
Epinephelus faveatus	(Valenciennes 1828) new combination
Epinephelus flavocaeruleus (Lacepède 1802)	Blue and yellow grouper, (Fr M) Max. 80 cm TL. Lakshadweep Islands and the Andaman Islands. Museum: Madras?, BMNH 1803.11.26.14.
Holocentrus gymnosus	Lacepède 1802 junior synonym
Bodianus macrocephalus	Lacepède 1802 junior synonym
Serranus borbonicus	Quoy and Gaimard 1824 junior synonym
Perca flava-purpurea	Bennett 1830 junior synonym
Cynichthys flava-purpuratus	Swainson 1839 other
Epinephelus flavocoeruleus	(Lacepède 1803) misspelling
Epinephelus flavocaeruleus	(Lacepède 1802) new combination
Holocentrus flavo-caeruleus	Lacepède 1802 original combination
Epinephelus fuscoguttatus (Forsskål 1775)	Brown-marbled grouper, (Fr M Dan) Max. 120 cm . Lakshadweep (Laccadive Islands).
Epinephelus fuscoguttatus	(Forsskål 1775) new combination
Serranus taeniocheirus	Valenciennes 1830 junior synonym
Perca summana var. *fusco-guttata*	Forsskål 1775 original combination
Serranus horridus	Valenciennes 1828 junior synonym
Serranus lutra	Valenciennes 1831 junior synonym
Epinephelus lanceolatus (Bloch 1790)	Giant grouper, (Fr Br M Dan) Max. 270 cm Museum: Vishakhapatnam, SU 41935; NW; SE
Holocentrus lanceolatus	Bloch 1790 original combination
Serranus geographicus	Valenciennes 1828 junior synonym
Serranus phaeostigmaeus	Fowler 1907 junior synonym
Promicrops lanceolatus	(Bloch 1790) new combination
Stereolepoides thompsoni	Fowler 1923 junior synonym
Batrachus gigas	Gunther 1869 junior synonym
Oligorus terrae-reginae	Ramsay 1880 junior synonym
Oligorus goliath	De Vis 1883 junior synonym

(continued)

pendix I (continued)

Perciformes (perch-like) Serranidae	Sea basses, groupers and fairy basslets
Serranus abdominalis	Peters 1855 junior synonym
Epinephelus lanceolatus	(Bloch 1790) new combination
Epinephelus latifasciatus	Striped grouper, (Fr M)
(Temminck & Schlegel 1842)	Max. 137 cm SL. Museum: NW of Bombay, CMFRI uncat. Quilon, CMFRI uncat. Cochin, BPBM 27566, 27585; RUSI 11380. SW of Cochin, RUSI 11411. Madras, ANSP 100153; BPBM 20515; NW
Priacanthichthys maderaspatensis	Day 1868 junior synonym
Epinephelus latifasciatus	(Temminck & Schlegel 1842) new combination
Serranus grammicus	Day 1867 junior synonym
Serranus latifasciatus	Temminck and Schlegel 1842 original combination
Epinephelus longispinis	Longspine grouper, (Fr M)
(Kner 1864)	Max. 55 cm. Museum: Kerala, Kovalam, BPBM 27682. Tuticorin, BPBM 20569. In Lakshadweep Islands and Nicobars; SE
Epinephelus gaimardi	(non Valenciennes 1830) misidentification
Epinephelus fario	(Thunberg 1793) other
Epinephelus maculatus	(non Bloch 1790) misidentification
Epinephelus longispinis	(Kner 1864) new combination
Serranus longispinis	Kner 1864 original combination
Epinephelus macrospilos	Snubnose grouper, (Fr M)
(Bleeker 1855)	Max. 51 cm TL.Museum: Nicobar Is., SMF 20433.
Serranus cylindricus	Gunther 1859 junior synonym
Epinephelus macrospilos	(Bleeker 1855) new combination
Epinephelus quoyanus	(non Valenciennes 1830) misidentification
Epinephelus faveatus	(non Valenciennes 1828) misidentification
Epinephelus macrospilus	(Bleeker 1855) misspelling
Serranus macrospilos	Bleeker 1855 original combination
Epinephelus megachir	(non Richardson 1846) misidentification
Epinephelus malabaricus	Malabar grouper, (Fr Br M)
(Bloch & Schneider 1801)	Max. 234 cm. Museum: BPBM 27497, 27993, 20592; CMFRI 143, 173; RUSI 11382; MNHN 743 (Holotype of *S. semipunctatus*); NW; SE
Serranus salmonoides	Valenciennes 1828 other
Serranus crapao	Cuvier 1829 junior synonym
Epinephelus salmonoides	(Lacepède 1802) junior synonym
Epinephelus malabaricus	(Bloch & Schneider 1801) new combination
Epinephelus tauvina	(non Forsskål 1775) misidentification
Holocentrus salmoïdes	Lacepède 1802 junior synonym
Serranus polypodophilus	Bleeker 1849 junior synonym
Serranus semi-punctatus	Valenciennes 1828 junior synonym
Holocentrus malabaricus	Schneider 1801 original combination
Epinephelus abdominalis	(non Peters 1855) misidentification
Epinephelus salmoides	(Lacepède 1802) junior synonym
Epinephelus cylindricus	Postel 1965 junior synonym
Serranus estuarius	Macleay 1884 questionable
Epinephelus salmoides	(Lacepède 1802) junior synonym

(continued)

Appendix I (continued)

Perciformes (perch-like) Serranidae	Sea basses, groupers and fairy basslets
Epinephelus morrhua (Valenciennes 1833)	Comet grouper, (Fr M Dan) Max. 90 cm TL. In Lakshadweep Islands.
Epinephelus morrhua	(Valenciennes 1833) new combination; SW
Epinephelus poecilonotus	(non Temminck & Schlegel 1842) misidentification
Serranus morrhua	Valenciennces 1833 original combination
Epinephelus cometae	Tanaka 1927 junior synonym
Epinephelus octofasciatus Griffin 1926	Eightbar grouper, (Fr M), Max. 130 cm TL. Lakshadweep (Laccadive) Is.
Epinephelus compressus	Postel, Fourmanoir, & Guézé 1963 junior synonym
Epinephelus octofasciatus	Griffin 1926 original combination
Epinephelus mystacinus	(non Poey 1852) misidentification
Epinephelus septemfasciatus	(non Thunberg 1793) misidentification
Epinephelus poecilonotus (Temminck & Schlegel 1842)	Dot-dash grouper, (Fr M), Max. 65 cm . Museum: Madras, AMS B.5342. Also found in Lakshadweep Islands.
Serranus poëcilonotus	Temminck & Schlegel 1842 original combination
Epinephelus morrhua	(non Valenciennes 1833) misidentification
Epinephelus poecilonotus	(Temminck & Schlegel 1842) new combination
Epinephelus polylepis Randall & Heemstra 1991	Smallscaled grouper, (Fr M)
Epinephelus chlorostigma	(non Valenciennes 1895) misidentification
Epinephelus sp.	Not applicable misidentification
Epinephelus polylepis	Randall & Heemstra 1991 original combination
Epinephelus polyphekadion (Bleeker 1849)	Camouflage grouper, (Fr M Dan) Max. 90 cm SL. Museum: Mandapam, Kulak Karai, RUSI 16296.
Serranus polyphekadion	Bleeker 1849 original combination
Epinephelus polyphekadion	(Bleeker 1849) new combination
Epinephelus microdon	(Bleeker 1856) junior synonym
Epinephelus goldmani	(Bleeker 1855) junior synonym
Serranus dispar var. b	Playfair 1867 junior synonym
Serranus microdon	Bleeker 1856 junior synonym
Serranus goldmanni	Bleeker 1855 junior synonym
Epinephelus radiatus (Day 1867)	Oblique-banded grouper, (Fr M) Max. 70 cm SL. Museum: Vishakhapatnam, USNM 272429.
Epinephelus radiatus	(Day 1867) new combination
Serranus radiatus	Day 1867 original combination
Serranus morrhua	(non Valenciennes 1833) misidentification
Serranus brunneus	(non Bloch 1793) misidentification
Epinephelus doderleinii	Franz 1910 junior synonym
Epinephelus morrhua	(non Valenciennes 1833) misidentification
Epinephelus spilotoceps Schultz 1953	Foursaddle grouper, (Fr M) Max. 25 cm SL. Found in Lakshadweep (Laccadive) Islands.
Epinephelus spilotoceps	Schultz 1953 original combination
Epinephelus salonotus	Smith and Smith 1963 junior synonym

(continued)

Appendix I (continued)

Perciformes (perch-like) Serranidae	Sea basses, groupers and fairy basslets
Epinephelus tauvina (Forsskål 1775)	Greasy grouper, (Fr M) Max. 75 cm TL. Museum: Lakshadweep (Laccadive Is.), Minicoy and Kilta, CMFRI-LA-F 115/117; SW; SE
Serranus goldiei	Macleay 1883 junior synonym
Serranus jansenii	Bleeker 1857 questionable
Holocentrus pantherinus	Lacepède 1801 junior synonym
Perca tauvina	Forsskål 1775 original combination
Epinephelus elongatus	Schultz 1953 junior synonym
Epinephelus chewa	Morgans 1966 junior synonym
Epinephelus tauvina	(Forsskål 1775) new combination
Epinephelus salmoides	(non Lacepède 1802) misidentification
Epinephelus tukula Morgans 1959	Potato grouper, (Fr Br M) Max. 200 cm . Museum: Kerala, Kovalam, BPBM 27634.
Epinephelus tukula	Morgans 1959 original combination
Epinephelus fuscoguttatus	(non Forsskål 1775) misidentification
Serranus fuscoguttatus	(non Forsskål 1775) misidentification
Serranus dispar var. A	Playfair & Gunther 1867 junior synonym
Epinephelus undulosus (Quoy & Gaimard 1824)	Wavy-lined grouper, Heraku, (Fr M Fi) Max. 73 cm TL. Museum: Vizhinjam, BPBM 27702. Tuticorin, BPBM 20570. CMFRI 97; RUSI 11412. Pondicherry, MNHN 7544 (Syntype of *S. lineatus*). Madras, BMNH 1889.2.1.4226 (Paratype of *S. coromandelicus*); NMW 40392; SE
Bodianus undulosus	Quoy and Gaimard 1824 original combination
Serranus lineatus	Valenciennes 1828 junior synonym
Serranus amboinensis	Bleeker 1852 junior synonym
Epinephelus undulosus	(Quoy & Gaimard 1824) new combination
Variola louti (Forsskål 1775)	Yellow-edged lyretail, (Fr M Dan) Max. 81 cm TL.
Serranus luti	Valenciennes 1828 other
Variola longipinna	Swainson 1839 junior synonym
Serranus longipinna	Swainson 1839 junior synonym
Variola louti	(Forsskål 1775) new combination
Variola melanotaenia	Bleeker 1857 junior synonym
Serranus roseus	Valenciennes 1828 junior synonym
Serranus flavimarginatus	Rüppell 1830 junior synonym
Labrus punctulatus	Lacepède 1801 junior synonym
Perca louti	Forsskål 1775 original combination
Serranus phaenistomus	Swainson 1839 junior synonym
Serranus cernipedis	Miranda-Ribeiro 1915 questionable

M = marine; Br = brackish; Fr = freshwater; Fi = fishery; Aq = aquaculture; Or = ornamental; Sp = sport; Bait = used as bait; Dan = dangerous to human; Thr = threatened; En = endemic; In = introduced and still present; Ex = extirpated; Mi = misidentified; Pr = protected; Rest = restricted; NW = occuring on northwest coast of India; SW = occuring on Southwest coast of India (including Laccadives); SE = occuring on southeast coast of India. M, Br, Fr, Dan, and Thr refer to the species in general.

Museum: .... refers to museum specimens collected in this country.

Note: This list of species was assembled from country records for species entered in FishBase as of 18 June 1996. The scientific name is followed by the international FishBase name and, if available, a common name used in the country. Not all extant species of fishes are included in this version of FishBase, nor have all species been assigned to the countries in which they occur. Thus, this list is likely to be incomplete. Conversely, this list may include fish that are very rare or extinct, or reported only once from a given country. Please check FishBase 96 or subsequent versions under the name of the species in question for additional information.

Appendix II

FishBase checklist of family Lutjanidae in India based mainly on Allen (1985). [*Lista revisada de FishBase para la familia Lutjanidae de la India, basada principalmente en Allen (1985).*]

Perciformes (perch-like) Lutjanidae	Snappers
Aphareus furca	Small toothed jobfish, (Fr M)
(Lacepède 1801)	Max. 40 cm SL.
Aphareus flavivultus	Jenkins 1901 junior synonym
Caranxomorus sacrestinus	Lacepède 1803 junior synonym
Labrus furca	Lacepède 1801 original combination
Aphareus furcatus	(Lacepède 1801) misspelling
Aphareus furca	(Lacepède 1801) new combination
Aphareus caerulescens	Cuvier 1830 junior synonym
Aphareus rutilans	Rusty jobfish, (Fr M)
Cuvier 1830	Max. 80 cm SL.
Aphareus thompsoni	Fowler 1923 junior synonym
Aphareus rutilans	Cuvier 1830 original combination
Aprion virescens	Green jobfish, (Fr M Dan)
Valenciennes 1830	Max. 80 cm SL; SE
Aprion konekonis	Tanaka 1914 junior synonym
Mesoprion microchir	Bleeker 1853 junior synonym
Sparopsis elongatus	Kner 1868 junior synonym
Sparopsis latifrons	Kner 1868 junior synonym
Aprion virescens	Valenciennes 1830 original combination
Etelis carbunculus	Ruby snapper, (Fr M)
Cuvier 1828	Max. 127 cm FL.
Etelis coruscans	(non Valenciennes 1862) misidentification
Etelis carbunculus	Cuvier 1828 original combination
Eteliscus marshi	Jenkins 1903 junior synonym
Etelis evurus	(non Jordan & Evermann 1903) misidentification
Etelis coruscans	Flame snapper, (Fr M)
Valenciennes 1862	Max. 85 cm SL.
Etelis carbunculus	(non Cuvier 1828) misidentification
Etelis coruscans	Valenciennes 1862 original combination
Etelis evurus	Jordan & Evermann 1903 junior synonym
Etelis radiosus	Scarlet snapper, (Fr M)
Anderson 1981	Max. 80 cm SL.
Etelis radiosus	Anderson 1981 original combination
Lipocheilus carnolabrum	Tang's snapper, (Fr M)
(Chan 1970)	Max. 50 cm SL.
Tangia carnolabrum	Chan 1970 original combination
Lipocheilus carnolabrum	(Chan 1970) new combination
Lutjanus argentimaculatus	Mangrove red snapper, Banda, (Fr Br M)
(Forsskål 1775)	Max. 150 cm TL; NW; SE
Mesoprion roseigaster	Macleay 1881 junior synonym
Mesoprion sexfasciatus	Macleay 1883 junior synonym
Mesoprion taeniops	Valenciennes 1830 junior synonym
Sciaena argentata	Gmelin 1789 junior synonym

(continued)

Appendix II (continued)

Perciformes (perch-like) Lutjanidae	Snappers
Lutjanus argentimaculatus	(Forsskål 1775) new combination
Lutianus johngarah	Day 1875 junior synonym
Mesoprion olivaceus	Cuvier 1828 junior synonym
Sciaena argentimaculata	Forsskål 1775 original combination
Mesoprion griseoides	Guichenot 1862 junior synonym
Mesoprion garretti	Günther 1873 junior synonym
Alphestes gembra	Schneider 1801 junior synonym
Lutianus salmonoides	Gilchrist & Thompson 1908 junior synonym
Mesoprion flavipinnis	Cuvier 1828 junior synonym
Diacope superbus	Castelnau 1878 junior synonym
Mesoprion obscurus	Macleay 1881 junior synonym
Lutjanus bengalensis	Bengal snapper, (Fr M)
(Bloch 1790)	Max. 30 cm TL.
Holocentrus bengalensis	Bloch 1790 original combination
Lutjanus bengalensis	(Bloch 1790) new combination
Mesoprion pomacanthus	Bleeker 1855 junior synonym
Diacope octovittata	Valenciennes 1830 junior synonym
Diacope octolineata	Cuvier 1828 junior synonym
Lutjanus biguttatus	Two-spot banded snapper, (Fr M)
(Valenciennes 1830)	Max. 20 cm TL.
Mesoprion elongatus	Hombron & Jacquinot 1853 junior synonym
Serranus biguttatus	Valenciennes 1830 original combination
Lutjanus biguttatus	(Valenciennes 1830) new combination
Mesoprion bleekeri	Günther 1859 junior synonym
Lutjanus bohar	Two-spot red snapper, (Fr M Dan)
(Forsskål 1775)	Max. 75 cm TL; SW
Sparus lepisurus	Lacepède 1802 junior synonym
Mesoprion rubens	Macleay 1882 junior synonym
Lutjanus bohar	(Forsskål 1775) new combination
Sciaena bohar	Forsskål 1775 original combination
Lutjanus coatesi	Whitley 1934 junior synonym
Diacope labuan	Thiollière 1856 junior synonym
Lutianus nukuhivae	Seale 1906 junior synonym
Mesoprion rangus	Cuvier 1828 junior synonym
Diacope quadriguttata	Cuvier 1828 junior synonym
Lutjanus rangus	(Cuvier 1828) junior synonym
Lutjanus carponotatus	Spanish flag snapper, (Fr M)
(Richardson 1842)	Max. 40 cm TL.
Lutjanus chrysotaenia	(Bleeker 1851) junior synonym
Mesoprion carponotatus	Richardson 1842 original combination
Mesoprion naborer	Thiollère 1856 junior synonym
Mesoprion chrysotaenia	Bleeker 1851 junior synonym
Lutjanus carponotatus	(Richardson 1842) new combination
Lutjanus decussatus	Checkered snapper, (Fr M)
(Cuvier 1828)	Max. 30 cm TL.
Mesoprion therapon	Day 1869 junior synonym
Mesoprion decussatus	Cuvier 1828 original combination
Lutjanus decussatus	(Cuvier 1828) new combination

(continued)

Appendix II (continued)

Perciformes (perch-like) Lutjanidae	Snappers
Lutjanus ehrenbergii	Blackspot snapper, (Fr M)
(Peters 1869)	Max. 35 cm TL.
Lutianus ehrenbergii	Peters 1869 original combination
Lutjanus ehrenbergii	(Peters 1869) new combination
Lutjanus oligolepis	Bleeker 1873 junior synonym
Lutjanus erythropterus	Crimson snapper, (Fr M)
Bloch 1790	Max. 60 cm TL.
Lutjanus altifrontalis	Chan 1970 junior synonym
Lutjanus longmani	Whitley 1937 junior synonym
Mesoprion annularis	Cuvier 1828 junior synonym
Mesoprion chirtah	Cuvier 1828 junior synonym
Mesoprion rubellus	Cuvier 1828 junior synonym
Lutjanus malabaricus	(non Schneider) misidentification
Lutjanus annularis	(Cuvier 1828) junior synonym
Lutjanus erythropterus	Bloch 1790 original combination
Genyoroge macleayana	Ramsay 1883 junior synonym
Lutjanus fulviflamma	Blackspot snapper, (Fr M)
(Forsskål 1775)	Max. 35 cm TL.
Mesoprion aureovittatus	Macleay 1879 junior synonym
Lutjanus fulviflammus	(Forsskål 1775) misspelling
Sciaena fulviflamma	Forsskål 1775 original combination
Lutjanus fulviflamma	(Forsskål 1775) new combination
Lutjanus unimaculatus	Quoy & Gaimard 1824 junior synonym
Centropomus hober	Lacepède 1802 junior synonym
Mesoprion terubuan	Thiollière 1856 junior synonym
Mesoprion aurolineatus	Cuvier 1830 junior synonym
Lutjanus fulvus	Blacktail snapper, (Fr M Dan)
(Schneider 1801)	Max. 40 cm TL; NW
Mesoprion argenteus	Hombron & Jacquinot 1853 junior synonym
Lutjanus fulvus	(Schneider 1801) new combination
Lutjanus marginatus	(Cuvier 1828) junior synonym
Mesoprion marginipinnis	Macleay 1883 junior synonym
Lutjanus vaigiensis	(Quoy & Gaimard 1824) junior synonym
Holocentrus fulvus	Schneider 1801 original combination
Mesoprion maus	Thiollière 1856 junior synonym
Mesoprion gaimardi	Bleeker 1859 junior synonym
Lutjanus marginatoides	Kendall & Goldsborough 1911 junior synonym
Genyoroge nigricauda	De Vis 1885 junior synonym
Diacope xanthopus	Cuvier 1829 junior synonym
Diacope vaigiensis	Quoy & Gaimard 1824 junior synonym
Diacope marginata	Cuvier 1828 junior synonym
Diacope immaculata	Cuvier 1828 junior synonym
Diacope flavipes	Valenciennes 1830 junior synonym
Diacope aurantiaca	Valenciennes 1830 junior synonym
Diacope analis	Valenciennes 1830 junior synonym
Mesoprion kagoshimna	Steindachner & Doederlein 1883 junior synonym

(continued)

Appendix II (continued)

Perciformes (perch-like) Lutjanidae	Snappers
Lutjanus gibbus	Humpback snapper, (Fr M Dan)
(Forsskål 1775)	Max. 50 cm TL; SW
Diacope lineata	Quoy & Gaimard 1824 junior synonym
Diacope axillaris	Valenciennes 1830 junior synonym
Diacope borensis	Cuvier 1828 junior synonym
Diacope melanura	Ruppell 1838 junior synonym
Diacope coccinea	Cuvier 1828 junior synonym
Diacope striata	Cuvier 1828 junior synonym
Diacope tiea	Lesson 1830 junior synonym
Genyoroge bidens	Macleay 1883 junior synonym
Lutianus tahitiensis	Seale 1906 junior synonym
Lutjanus comoriensis	Fourmanoir 1957 junior synonym
Mesoprion janthinurus	Bleeker 1854 junior synonym
Sciaena gibba	Forsskål 1775 original combination
Lutjanus gibbus	(Forsskål 1775) new combination
Diacope rosea	Valenciennes 1830 junior synonym
Lutjanus guilcheri	Yellowfin red snapper, (Fr M)
Fourmanoir 1959	Max. 60 cm TL.
Lutjanus guilcheri	Fourmanoir 1959 original combination
Lutjanus johnii	John's snapper, (Fr M)
(Bloch 1792)	Max. 70 cm TL; NW
Mesoprion yapilli	Cuvier 1828 junior synonym
Lutjanus johnii	(Bloch 1792) new combination
Lutjanus johni	(Bloch 1792) misspelling
Anthias johnii	Bloch 1792 original combination
Serranus pavoninus	Valenciennes 1831 junior synonym
Diacope xanthozona	Bleeker 1845 other
Coius catus	Buchanan 1822 junior synonym
Sparus tranquebaricus	Shaw 1803 junior synonym
Lutjanus kasmira	Common bluestripe snapper, (Fr M)
(Forsskål 1775)	Max. 40 cm TL; SW
Diacope octolineata	(non Cuvier 1828) misidentification
Mesoprion etaape	Lesson 1830 junior synonym
Mesoprion pomacanthus	(non Bleeker 1855) misidentification
Sciaena kasmira	Forsskål 1775 original combination
Lutjanus kasmira	(Forsskål 1775) new combination
Lutjanus lemniscatus	Yellowstreaked snapper, (Fr M)
(Valenciennes 1828)	Max. 65 cm TL.
Lutjanus rangus	(non Cuvier 1828) misidentification
Lutjanus janthinuropterus	(Bleeker 1852) junior synonym
Lutjanus lemniscatus	(Valenciennes 1828) new combination
Mesoprion janthinuropterus	Bleeker 1852 junior synonym
Lutjanus furvicaudatus	Fowler 1904 junior synonym
Mesoprion immaculatus	Cuvier 1828 junior synonym
Serranus lemniscatus	Valenciennes 1828 original combination

(continued)

Appendix II (continued)

Perciformes (perch-like) Lutjanidae	Snappers
Lutjanus lunulatus	Lunartail snapper, Chemara, (Fr M)
(Park 1797)	Max. 35 cm TL.
Mesoprion caudalis	Valenciennes 1830 junior synonym
Perca lunulata	Park 1797 original combination
Lutjanus lunulatus	(Park 1797) new combination
Lutjanus madras	Indian snapper, (Fr M)
(Valenciennes 1831)	Max. 30 cm TL.
Lutjanus madras	(Valenciennes 1831) new combination
Mesoprion madras	Valenciennes 1831 original combination
Lutjanus malabaricus	Malabar blood snapper, (Fr M)
(Bloch & Schneider 1801)	Max. 100 cm TL; NW; SE
Lutjanus dodecacanthus	(Bleeker 1853) junior synonym
Lutjanus malabaricus	(Bloch & Schneider 1801) new combination
Lutjanus sanguineus	(non Cuvier 1828) misidentification
Mesoprion dodecacanthus	Bleeker 1853 junior synonym
Sparus malabaricus	Bloch & Schneider 1801 original combination
Lutjanus monostigma	One-spot snapper, (Fr M Dan)
(Cuvier 1828)	Max. 60 cm TL.
Lutianus monostigma	(Cuvier 1828) misspelling
Lutjanus monostigmus	(Cuvier 1828) misspelling
Lutjanus lioglossus	(Bleeker 1873) junior synonym
Lutjanus monostigma	(Cuvier 1828) new combination
Mesoprion monostigma	Cuvier 1828 original combination
Lutjanus quinquelineatus	Five-lined snapper, (Fr M)
(Bloch 1790)	Max. 38 cm TL.
Holocentrus quinquelinearis	Bloch 1790 junior synonym
Lutjanus quinquelineatus	(Bloch 1790) new combination
Lutjanus spilurus	(Bennett 1832) junior synonym
Genyoroge notata var. sublineata	De Vis 1885 junior synonym
Genyoroge notata var. sexlineata	Kent 1893 junior synonym
Genyoroge grammica	Day 1870 junior synonym
Diacope spirula	Bennett 1832 junior synonym
Diacope decemlineata	Valenciennes 1830 junior synonym
Holocentrus quinquelineatus	Bloch 1790 original combination
Lutjanus rivulatus	Blubberlip snapper, (Fr M)
(Cuvier 1828)	Max. 65 cm TL; SE
Mesoprion parvidens	Macleay 1883 junior synonym
Diacope rivulata	Cuvier 1828 original combination
Lutjanus rivulatus	(Cuvier 1828) new combination
Mesoprion quadripunctatus	Günther 1859 junior synonym
Diacope sinal	Thiollière 1857 junior synonym
Diacope revulina	Cuvier 1828 misspelling
Diacope alboguttata	Valenciennes 1831 junior synonym
Diacope coeruleo-punctata	Cuvier 1828 junior synonym
Mesoprion myriaster	Liénard 1839 junior synonym

(continued)

Appendix II (continued)

Perciformes (perch-like) Lutjanidae	Snappers
Lutjanus russelli	Russell's snapper, (Fr M)
(Bleeker 1849)	Max. 50 cm TL; SW
Lutianus nishikawae	Smith & Pope 1906 junior synonym
Lutjanus orientalis	Seale 1909 junior synonym
Mesoprion russelli	Bleeker 1849 original combination
Lutjanus russelli	(Bleeker 1849) new combination
Lutjanus russellii	(Bleeker 1849) misspelling
Lutjanus sanguineus	Humphead snapper, (Fr M)
(Cuvier 1828)	Max. 90 cm FL; NW
Lutjanus coccineus	(non Cuvier 1828) misidentification
Diacope sanguinea	Cuvier 1828 original combination
Diacope erythrina	Ruppell 1838 junior synonym
Lutjanus sanguineus	(Cuvier 1828) new combination
Lutjanus sebae	Emperor red snapper, (Fr M)
(Cuvier 1816)	Max. 100 cm TL.
Diacope civis	Valenciennes 1831 junior synonym
Diacope siamensis	Valenciennes 1830 junior synonym
Genyoroge regia	De Vis 1885 junior synonym
Diacope sebae	Cuvier 1816 original combination
Lutjanus sebae	(Cuvier 1816) new combination
Lutjanus vitta	Brownstripe red snapper, (Fr M)
(Quoy & Gaimard 1824)	Max. 40 cm TL.; NW; SE
Lutjanus iita	(Quoy & Gaimard 1824) misspelling
Serranus vitta	Quoy & Gaimard 1824 original combination
Lutjanus vitta	(Quoy & Gaimard 1824) new combination
Lutjanus lutjanus	(non Bloch 1790) misidentification
Mesoprion phaiotaeniatus	Bleeker 1849 junior synonym
Mesoprion ophuysenii	(non Bleeker 1860) misidentification
Mesoprion enneacanthus	Bleeker 1849 junior synonym
Lutjanus vittus	(Quoy & Gaimard 1824) misspelling
Macolor niger	Black and white snapper, (Fr M)
(Forsskål 1775)	Max. 48 cm SL.
Diacope macolor	Lesson 1827 junior synonym
Macolor typus	Bleeker 1867 junior synonym
Sciaena nigra	Forsskål 1775 original combination
Macolor niger	(Forsskål 1775) new combination
Macolor macolor	(Lesson 1827) junior synonym
Macolor macularis	(non Fowler 1931) misidentification
Paracaesio sordida	Dirty ordure snapper, (Fr M)
Abe & Shinohara 1962	Max. 40 cm SL.
Paracaesio soldidus	Abe & Shinohara 1962 misspelling
Paracaesio sordida	Abe & Shinohara 1962 original combination
Paracaesio xanthura	Yellowtail blue snapper, (Fr M)
(Bleeker 1869)	Max. 40 cm SL.
Paracaesio pedleyi	Mcculloch & Waite 1916 questionable
Paracaesio xanthura	(Bleeker 1869) new combination

(continued)

Appendix II (continued)

Perciformes (perch-like) Lutjanidae	Snappers
Paracaesio xanthurus	(Bleeker 1869) misspelling
Vegetichthys tumidus	Tanaka 1917 junior synonym
Aetiasis cantharoides	Barnard 1937 junior synonym
Caesio xanthurus	Bleeker 1869 original combination
Pinjalo lewisi	Slender pinjalo, (Fr M)
Randall, Allen, & Anderson 1987	Max. 36 cm SL.
Pinjalo microphthalmus	Lee 1987 questionable
Pinjalo lewisi	Randall, Allen, & Anderson 1987 original combination
Pinjalo sp.	N.A. questionable
	N.A. misidentification
Macolor sp.	Not applicable misidentification
Paracaesio sp.	Not applicable misidentification
Pinjalo typus	(non Bleeker) misidentification
Pinjalo pinjalo	(non Bleeker 1850) misidentification
Pinjalo pinjalo	Pinjalo, (Fr M)
(Bleeker 1850)	Max. 46 cm SL.
Mesoprion mitchelli	Günther 1867 junior synonym
Caesio pinjalo	Bleeker 1850 original combination
Pinjalo typus	Bleeker 1873 junior synonym
Odontonectes pinjalo	(Bleeker 1850) new combination
Odontonectes erythrogaster	(non Cuvier 1830) misidentification
Pinjalo pinjalo	(Bleeker 1850) new combination
Pinjalo sp.	Not applicable misidentification
Pinjalo microphthalmus	Lee 1987 questionable
Pristipomoides filamentosus	Crimson jobfish, (Fr M)
(Valenciennes 1830)	Max. 80 cm SL.
Aphareus roseus	Castelnau 1879 junior synonym
Chaetopterus microlepis	Bleeker 1869 junior synonym
Aprion kanekonis	Tanaka 1935 junior synonym
Pristipomoides filamentosus	(Valenciennes 1830) new combination
Pristipomoides microlepis	(Bleeker 1868) junior synonym
Etelis brevirostris	Vaillant 1873 junior synonym
Bowersia violescens	Jordan & Evermann 1903 junior synonym
Aprion microdon	Steindachner 1876 junior synonym
Serranus filamentosus	Valenciennes 1830 original combination
Pristipomoides multidens	Goldbanded jobfish, (Fr M)
(Day 1870)	Max. 70 cm SL.
Pristipomoides multidens	(Day 1870) new combination
Diacope sparus	Temminck & Schlegel 1842 junior synonym
Mesoprion multidens	Day 1870 original combination
Pristipomoides sieboldii	Lavender jobfish, (Fr M)
(Bleeker 1857)	Max. 50 cm SL.
Pristipomoides microdon	(Steindachner 1876) questionable
Bowersia ulaula	Jordan & Evermann 1903 junior synonym
Chaetopterus dubius	Günther 1859 junior synonym
Pristipomoides sieboldii	(Bleeker 1857) new combination
Chaetopterus sieboldii	Bleeker 1857 original combination

(continued)

Appendix II (continued)

Perciformes (perch-like) Lutjanidae	Snappers
Pristipomoides zonatus	Oblique-banded snapper, (Fr M), Ref. 55
(Valenciennes 1830)	Max. 40 cm SL.
Serranus argyrogrammicus	Valenciennes 1831 questionable
Rooseveltia aloha	Jordan & Snyder 1907 junior synonym
Serranus brighami	Seale 1901 junior synonym
Serranus telfairi	Bennett 1831 junior synonym
Rooseveltia brighami	(Seale 1901) junior synonym
Tropidinus zonatus	(Valenciennes 1830) new combination
Serranus zonatus	Valenciennes 1830 original combination
Pristipomoides zonatus	(Valenciennes 1830) new combination

M = marine; Br = brackish; Fr = freshwater; Fi = fishery; Aq = aquaculture; Or = ornamental; Sp = sport; Bait = used as bait; Dan = dangerous to human; Thr = threatened; En = endemic; In = introduced and still present; Ex = extirpated; Mi = misidentified; Pr = protected; Rest = restricted; NW = occurring on Northwest coast of India; SW = occurring on Southwest coast of India (including Laccadives); SE = occuring on Southeast of India. M, Br, Fr, Dan, and Thr refer to the species in general.

Museum: .... refers to museum specimens collected in this country.

Note: This list of species was assembled from country records for species entered in FishBase as of 18 June 1996. The scientific name is followed by the international FishBase name and, if available, a common name used in the country. Not all extant species of fishes are included in this version of FishBase, nor have all species been assigned to the countries in which they occur. Thus, this list is likely to be incomplete. Conversely, this list may include fish that are very rare or extinct, or reported only once from a given country. Please check FishBase 96 or subsequent version under the name of the species in question for additional information.