



Snappers (Perciformes : Lutjanidae) of West Bengal coast with eight new records and a key for their identification

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Abstract

Snappers of the family Lutjanidae are a group of colourful, attractive and important marine food fishes. The paper reviews the snappers of West Bengal state, India and reports eight new records, *Lutjanus decussatus*, *L. lunulatus*, *L. momostigma*, *L. quinquelineatus*, *Pinjalo pinjalo*, *Pristipomoides filamentosus*, *P. multidens* and *P. typus*, from the coastal waters of the state with their systematic account. The paper also presents a working key to identification of all 24 species of snappers known to occur in the state till date, which will help in correcting several confusions occurred in earlier literature.

Keywords: New record, *Lutjanus*, *Pinjalo*, *Pristipomoides*, West Bengal

Introduction

Snappers are typical perch-like fishes placed in the family Lutjanidae, under order Perciformes. They form an important group of marine food fishes in our region (Talwar and Kacker, 1984) although some species at times may cause ciguatera poisoning as reported elsewhere. Snappers are mainly shallow water inshore demersal species, found in tropical and subtropical seas throughout the world; most species are reef associated but also found in brackish estuaries, mangroves and hyper saline lagoons with several deep-water and three freshwater species (Allen, 1985). The family Lutjanidae comprise of 17 genera and 110 species (Froese and Pauly, 2013). *Lutjanus* Bloch, 1790 is by far the largest genus with 70 species, including at least 43 species from the Indo-West Pacific region (Allen *et al.*, 2013). There are about 10 genera and 45 species of the family reported to occur along the coasts of India although some records need to be verified with material support.

West Bengal, being a maritime state, its coastal waters are known to harbor 14 species of snappers till date, viz., *Aprion virescens*, *Lutjanus argentimaculatus*,

L. bengalensis, *L. carponotatus*, *L. fulviflamma*, *L. fulvus* (as *L. vaigiensis*), *L. guilcheri*, *L. indicus* (as *L. russellii*), *L. johnii*, *L. kasmira*, *L. lutjanus*, *L. malabaricus*, *L. rivulatus* and *L. sanguineus* (Misra, 1962; Manna and Goswami, 1985; Goswami, 1992; Talwar *et al.*, 1992; Das *et al.*, 2007). *Lutjanus erythropterus* Bloch 1970 was reported by Barman *et al.* (2013) as a new record thus increased the species number to 15. Record of *L. carponotatus* and *L. guilcheri* are most possibly unsubstantial as it has been listed by Talwar *et al.* (1992) with a question mark. But Das *et al.* (2007) and Sanyal *et al.* (2012) subsequently followed it with out material proof.

During the survey of Ichthyofauna of northern east coast of India in the years 2011-2013, eight more species of fishes of the family Lutjanidae have been collected, viz., *Lutjanus decussatus*, *L. lunulatus*, *L. monostigma*, *L. quinquelineatus*, *Pinjalo pinjalo*, *Pristipomoides filamentosus*, *P. multidens* and *P. typus*, which are hitherto not reported from the coastal waters of West Bengal. All these eight species of snappers are reported here for the first time from West Bengal coast and systematic account of all these species are provided in this paper to document their first record from the state.

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Materials and Methods

All the specimens were collected from Digha Mohona and Shankarpur during local survey. The collected specimens were usually known to have captured by bottom trawl nets from the Exclusive Economic Zone off West Bengal state. Measurement and counting were carried out following Allen and Talbot (1985) and Allen (1985). Since on preservation lutjanids are known to get the colour pattern faded up, which is one of the most important characters for their identification, care have been taken first to photograph them in fresh condition. After correct determination, the specimens were preserved in 10% formalin. The preserved specimens were deposited in the marine museum collections of MARC, Zoological Survey of India, Digha.

Abbreviations used: D – Dorsal fin; A – Anal fin; P – Pectoral fin; V – Pelvic fin; LL – Lateral line scales; GR – Gill rakers; SL – Standard length; HL- Head length; MARC – Marine Aquarium and Research Centre; ZSI – Zoological Survey of India.

Other materials examined: Apart from the 8 species reported in this paper as new records, six other species were also collected from West Bengal coast. Those are listed here under confirming their availability in the region.

Lutjanus argentimaculatus (Forsskal, 1775): MARC/ZSI/F3156, 1 ex., 68 mm SL, Digha Mohona, 30.11.11, Coll. Dipanjan Ray.

Lutjanus fulvus (Forster, 1801): MARC/ZSI/F1601, 6 ex., 102-150 mm SL, Digha Mohona, 30.12.10, Coll. Dipanjan Ray.

Lutjanus indicus Allen, White & Erdmann, 2013: MARC/ZSI/F759, 3 ex., 147-161 mm SL, Digha Mohona, 26.12.2010, Coll. Dipanjan Ray.

Lutjanus johnii (Bloch, 1792): MARC/ZSI/F1834, 2 ex., 130-145 mm SL, Digha Mohona, 09.06.2011, Coll. Dipanjan Ray.

Lutjanus lutjanus (Park, 1797): MARC/ZSI/F752, 5 ex., 82-140 mm SL, Digha Mohona, 25.12.10, Coll. Dipanjan Ray.

Lutjanus malabaricus (Bloch & Schneider, 1801): MARC/ZSI/F764, 3 ex., 98-155 mm SL, Digha Mohona, 28.12.12, Coll. Dipanjan Ray.

Systematic Accounts

Lutjanus decussatus (Cuvier, 1828)

(Checked red snapper)

1828. *Mesoprion decussatus* Cuvier (ex Kuhl & van Hasselt), in Cuvier & Valenciennes, *Hist. nat. poiss.*, 2: 487 (Java, Indonesia).

1985. *Lutjanus decussatus*: Allen, *FAO Fish. Synop.*, (125) 6: 73, pl. 13, Figure 52.

Material examined: MARC/ZSI/F3092, 1 ex., 186 mm SL, Shankarpur, 05.07.2013, Coll. D. Ray.

Diagnosis: D X, 13; A III, 8; P 16; V I, 5; LL 52; GR 14. Body moderately deep, depth 2.77 in SL. Dorsal profile of head slope, HL 2.69 in SL. Snout pointed, its length 2.30 in HL; eye diameter 5.87 in HL; interorbital space 6.28 in HL; Preorbital bone more or less equal to eye diameter; preopercular notch poorly developed and knob indistinct. Vomerine tooth patch crescentic, without median posterior extension; a patch of granular teeth present on tongue; both jaws with few curved canine teeth; maxilla reaching to below front border of eye. Scale rows on back above lateral line rising obliquely to dorsal profile. Soft dorsal part as high as spinous part; soft anal fin part deeper than spinous part; posterior profile of dorsal and anal fin rounded; caudal fin emarginate.

Colour: Body silvery white with 5 broad dark longitudinal bands across body from head to caudal peduncle, upper three bars crossed by dark vertical bars forming a network of light and dark squares (checker-board pattern). A large black spot on caudal fin base; dorsal and caudal fin dusky red; other fins yellowish.

Distribution: Indo-West Pacific: southern India and Sri Lanka to New Guinea, north to the Ryukyu Islands (Froese and Pauly, 2013). From Indian coastal waters this species was reported from Andaman and Nicobar Island (Rao, 2009); Andhra Pradesh (Barman *et al.*, 2004) and Gulf of Mannar, Tamil Nadu (Varghese *et al.*, 2011).



Figure 1. *Lutjanus decussatus* (Cuvier, 1828).

Lutjanus lunulatus (Park, 1797)

(Lunartail Snapper)

1797. *Perca lunulata* Park, *Trans. Linn. Soc., London.*, **3**: 37, pl. 6 (Sumatra, Indonesia).1985. *Lutjanus lunulatus* : Allen, *FAO Fish. Synop.*, (125) **6**: 98, pl. 17, Figure 65.*Material examined*: MARC/ZSI/F 2102, 1 ex., 216 mm SL, Digha Mohona, 08.12.2011, Coll. D. Ray.*Diagnosis*: D X, 13; A III, 8; P 16; V I, 5; LL 49; GR 17. Body moderately deep, its depth 2.63 in SL; dorsal profile of head steeply sloped, HL 2.66 in SL. Pre orbital more or less equal to eye diameter, eye 4.06 in HL; interorbital space 4.02 in HL; snout 3.08 in HL. Preopercle with 6 scale rows; preopercular notch and knob poorly developed. Vomerine teeth patch crescentic and without a medial posterior extension; tongue with a patch of granular teeth. Longitudinal scale rows ascending obliquely above lateral line and running horizontally below it; predorsal scale beginning behind eye. First dorsal spine half length of second which is shorter than third, 4th dorsal spine is longest among dorsal spines; following dorsal spines gradually decreasing in length. 1st anal spine much shorter than 2nd which is equal or slightly smaller than 3rd; pectoral fin longer than ventral; soft dorsal and anal rounded; caudal fin emarginated.*Colour*: Back and upper part of body pinkish red, ventral sides of head and belly yellowish white; dorsal fin light red and other fins are light yellow; caudal fin with broad crescent black band with the posterior portion of fin pink.*Distribution*: Indo-West Pacific: northeastern Arabian Sea to Philippines and Vanuatu (Froese and Pauly, 2013). In Indian coastal waters this species was reported from Andaman & Nicobar Island (Rao, 2009); Palk Bay, Tamil Nadu (Venkataraman *et al.*, 2007); Andhra Pradesh (Barman *et al.*, 2004); Maharashtra (Barman *et al.*, 2012) and Gujarat (Barman *et al.*, 2000).**Figure 2.** *Lutjanus lunulatus* (Park, 1797).***Lutjanus monostigma*** (Cuvier, 1828)

(One-spot snapper)

1828. *Mesoprion monostigma* Cuvier, in Cuvier & Valenciennes, *Hist. nat. poiss.*, **2**: 446 (Seychelles).1985. *Lutjanus monostigma* : Allen, *FAO Fish. Synop.*, (125) **6**: 106, pl. 19, Figure 71.*Material examined*: MARC/ZSI/F 2404, 1 ex., 75 mm SL, Digha Mohona, 03.02.2012, Coll. D. Ray.*Diagnosis*: D X, 13; A III, 8; P 16; V I, 5; LL 50; GR 19. Body slightly slender, its depth 2.77 in SL; dorsal profile of the head gently sloped, HL 2.5 in SL; mouth somewhat oblique; maxilla reaching below fore border of eye; eye 4.28 in HL; interorbital space 4.68 in HL; snout 3.33 in HL. Preorbital equal to eye diameter; preopercular knob and notch poorly developed; preopercle with 6 rows of scale. Vomerine teeth patch crescentic without a medial posterior extension; tongue smooth, without teeth. Longitudinal scale rows ascending obliquely above lateral line and running horizontally below it; predorsal scales beginning well behind eyes. First dorsal spine less than half length of second; third spine longest among dorsal spines; first anal spine less than half length of second which is as long as third; soft dorsal rounded and soft anal truncate; caudal fin emarginated.*Colour*: Body brownish yellow above and silvery below; each scale with more or less distinct silvery spot. A large black blotch in lateral line below junction of spinous and soft portions of dorsal fin; fins yellow.*Distribution*: Indo-Pacific: East Africa to the Marquesas and Line islands, north to the Ryukyu Islands, south to Australia (Froese and Pauly, 2013). In Indian coastal waters this species was reported from Andaman & Nicobar Islands (Rao, 2009); Palk Bay, Tamil Nadu (Venkataraman *et al.*, 2007); Andhra Pradesh (Barman *et al.*, 2004), Gujarat (Barman *et al.*, 2000) and Maharashtra (Barman *et al.*, 2012).**Figure 3.** *Lutjanus monostigma* (Cuvier, 1828).

Lutjanus quinquelineatus (Bloch, 1790)

(Fivelined Snapper)

1790. *Holocentrus quinquelineatus* Bloch, *Naturges. ausland. Fische.*, **4**: 84, pl. 249 (Japan).

1985. *Lutjanus quinquelineatus* : Allen, *FAO Fish. Synop.*, (125) **6**: 111, pl. 19, Figure 73.

Material examined: MARC/ZSI/F 2104, 2 ex., 99-161 mm SL, Digha Mohona, 08.12.2011, Coll. D. Ray.

Diagnosis: D X, 13; A III, 8; P 16; A I, 5; LL 49; GR 20. Body moderately deep, its depth 2.60-2.77 in SL; dorsal profile of head steeply sloped, HL 2.63-2.67 in SL; eye diameter 3.7-3.8 in HL; interorbital space 3.36-3.64 in HL; snout 3.19-3.25 in HL. Preorbital less than eye diameter; preopercular notch and knob well developed; vomerine tooth patch crescentic, without a medial posterior extension; tongue smooth, without teeth. Longitudinal scale rows above lateral line ascending obliquely to dorsal profile and running horizontally below it; predorsal scales beginning at midinterorbital space; preopercle with 9 or 10 scale rows, including those on lower border. First dorsal spine less than half length of second; third spine longest among dorsal spines; first anal spine less than half length of second which is as long as third, caudal fin emarginate.

Colour: Body bright yellow; upper part of brownish; sides and belly light yellow; a series of 5 bright blue stripes on sides; a round black spot below anteriormost soft dorsal rays at level of lateral line; fins yellow.

Distribution: Indo-West Pacific: Persian Gulf and the Gulf of Oman to Fiji, north to southern Japan (Froese and Pauly, 2013). In Indian coastal waters this species was reported from Andaman & Nicobar Island (Rao, 2009); Andhra Pradesh (Barman *et al.*, 2004); Gujarat (Barman *et al.*, 2000); Kerala (James *et al.*, 1994); Tamil Nadu (Barman *et al.*, 2011) and Gulf of Mannar (Varghese *et al.*, 2011); Maharashtra (Barman *et al.*, 2012).



Figure 4. *Lutjanus quinquelineatus* (Bloch, 1790).

Pinjalo pinjalo (Bleeker, 1850)

(Pinjalo)

1850. *Caesio pinjalo* Bleeker, *Verh. Batav. Genoot. Kunst. Wet.*, **23** (7): 10 (Java, Indonesia).

1985. *Pinjalo pinjalo* Allen, *FAO Fish. Synop.*, (125) **6**: 139, pl. 25, Figure 91.

Material examined: MARC/ZSI/F 1676, 5 ex., 100-125 mm SL, Digha Mohona, 22.02.2011, Coll. D. Ray.

Diagnosis: D XI, 14; A III, 10; P 18; V I, 5; LL 49-50; GR 21. Body moderately deep, its depth 2.32-2.90 in SL; dorsal profile of head high, HL 2.87-3.35 in SL; snout short and pointed its depth 4.42-4.55 in HL; mouth small and oblique; maxilla reaching to below anterior border of eye; interorbital space convex and 2.42-2.62 in HL; eye large with adipose eyelid and 3.5-3.85 in HL. Lower edge of eye touching the line from snout tip to upper pectoral fin base. A sharply bent band of small teeth on vomer and an elongate band on palatine. Both above and below lateral line appear to rise obliquely toward dorsal profile; predorsal scales on top of head beginning above middle of eyes. 6 transverse rows of scales on preoperculum. 3rd, 4th and 5th dorsal spines are longest; second anal spine longest and strongest; soft dorsal and anal rounded; caudal slightly emarginate.

Colour: Body pinkish, silvery white on lower sides and belly; dorsal, anal, caudal and pelvic fins with black margin; pelvic and anal fins yellowish.

Distribution: Indo-West Pacific: Persian Gulf to the Gulf of Papua (Papua New Guinea), north to Taiwan (Froese and Pauly, 2013). In Indian coastal waters this species was reported from Andaman & Nicobar Island (Rao, 2009); Kerala (Naomi *et al.*, 2011); Andhra Pradesh (Barman *et al.*, 2004); Gujarat (Barman *et al.*, 2000); Tamil Nadu (Barman *et al.*, 2011), Gulf of Mannar (Varghese *et al.*, 2011) and Maharashtra (Barman *et al.*, 2012).



Figure 5. *Pinjalo pinjalo* (Bleeker, 1850).

Pristipomoides filamentosus (Valenciennes, 1830)

(Crimson jobfish)

1830. *Serranus filamentosus* Valenciennes, in Cuvier & Valenciennes, *Hist. nat. poiss*, 6: 508 (Saint-Denis, Reunion).

1985. *Pristipomoides filamentosus*: Allen, *FAO Fish. Synop.*, (125) 6: 147, pl. 26, Figure 95.

Material examined: MARC/ZSI/F 2472, 5 ex., 96-160 mm SL, Digha Mohona, 14.03.2012, Coll. D. Ray.

Diagnosis: D X-XI, 10-11; A III, 8; P 16; V I, 5; LL 65; GR 25. Body elongated, robust, its depth 2.90-3.12 in SL; HL 2.42-2.58 in SL; interorbital space flat, 4.13-4.44 in HL; eye 4.59-4.8 in HL and snout 3.87-4.04 in HL. Lower jaw slightly protruding; both jaws with an outer row of conical and canine teeth and an inner band of villiform teeth, canines at front of lower jaw but not greatly enlarged; weak vomerine tooth patch triangular without a median posterior extension; tongue without teeth. Bases of dorsal and anal fins scale less, their last soft rays extended into short filaments; pectoral fins long, reaching level of anus and slightly falcate; caudal fin forked. Scale rows on back parallel to lateral line.

Colour: Body reddish purple and lower part reddish white; snout and interorbital space with narrow yellow lines; Soft dorsal and caudal fins margined with red.

Distribution: Indo-Pacific: East Africa to Hawaii and Tahiti, north to southern Japan, south to eastern Australia and Lord Howe Island (Froese and Pauly, 2013). In Indian coastal water this species was reported from Andaman & Nicobar Islands (Rajan, 2001); Andhra Pradesh (Barman *et al.*, 2004); Maharashtra (Barman *et al.*, 2012) and Gujarat (Barman *et al.*, 2000).

Remarks: Usually in all *Pristipomoides* species number of dorsal spine is constantly 10. But one specimen so collected from Digha has 11 dorsal spines. This is an abnormal and rare condition observed. Except for number of dorsal spine, the specimen in all accounts agrees with *P. filamentosus* Valenciennes.



Figure 6. *Pristipomoides filamentosus* (Valenciennes, 1830).

Pristipomoides multidens (Day, 1871)

(Goldbanded jobfish)

1871. *Mesoprion multidens* Day, *Proc. Zool. Soc. London*, 1870 (3): 680 (Andaman Islands).

1985. *Pristipomoides multidens*: Allen, *FAO Fish. Synop.*, (125) 6: 152, pl. 26, Figure 97.

Material examined: MARC/ZSI/F 2697, 1 ex., 370 mm SL, Digha Mohona, 03.10.2012, Coll. Dipanjan Ray.

Diagnosis: D X, 11; A III, 8; P 16; V I, 5; LL 50; GR 22. Body elongate, robust its depth 3 in SL; HL 2.84 in SL; interorbital space flat and 4.06 in HL; eye diameter 5.28 in HL and snout 2.88 in HL; lower jaw slightly protruding; both jaws with an outer rows of conical teeth and an outer rows of villiform teeth; a pair of bigger canines well apart from each other situated near the anterior end of both the upper and lower jaws; vomerine teeth in a triangular villiform patch; tongue without teeth. Suborbital with is 28mm. Dorsal and anal fin base without scales; last soft rays of dorsal and anal fins extends into short filaments; caudal fin deeply forked. 7 rows of scales in cheek; scales above lateral line 7 and below lateral line 15.

Colour: Six longitudinal yellow bands along the body; two golden bands edged with dark blue on snout and cheek; brownish yellow vermiculations on front and top of head. Dorsal fin with reddish yellow spot; dorsal fin margin also reddish yellow.

Distribution: Indo-Pacific: Red Sea, Arabian Sea and East Africa to Samoa, north to southern Japan, south to Australia. (Froese and Pauly, 2013). In Indian coastal water this specie was reported from Andaman and Nicobar Islands (Rajan, 2001); Andhra Pradesh (Barman *et al.*, 2004); Maharashtra (Barman *et al.*, 2012) and Gujarat (Barman *et al.*, 2000).



Figure 7. *Pristipomoides multidens* (Day, 1871).

Pristipomoides typus (Bleeker, 1852)

(Sharptooth Jobfish)

1852. *Pristipomoides typus* Bleeker, *Natuurk. Tijdschr. Ned. Indië*, 3: 575 (Sibogha, Sumatra).1904. *Pristipomoides typus*: Allen, *FAO Fish. Synop.*, (125) 6: 154, pl. 27, Figure 99.*Material examined*: MARC/ZSI/F 2882, 1 ex., 87 mm SL, Digha Mohona, 07.02.2013, Coll. D. Ray.*Diagnosis*: D X, 11; A III, 8; P 16; V I, 5; LL 51; GR 15. Body elongate and robust, its depth 3.29 in SL; HL 2.9 in SL; interorbital space flat and 3.92 in HL; eye 3.69 in HL and snout 2.95 in HL; mouth slightly oblique, jaw sub equal with an outer row of conical teeth, in front of which are canine teeth and an inner band of villiform teeth; vomerine tooth patch triangular; palatine teeth absent; maxillary reaching almost to below middle of eye. Six transverse rows of scales on preoperculum. Suborbital with is 6 mm. Dorsal spine moderate, 5th longest; First anal spine half length of second, which is as strong and as long third spine; last dorsal and anal ray produced; pectoral fin pointed; caudal fin deeply forked with pointed lobes.*Colour*: Body red, more deep in upper part and pale in lower part; all fins yellowish, dorsal fin with wavy yellow lines. Golden band absent on snout and cheek; top of head with longitudinal vermiculated lines.*Distribution*: Eastern Indian Ocean: Andaman Sea. Western Pacific: New Guinea to Sumatra, north to the Ryukyu Islands; also in Australia (Froese and Pauly, 2013). In Indian coast this species was reported from Tamil Nadu (Varghese *et al.*, 2011), Andaman and Nicobar Islands (Rajan, 2001); Kerala (James *et al.*, 1994).**Figure 8.** *Pristipomoides typus* (Bleeker, 1852).**Discussion**

The first record of a snapper in West Bengal waters is found in Hamilton (1822) as *Coius catus* Hamilton, a junior synonym of *Lutjanus johnii* Bloch (Allen and Talbot, 1985). Misra (1962) has indicated occurrence of seven species of snappers in West Bengal, viz., *L. argentimaculatus*, *L. johnii*, *L. kasmira*, *L. lutjanus*, *L. rivulatus*, *L. sanguineus*

and *L. vaigiensis* [= *L. fulvus*]. Talwar *et al.* (1992) listed only 4 species namely, *L. argentimaculatus*, *L. bengalensis*, *L. johnii* and *L. russelli*, while stating that the Bengal snapper is fairly common in trawl catches. Talwar *et al.*, (1992) have observed that the reports of *Lutjanus kasmira* (Forsskal), *L. rivulatus* (Cuvier), *L. sanguineus* (Cuvier) and *L. vaigiensis* (Quoy & Gaimard) from West Bengal by Misra (1962) are without material confirmation and so erroneous, whereas they doubtfully included *Lutjanus carponotatus* (Richardson) and *L. gulcheri* Fourmanoir (with a question mark) as from West Bengal coast without material support. Goswami (1992) included *Aprion virescens* Valenciennes and *Lutjanus fulviflamma* (Forsskal) in his list of 5 species in the Family Lutjanidae, of which *Lutjanus holocentrum* (Bleeker) is a wrong combination for *Priacanthus holocentrum* Bleeker (= *Priacanthus tayenus* Richardson) (Family Priacanthidae). Das *et al.* (2007) listed 13 species of *Lutjanus* in their 'Piscine diversity of West Bengal' including *L. malabaricus*. Sanyal *et al.* (2012) retained the species named in Talwar *et al.* (1992), but without the question mark used against *L. carponotatus* and *L. gulcheri*.

Apart from the eight species described here as new record for West Bengal coast, we could have collected only 6 more species, viz., *L. argentimaculatus*, *L. fulvus*, *L. indicus*, *L. johnii*, *L. lutjanus* and *L. malabaricus*. The name *Lutjanus indicus* is used here for first time to report its occurrence in this region, but we are not reporting as first record from West Bengal as it was earlier recorded as *L. russelli*. As per the recent findings (Allen *et al.*, 2013), the specimens along Indian coast earlier recorded as *L. russelli* are to be referred as *L. indicus*. Similarly, earlier records of *Lutjanus vaigiensis* (Quoy & Gaimard) should be treated as *Lutjanus fulvus* (Forster) (Allen, 1985). Since Misra (1962) reported occurrence of *L. vaigiensis* from West Bengal coast, *L. fulvus* is not treated here as a first record although we have fresh specimens of this species proving the observations of Talwar *et al.* (1992) wrong with respect to this particular species.

Misra (1962) misapplied the name *Lutjanus lutjanus* to the specimens of *Lutjanus madras* Valenciennes, while treating *Lutjanus lineolatus* (Ruppell), a junior synonym of *L. lutjanus* Bloch (Allen & Talbot, 1985), as valid. With regard to these two species, Talwar & Kacker (1984) followed Misra (1962), but interestingly neither the species included in Talwar *et al.* (1992). However, it is important to note that we could not find a single specimen of *L. madras* from West Bengal coast during

our study period, but we have few *L. lutjanus* specimens collected (see other materials examined). Considering use of *L. lutjanus* name in earlier reports we refrain from naming it as new record, but factually, since the name was misapplied for *L. madras*, this forms the first record of *L. lutjanus* from West Bengal and *L. madras* is supposed to be available along this coast as reported in Misra (1962).

Lutjanus bengalensis, *L. kasmira* and *L. quinquelineatus* form a most confusing group in Indian literature and all are characterized in having a pale ground colour with blue stripes. Day (1875) reported *L. bengalensis*, *L. quinquelinearis* and *L. quinquelineatus* from Indian coast. Subsequently, he suggested (Day, 1888) reading *L. bengalensis* as *L. kasmira* and *L. quinquelineatus* as *L. coeruleonineata*. That resulted in reporting *L. kasmira*, *L. caeruleolineatus* and *L. quinquelinearis* from Indian waters (Day, 1888). But it has been observed that last named two species are to be treated as *L. quinquelineatus* and the first species in fact represent two species, viz., *L. bengalensis* and *L. kasmira*. With the background of the work of Sir F. Day, Misra (1962) reported *L. kasmira* from India including West Bengal. Obviously that illustration includes all those three species. So, it can never be assured what species Misra (1962) observed from West Bengal

coast. While doubting occurrence of *L. kasmira* in West Bengal, Talwar *et al.* (1992) has reported *L. bengalensis*. This has been retained in Chatterjee *et al.* (2000), while Das *et al.* (2007) included both in their list. However, we have not obtained any of those species yet.

From the so far reported species of snappers (24 nos.) from West Bengal, we could not get specimens of *Aprion virescens*, *Lutjanus bengalensis*, *L. carponotatus*, *L. guilcheri*, *L. kasmira*, *L. madras*, *L. rivulatus* and *L. sanguineus*. Report of *Aprion virescens* by Goswami (1992) needs to be verified. *L. carponotatus* and *L. guilcheri* included in Talwar *et al.* (1992) with question marks are very much unlikely to occur along West Bengal coast. Among the species included in Misra (1962), *L. rivulatus* and *L. sanguineus* as well as *L. madras* needs material confirmation.

With this information, a working key for identification of all 24 species of snappers so far known from West Bengal, including *Lutjanus madras* and *Aprion virescens*, has been prepared for correct identification of the specimens when obtained and presented here under. Despite having clear knowledge that *L. carponotatus* and *L. guilcheri* are not occurring in this region, both are also included in the working key given here.

Key to the Species of Snappers of West Bengal: (modified and after Allen, 1985)

- 1a. Lower margin of eye touching the line from snout tip to upper pectoral fin base; scale rows below lateral line appear to rise obliquely to dorsal profile; mouth rather small, extending at most vertical through anterior edge of eye... .. ***P. pinjalo***
- 1b. Lower margin of eye above the line from snout tip to upper pectoral fin base; scale rows below lateral line appear as parallel to axis; mouth moderate to large, extending vertical through anterior border of pupil or middle of eye 2
- 2a. Soft dorsal and anal fins without scales; last soft ray of dorsal and anal fins distinctly longer than preceding rays... .. 3
- 2b. Soft dorsal and anal fins with scales at least basally; last soft ray of dorsal and anal fins not longer than preceding rays 6
- 3a. A distinct horizontal groove before of eye present on snout; pectoral fins short, about equal to snout length... .. ***A. virescens***
- 3b. No groove before of eye present on snout; pectoral fins distinctly longer than snout length 4
- 4a. Lateral-line scales 57 to 63; top of head without vermiculations ***P. filamentosus***
- 4b. Lateral-line scales 48 to 50; top of head with vermiculations 5
- 5a. Two golden stripes bordered with blue on snout and cheek; transverse vermiculations on top of head; total gill rakers 20 to 22 on first arch..... ***P. multidentis***
- 5b. No golden stripes on snout and cheek; longitudinal vermiculations on top of head; total gill rakers 23 to 26 on first arch ***P. typus***
- 6a. Longitudinal scale rows above lateral line entirely horizontal or some rows rising obliquely posteriorly beyond middle part of dorsal fin 7
- 6b. Longitudinal scale rows above lateral line obliquely rising to dorsal profile 8

- 7a. A large black spot on upper back usually present, if absent ground colour pale; longitudinal scale rows on upper back entirely parallel to lateral line..... ***L. johnii***
- 7b. Black spot on upper back absent, ground colour dark; longitudinal scale rows on upper back parallel to lateral line anteriorly, some rows rising obliquely posteriorly..... ***L. argentimaculatus***
- 8a. Ground colour pale (mainly yellow in life) with a series of 4 or 5 longitudinal blue stripes (brownish in preservative) on sides..... 9
- 8b. Ground colour darker without longitudinal blue stripes as above 11
- 9a. Dorsal fin with XI or XII spines; gill rakers on lower limb of first arch 17 to 19 ***L. bengalensis***
- 9b. Dorsal fin with X spines; gill rakers on lower limb of first arch 13 to 15 10
- 10a. Four stripes on sides; scale rows on cheek 5 or 6; upper pectoral-fin rays darker ***L. kasmira***
- 10b. Five stripes on sides (rarely six); scale rows on cheek 10 or 11; upper pectoral-fin rays pale ***L. quenquilineatus***
- 11a. Vomerine tooth patch triangular or diamond-shaped with a medial posterior extension... 12
- 11b. Vomerine tooth patch crescentic to triangular without a posterior extension 16
- 12a. Preorbital or suborbital space (distance between upper jaw and eye) very narrow, 9.2 to 16.3 times in head length; body slender, usually 2.9 or more times in standard length; a broad yellow to brownish stripe from eye to caudal fin base ***L. lutjanus***
- 12b. Preorbital (“suborbital”) space wider, 3.3 to 8.9 times in head length; body deeper, 2.1 to 3.1 times, but usually less than 3 times, in standard length 13
- 13a. Axil of pectoral fin with a distinct black spot on upper portion; a series of 8 or 9 broad orange or yellow stripes on sides ***L. carponotatus***
- 13b. Axil of pectoral fins without black spot; colour not as above 14
- 14a. Black spot on lateral line below dorsal fin absent; a blunt, flattened spine on upper margin of opercle, above the main centrally located spine ***L. madras***
- 14b. A black spot on lateral line below dorsal fin present; blunt spine above centrally located opercular spine absent 15
- 15a. Soft dorsal-fin rays usually 13; little or no gap between temporal scale bands of each side; spot on upper side situated mostly below lateral line or bisected by it, spot sometimes very elongated; young specimens without series of 4 to 7 broad dark stripes ***L. fulviflamma***
- 15b. Soft dorsal-fin rays usually 14; a relatively wide gap between temporal scale bands of each side; a black spot on upper side situated mainly above lateral line, spreading to just one scale below it; young specimens with series of 4 to 7 broad stripes (blackish to orange or yellow-brown in life) on sides, upper stripes raising obliquely to dorsal profile ***L. indicus***
- 16a. Preopercular notch distinct, moderately to well developed 17
- 16b. Preopercular notch indistinct, shallow or absent..... 18
- 17a. Soft dorsal-fin rays 15 or 16; head usually with numerous wavy lines (bluish in life); a chalky spot often present below junction of spinous and soft parts of dorsal fin, bordered with black in juveniles, but lost with age... ***L. rivulatus***
- 17b. Soft dorsal-fin rays 13 or 14; caudal fin and distal third of dorsal fin blackish or dusky brown with a narrow white border ***L. fulvus***
- 18a. A series of 5 dark stripes on whitish ground colour; 2 or 3 uppermost stripes crossed by dark vertical bars forming a network of light and dark squares; a large dark spot at base of caudal fin ***L. decussatus***
- 18b. Colour pattern not as above..... 19
- 19a. Caudal fin with a distinctive crescentic black mark, rest of body and fins uniformly yellowish with a silvery sheen on lower sides ***L. lunulatus***
- 19b. Caudal fin without a distinctive black mark as above; colour of body and fins variable..... 20
- 20a. A black spot on upper side at level of lateral line below soft dorsal fin (faint or absent in large adults); body and fins mainly pale (fins yellow, body pink or yellow in life)..... ***L. monostigma***

- 20b. Black spot on upper side of body along lateral line absent 21
- 21a. A prominent hump on forehead and a series of shallow, horizontal grooves behind eye in specimens over about 20 to 25 cm standard length; anterior and posterior nostrils widely separated, the distance between them much greater than length of posterior nostril opening ***L. sanguineus***
- 21b. Hump on forehead and grooves behind eye absent at all sizes; anterior and posterior nostrils close-set, the distance between them about equal or less than length of posterior nostril opening 22
- 22a. Dorsal profile of head concave; longitudinal scale rows below lateral line horizontal; pectoral fins yellow in life ***L. guilcheri***
- 22b. Dorsal profile of head straight, concave or convex; some scale rows below lateral line slanting obliquely in posterior direction toward dorsal profile, mostly in juveniles; pectoral fins reddish or pink in life 23
- 23a. Mouth relatively small, maxilla length much less than distance between bases of last dorsal- and anal-fin rays; interorbital width 3.5 to 4.8 times in head length (specimens in excess of 15 cm standard length); some longitudinal scale rows below lateral line slanting obliquely in posterior direction toward dorsal profile; head profile convex (in specimens over about 15 cm standard length) ***L. erythropterus***
- 23b. Mouth larger, maxilla length about equal to distance between bases of last dorsal- and anal-fin rays; interorbital width 5.1 to 6.6 times in head length (specimens in excess of 12 cm standard length); longitudinal scale rows below lateral line horizontal, although some rows may slant obliquely in juveniles under about 10 cm standard length; head profile straight or slightly concave ***L. malabaricus***

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