Studies on the

Reef-Dwelling Fishes of India

Parrotfishes

(Family SCARIDAE)

R.P. BARMAN
S.S. MISHRA

ZOOLOGICAL SURVEY OF INDIA

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and

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INTRODUCTION

A varied number of fish families known to occur in coral reefs. Most of them are brilliantly coloured and developed certain adaptability to have their abode in and around the reefs. Parrotfishes of the family Scaridae are such an interesting group among them. The studies on the parrotfishes in India are very much scattered and many of those identifications are obsolete, considered the present parlance of nomenclature. An attempt is made to consolidate the old reports as well as verifying fresh collections all along the coasts of India, mainly from the reefs where these fishes found dominantly.

Jones and Kumaran (1980) dealt with the fishes of Laccadive Islands and Venkataraman *et al.* (2003) prepared a checklist of the fishes of the Gulf of Mannar. A series of work also published from Andaman and Nicobar Islands (Rao *et al.*, 2000; Rajan, 2001; Rajan, 2003; Kamladevi and Rao, 2003; Rao and Kamladevi, 2004; Rao, 2004). Detailed study of reef fishes from Indian coasts is very much lacking and need to give special attention. Study of parrotfish family Scaridae form an initiation in this line.

Materials: For the present study fresh collections were made from coasts of India. Along with the fresh collections, the old collections at the National Zoological Collection at Fish Division, Zoological Survey of India, Kolkata were also utilised as study material. The authors also got the opportunity to examine the specimens at Andaman and Nicobar Regional Station, Z. S. I., Port Blair and at Marine Biological Station, Z. S. I., Chennai.

Family SCARIDAE

Body oblong to moderately elongate; somewhat compressed. Head usually bluntly rounded anteriorly. Mouth small, with jaws fused into beak-like dental plates. Due to the presence of these dental plates resembling parrot-like beak and brilliant colour pattern these fishes are aptly named as parrotfishes. Some species are with

posterior canine teeth in dental plates. Dorsal fin with 9 spines and 10 soft rays. Anal fin with 3 spines and 9 soft rays. Pectoral fin with 13 to 16 rays. Pelvic fin with 1 spine and 5 soft rays. Caudal fin with 11 branched rays, rounded in juveniles, but lobes usually produced in adults. Scales large and cycloid, those on lateral line with arborescent tubes. Head naked, but with few scales on cheek. Lateral line interrupted below posterior margin of dorsal fin, with 22 to 24 scales. Vertebrae 24 or 25.

Juveniles usually differ in colour from adults, and the adults of most species exhibit striking sexual dichromatism. Sex change appears to be a common phenomenon with an initial phase of both male and females, and the latter changing into a brilliantly coloured male terminal phase. Fishes of initial phase, only females in some species or both sexes in others, are generally darb, often brown, reddish or grey. Terminal males, mostly of a result of sex change, are usually brightly and complexly coloured, with green frequently dominant. Initial phase fish tend to spawn in aggressions, typically with several males making the upward spawning rushes with a single female. Terminal males maintain sexual territories and spawn with single female within their territories.

Many species could be identified by their live colouration, but this may be lost in preservation, or even vary between juveniles and adults and with sex changes.

Parrotfishes are herbivorous, generally scraping algae from the dead coral substrate with the help of their strong dental plates. A few species feed on portions of live coral. Bits of rock and sand eaten with the algae are crushed into sand and ground with the algae to aid in digestion, making parrotfish some of the most important producers of sand on coral reefs. Some species are seen to rest enveloped in their mucoid secretion.

Parrotfishes are usually found in inshore waters, mostly abundant on coral reefs where they form one of the largest components of fish biomass. Some species are also found in lagoons, creeks, and sea grass beds associated with reef areas.

Parrotfishes are important food fishes, but are not of significant commercial importance. They form an important part of reef associated artisanal fisheries and are commonly found in local fish markets. They are mainly caught by traps, but some are netted or speared. The flesh is soft and does not keep well. Thus these fishes are usually consumed fresh. These fishes are difficult to maintain in aquaria, as the fused teeth need to constantly graze dead coral rock in order to keep from growing too long.

Distribution : Chiefly tropical, abundant on coral reefs, along rocky shores and in sea grass beds, in the Atlantic, Indian and Pacific Oceans.

In all, 95 species are known worldwide under 10 genera and 2 subfamilies; there are 18 species and 6 genera belonging to 2 subfamilies known to occur in India.

Talwar (1984) included *Scarus oedema* (Snyder, 1909) (=*Chlorurus oedema*) and *Scarus tricolor* Bleeker, 1847 in the key to species. Bruce and Randall (1984) shown *Calotomos corolinus* (Valenciennes, 1840) and *Scarus viridifucatus* (Smith, 1956) to occur near Indian coast. These four species are excluded from this work due to want of reliable records, but included in the key to that particular genus.

Species known to occur in India

1. *Calotomus spinidens* (Quoy and Gaimard, 1824)
2. *Cetoscarus bicolor* (Ruppell, 1828)
3. *Chlorurus enneacanthus* (Lacepede, 1802)
4. *Chlorurus gibbus* (Ruppell, 1828)
5. *Chlorurus sordidus* (Forsskal, 1775)
6. *Hipposcarus harid* (Forsskal, 1775)
7. *Leptoscarus vaigiensis* (Quoy and Gaimard, 1824)
8. *Scarus frenatus* Lacepede, 1802

9. *Scarus ghobban* Forsskal, 1775
10. *Scarus globiceps* Valenciennes, 1840
11. *Scarus niger* Forsskal, 1775
12. *Scarus prasiognathus* Valenciennes, 1840
13. *Scarus psittacus* Forsskal, 1775
14. *Scarus quoyi* Valenciennes, 1840
15. *Scarus rivulatus* Valenciennes, 1840
16. *Scarus rubroviolaceus* Bleeker, 1847
17 *Scarus russelii* Valenciennes, 1840
18. *Scarus scaber* Valenciennes, 1840

Key to genera

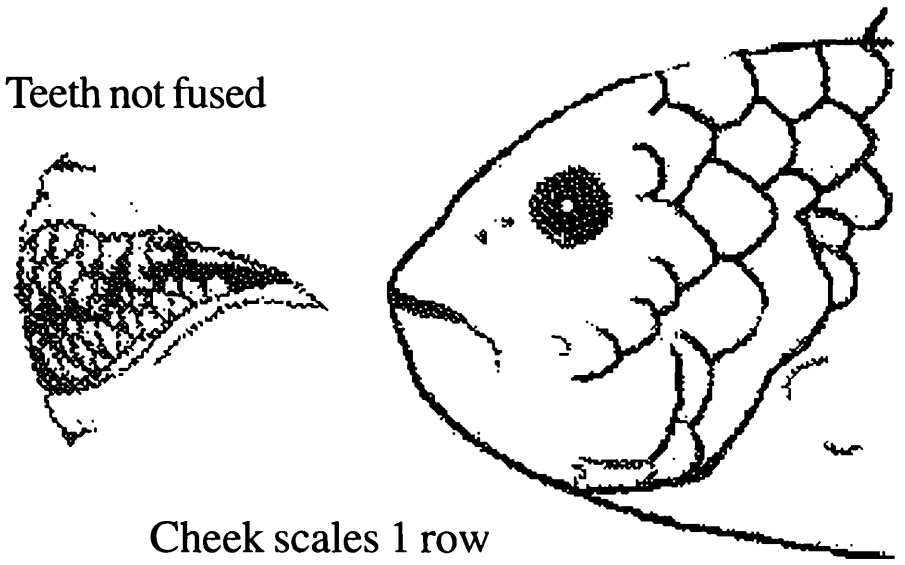
1a. Cheek with only one row of scales containing 3 or 4 scales below eye; teeth incompletely fused; pectoral fin rays usually 13 (rarely 12 or 14) (subfamily Sparisomatinae) 2

1b. Cheek with 2 to 4 horizontal rows of scales below eye; teeth completely fused; pectoral fin rays usually 14 to 16 (rarely 13 or 17) (subfamily Scarinae) 3

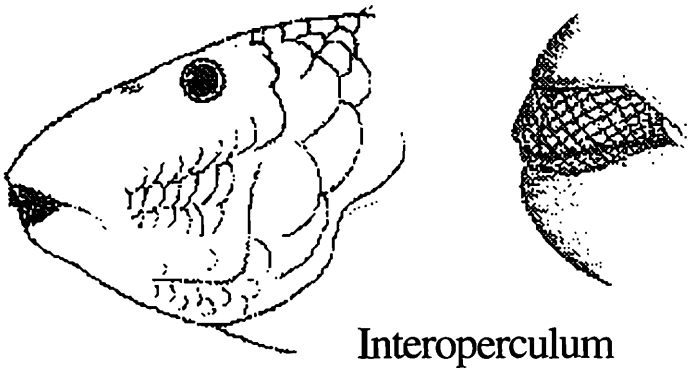
2a. Teeth not fused; free, imbricate, incisor-like teeth present externally on both jaws; upper and lower jaw directly opposed; inner lip developed only posteriorly ..... ***Calotomus***

2b. Teeth fused to form beak like dental plate; upper dental plates enclosed by lower jaw when mouth closed; inner upper lip fully developed and separate from outer lip ..... ***Leptoscarus***

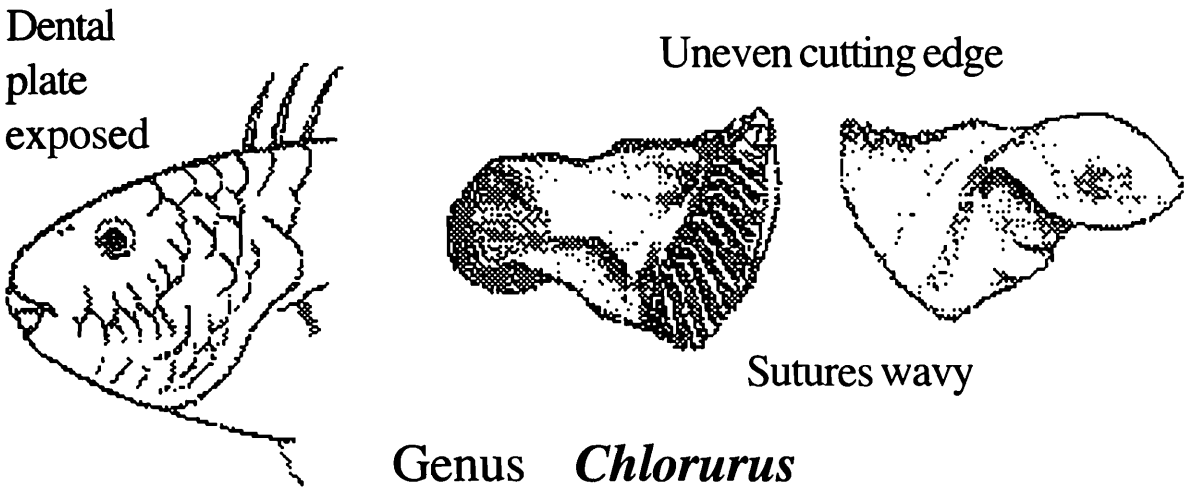
3a. Entire surface of dental plates rough, showing individual teeth; no lateral canine teeth; posterior nostril large; 3 rows of cheek scales and 1 or 2 scales imbedded on preopercular flange .... ***Cetoscarus***



Genus · ***Calotomus***

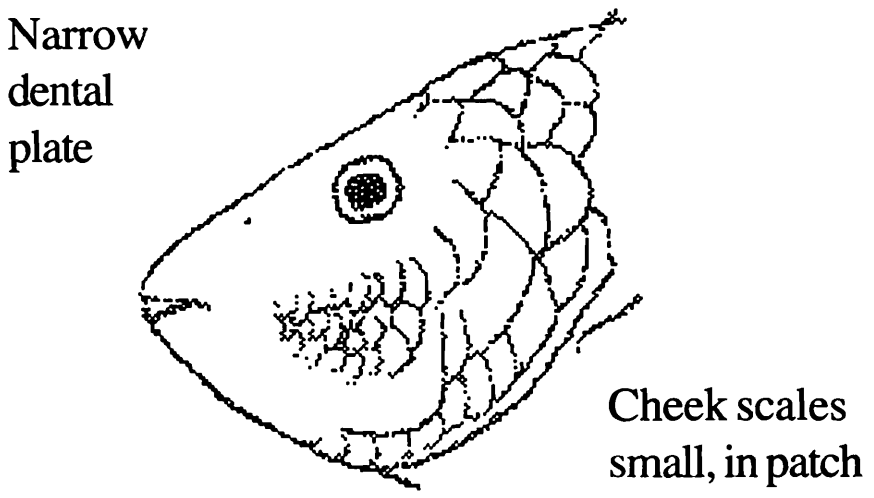


Genus ***Cetoscarus***

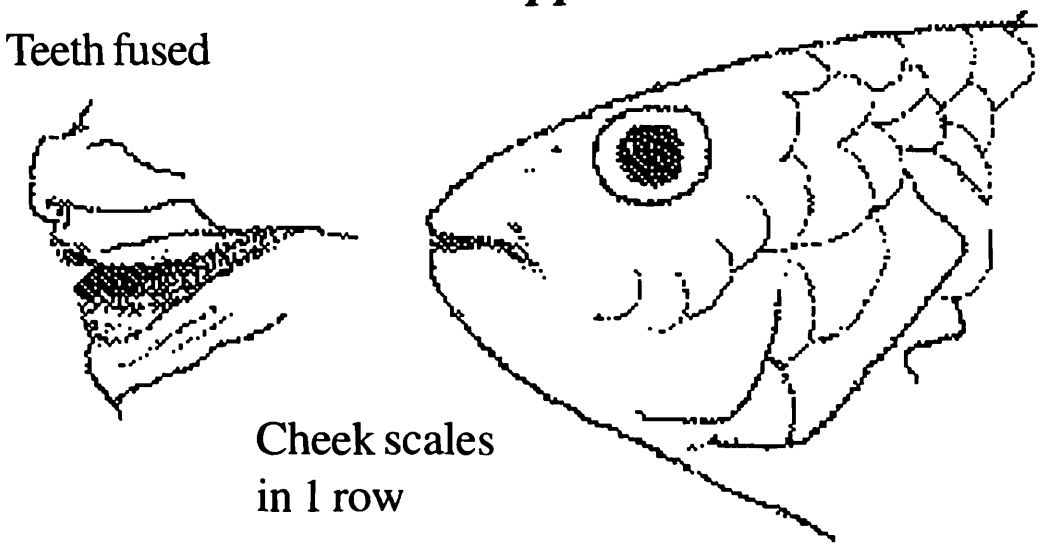


Genus ***Chlorurus***

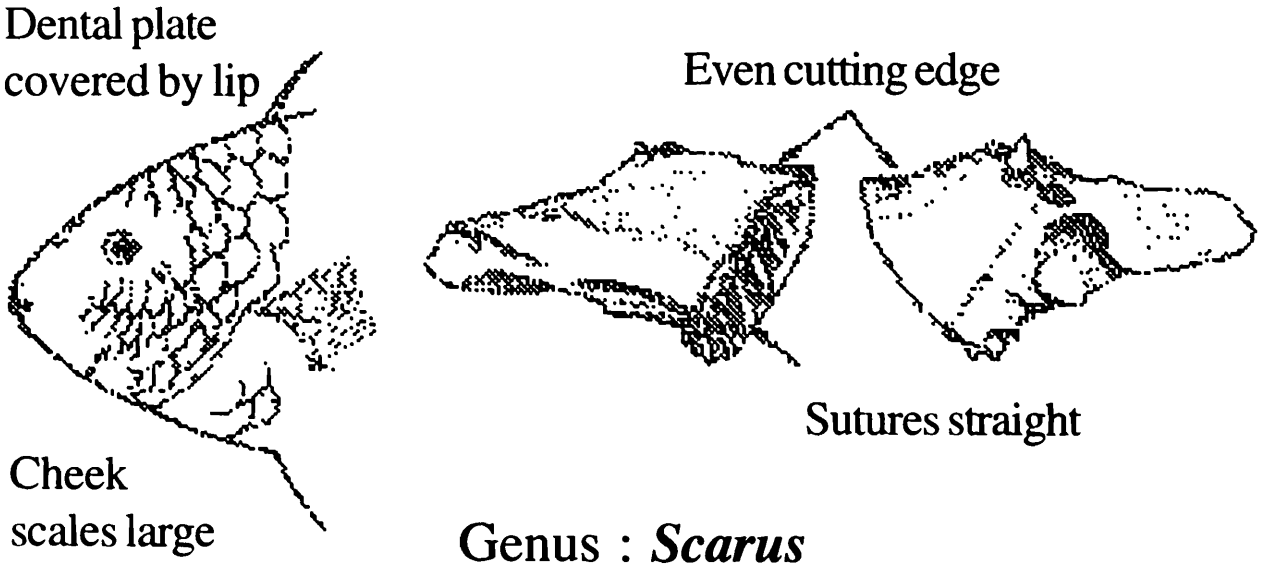
Fig. 1



Genus : ***Hipposcarus***



Genus : ***Leptoscarus***



Genus : ***Scarus***

Fig. 2

3b. Teeth composing dental plates discernable only at margin of dental plates; lateral canine teeth often present; posterior nostril small (except in *S. ghobban*) 4

4a. Cheek scales small, in 3 or 4 rows, in a nearly isolated subtriangular patch; dental plates narrow, their height about 1.5 to 2.2 times in eye diameter; head profile pointed with distinctly angular snout ..... ***Hipposcarus***

4b. Cheek scales not small, in 2 or 3 rows and not in a isolated patch; dental plates broad, their height usually greater than eye diameter; head profile not pointed, snout blunt or rounded 5

5a. Dental plates broadly exposed, lips cover less than half of dental plates ; cutting edge of jaws irregular, zig-zag sutures joining lower jaw; pectoral fin rays 15 or more (rarely 14); median predorsal scales 4 (rarely 3) with no anterior pair; head profile bullet shaped or blunt ..... ***Chlorurus***

5b. Dental plates usually covered by lips up to half or more; cutting edge of jaws usually even, straight sutures joining lower jaw; pectoral fin rays usually 14 or less; median predorsal scales usually 5 to 7 (rarely 4 or 8), an anterior pair may present; head profile rounded or angular ..... ***Scarus***

Genus *Calotomus* Gilbert, 1890

Five species known world over, only one species recorded from Indian waters.

Key to species

1a. Anus not in a black area; incisiform teeth on outer surface at front of upper jaw in a single irregular row; caudal fin rounded, rear margin not whitish ..... *C. spinidens*

1b. Anus in a black area; incisiform teeth on outer surface at front of upper jaw in 2 to 6 overlapping rows; caudal fin slightly rounded to truncate in juveniles, double emarginate with

produced lobes in large males, with a narrow white rear margin ..... *C. carolinus*

In the absence of reliable records, *C. carolinus* (Valenciennes, 1840) is included here only in the key for it likely to occur in the Indian waters (Bruce and Randall, 1984) and also reported from Sri Lanka (de Bruin *et al.*, 1995).

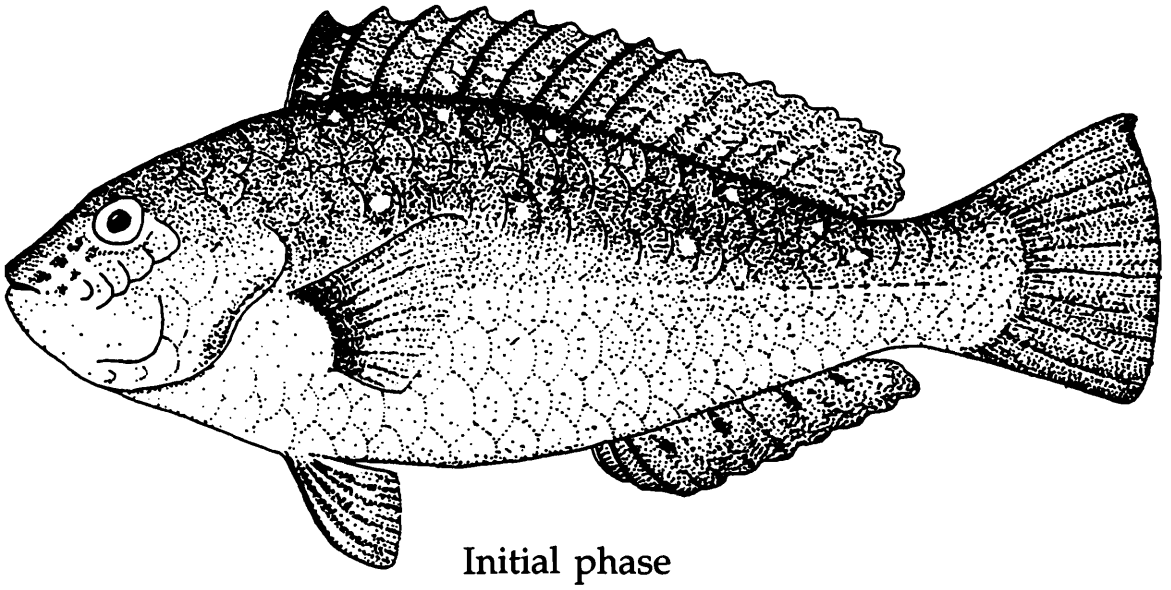
1. ***Calotomus spinidens*** (Quoy and Gaimard, 1824)
(Spinytooth parrotfish)

Diagnostic features : Body depth about 2.5 to 3.2 times in standard length. Teeth not fused, but individual teeth closely applied. Upper and lower jaw directly opposing with mouth closed; 1 to 3 canine teeth on each side of upper jaw. Cheek with 1 row of scales containing 4 or 5 (usually 5) scales. Median predorsal scales usually 4. Pectoral fin with 11 (rarely 12) branched rays. Caudal fin rounded at all sizes.

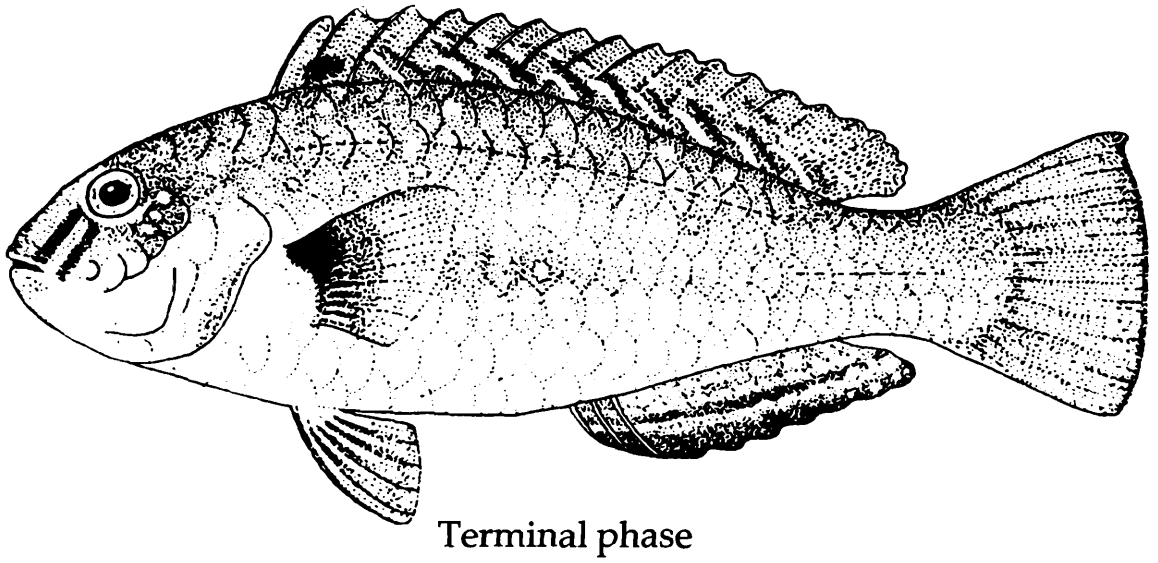
Colour : **Initial phase-** Body greenish brown dorsally, pale ventrally, belly dull rose to yellow. A pale whitish stripe sometimes present on middle of sides. Two irregular reddish bars from eye to upper jaw interspaced by pale yellow. Dorsal and anal fins with pale membrane and darker blotches on spines and rays. Unscaled portion of caudal fin with alternate dark and pale vertical lines,

Calotomus spinidens (Quoy and Gaimard)

posterior edge narrowly unpigmented. Pectoral fins hyaline. Pelvic fins hyaline but with small white spots and few reddish blotches. Teeth white in both phases. **Terminal phase**- Head and body grayish black with pale speckling dorsally, grading to reddish below the midline and whitish ventrally; whitish speckling may form a pale horizontal stripe along midline. Cheeks pale rose; 2 irregular dull rose bars from eye to upper jaw interspaced by white. Dorsal fin pale but speckled with dark pigment and a very prominent irregular black blotch on second dorsal spine and following membrane. Anal fin basally with an irregular reddish band, followed by a pale brown band and a broad black band distally. Unscaled portion of caudal



Initial phase



Terminal phase

Calotomus spinidens (Quoy and Gaimard)

fin with narrow vertical pale and dark bars; posterior edge hyaline. Pectoral fin bases black, yellowish towards base and hyaline at posterior half. Pelvic fins hyaline with whitish speckling and irregular reddish blotches basally.

Size : Maximum to 15 cm standard length.

Distribution : Tropical Indo-West Pacific. Usually associated with sea grass beds and confined to shallow water, usually less than 10m depth.

Remarks : This species has earlier reported as *Cryptotomus spinidens* by de Beaufort (1940), Balan (1958) and Jones and Kumaran (1980) from Indian waters. Day (1877) recorded this species as *Callyodon viridiscens* (Ruppell), a species which differs from *C. spinidens* mainly in colouration, in having numerous small black spots on opercle and in area near pectoral fins, and dark pigment around anus, and, caudal fin rounded to double emarginate.

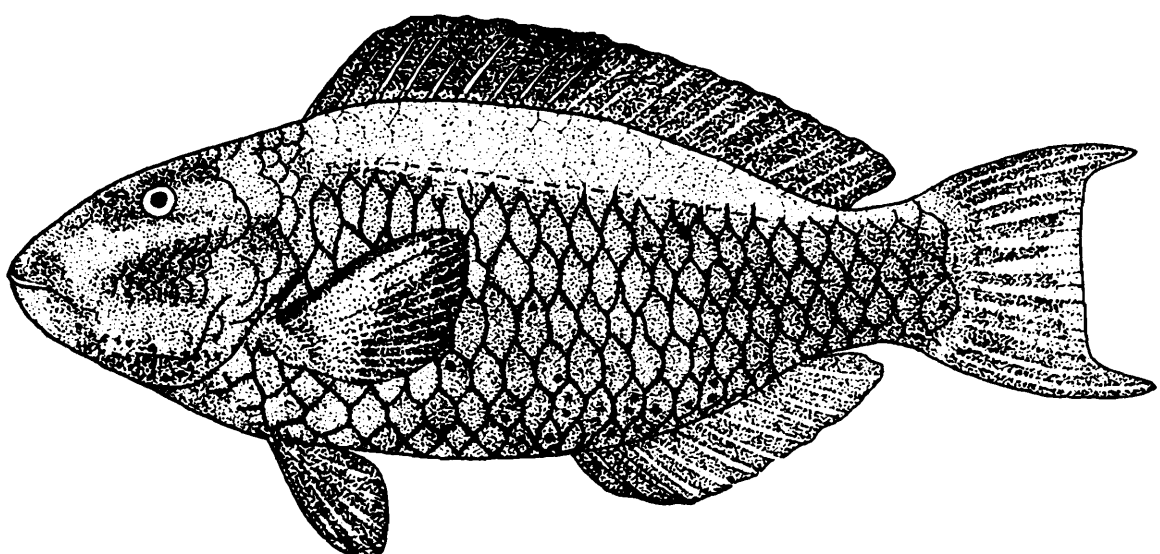
Genus ***Cetoscarus*** Smith, 1956

This genus known to contain only one species in world over, *i.e. C. bicolor,* reported recently from the Andamans.

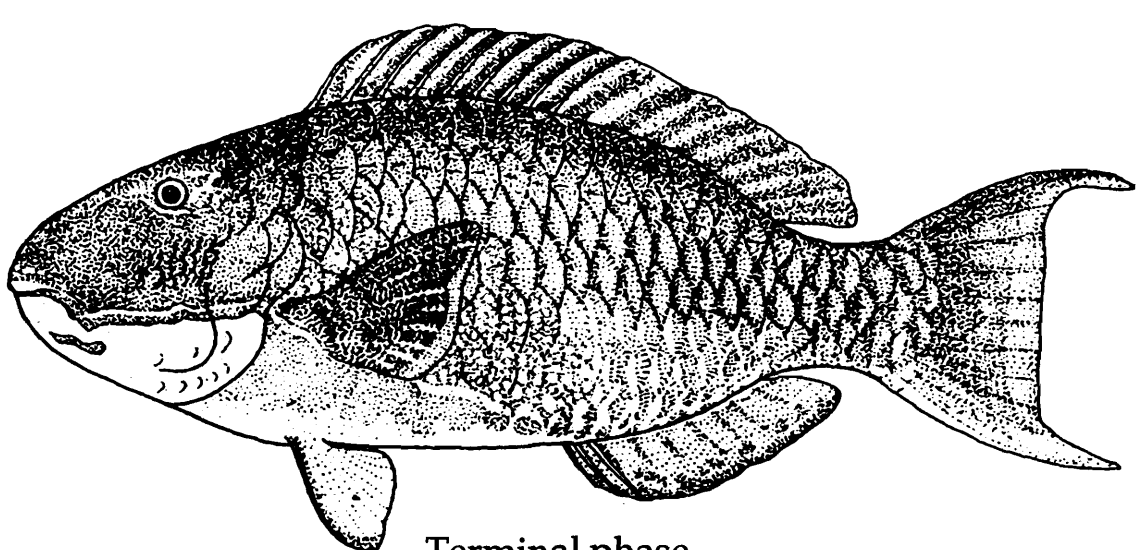
2. ***Cetoscarus bicolor*** (Ruppell, 1828)
(Bicolor parrotfish)

Diagnostic features : Body depth at pelvic fin base about 2.8 times in standard length. Teeth fused in upper and lower jaws to form dental plates; plates rough to touch, the individual teeth clearly visible over entire surface of plates; lips cover ¾ to whole of dental plates; no canine teeth on jaws. Median predorsal scales 6, rarely 5 or 7 Cheek with 3 rows of scales containing 5 to 8 scales in upper row, 5 to 9 scales in middle row and 1 to 8 scales in lower row. Posterior nostril large and oval. Pectoral fins with 12 (sometimes 13) branched rays. Caudal fin slightly rounded to truncate in young, emarginate to deeply emarginate in adults.

Colour : **Initial phase**- Body yellow dorsally above level of eye, bluish grey ventrally. Scales with black edges, centers with small black spots and short irregular lines. Head purplish to reddish brown with some small black spots posterioly and ventrally. Fins reddish to purplish brown. Caudal fin with a pale yellow crescent midposterioly. Anterior part of dorsal fin and rays on underside of pectoral fins often yellow. Dental plates white in both phases. **Terminal phase**- Body mostly green. Ventral side of head, thorax and abdomen orange. The edges of the scales orange. Anterior scales on body with many small orange spots. An orange to pink line from edge of upper lip to pectoral fin base, head above this



Initial phase



Terminal phase

Cetoscarus bicolor (Ruppell)

Initial phase

Terminal phase

Cetoscarus bicolor (Ruppell)

line green with orange to pink spots except for irregular green band through upper part of eye. A broad green band across lower cheek adjacent to orange line, continuing broadly on thorax and narrowing as it passes posteriorly on abdomen to origin of anal fin. Dorsal fin blue with orange streak on each interradial membrane parallel to the rays. Anal fin orange with a blue border and some scattered blue spots on outer margin. Caudal fin orange with a pale or yellowish crescent mark midposteriorly, preceded by a band of blue-green or a series of blue-green spots. Upper and lower edge of caudal fin blue. Pectoral fins with dark purplish rays and hyaline membranes, yellow at axils. Pelvic fins orange with blue leading edge. Juveniles distinctly coloured; white with a broad dark edged orange bar on head enclosing eye and most of postorbital head; a large yellow to orange-edged black spot anteriorly in dorsal fin; caudal fin broadly edged with orange yellow.

Size : Maximum to 75 cm standard length.

Distribution : Indo-West Pacific. Found close to regions of deep water on coral reefs.

Remarks : Rao (2004) reported this species from the Andamans only recently.

Genus *Chlorurus* Swainson, 1839

This genus comprises 18 species world wide, 3 in Indian waters. Although, Talwar (1984) has included *Scarus oedema* (Snyder, 1909) (=*Chlorurus oedema*), reliable records of its occurrence in Indian waters not traceable. But this has been reported from Sri Lanka (de Bruin *et al.*, 1995) and hence, included only in the key.

Key to the species

1a. Median predorsal scales 3; dorsal profile of head of adults with a prominent hump above eyes; body uniform brown to bluish black ..... *C. oedema*

1b Median predorsal scales usually 4; dorsal profile of head not humped above eyes; colour mostly greenish, if brown with white spots on sides 2

2a. Pectoral fins usually with 14 branched rays; cheek with 3 rows of scales; dorsal profile of snout strongly convexed; initial phase primarily red and terminal males green in colour .... *C. gibbus*

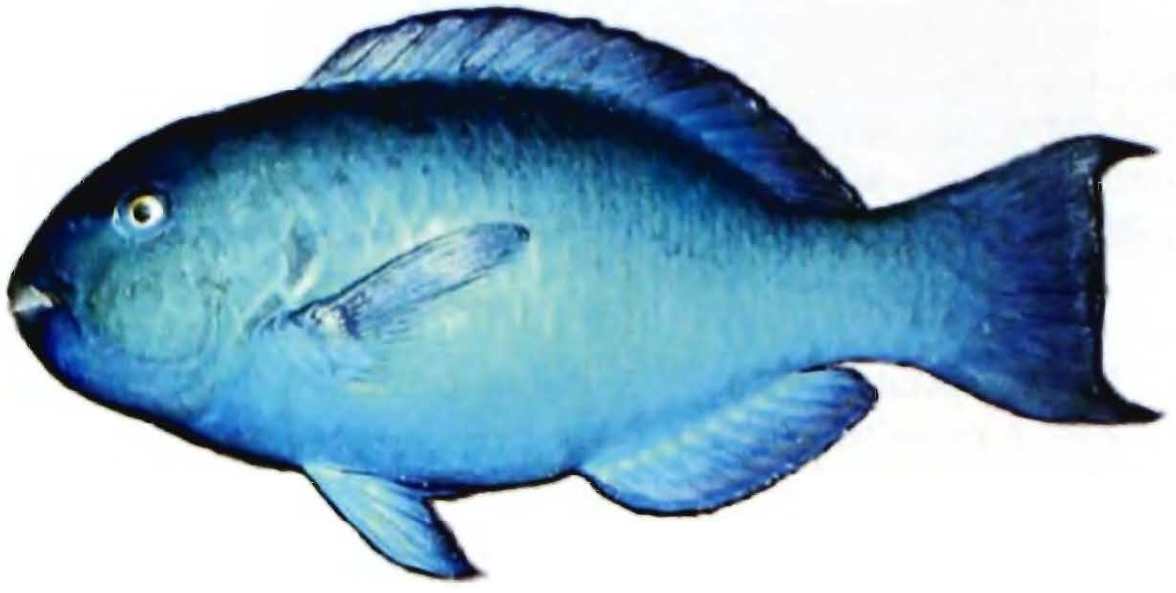
2b. Pectoral fins usually with 13 branched rays; cheek with 2 rows of scales; dorsal profile of snout bluntly rounded or steep; colour not as in 2a 3

3a. Pectoral fins about 1.4 and pelvic fins about 1.7 times in head length; gillrakers 54 to 61; head and body mostly green; an orange streak at corner of mouth and narrow circle of lavender pink around eyes ..... *C. enneacanthus*

3b. Pectoral fins 1.4 to 1.6 and pelvic fins 1.8 to 2.1 times in head length; gillrakers 42 to 51; initial phase dark brown, red around mouth, often with 2 rows of whitish spots on sides; terminal males green with green cheek and pink chin .....*C. sordidus*

3. *Chlorurus enneacanthus* (Lacepede, 1802) (Captain parrotfish)

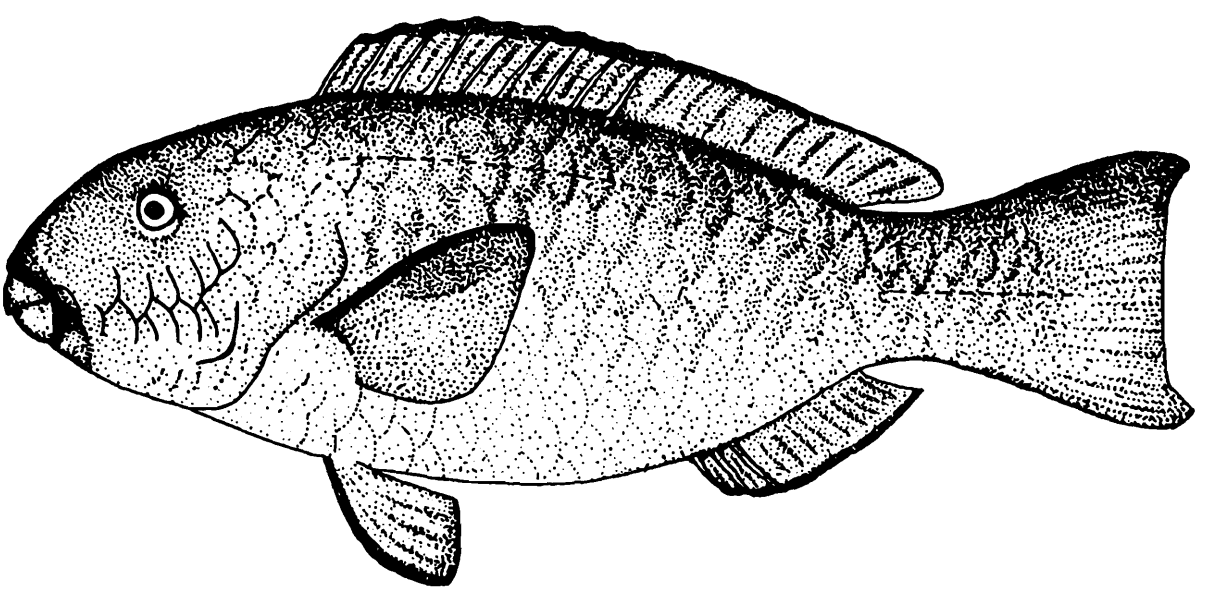
Diagnostic features : Body depth 2.6 to 2.9 times in standard length. Dorsal profile of snout steep. Teeth fused in upper and lower jaws to form dental plates; plates smooth to touch, the



Chlorurus enneacanthus (Lacepede)

individual teeth visible only at margins; upper jaw enclosing lower jaw. Lips cover less than half of dental plates; about 3 canine teeth posteriorly on upper dental plates. Total gill rakers 54 to 61 on first arch. Median predorsal scales 4. Cheek with 2 rows of scales containing 6 to 7 scales in upper row, 5 to 7 scales in lower row. Posterior nostril small. Pectoral fins with 13 (sometimes 12) branched rays. Caudal fin slightly rounded to truncate in young, emarginate in adults.

Colour : Body greenish dorsally. Scales on midbody and posterior part narrowly edged with faint lavender pink. Caudal peduncle and basal scaled part of caudal fin lighter green. Dental plates greenish. Caudal fin violet with blue upper and lower margins and green posterior margin; a pink streak in each lobe. Pectoral and pelvic fins greenish with blue anterior margins. Dorsal and anal fins pinkish with blue border.



Chlorurus enneacanthus (Lacepede)

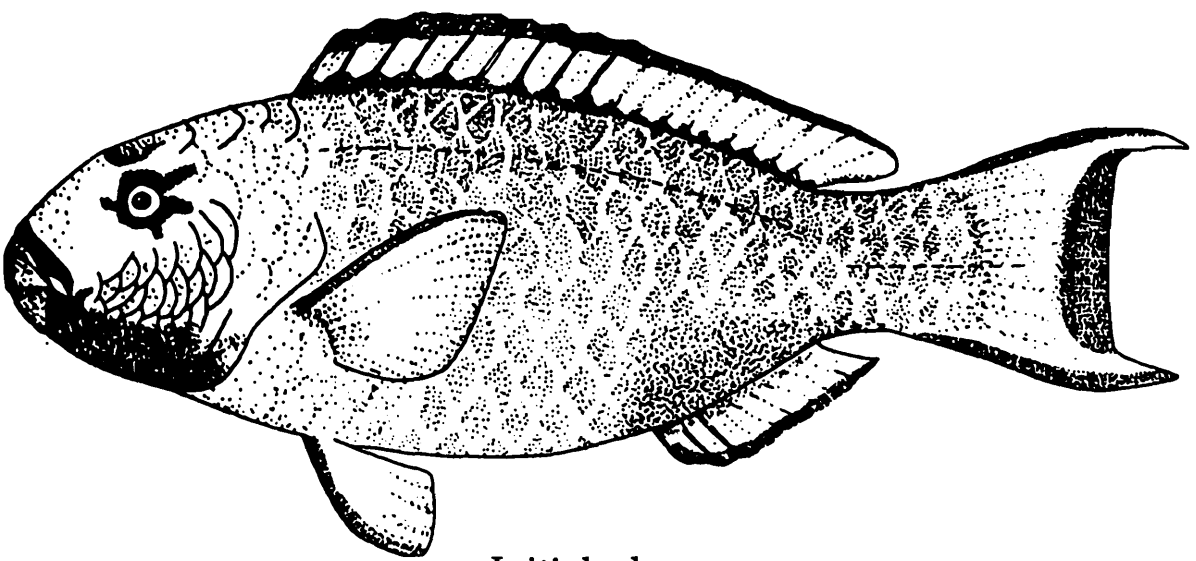
Size : Maximum to 40 cm standard length.

Distribution : Indo-West Pacific.

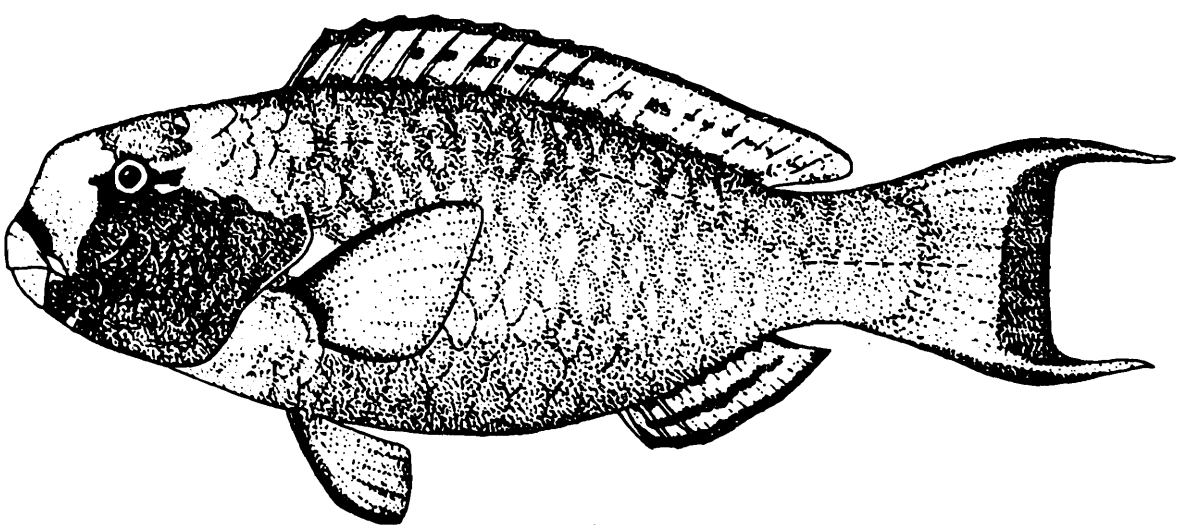
Remarks : Previously recorded as *Callyodon capitaneus* (Valenciennes) by Jones and Kumaran (1965, 1980), where the specimens stated to have 'scales of head and upper sides of anterior part of body with several small pale spots'

4. *Chlorurus gibbus* (Ruppell, 1828)
(Heavybeak parrotfish)

Diagnostic features : Body depth 2.4 to 2.6 times in standard length. Dorsal profile of snout greatly convex, becoming bulged in terminal phase. Teeth fused in upper and lower jaws to form dental plates; plates smooth to touch, the individual teeth visible only at margins; upper jaw enclosing lower jaw. Lips cover ¼ or less than half of dental plates; one or two canine teeth posteriorly on upper dental plates. Median predorsal scales 4 (sometimes 3). Cheek with 3 rows of scales containing 4 to 8 scales in upper row, 5 to 10 scales in middle row, and 1 to 8 scales in lower row. Posterior

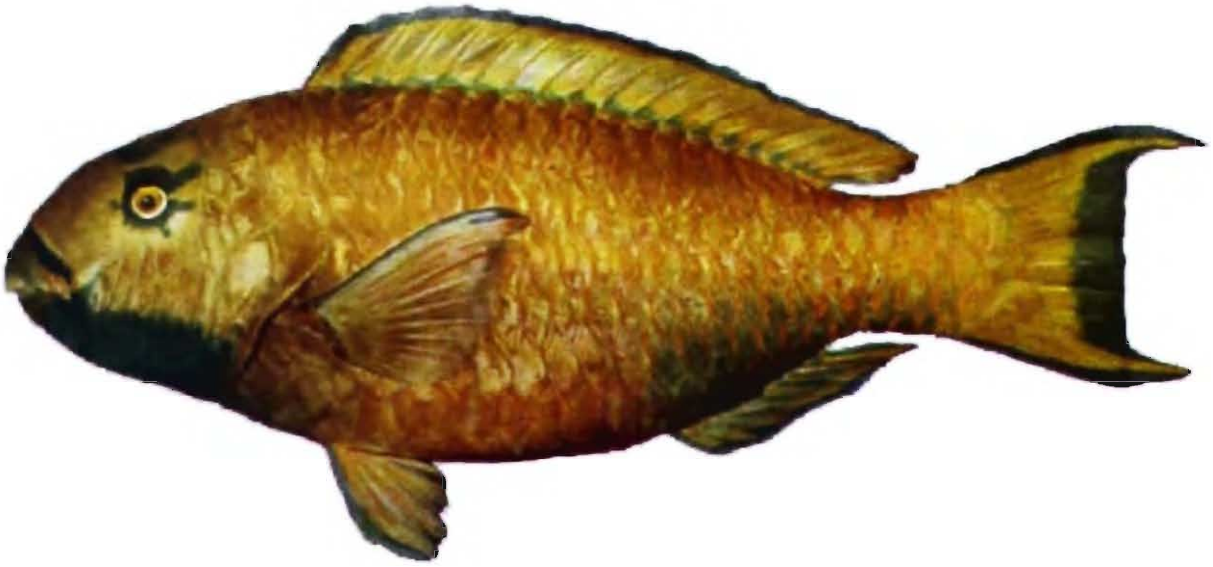


Initial phase



Terminal phase

Chlorurus gibbus (Ruppell)



Initial phase

Terminal phase

Chlorurus gibbus (Ruppell)

nostril small. Pectoral fins with 14 (rarely 13 or 15) branched rays. Caudal fin emarginate in young, produced in adults, the lobes very long in terminal phase.

Colour : **Initial phase**-Body dark red; lips with short green stripes. Dorsal and anal fin yellow with green margins. Pelvic and pectoral fins red with a narrow green leading edge. Anal fin with a blue margin, a blue green medial band and green basal spots. Dental plates greenish to blue green. **Terminal phase**- Body grey green. Scales on body with a narrow pink or orange bar. Thorax blue green and abdomen pale greenish yellow with 2 faint greenish broken stripes. Snout and upper part of head purplish. Lips broadly edged in blue. An irregular dull whitish blotch may present posterior to eyes. Dorsal and anal fin light orange with blue margin and a median blue green band. Caudal fin orange with bluish margin. Pectoral fins purple green and pelvic fins pinkish, both with blue leading edges.

Size : Maximum to 50 cm standard length.

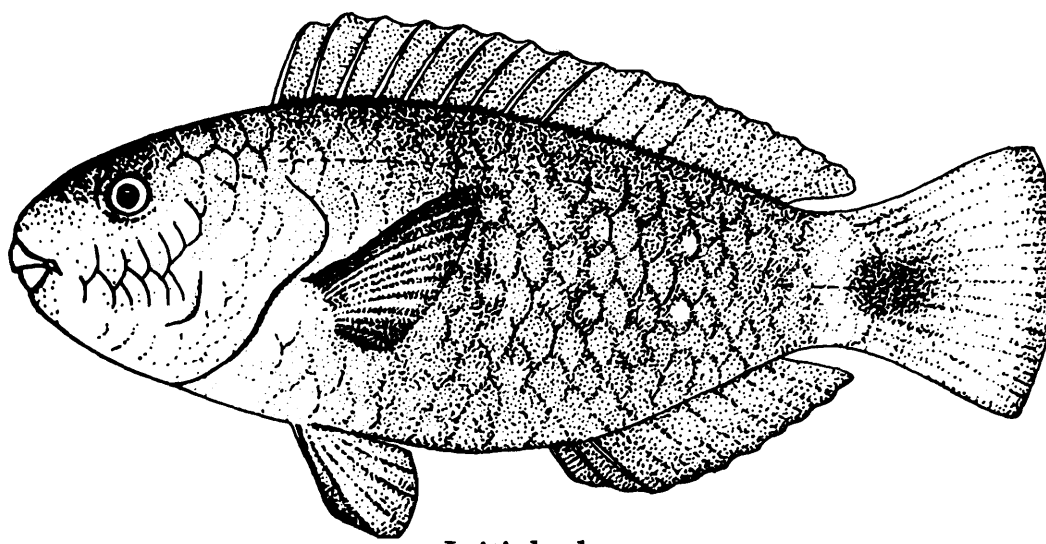
Distribution : Indo-West Pacific. Occurs primarily on outer reef areas.

Remarks : This species has recently reported from the Andamans by Rao (2004).

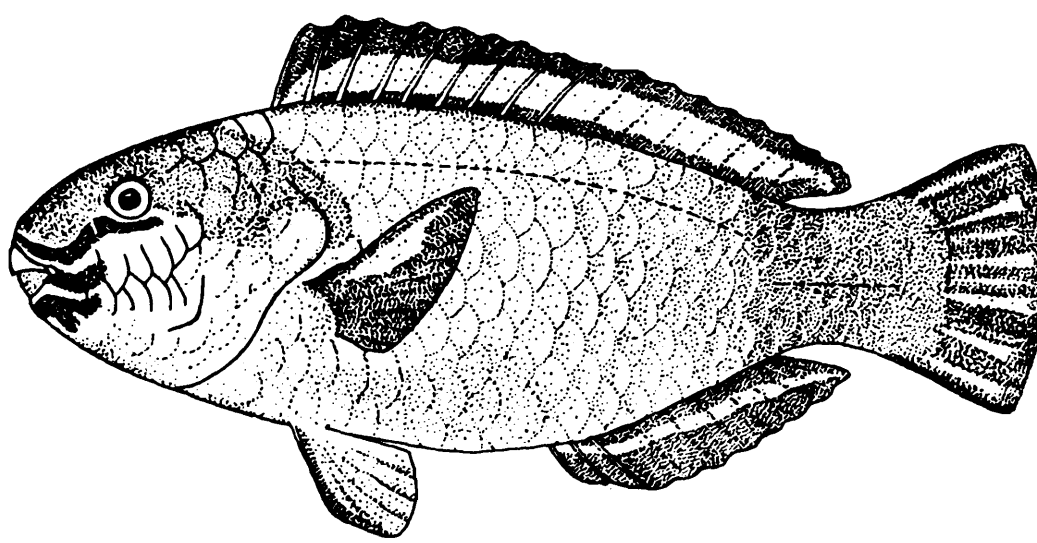
5. ***Chlorurus sordidus*** (Forsskal, 1775)
(Daisy parrotfish)

Diagnostic features : Body depth 2.3 to 3.0 times in standard length. Dorsal profile of snout bluntly rounded. Teeth fused in upper and lower jaws to form dental plates; plates smooth to touch, the individual teeth visible only at margins; upper jaw enclosing lower jaw. Lips cover less than half of dental plates; 0 to 2 canine teeth posteriorly on upper dental plates. Total gill rakers 42 to 51 on first arch. Median predorsal scales 4 (rarely 3). Cheek with 2 rows of scales containing 6 to 8 scales in upper row, and 5 to 8 scales in lower row. Posterior nostril small. Pectoral fins with 13 (rarely 12 or 14) branched rays. Caudal fin rounded at all size.

Colour : **Initial phase**- Body dark brown. Scales sometimes edged in dull yellow, often with 2 longitudinal rows with 5 or 6 whitish spots along sides. A broad whitish bar containing a large round black spot on caudal peduncle and caudal fin base often present. Dorsal, anal and pelvic fins dark brown to reddish brown; pectoral fins pale with dark brown rays. Dental plates reddish. **Terminal phase**- Body green. Scales edged in salmon pink. Scales of caudal peduncle and caudal fin base greenish. Ventral side pale salmon with indistinct green stripes. A broad pink band from snout to below eye. Cheek green up to pectoral fin base. Green bands radiating from eyes. Chin pink with broad irregular transverse



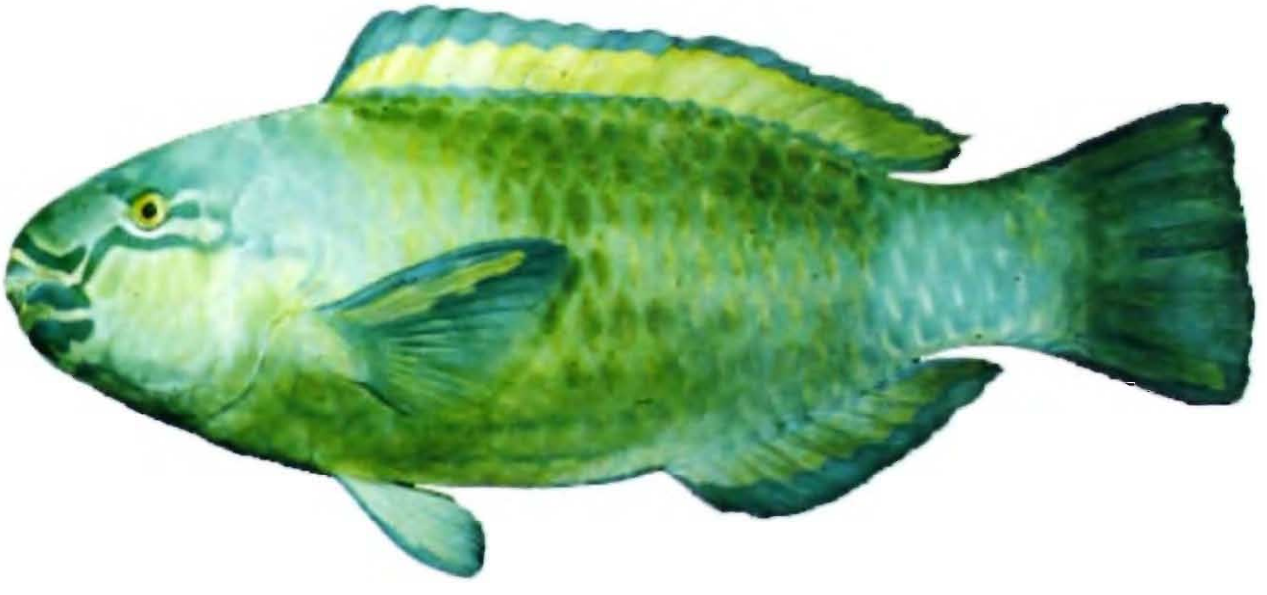
Initial phase



Terminal phase

Chlorurus sordidus (Forsskal)

Initial phase



Terminal phase

Chlorurus sordidus (Forsskal)

blue green bands. Upper and lower edges of caudal fin blue with a salmon pink submarginal band. Dorsal fin with broad blue border, a middle salmon pink zone and a green basal band. Pectoral fins with blue green rays. Pelvic fins light orange with a blue leading edge. Dental plates greenish.

Size : Maximum to 32 cm standard length.

Distribution : Indo- Pacific, eastward to Hawaian Islands. A very common species on coral reefs and lagoons, often occurring in shallow waters.

Remarks : Previously recorded as *Pseudoscarus erythrodon* (Valenciennes) and *Pseudoscarus sordidus* (Forsskal) by Day (1877) and as *Callyodon sordidus* by Jones and Kumaran (1980).

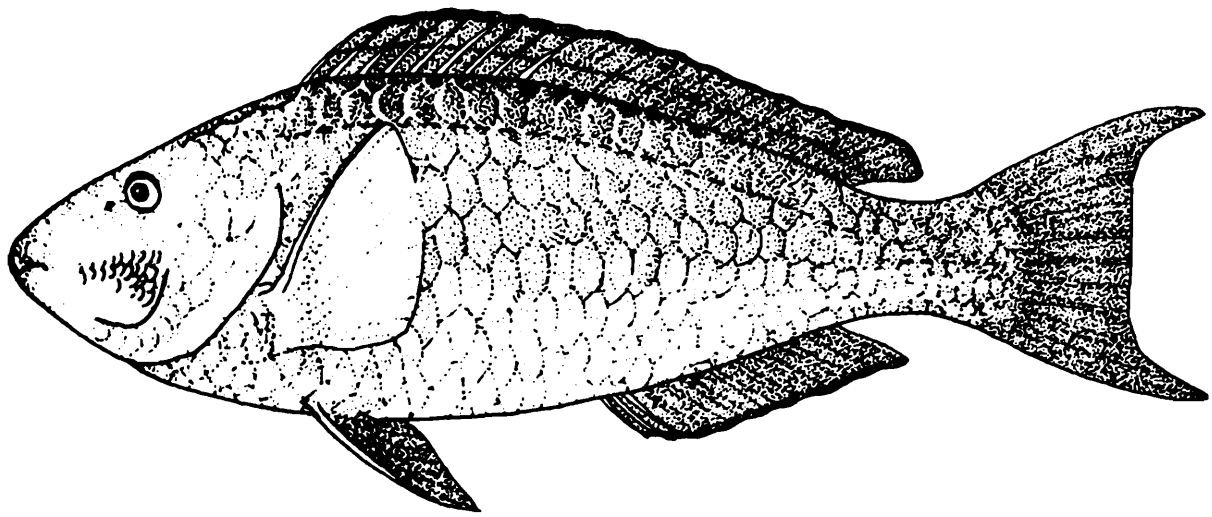
Genus ***Hipposcarus*** Smith, 1956

This genus is represented by 2 species, only *H. harid* occurs in Indian waters.

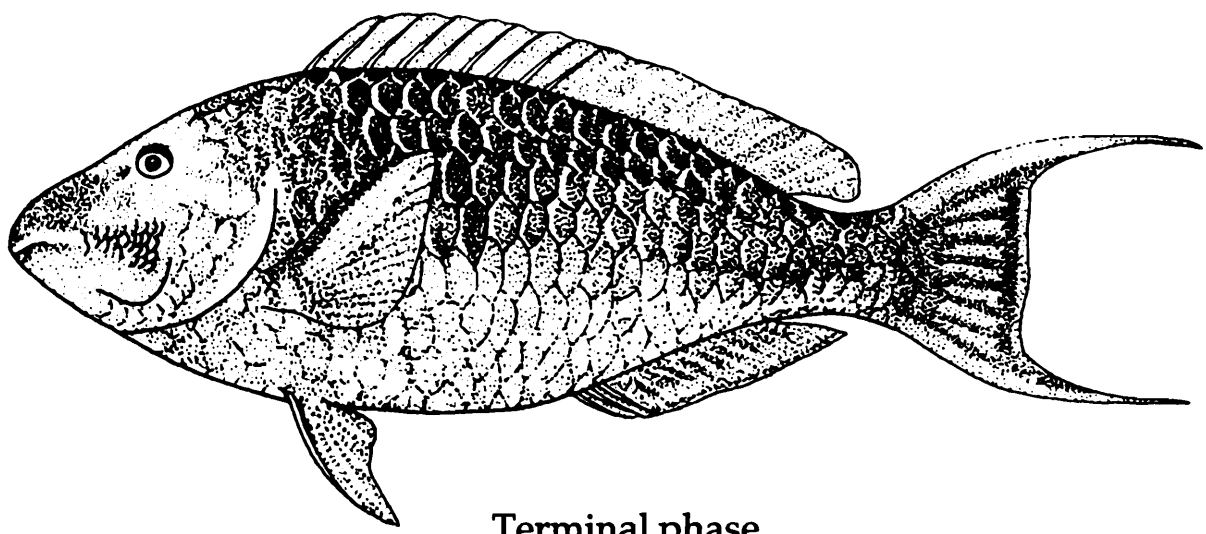
6. ***Hipposcarus harid*** (Forsskal, 1775) (Candelamoa parrotfish)

Diagnostic features : Body depth at pelvic fin base 2.7 to 2.9 times in standard length. Upper and lower head profile slope gradually, producing a characteristic long snout. Teeth fused to form dental plates in both jaws; dental plates smooth, the individual teeth only visible at margins. Dental plates narrow, 1.5 to 2.0 times in eye diameter, lips covering nearly full dental plates. Upper dental plate with 1 or 2 canines posteriorly. Median predorsal scales 4 (rarely 3). Cheek with 3 or 4 rows of small scales in a subtriangular patch, the dorsal row with 7 to 10 scales, the 2nd row with 6 to 10 scales, the 3rd row with 2 to 8 scales and the 4th row (if present) with 2 to 9 scales. Pectoral fin with 13 (rarely 12 or 14) branched rays. Caudal fin emarginate in young and lobes greatly produced in the terminal phase.

Colour : **Initial phase** – Light grey dorsally, whitish ventrally, scales with pale edges. Dorsal edge of eye blue. Dorsal and anal



Initial phase



Terminal phase

Hipposcarus harid (Forsskal)

fins pale yellow with light blue-green borders; some times with a blue longitudinal band in middle of fins. Caudal fin pale yellow, with light blue rays. Pectoral fin pale, rays yellowish, 2nd ray pale orange; basal edge light blue. Pelvic fins light orange with a pale blue leading edge. Dental plates white in both phases. **Terminal phase** –Body green, scales with orange edges dorsally. A row of blue spots on scales below pectoral fin base. A few blue spots near anal fin origin. Head green dorsally with irregular pale yellow bands from eyes, 2 anteriorly and 3 posteriorly. Cheek and lower part of head pale orange. Dorsal and anal fins light orange-yellow with blue borders and 1 or 2 longitudinal rows of blue spots in the middle. Caudal fin blue with a broad orange band in each lobe and

Initial phase

Terminal phase

Hipposcarus harid (Forsskal)

a short longitudinal orange streak on central part of median 7 rays. Upper margin of pectoral fins blue followed by a deep yellow zone and lower part orange. Pelvic fins light orange with a blue lateral edge.

Size : Maximum to 42 cm standard length.

Distribution : Indian Ocean. This species is found in coastal waters associated with coral reefs and reef flats.

Remarks : Previously recorded as *Pseudoscarus harid* by Day (1877) and as *Callyodon harid* by Jones and Kumaran (1980).

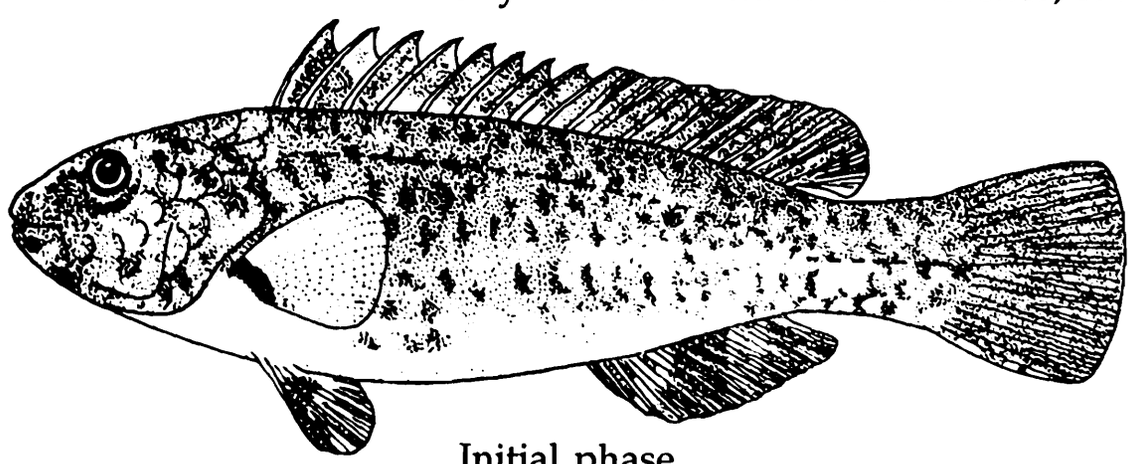
Genus ***Leptoscarus*** Swainson, 1839

This genus is represented by only one species.

7 ***Leptoscarus vaigiensis*** (Quoy and Gaimard, 1824) (Marbled parrotfish)

Diagnostic features : Body elongate, depth 2.8 to 3.8 times in standard length. Teeth fused to form dental plates; upper dental plates enclosed by the lower plates when closed. Matured males with 1 to 4 canine teeth projecting laterally from upper dental plates. Cheek with 1 row of 3 to 6 scales below eye. Median predorsal scales 3 to 5. Pectoral fin with 11 or 12 branched rays. Caudal fin slightly rounded at all sizes.

Colour : **Initial phase** – Greenish-brown, darker above, and whitish below. Head and body covered with white blotches; lower

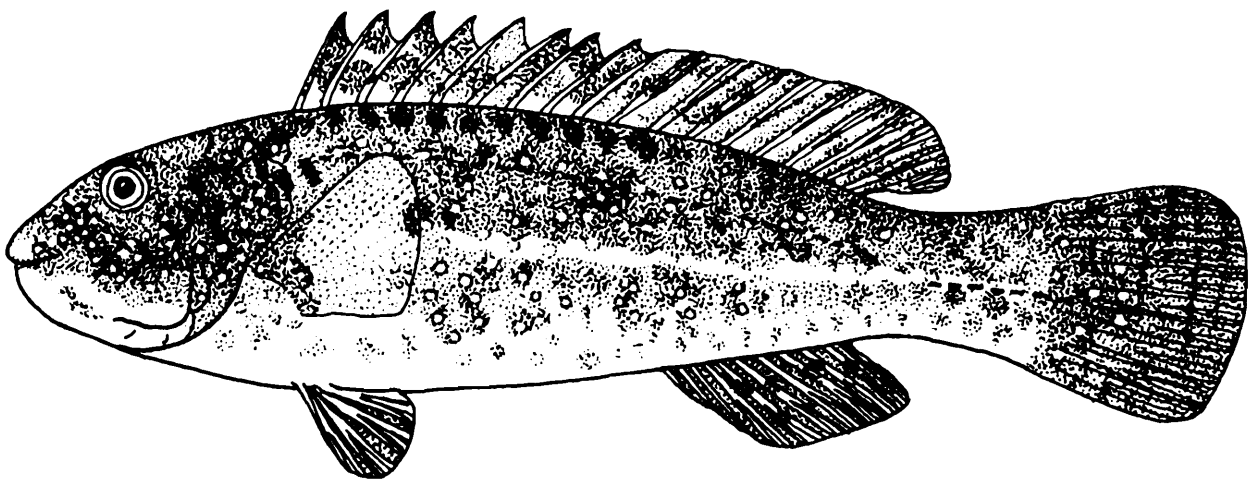


Initial phase

Initial phase

Terminal phase

Leptoscarus vaigiensis (Quoy and Gaimard)



Terminal phase

Leptoscarus vaigiensis (Quoy and Gaimard)

flank, anal and pelvic fins spotted with brown. Pectoral fin bases dark. **Terminal phase** - Greenish-brown, darker above, yellowish below. Head, body and caudal fin spotted with blue, with a broad white stripe along midbody from posterior to opercle to anterior to caudal peduncle.

Size : Maximum to 27 cm standard length.

Distribution : Indo-west Pacific, from east coast of Africa, Red Sea, east ward to Mariana Islands and Easter Island. Usually found in sea grass beds, in shallow waters.

Remarks : Previously reported as *Scarichthys caeruleopunctatus* (Ruppell) by Day (1877).

Genus ***Scarus*** Forsskal, 1775

This genus known to comprise 51 species world wide; 11 species occur in Indian waters. Although reliable records are not available for *S. tricolor* and *S. viridifucatus*, both are included in the key here, considering it may occur in our area as indicated in Talwar (1984) and Bruce and Randall (1984).

Key to species

1a. Dorsal profile of head rising steeply from mouth to level of eye, then curving sharply to nearly straight; no rudimentary lateral row of teeth on upper pharyngeal bones; initial phase yellowish-grey dorsally, reddish ventrally; terminal males green dorsally, yellowish on sides, pale blue-green ventrally ..... *S. rubroviolaceus*

1b. Dorsal profile of head not shaped as above; a row of rudimentary teeth laterally on each upper pharyngeal bone often present 2

2a. Median predorsal scales usually 4; 2 or 3 rows of cheek scales 3

2b. Median predorsal scales usually 5 to 7; 3 rows of cheek scales 5

3a. Scale rows on cheek 3; a pair of small laterally adjoining or slightly overlapping scales anterior to first median predorsal scale; terminal male with a large bright blue-green patch on side of head anterior to eye ..... *S. viridifucatus*

3b. Scale rows on cheek 2; no pair of laterally adjoining scales anterior to first median predorsal scale 4

4a. Median predorsal scales subequal; caudal fin of initial phase slightly emarginate and, of terminal phase deeply emarginate; a dark brown spot basally at front of 1st interspinous membrane of dorsal fin; initial phase reddish-brown without dark bars; lips without bands of green or orange; terminal phase not abruptly darker on anterior half of body; snout of terminal male lavender grey dorsally ..... *S. psittacus*

4b First two median predorsal scales larger than last two; caudal fin of initial phase slightly rounded, becoming double emarginate with prolonged lobes in terminal phase; no dark spot on 1st interspinous membrane of dorsal fin; initial phase reddish-brown, often with 5 dark bars on body; lips with transverse bands of dull green and orange; terminal phase

abruptly darker anterior to a line from base of 9th dorsal spine to anal fin origin; snout blue green dorsally ..... *S. russelii*

5a. Median predorsal scales usually 7 6

5b. Median predorsal scales usually 5 or 6 7

6a. Dental plates blue green; initial phase reddish brown, grey along sides with brown spots and short lines; head with dull green bands on lips, chin and extending anteriorly and posteriorly from eyes; terminal phase dark green, scales with narrow edges; head with some green bands, a broad irregular band from upper edge of eyes to a greenish yellow spot at upper end of gill openings; penultimate anal fin ray prolonged in terminal male ..... *S. niger*

6b. Dental plates white; initial phase yellow to light reddish brown, with 5 dark brown stripes along sides; no green markings on head; terminal phase green on lower part of head and body posterior to a vertical at base of 5th dorsal fin ray; rest of head and body green with numerous small orange spots and short irregular lines; penultimate ray of anal fin not prolonged .... *S. frenatus*

7a Median predorsal scales usually 5; 3 whitish stripes on abdomen following centers of scales rows; initial phase brown to grayish brown; no dark band at pectoral fin base; terminal males green with an orange bar on each scale except on abdomen, 3 green stripes on abdomen; salmon pink stripes edged in blue green from front of snout through eyes, an narrow blue-green bands radiating dorsally from eyes; a black spot at or near base of 4th spine of dorsal fin ..... *S. globiceps*

7b. Median predorsal scales usually 6; no whitish stripe on abdomen following centers of scales rows; colour of initial and terminal phases not as above 8

8a. Pectoral fins usually with 13 branched rays 9

8b. Pectoral fins usually with 12 branched rays 10

9a. Posterior nostril oval, 2.5 times larger than anterior nostril; 3rd row of scales on cheek, when present, usually with 1 scale; dental plates white; initial phase yellow, the centers of scales blue, often with 5 blue bars on body; terminal phase light green, the scales edged with salmon-pink; a broad irregular green band across lower cheek ..... *S. ghobban*

9b. Posterior nostril at most slightly larger than anterior nostril; 3rd row of scales on cheek with 1 to 4 scales; dental plates greenish; initial phase reddish brown without dark bars, pale posteriorly on caudal peduncle with whitish spots; head with few dark green dots and a narrow dark green band from chin to near eyes; terminal phase dark green; cheek and opercle below eyes bright blue green, head above cheek and around mouth abruptly orange; caudal fin pale blue green with blue margin and a broad submarginal orange band on each lobe ..... *S. prasiognathus*

10a. Caudal fin slightly rounded to truncate in initial phase, lobes produced a little in terminal phase; dental plates yellowish; body mostly green with red margins or pink bars to scales. 11

10b. Caudal fin lunate to moderately emarginate in initial phase, lobes well produced in terminal phase; dental plates whitish; body mostly grey or purplish grey with dark edges to scales in initial phase; terminal phase greenish with bands on snout to below eyes 12

11a. Dorsal and anal fins rosy; head with blue green streaks radiating from eyes ..... *S. quoyi*

11b. Dorsal and anal fins bluish green; head light orange with irregular blue green lines and spots forming reticulum on chin and snout; cheek yellow orange ..... *S. rivulatus*

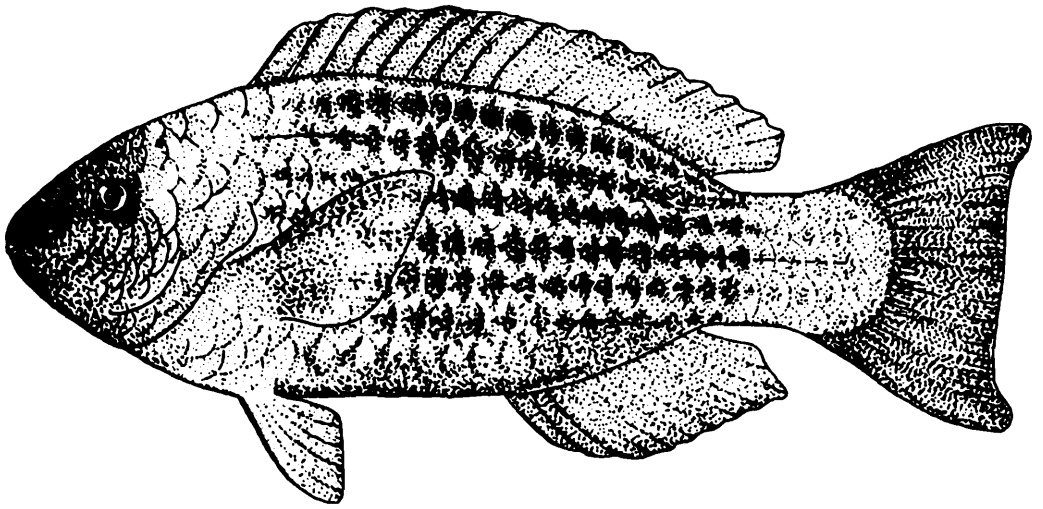
12a. Scales in 3rd row on cheek 1 to 4; no canine teeth on dental plates; initial phase yellowish dorsally with 4 dark grey bars, light yellowish to pinkish white ventrally; terminal phase green posteriorly, dark grey anteriorly ..... *S. scaber*

12b Scales in 3rd row on cheek 3 to 6; 1 or 2 canine teeth on dental plates posteriorly in terminal male and large initial phase; initial phase dark purplish to blackish dorsally blue on sides, orange ventrally; terminal males green with 2 narrow blue green stripes on head from snout backwardly touching upper and lower margin of eyes ..... *S. tricolor*

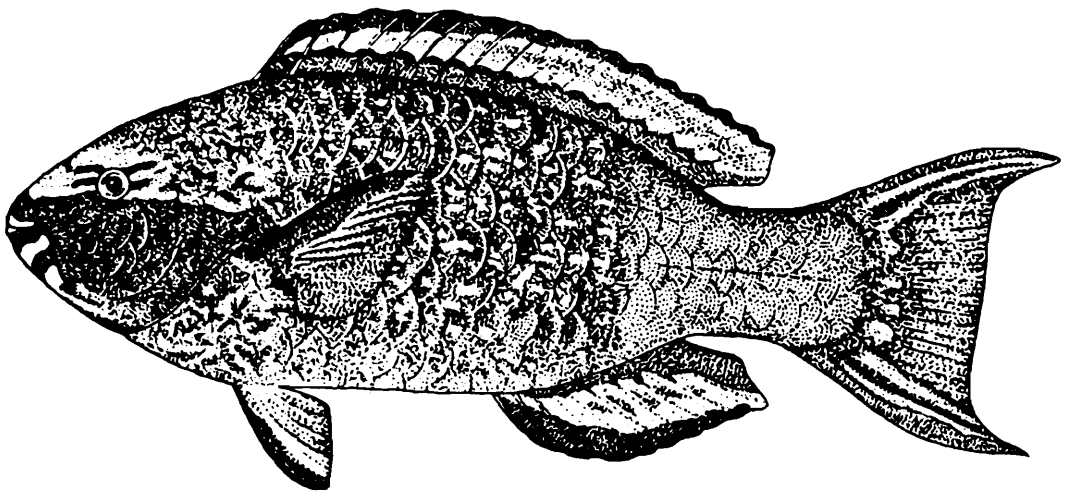
8. *Scarus frenatus* Lacepede, 1802
(Bridled parrotfish)

Diagnostic features : Body depth 2.8 to 2.9 times in standard length. Upper jaw encloses lower jaw when mouth closed. Teeth fused in jaws to form dental plates; plates smooth, individual teeth only visible at edges. Lips covering from ¾ to whole of dental plates. Upper dental plates with 0 to 2 canine(s) posteriorly, well developed in large specimens. Median predorsal scales usually 6 or 7 Cheek with 3 rows of scales, 5 to 7 scales in upper row, 6 to 8 in middle row and 2 to 4 scales in lower row. Pectoral fins with 12 branched rays. Caudal fin truncate in young, becoming double emarginate in larger initial phase fish and with caudal lobe slightly produced in terminal phase.

Colour : **Initial phase**- Ground colour reddish brown with 6 or 7 indistinct horizontal dark stripes from behind head to anterior part of caudal peduncle. Caudal peduncle and caudal fin pale, without stripes. Scales yellowish on ventral side. Head and thorax brownish red, bright red around mouth. All fins dull reddish. **Terminal phase**- Body anteriorly up to vertical through the base of 5th soft ray of dorsal fin dark green with orange to orange-pink irregular lines and spots. Posterior part of body light green. A broad green band across cheek below lower margin of eyes from tip of snout to pectoral fin base. A second green band across chin present. Colour below the green band, orange to salmon pink and with green blotches. Upper lip orange. Dorsal and anal fins with a broad middle orange zone, blue margins and blue bases. Caudal fin green with a large narrow orange cresent containing green to blue green markings. Pectoral fins green with an orange band in upper central



Initial phase



Terminal phase

Scarus frenatus Lacepede

part of fin. Pelvic fins orange with 3 or 4 narrow green longitudinal lines and a broad blue lateral margin.

Size : Maximum to 46 cm standard length.

Distribution : Indo-West Pacific, from Red Sea, east coast of Africa eastward to the Pitcairn group of islands.

Remarks : Jones and Kumaran (1980) recorded the initial phase of this species as *Callyodon sexvittatuas* (Ruppell).

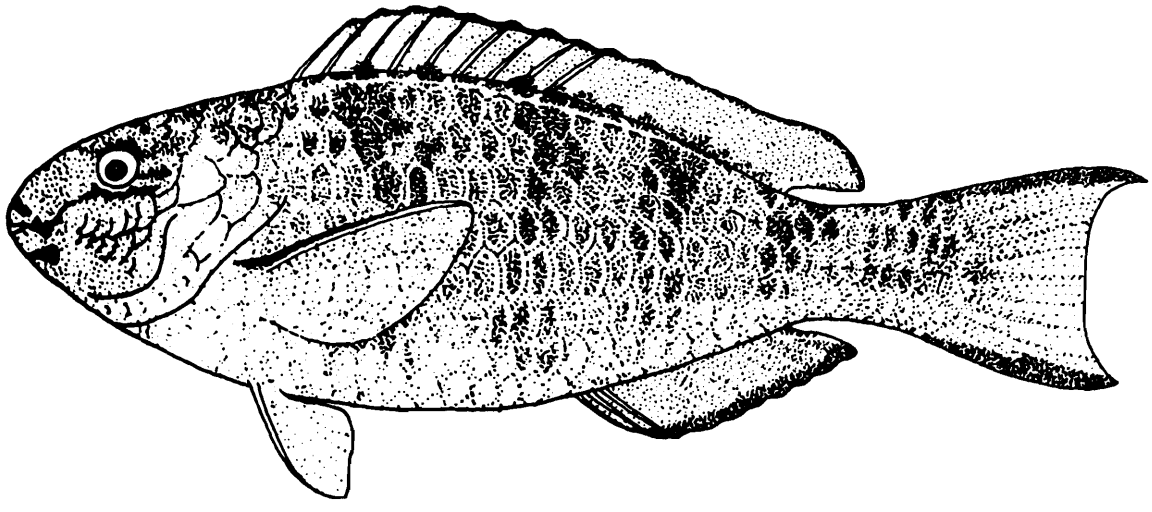
Initial phase

Terminal phase

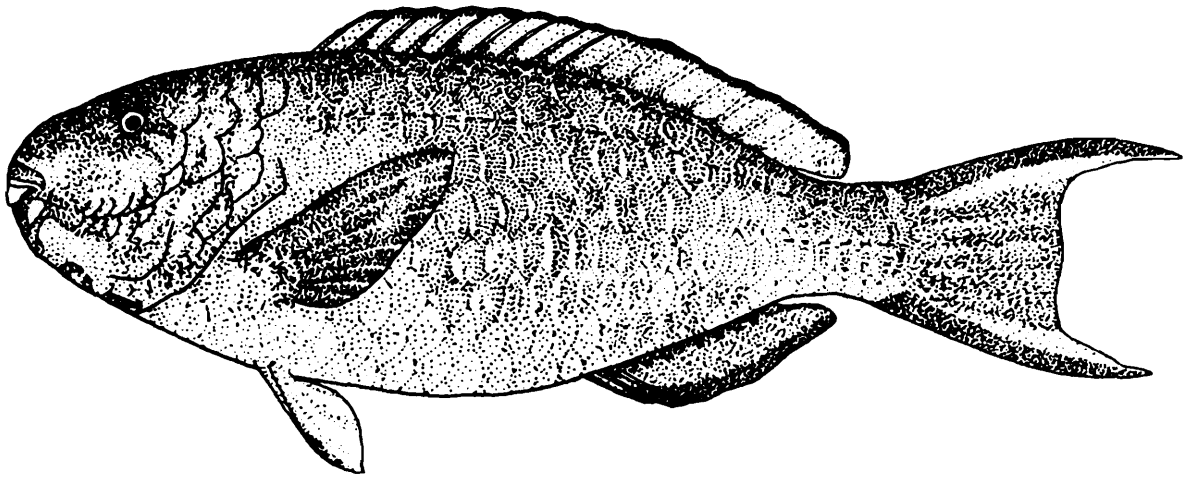
Scarus frenatus Lacepede

9. *Scarus ghobban* Forsskal, 1775
(Yellowscale parrotfish)

Diagnostic features : Body depth 2.7 to 3.3 times in standard length. Upper jaw encloses lower jaw when mouth closed. Teeth fused in jaws to form dental plates; plates smooth, individual teeth only visible at edges. Lips cover from ½ to 4/5 of dental plates. Upper dental plates with 0 to 4 canine(s) posteriorly, canines more and larger in terminal phase. Total gillrakers 45 to 53 on first arch. Median predorsal scales usually 5 to 7. Cheek with 3 rows of scales, 6 (rarely 5 or 7) scales in upper row, 5 to 7 in middle row and 1 to 2 scales in lower row. Posterior nostril large and oval. Pectoral fins



Initial phase



Terminal phase

Scarus ghobban Forsskal

Initial phase

Terminal phase

Scarus ghobban Forsskal

with 13 (rarely 12 or 14) branched rays. Caudal fin slightly emarginate or double emarginate, becoming lunate in large terminal males.

Colour : **Initial phase-** Scales on body bluish, white or pale red on thorax and abdomen, the edges yellow to orange-yellow. Five narrow irregular blue bars on body often present. Head yellow to orange; snout grey dorsally, lips salmon pink, a series of blue bands on chin and cheek. Dorsal and anal fins light orange yellow with blue margins. Caudal fin orange yellow with broad blue upper and lower edges and sometimes with blue streaks or spots at center. Pectoral fins with light yellow rays and pale membranes with a blue leading edge. Pelvic finds light yellow to white with a blue leading edge. Dental plates white in both phases. **Terminal phase-** Head and body green dorsally. Scales with very narrow salmon-pink edges, grading ventrally to mostly salmon with very little green. Two faint irregular blackish bars on body may present. Scales on opercle and cheek orange suffused with green. Ventral side of head pale salmon pink. Upper lip margin pink with a bright green band above it. Bright blue and green bands on cheek and chin. Dorsal and anal fins orange to salmon pink with greenish margins and blue-green base. Caudal fin green with salmon pink band in each lobe. Pectoral fins blue-green with an orange streak. Pelvic fins salmon with a broad blue leading edge.

Size : Maximum to 57 cm standard length.

Distribution : Indo-Pacific.

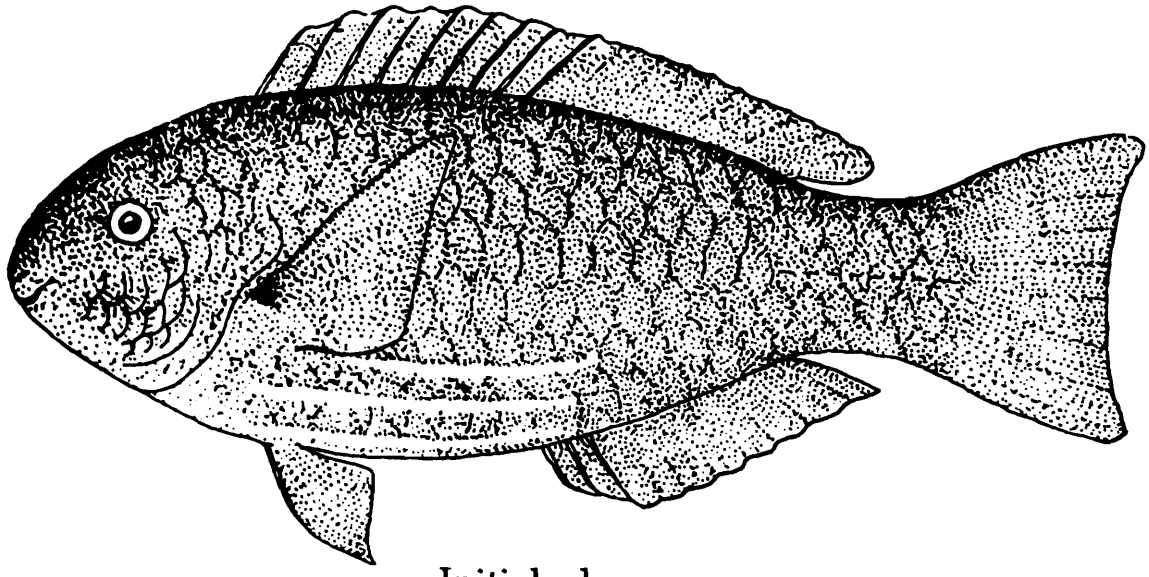
Remarks : Previously also recorded as *Pseudoscarus ghobban* by Day (1877) and *Callyodon ghobban* by Jones and Kumaran (1980).

10. ***Scarus globiceps*** Valenciennes, 1840
(Globehead parrotfish)

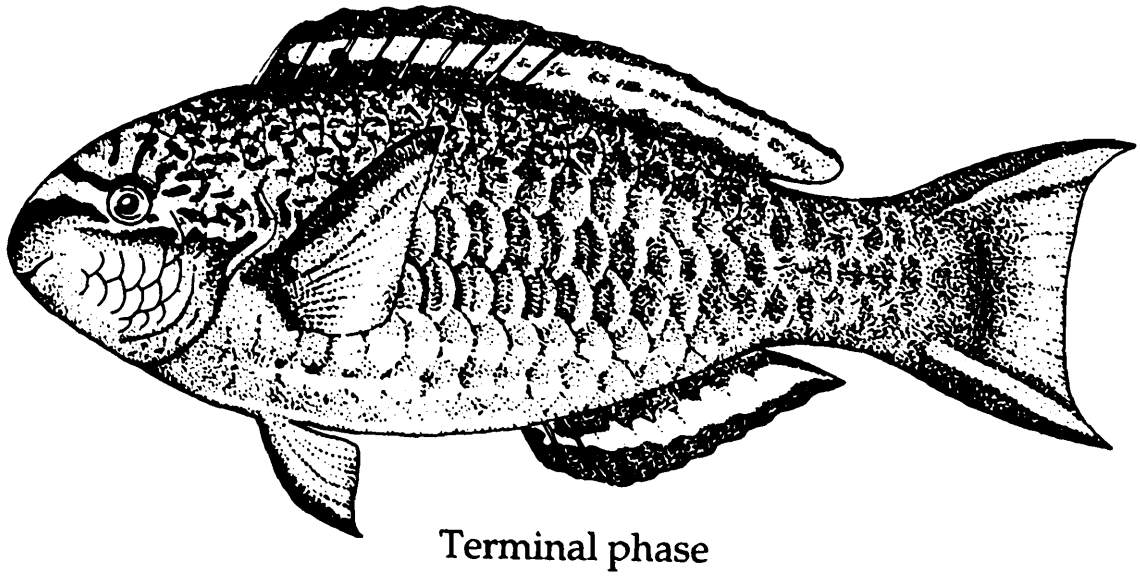
Diagnostic features : Body depth 2.6 to 3.0 times in standard length. Anterior head profile almost hemispherical, mouth inferior. Upper jaw encloses lower jaw when mouth closed. Teeth fused in jaws to form dental plates; plates smooth, individual teeth only

visible at edges. Lips almost covering dental plates. Upper and lower dental plates with 1 to 2 canine(s) posteriorly. Total gillrakers 46 to 49 on first arch. Median predorsal scales usually 4 to 6. Cheek with 3 rows of scales, 5 to 8 scales in upper row, 5 to 9 in middle row and 1 to 4 scales in lower row. Pectoral fins with 12 branched rays. Caudal fin slightly rounded to double emarginate in initial phase, becoming more so in terminal phase; lobes never produced.

Colour : **Initial phase**- Dark brown to grey brown dorsally, shadding to yellowish brown ventrally, with 3 faint whitish lines on abdomen. Eyes greenish brown. Median fins dark brown. Pectoral fins with dark brown rays and pale membranes. Pelvic



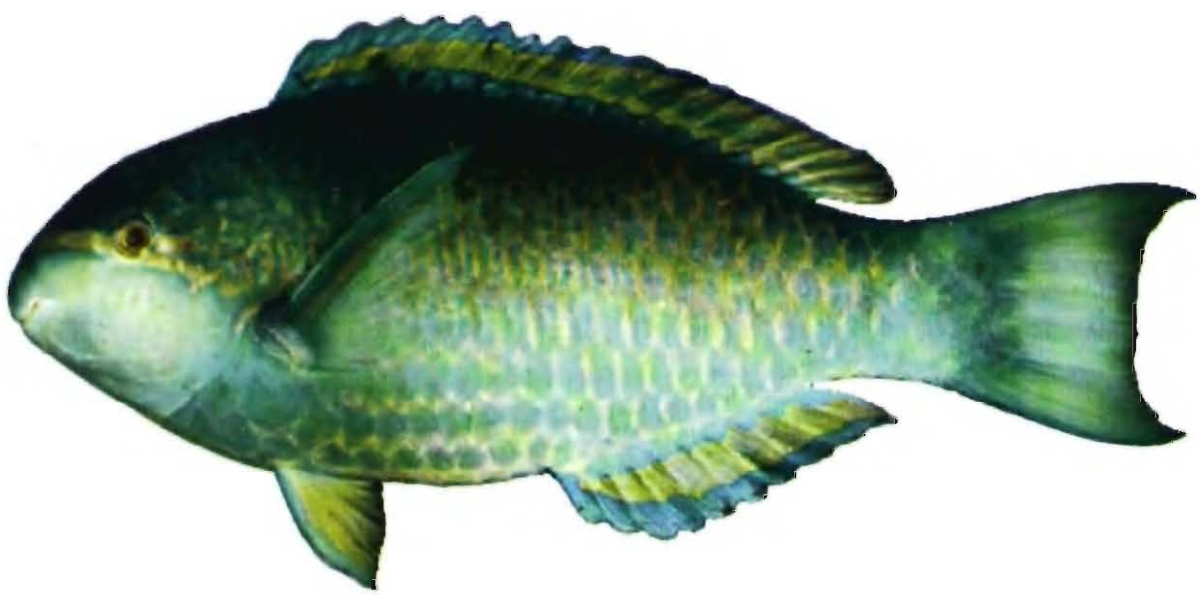
Initial phase



Terminal phase

Scarus globiceps Valenciennes

Initial phase



Terminal phase

Scarus globiceps Valenciennes

fins dark brown with light red or orange tinge. **Terminal phase-** Body green with a salmon pink to orange bars on each scale. Thorax solid green. A horizontal orange to light brown band passing in front of snout to eyes, continuing to edge of opercle. Head green below and lavender above this band. Few green bands radiating from eyes. Dorsal and anal fins with a blue border, a broad median orange band with a row of large green spots, and green to blue green basal band. A black spot at or near base of 4th dorsal spine often present. Caudal fin green with a submarginal orange streak in each lobe. Pectoral fins with green rays and pale membrane except for an orange streak around 3rd to 5th rays; a dark bar at base. Pelvic fins salmon with a blue leading edge.

Size : Maximum to 23 cm standard length.

Distribution : Indo-west Pacific.

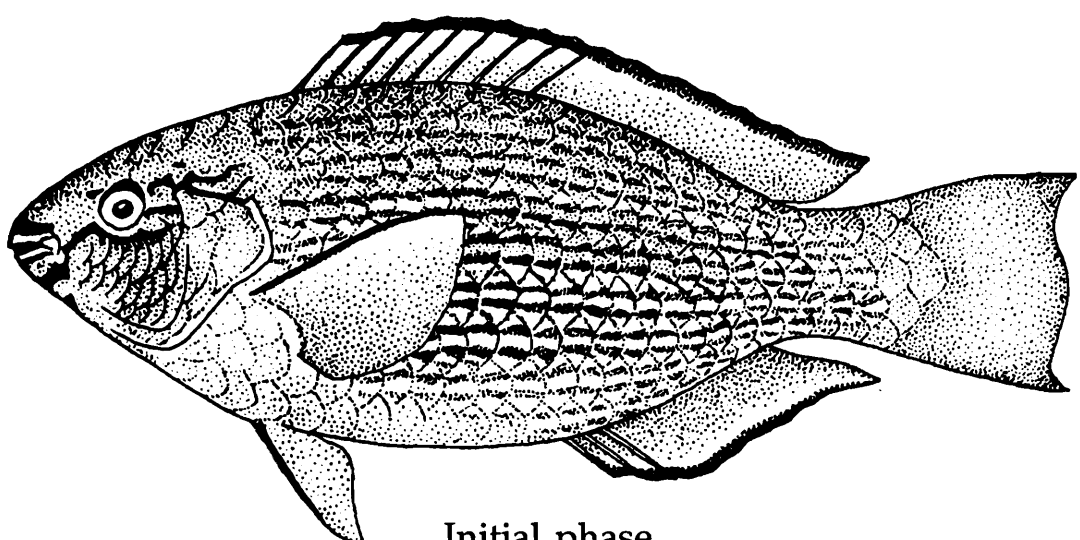
Remarks : This species has recently reported by Rao (2004) from the Andamans. Talwar (1984) also included it in the key only. Day (1877) reported *Scarus aeruginosus* (Valenciennes) from Indian waters, which has been placed under synonym of *Callyodon dubius* (Bennett, 1828) by de Beaufort (1940). Rao *et al.* (2000) recorded *S. dubius* from the Andaman following taxonomic details given in de Beaufort (1940). But it is not included in the account given by Rao (2004), which is rather replaced by *S. globiceps*. It was stated that records of *S. dubius* outside Hawaiian Islands are probably misidentification (Parenti and Randall, 2000). The authors examined the Day's collections of *Scarus aeruginosus* in the National Zoological Collections, Z. S. I., Kolkata and observed that the specimens, even though shows no colouration, are certainly *S. globiceps*.

11. ***Scarus niger*** Forsskal, 1775
(Dusky parrotfish)

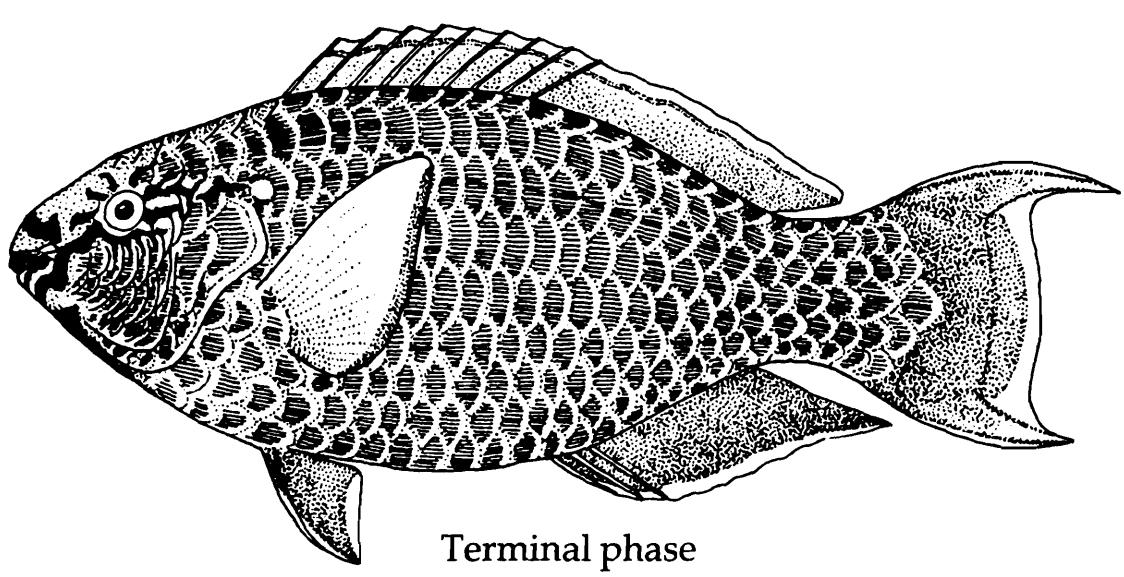
Diagnostic features : Body depth 2.2 to 2.5 times in standard length. Upper jaw encloses lower jaw when mouth closed. Teeth fused in jaws to form dental plates; plates smooth, individual teeth only visible at edges. Lips cover from ¾ to whole of dental plates.

Upper dental plates with 0 to 2 canine(s) posteriorly. Total gill rakers on first arch 44 to 50. Median predorsal scales usually 6 to 9 (usually 7). Cheek with 3 rows of scales, 6 to 8 scales in upper row, 6 to 9 in middle row and 2 to 5 scales in lower row. Pectoral fins with 12 (rarely 11 or 13) branched rays. Caudal fin slightly rounded in small fish, becoming double emarginate with produced lobes, the lobes pointed.

Colour : **Initial phase**- Reddish brown in ground colour. Scales bluish grey with 2 to 5 horizontal dark brown lines. Head brownish red, cheek and opercle with orange red spots or short lines; lips and chin orange red, the base of upper lip with a transverse green



Initial phase



Terminal phase

Scarus niger Forsskal

Initial phase

Terminal phase

Scarus niger Forsskal

band, lower lip with a narrow green band and chin with a broad green band to below the eyes. An irregular horizontal green band from in front of upper edge of eyes. A longitudinal green band on head posterior to eyes. Dorsal and anal fins dull orange with dull blue margins. Caudal fin reddish or orange brown, the upper and lower margin dark blue. Pectoral fins with orange-red rays, upper edge dull blue. Pelvic fins light orange-red, with dull blue margin. Dental plates green in both phases. **Terminal phase**- Scales of body bright green, narrowly edged with dark red. Scales of head deep green to reddish brown on nape. Lips salmon, snout and chin dull reddish. Indistinct green bands as in case of initial phase present. Dorsal and anal fins orange with dull green interradial zones, the margin blue with a submarginal dark lines. Caudal fin deep salmon-pink in lobes with blue upper and lower borders and a broad posterior blue area containing a dull yellow band. Pectoral fins deep salmon-pink, the leading edge bluish. Pelvic fins dull orange, edge with blue.

Size : Maximum to 30 cm standard length.

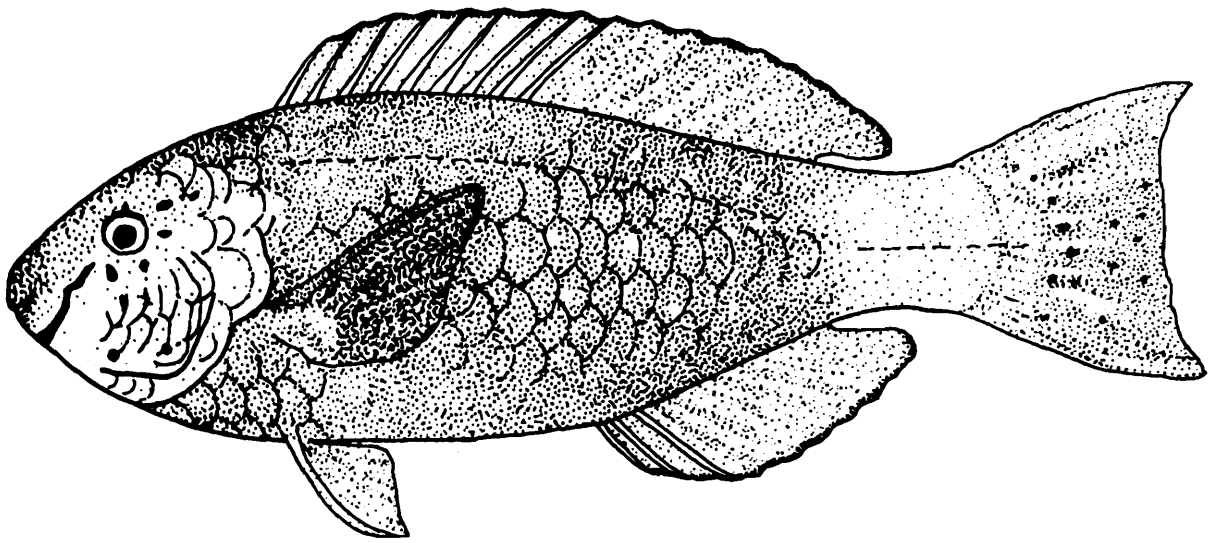
Distribution : Indo-west Pacific.

Remarks : The terminal males of this species was reported as *Callyodon niger* by Jones and Kumaran (1965, 1980).

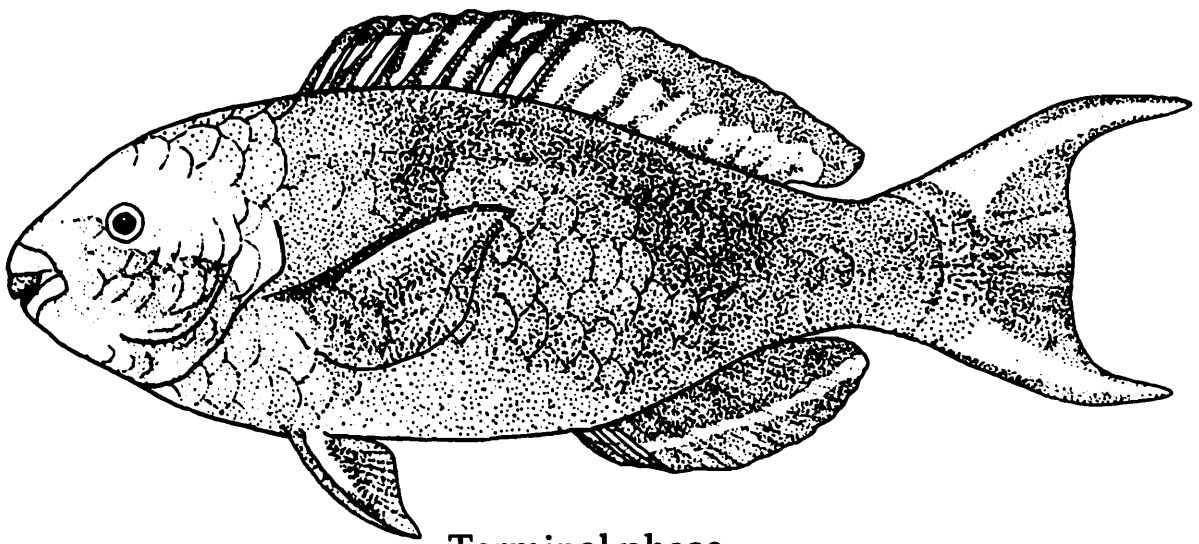
12. *Scarus prasiognathus* Valenciennes, 1840
(Singapore parrotfish)

Diagnostic features : Body depth 2.3 to 2.7 times in standard length. Mouth slightly ventral in position. Upper jaw encloses lower jaw when mouth closed. Teeth fused in both jaws to form dental plates; plates smooth, individual teeth only visible at edges. Lips covering ½ to whole of dental plates. Upper dental plates with 0 to 2 canine(s) posteriorly. Median predorsal scales usually 6. Cheek with 3 rows of scales, 6 (rarely 5) scales in upper row, 6 to 8 in middle row and 1 to 3 scales in lower row. Pectoral fins with 13 branched rays. Caudal fin slightly emarginate in small fish to deeply concave in large terminal phase.

Colour : **Initial phase**- Reddish brown to brown, becoming pale posteriorly on caudal peduncle with numerous whitish spots of



Initial phase



Terminal phase

Scarus prasiognathus Valenciennes

unequal size on scales. Head brownish red, with a few scattered dark green spots and a narrow dark green band from chin to below eyes. Median and pelvic fins dull orange, margins of dorsal and anal fins and edges of caudal fin bluish grey. Caudal fin with some small blue green spots centrally basally. Dental plates green in both phases. **Terminal phase**- Body dark green, scale edges dull orange. Cheek and opercle below eyes bright blue green. Head above cheek and a broad region around mouth orange. An orange band from eyes to corner of mouth. Dorsal fin blue with vertical orange streaks. Anal fin blue with a narrow orange band at the middle. Caudal fin pale blue green with blue margins and a broad

Initial phase

Terminal phase

Scarus prasiognathus Valenciennes

submarginal orange band in each lobe. Pectoral fins with dark brown rays, paler distally, the leading edge blue. Pelvic fins blue-green with a blue leading edge and orange streak on first ray.

Size : Maximum to 50 cm standard length.

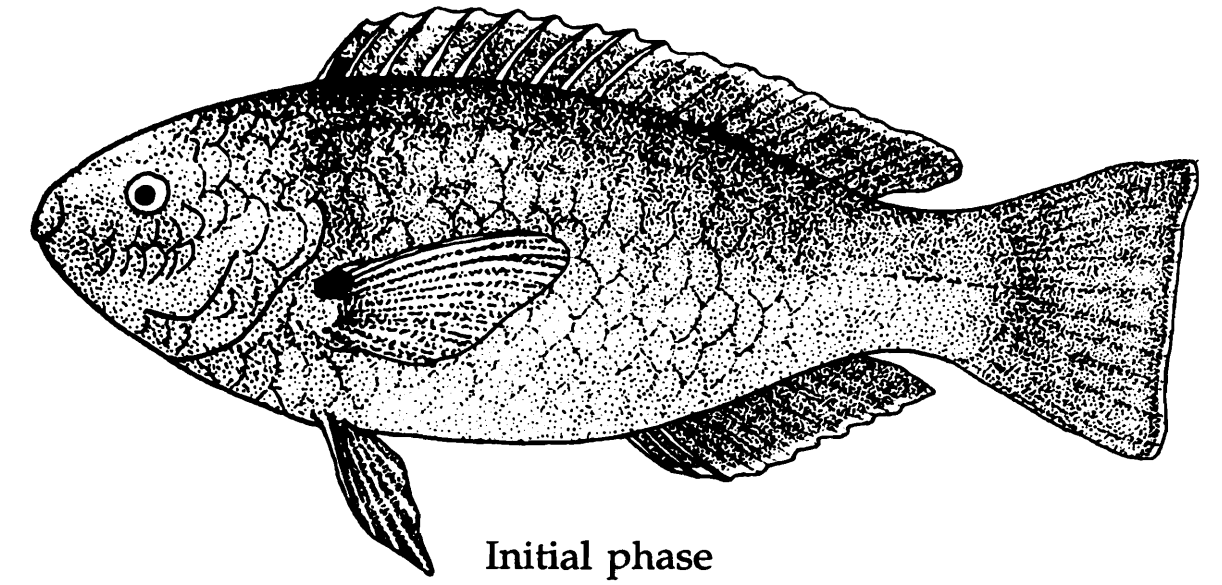
Distribution : Indo-West Pacific.

Remarks : The terminal male of this species was reported as *Callyodon janthochir* (Bleeker) by Jones and Kumaran (1965, 1980).

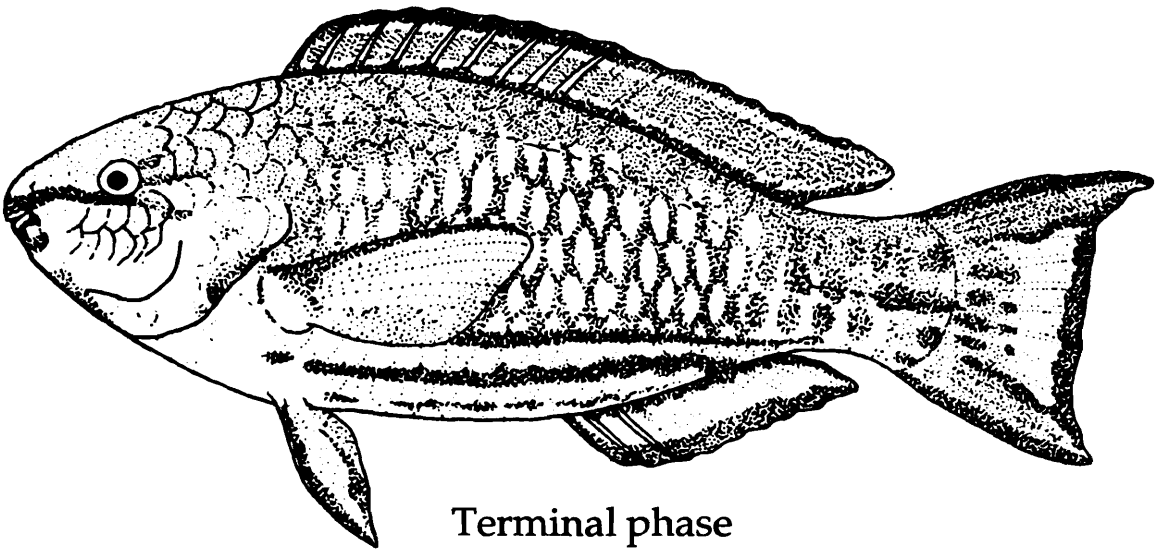
13. ***Scarus psittacus*** Forsskal, 1775
(Common parrotfish)

Diagnostic features : Body depth 2.6 to 3.1 times in standard length. Upper jaw enclosing lower jaw when mouth closed. Teeth fused in both jaws to form dental plates; plates smooth, individual teeth only visible at edges. Lips almost covering the whole dental plates. Upper and lower dental plates with 0 to 2 canine(s) posteriorly. Total gill rakers on first arch 40 to 50. Median predorsal scales 3 to 5 (usually 5). Cheek with 2 rows of scales, 5 to 7 scales in both rows. Pectoral fins with 12 (rarely 11 or 13) branched rays. Caudal fin truncate to emarginate in the initial phase, becoming more pronounced emarginate in terminal phase, but lobes never produced.

Colour : **Initial phase**- Brown to reddish-brown, light orange-red on thorax. Dorsal fin brown to orange-brown with a narrow pale margin and a large diffuse dark brown spot basally on the first interspinous membrane. Anal fin orange-brown with a narrow pale margin. Caudal fin brown with a narrow whitish distal margin. Pectoral fins with brown rays and a small triangular black spot at upper base. Pelvic fins orange-red. Dental plates whitish in both phases. **Terminal phase**- Scales of body about half green and half pink to salmon, the green arranged in 4 to 5 longitudinal series of spots on sides of caudal peduncle and as 3 stripes on abdomen. Head greenish dorsally, the snout lavender-grey; lower part of head orange-red to salmon-pink; ventral part of head with a blue-green streak. A blue band on upper lip extending across snout to



Initial phase



Terminal phase

Scarus psittacus Forsskal

posterior orbit; 2 green bands posterior to orbit. Lower lip and chin with 2 transverse blue bands. Dorsal and anal fins light orange with a blue margin and a blue band at base, the dorsal with a median series of green spots. Caudal fin light orange to lavender-pink, with blue upper, lower and posterior borders and a vertical series of blue spots in centre. Pectoral fins with blue upper and lower rays and a blue base, the remainder orange. Pelvic fins blue with 3rd and 4th rays orange.

Size : Maximum to 27 cm standard length.

Distribution : Indo-West Pacific.

Initial phase

Terminal phase

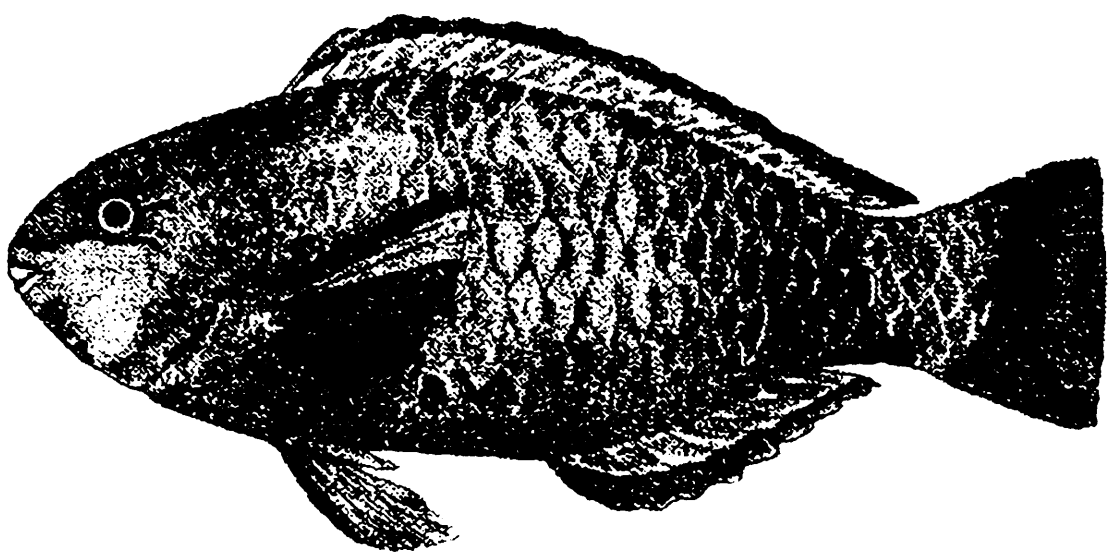
Scarus psittacus Forsskal

Remarks : The initial phase of this species were previously recorded as *Callyodon taeniurus* (Valenciennnes) by Jones and Kumaran (1965, 1980), and as *Scarus taeniurus* by Rao *et al.* (2000). The terminal males were recorded as *Pseudoscarus bataviensis* (Bleeker) by Day (1888), *Scarus forsteri* (Valencinnes) by Jones and Kumaran (1959) and *Callyodon bataviensis* by Jones and Kumaran (1980).

14. ***Scarus quoyi*** Valenciennes, 1840
(Quay's parrotfish)

Diagnostic features : Body depth 2.6 to 2.7 times in standard length. Upper jaw encloses lower jaw when mouth closed. Teeth fused in both jaws to form dental plates; plates smooth, individual teeth only visible at edges. Lips cover 2/3 to whole dental plates. Upper and lower dental plates with 1 to 3 canine(s) posteriorly. Median predorsal scales 6 (rarely 5). Cheek with 3 rows of scales, 6 scales in upper row, 5 scales in middle row, 1 or 2 scales in lower row. Pectoral fins with 12 (rarely 13) branched rays. Caudal fin truncate or slightly rounded in the initial phase, lobes slightly produced in terminal males.

Colour : Mostly green dorsally, scales with reddish margins. Abdomen reddish to purplish with blue edged scales. Upper lip with one and lower lip with two yellow cross bands passing into a subtriangular spot between the eye and the angle of mouth. Three



Scarus quoyi Valenciennes

Initial phase

Terminal phase

Scarus quoyi Valenciennes

short yellow streaks radiate from eye posteriorly. Dorsal and anal fins rosy with a light narrow basal band and a narrow green margin. Caudal fin green, light yellowish distally. Pectoral fin yellowish; region between 3rd to 6th ray purplish, forming a streak along the whole length of the fin. Pelvic fin yellowish, the spine darker and the 1st ray darker. Dental plates white to yellowish.

Size : Maximum to 25 cm standard length.

Distribution : Indo-West Pacific.

Remarks : Day (1877) has recorded this species as *Pseudoscarus chrysopoma* (Bleeker). This name was considered by de Beaufort (1940) to be a synonym of *Scarsus blochii* (Valenciennes) = *Chlorurus japanesis* (Bloch), which have lips covered only basal margin of dental plates. On examination of Day's specimen from Andaman it was found that lip covers about 2/3rd of the dental plates. Hence, the above synonymy certainly erroneous and de Bruin *et al.* (1995) has rightly considered *Callyodon blochii* reported by Munro (1955) as *Scarus quoyi* following Randall and Nelson (1979). Talwar (1984) has included *Pseudoscarus chrysopoma* under *Scarus russelii* (Valenciennes), which seems to be erroneus.

15. *Scarus rivulatus* Valenciennes, 1840
(Surf parrotfish)

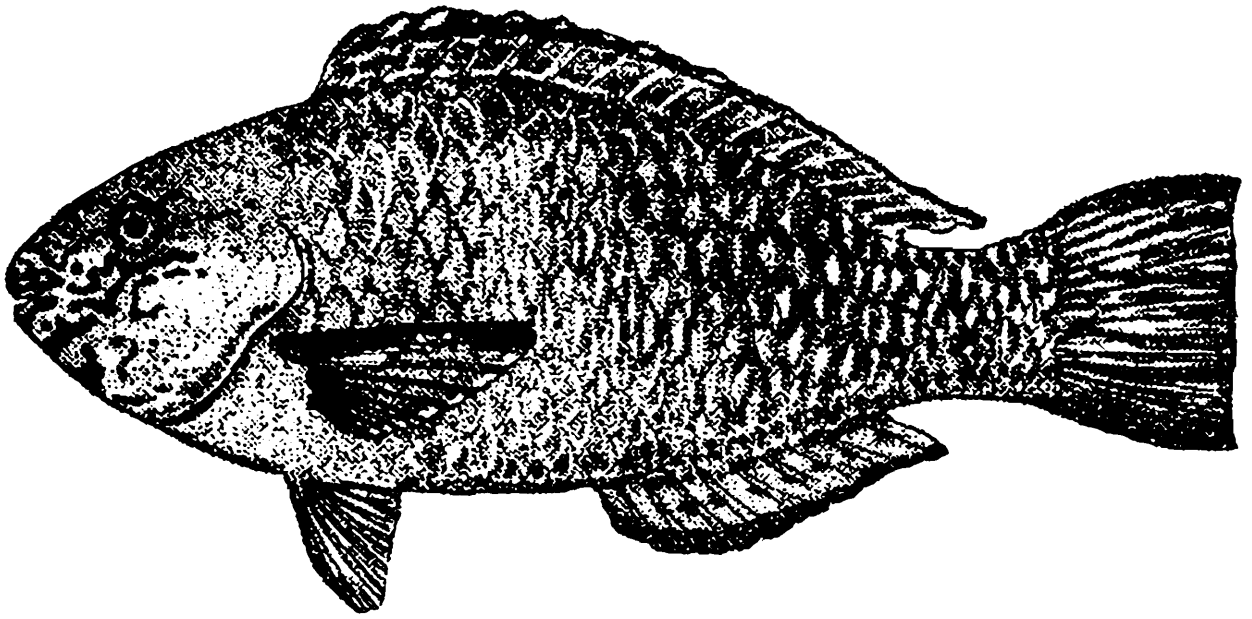
Diagnostic features : Body depth 2.4 to 2.8 times in standard length. Upper jaw encloses lower jaw when mouth closed. Teeth fused in both jaws to form dental plates; plates smooth, individual teeth only visible at edges. Lips almost cover the whole dental plates. Upper and lower dental plates with 0 to 2 canine(s) posteriorly. Median predorsal scales 5 to 7 Cheek with 3 rows of scales, 6 to 8 scales in upper row, 6 scales in middle row, and 1 or 2 scales in lower row. Pectoral fins with 12 (occasionally 13) branched rays. Caudal fin truncate in the initial phase, lobes slightly produced in terminal phase.

Colour : Body green with salmon to light pink bars on each scale. Head light orange with irregular blue green lines and spots

Initial phase

Terminal phase

Scarus rivulatus Valenciennes



Scarus rivulatus Valenciennes

forming a reticulum on chin and snout. Cheek yellowish orange. Pectoral fin light yellow with greenish margin. Dorsal fin yellowish green, a narrow green basal band and green margin with an intermediate row of spots. Anal and caudal fins bluish green. There is not much difference between initial phase and terminal phase. Females plain grey with pale lines along abdomen. Males easily recognized by the yellow pectoral fins and orange cheeks.

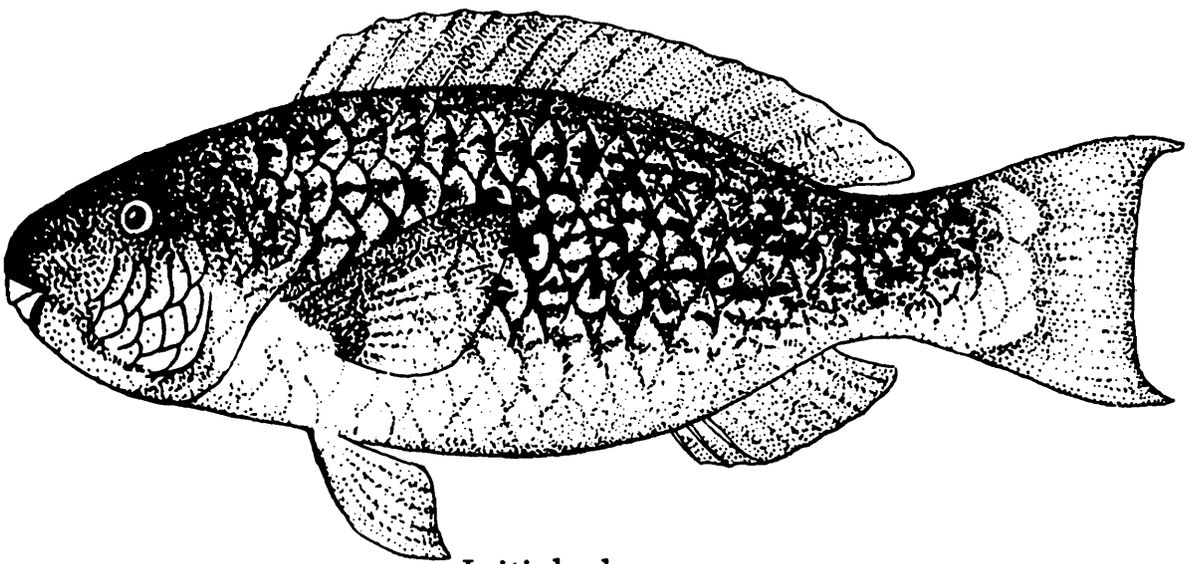
Size : Maximum to 40 cm standard length.

Distribution : Indo-West Pacific.

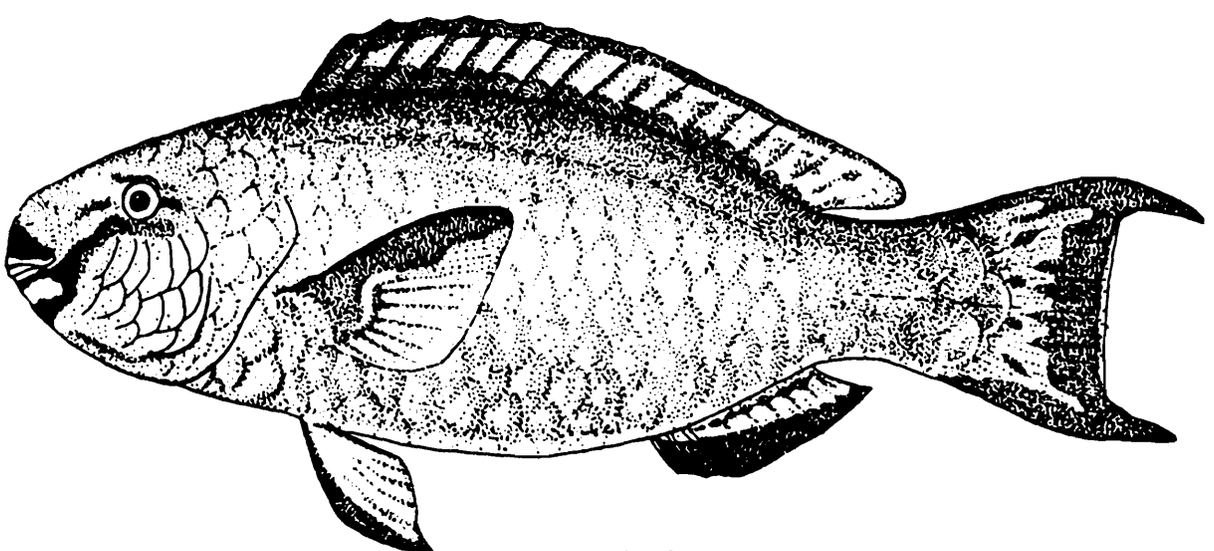
Remarks : Day (1877, 1889) has reported this species as *Pseudoscarus rivulatus* and de Beaufort (1940), as *Callyodon fasciatus* (Valenciennes). Talwar (1984) is erroneous in including *Peseudoscarus rivulatus* under *Scarus russelii* (Valenciennes).

16. ***Scarus rubroviolaceus*** Bleeker, 1847
(Ember parrotfish)

Diagnostic features : Body depth 2.4 to 3.1 times in standard length. Head profile rising sharply from above mouth than to dorsal fin origin; this hump on head more prominent in large specimens. Upper jaw encloses lower jaw when mouth closed. Teeth fused in both jaws to form dental plates; plates smooth, individual



Initial phase



Terminal phase

Scarus rubroviolaceus Bleeker

teeth only visible at edges. Lips cover ½ to 2/3 of dental plates. Upper dental plates with 0 to 3 canine(s) posteriorly. Total gillrakers 52 to 58 on first arch. Median predorsal scales usually 6 (rarely 5 or 7). Cheek with 3 rows of scales, 5 to 7 (usually 6) scales in upper row, 5 to 9 (usually 6 or 7) in middle row and 1 to 3 (usually 2) scales in lower row. Pectoral fins with 13 (rarely 12 or 14) branched rays. Caudal fin truncate in small fish, becoming emarginate in large specimens and with produced caudal lobes in terminal phase.

Colour : **Initial phase** – Body yellowish grey dorsally and on sides, light red ventrally. Scales with narrow blackish edges and numerous short blackish segments. Scaled part of head darker than

Initial phase

Terminal phase

Scarus rubroviolaceus Bleeker

body; unscaled part of head brownish red dorsally, light red on snout and ventrally. Median fins dull red. Pectoral fins orange-red on upper third, pale with orange rays ventrally. Pelvic fins orange-red. Dental plates rosy. **Terminal phase** – Green dorsally, suffused with dark purplish, shading to greenish yellow on sides, the scales edged in orange, becoming light blue-green ventrally. Lower lip edged with blue-green; chin salmon crossed by a blue-green band which curves dorsally to join blue-green band of lower lip and continues to posterior orbit; blue-green streaks about eye; a longitudinal blue-green streak on lower side of head. Dorsal fin orange with a blue border and a blue-green streak along each ray. Anal fin blue with an orange basal band. Upper and lower edges of caudal fin broadly blue, the central part orange with blue-green region enclosed. Pectoral fins broadly blue-green on leading edge, violet immediately below, and the rest of fin pale with blue-green rays. Pelvic fins orange, with a broad blue leading edge. Dental plates greenish.

Size : Maximum to 48 cm standard length.

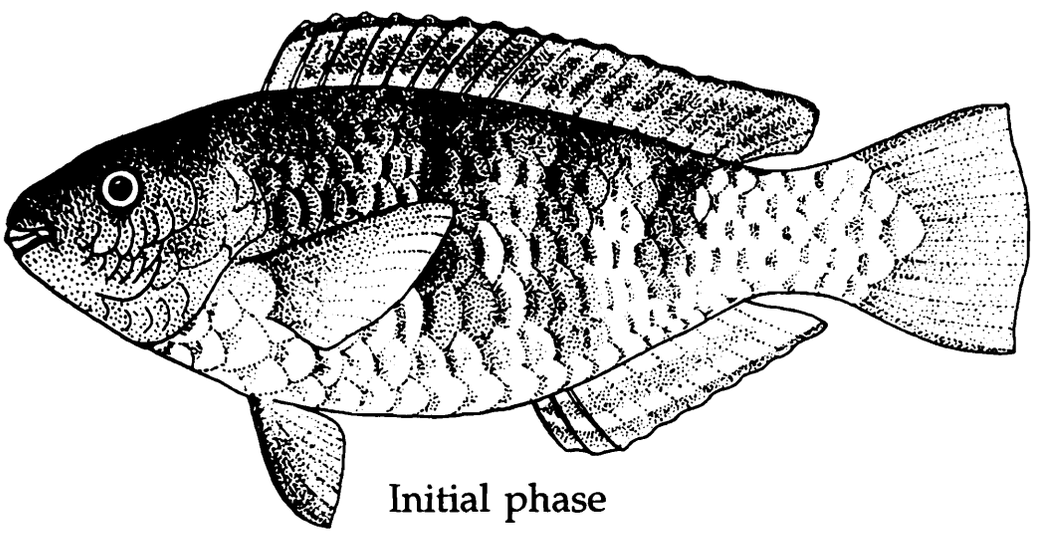
Distribution : Indo-Pacific.

Remarks : This species was previously recorded as *Callyodon jordani* (Jenkins) by Jones and Kumaran (1965, 1980).

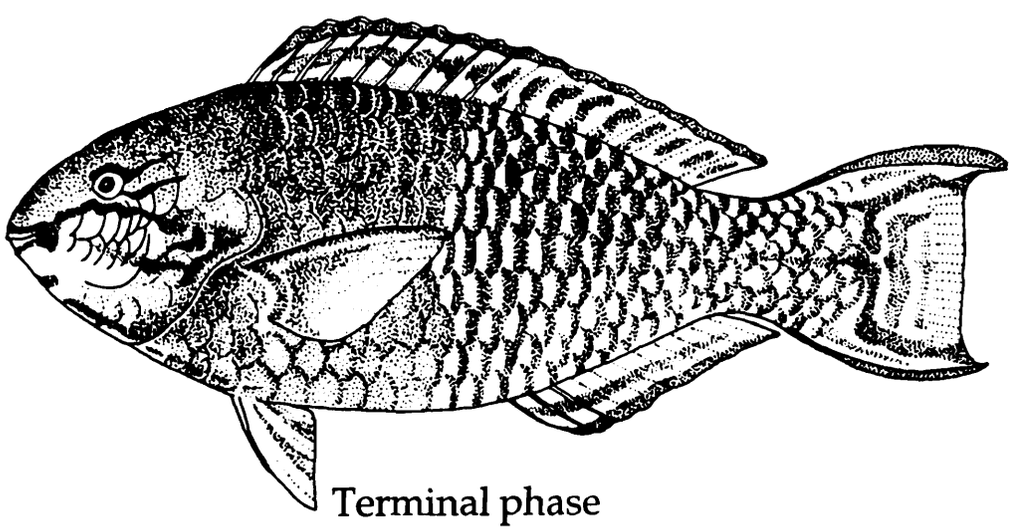
17 ***Scarus russelii*** Valenciennes, 1840
(Eclipse parrotfish)

Diagnostic features : Body depth 2.5 to 2.9 times in standard length. Mouth slightly ventral in position. Upper jaw encloses lower jaw when mouth closed. Teeth fused in both jaws to form dental plates; plates smooth, individual teeth only visible at edges. Lips almost cover whole of dental plates. Upper and lower dental plates with 0 to 2 canine(s) posteriorly. Total gillrakers 48 to 52 on first arch. Median predorsal scales usually 4. Cheek with 2 rows of scales, 6 (rarely 7) scales in upper row and 6 (rarely 5 or 7) scales in lower row. Pectoral fins with 12 (rarely 11 or 13) branched rays. Caudal fin double emarginate in initial phase fish, with produced lobes in terminal phase.

Colour : **Initial phase** – Scales reddish to purplish brown with an orange red bar. Body with 5 dark bars. Abdomen with 3 longitudinal dark bands. Lips dull red-orange, edge with dull blue-green. Transverse dull blue green band crossing front of snout, joining band from lower lip at rictus and continuing faintly to eyes. A broad transverse blue-green band on chin and a longitudinal band on head and thorax; 3 short faint blue-green band posterior to orbit. Dorsal and anal fins dull orange with a bluish grey margin and a median row of greenish spots. Caudal fin dark reddish, the upper and lower edges bluish grey with an elongate dull green bar at center. Pectoral fins with brownish rays, pale distally, leading edges bluish grey. An indistinct dark brown spot at upper base of pectoral fin. Pelvic fins orange brown, the median membrane pale



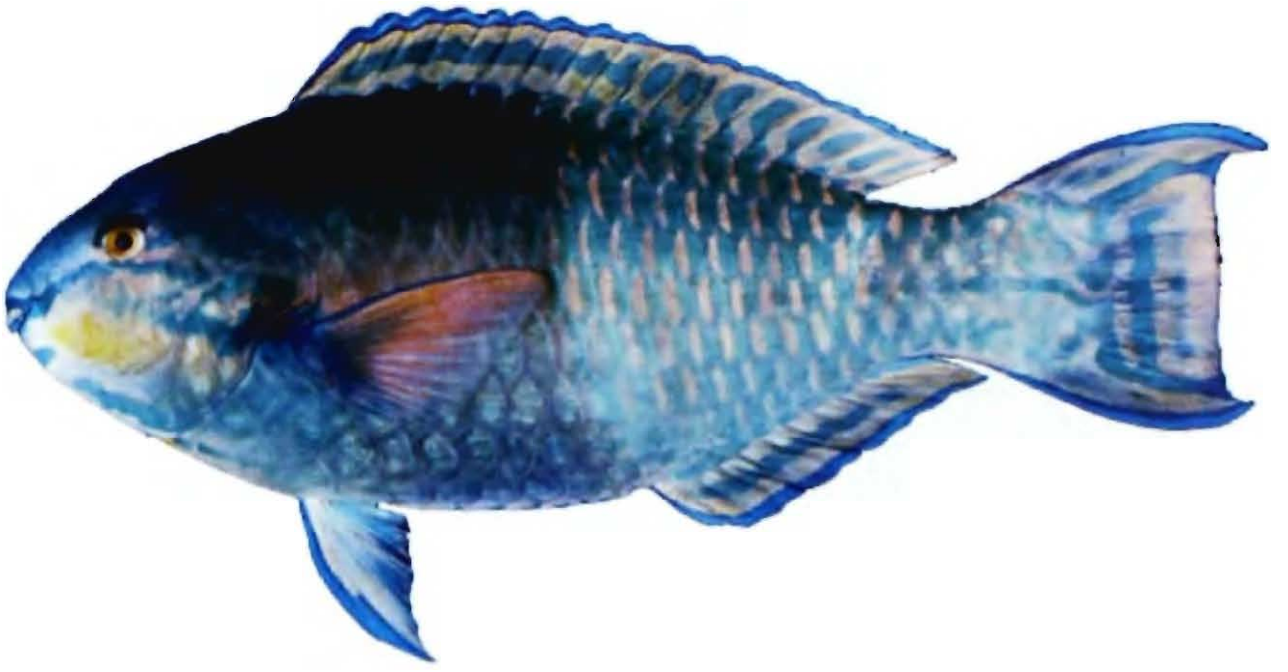
Initial phase



Terminal phase

Scarus russelii Valenciennes

Initial phase



Terminal phase

Scarus russelii Valenciennes

to dusky, leading edges bluish grey. Dental plates whitish in both phases. **Terminal phase-** Body blue-green, scales with salmon pink edges. Lower cheek dull yellow. Ventral part of head pale yellow. Upper lip bright blue green and salmon, lower lip edged in bright blue green, joining upper lip band and continuing as a band close to eyes on to opercles. Upper part of eyes surrounded by a deep blue green band. Large irregular bluish green patch on opercles. A short transverse blue-green band on chin and a longitudinal band ventrally on head. Median fins coloured as in initial phase but brighter. Pectoral fin rays orange to red distally, green basally leading edge blue green and the upper base with a deep violet spot. Pelvic fins salmon, medial rays with blue streaks.

Size Maximum to 30 cm standard length.

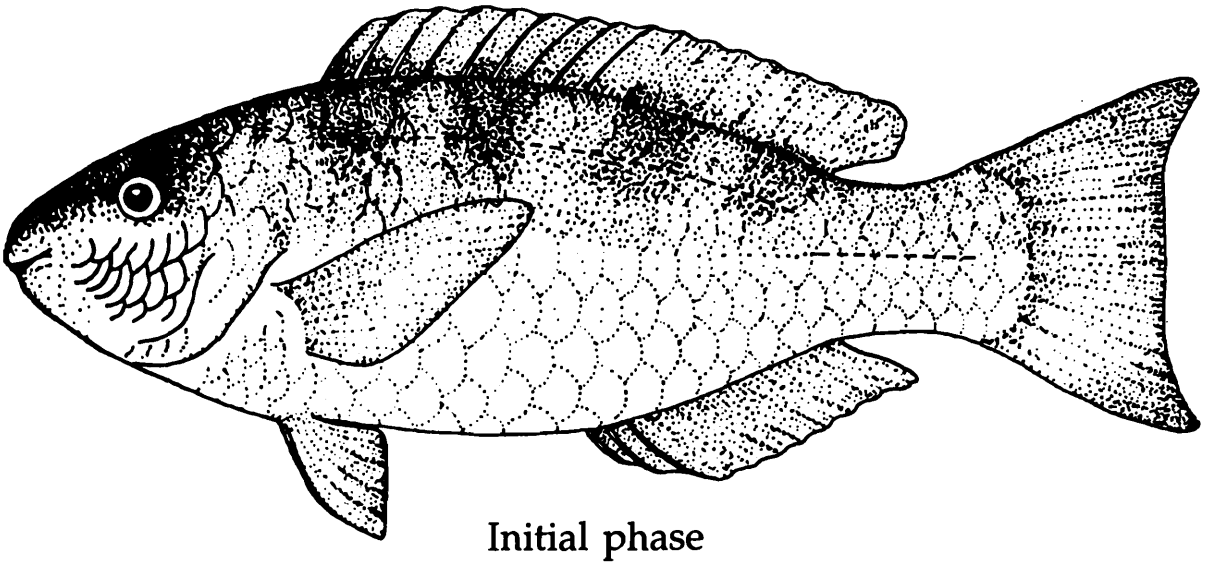
Distribution : Western Indian Ocean.

Remarks : Some of the Indian region records of this species were as *Callyodon oktodon* (Bleeker) or *Xanothon oktodon* (Bleeker) (Munro, 1955)

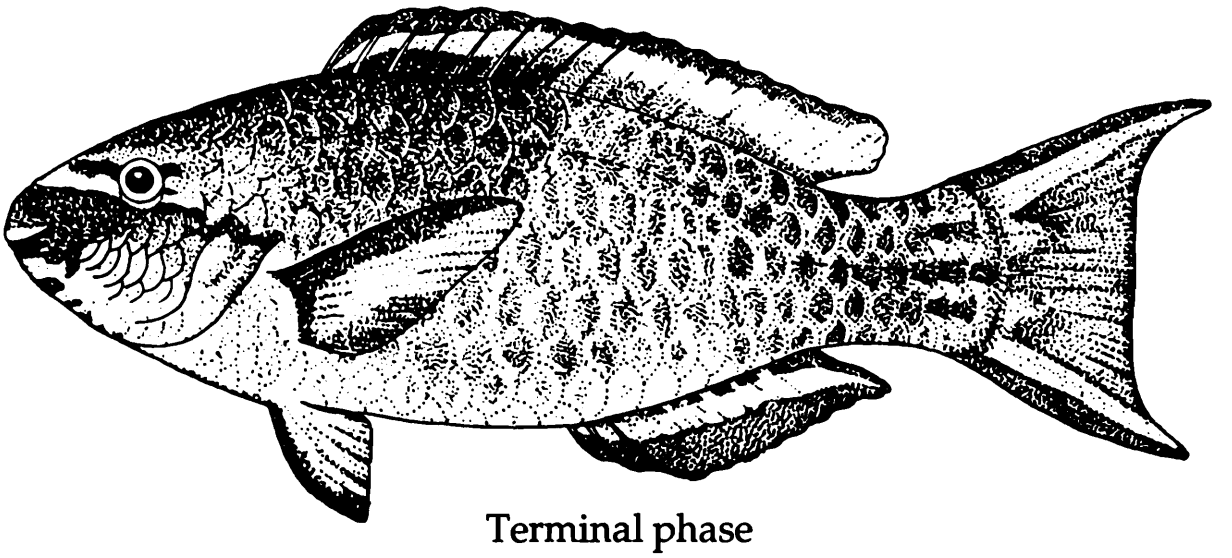
18. *Scarus scaber* Valenciennes, 1840
(Fivesaddle parrotfish)

Diagnostic features : Body depth 2.4 to 3.0 times in standard length. Upper jaw encloses lower jaw when mouth closed. Teeth fused in both jaws to form dental plates; plates smooth, individual teeth only visible at edges. Lips cover about ¾ to whole of dental plates. No canines on upper and lower dental plates. Total gillrakers 45 to 55 on first arch. Median predorsal scales 4 to 7 (usually 6). Cheek with 3 rows of scales, 6 to 8 (rarely 7) scales in upper row, 5 to 9 (usually 7 or 8) in middle row, and 1 to 4 (usually 2 or 3) scales in lower row. Pectoral fins with 12 (rarely 11) branched rays. Caudal fin lunate in initial phase fish, the lobes produced in terminal phase.

Colour : **Initial phase** – Upper $^{2}/_{5}$ of body with 4 alternating slightly diagonal bars of dark grey and yellow, lower $^{3}/_{4}^{th}$ and ventral part of head whitish with a pink tinge or light yellow. Edges of scales on upper part dusky. Head above lower edge of eyes dark grey with yellow tinge. Median and pelvic fins pale salmon



Initial phase



Terminal phase

Scarus scaber Valenciennes

pink. Pectoral fins pale yellow. A dark stripe from side of snout through eyes to upper end of opercles and a broad yellow zone on cheek may present. Dental plates whitish. **Terminal phase-** Anterior dorsal quarter of body and head purplish grey, rest of body green, scale edges salmon pink. Upper lip edged in salmon pink; a broad irregular blue green band from tip of snout and lower lip to opercle edge at level of upper pectoral fin base; a narrow blue green band extending anteriorly from upper edge of eyes to just posterior part of eyes. A small blue green spot posterior to center of eyes. Chin salmon with a transverse blue green band; a longitudinal row of

Initial phase

Terminal phase

Scarus scaber Valenciennes

faint blue green spots ventrally. Dorsal fin light orange with a broad blue border. Anal fin blue with a basal light orange band. Caudal fin blue with an orange band in each lobe. Pectoral fins with a broad blue leading edge, middle purple zone, pale lower part with blue rays. Pelvic fins salmon pink with a broad blue leading edge. Dental plates greenish.

Size : Maximum to 36 cm standard length.

Distribution : Western Indian Ocean.

Remarks : Jones and Kumaran (1965, 1980) recorded the initial phase of this species as *Callyodon scaber* and the terminal males as *Callyodon pectoralis* (Valenciennes).

CONCLUSION

This study through materials and literature summarises our knowledge on the distribution of 18 species of parrotfishes in the coral reef and rocky coasts of India. All the 18 species are described with coloured plates and the key to the genera and species are included for easy identification. Although synonyms were not given to start with the description of the species, those were discussed as remarks under each species. It will pave the way for future workers in the field to avoid the wrongs committed earlier.

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