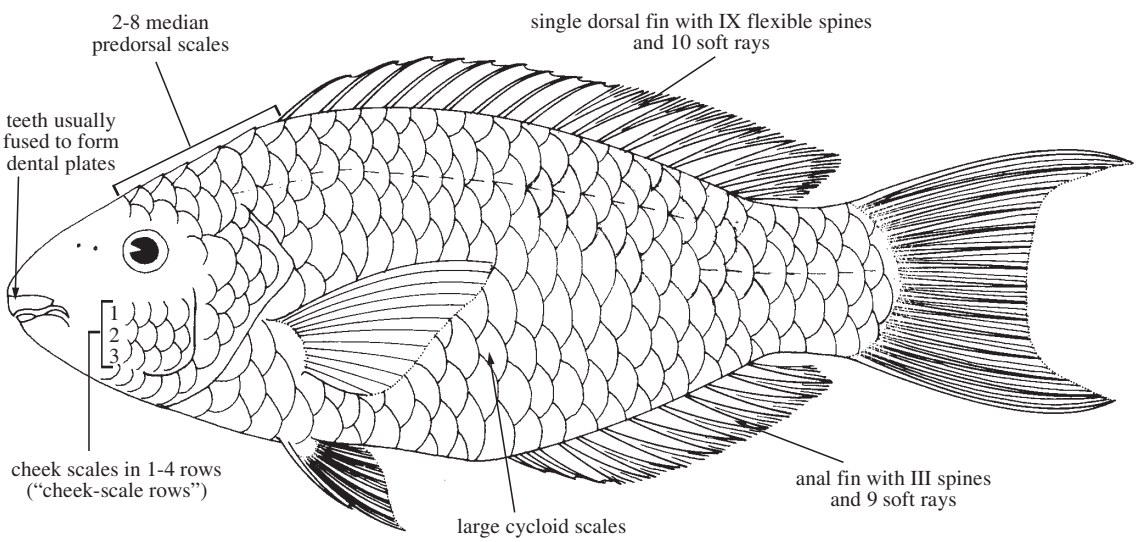
SCARIDAE

Parrotfishes

by D.R. Bellwood

Diagnostic characters: Body oblong, moderately compressed (size to 120 cm). Head generally bluntly rounded anteriorly. Jaws at most only slightly protrusible; **teeth usually fused to form a pair of beak-like plates in each jaw,** but a few species (*Calotomus*) have free, imbricate, incisor-like teeth present externally in upper and lower jaws. Small, isolated, projecting teeth (canines) occur in some species on outer sides of upper jaw; **pharyngeal dentition strong consisting of interdigitating paired upper pharyngeals with rows of elongate molariform teeth** on a slightly or strongly convex surface; **these teeth bear against the elongate molariform teeth on the surface of the single lower pharyngeal bone**. Dorsal fin continuous, with IX slender, flexible spines and 10 soft rays; anal fin with III flexible spines and 9 soft rays; pectoral fins with 2 unbranched rays (the first always rudimentary, the second supporting most of the leading margin of the fin), and 11 to 14 branched rays, caudal fin varying from rounded to lunate, with produced caudal-fin lobes, the shape often changing with growth. Scales large, cycloid, 22 to 24 on lateral line; fins without scales, except for a basal row on the median fins of most species; 1 to 4 rows of scales on cheek; 2 to 8 median predorsal scales. **Colour:** most species very colourful; many exhibit striking sexual dichromatism. Most species have 2 distinct adult colour phases (although a few appear to be monochromatic as adults). The relationship between colour phase and sex is complex, most species are protogynous hermaphrodites (individuals maturing first as females, then sexually transforming into males). This sexual transformation is usually accompanied by a change in colour phase. This basic pattern is further complicated, in some species, by the presence of primary males (i.e. non-sex changing individuals) which may also change colour phase as they grow. **In species where 2 adult colour phases are known**, the first is termed **"initial phase" (IP)**, the second, **"terminal phase" (TP)**. Initial phases may thus be male or female, while terminal phases are invariably male. Initial phase fish are rather drably coloured, with browns and greys usually predominating. Colour patterns of terminal phase fish are complex, with predominantly green, blue, and pink hues. For field identification of parrotfish species, reliance must usually be placed on colour patterns, as few meristic characters are of value. No key to species is given here. As an aid for the identification of species occurring in the area, colour plates are included in this volume.



Habitat, biology, and fisheries: Parrotfishes are most often found on or in the vicinity of coral reefs, and are usually most abundant in shallow waters to a depth of 30 m. They feed principally on algae and associated material scraped from rocks or dead corals. Ingested material is ground in the pharyngeal mill which reduces it to a fine slurry. Some species move over large areas, while others are strongly site attached and vulnerable to overfishing. Parrotfishes are not a major commercial catch, but they may form a significant component of artisanal fisheries and are frequently found in fish markets. Although they are highly popular food fishes in some areas, no catch data on parrotfishes are currently reported to FAO. They are usually caught in traps, gill nets, or by spearing. Their flesh is relatively soft and does not keep well, and parrotfishes are therefore marketed and eaten fresh.

Remarks: The species of Scaridae have been widely confused in the taxonomic literature and records from the area are often unreliable. The distributions given below rely largely on more recent literature and area records probably underestimate distributions.

example of labrid dentition

Similar families occurring in the area

The beak-like plates of most Scaridae, in addition to features such as large smooth scales and often bright colours, usually preclude parrotfishes being confused with any other fish family. However, members of the genus *Calotomus*, in which the teeth are not fused (Fig. 1), might be confused with some Labridae (wrasses), but in the latter family the teeth are usually well separated in the jaws and the mouth is clearly protrusible. Occasionally, species of another labrid genus, *Choerodon*, may be mistaken for a scarid.

Identification note

In the species accounts below, the number of "scales in cheek-scale rows" (see family figure on previous page) is presented as short formulas in which the first numeral indicates the respective scale row on the cheek (counted from above), with the number of scales in this row given in parenthesis, e.g. "2(3-6)" [= "second scale row with 3 to 6 scales"].

Key to the genera of Scaridae occurring in the area

Parrotfishes are difficult to identify. There are few morphological features or meristic values that enable even genera to be separated. At the species level, meristic values are rarely diagnostic. Most identifications therefore must rely on colour patterns. However, most species have at least 3 distinct patterns throughout life (juvenile, IP, and TP). The colours also change after death. Many species share common colour patterns especially as IPs. The WCP area also contains a lot of geographic variants or species pairs which overlap, particularly in the western part of the area. Accurate identifications for many species is best restricted to the colourful TP stage. The following key provides some assistance in identifying genera. Species are best identified using the colour plates at the end of this volume.

1a. One row of scales below eye (Figs 1 and 2); pectoral-fin rays 13 (rarely 12 or 14) . . . . . → ***2***

1b. Two or more rows of scales below eye (Figs 4 to 8); pectoral-fin rays 14 to 16 (rarely 13 or 17) . . . . . → ***3***

2a. Teeth not fused, upper dental plates directly opposed (Fig. 1) . . . . . ***Calotomus***

2b. Teeth fused to form narrow dental plate, upper dental plate enclosed within lower dental plates when jaws closed (Fig. 2) . . . . . ***Leptoscarus***

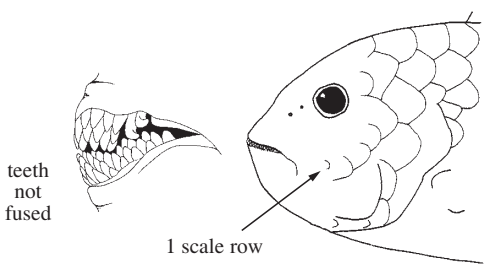


Fig. 1 ***Calotomus***

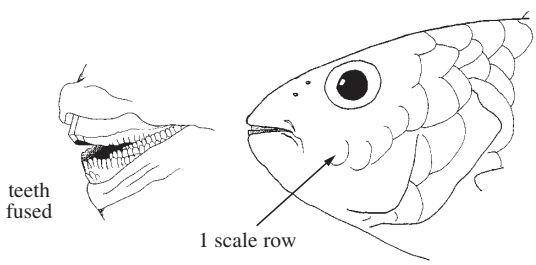
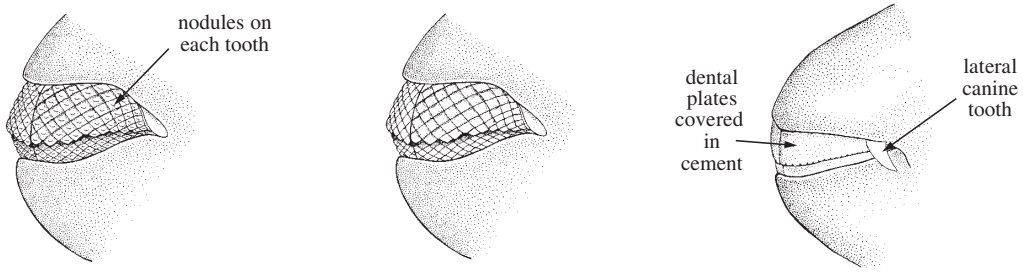


Fig. 2 ***Leptoscarus***

3a. Individual teeth on dental plates clearly visible (Fig. 3a, b), cement covering the dental plates restricted to base and invariably white, no lateral canine teeth; posterior nostril large (more than twice size of anterior nostril; Figs 4 and 5) . . . . . → ***4***

3b. Dental plates covered with cement (Fig. 3c) coloured white, blue or blue-green, individual teeth only visible near biting edge, lateral canine teeth often present (Fig. 3b); posterior nostril small (usually of similar size to anterior nostril; Figs 6 to 8) . . . . . → ***5***



a) ***Bolbometopon*** b) ***Cetoscarus*** c) ***Hipposcarus*, *Chlorurus*, *Scarus***

Fig. 3

4a. Head profile steep with distinct hump, profile almost vertical in large individuals (more than 60 cm standard length; Fig. 4); outer face of each tooth with small nodule at base (in specimens more than 35 cm standard length; Fig. 3a); 1 row of scales on interopercle (Fig. 4); median predorsal scales 2 to 5 (usually 4); pectoral-fin rays 15 or 16 . . . . . ***Bolbometopon***

4b. No hump present above eye, head profile evenly convex (Fig. 5); outer face of each tooth rounded with no tubercle (Fig. 3b); 2 rows of scales on interopercle (Fig. 5); median predorsal scales 5 to 7; pectoral-fin rays 14 (occasionally 15) . . . . . ***Cetoscarus***

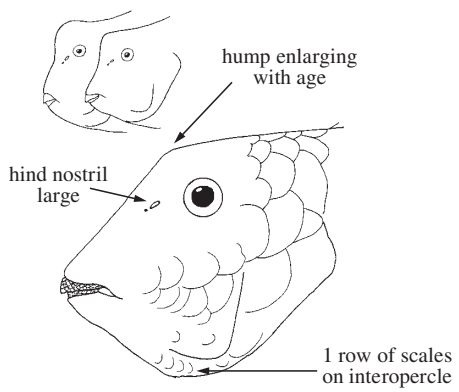


Fig. 4 ***Bolbometopon***

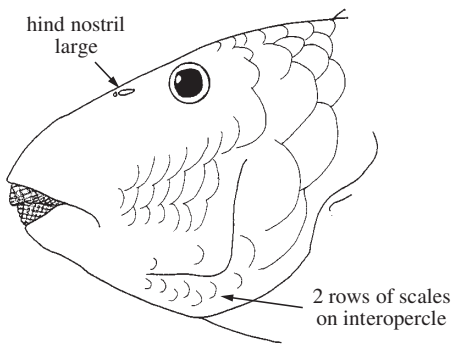


Fig. 5 ***Cetoscarus***

5a. Head profile pointed with distinctly angular snout; eye near dorsal profile; dental plates relatively narrow with white cement; cheek scales small, in an isolated patch, in indistinct rows (body uniformly pale, caudal and caudal peduncle often with yellow hue) (Fig. 6) . . . . . ***Hipposcarus***

5b. Head profile not pointed, snout blunt or rounded; eye not near dorsal profile; dental plates relatively deep with white, blue or blue-green cement; cheek scales large, in 2 to 3 distinct rows, not in an isolated patch (Figs 7 and 8); often dark or bright colours, yellow caudal and uniformly pale body only in IP *Scarus chameleon*) . . . . . → ***6***

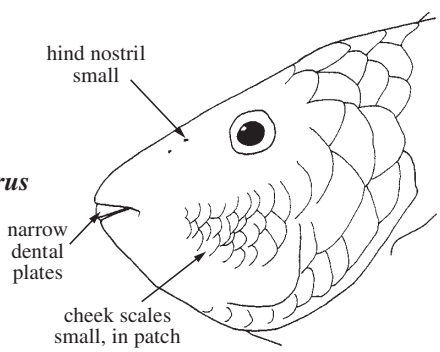


Fig. 6 ***Hipposcarus***

6a. Dental plates broadly exposed (Fig. 7); cutting edge of jaws irregular, zig-zag sutures joining lower jaw (Fig. 9a); pectoral-fin rays 15 or more (exceptionally 14); median predorsal scales 4 (rarely 3) with no anterior pair; head profile blunt (bullet-shaped or steep profile (Fig. 7) . . . . . ***Chlorurus***

6b. Dental plates usually covered by lips (Fig. 8); cutting edge of jaws usually even, straight sutures joining lower jaw (Fig. 9b); pectoral-fin rays usually 15 or less; median predorsal scales 3 to 8, usually 4 to 6, some species with an anterior pair; head profile rounded or angular (Fig. 8) . . . . . ***Scarus***

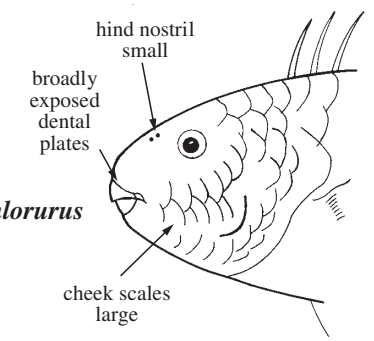


Fig. 7 ***Chlorurus***

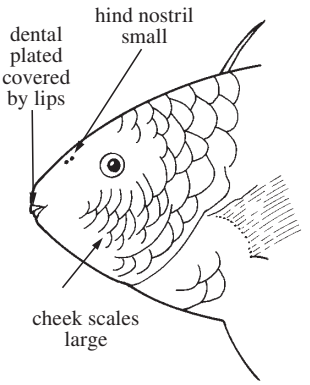


Fig. 8 ***Scarus***

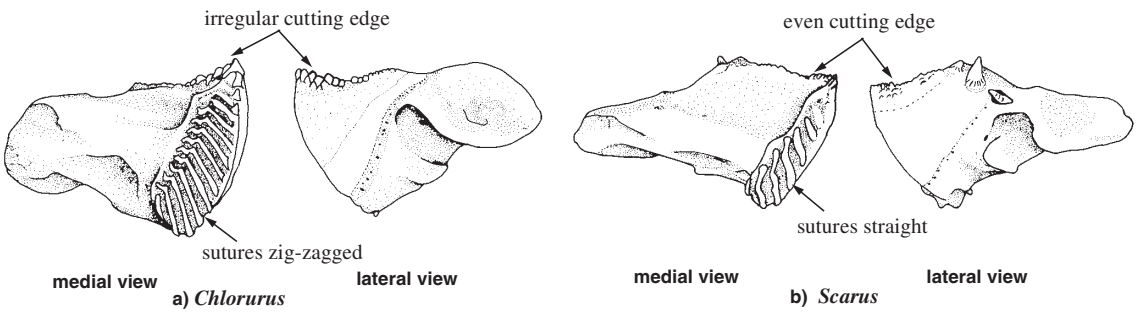


Fig. 9 lower jaw

List of species occurring in the area

The symbol ◄ is given when species accounts are included.

◄ *Bolbometopon muricatum* (Valenciennes in Cuvier and Valenciennes, 1840)

◄ *Calotomus carolinus* (Valenciennes in Cuvier and Valenciennes, 1840)
◄ *Calotomus spinidens* (Quoy and Gaimard, 1824)

◄ *Cetoscarus bicolor* (Rüppell, 1829)

◄ *Chlorurus bleekeri* (de Beaufort in Weber and de Beaufort, 1940)
◄ *Chlorurus bowersi* (Snyder, 1909)
◄ *Chlorurus capistratoides* Bleeker, 1849[1/]
◄ *Chlorurus frontalis* (Valenciennes in Cuvier and Valenciennes, 1840)
◄ *Chlorurus japanensis* (Bloch, 1789)
◄ *Chlorurus microrhinos* (Bleeker, 1854)
◄ *Chlorurus oedema* (Snyder, 1909)
◄ *Chlorurus sordidus* (Forsskål, 1775)
◄ *Chlorurus strongylocephalus* (Bleeker, 1854)[1/]
◄ *Chlorurus troschelii* (Bleeker, 1853)

1/ These are Indian Ocean forms which may be recorded from the western regions of Indonesia. All represent Indian Ocean members of species pairs or groups (*Hipposcarus harid/longipinnis*; *Chlorurus strongylocephalus/microrhinos*; *Scarus russelii/schlegeli*; *Scarus scaber/dimidiatus/oviceps*; *Scarus spinus/viridifucatus*). *Scarus viridifucatus* has been reported from Bali.

Hipposcarus harid (Forsskål, 1775)[1/]
Hipposcarus longiceps (Valenciennes in Cuvier and Valenciennes, 1840)
Leptoscarus vaigiensis (Quoy and Gaimard, 1824)
Scarus altipinnis (Steindachner, 1879)
Scarus chameleon Choat and Randall, 1986
Scarus dimidiatus Bleeker, 1859
Scarus festivus Valenciennes in Cuvier and Valenciennes, 1840
Scarus flavipectoralis Schultz, 1958
Scarus forsteni (Bleeker, 1861)
Scarus frenatus Lacepède, 1802
Scarus ghobban Forsskål, 17750
Scarus globiceps Valenciennes in Cuvier and Valenciennes, 1840
Scarus hypselopterus Bleeker 1853
Scarus koputea Randall and Choat, 1980
Scarus longipinnis Randall and Choat, 1980
Scarus niger Forsskål, 1775
Scarus oviceps Valenciennes in Cuvier and Valenciennes, 1840
Scarus prasiognathos Valenciennes in Cuvier and Valenciennes, 1840
Scarus psittacus Forsskål, 1775
Scarus quoyi Valenciennes in Cuvier and Valenciennes, 1840
Scarus rivulatus Valenciennes in Cuvier and Valenciennes, 1840
Scarus rubroviolaceus Bleeker, 1849
Scarus russelii Valenciennes in Cuvier and Valenciennes, 1840[1/]
Scarus scaber Valenciennes in Cuvier and Valenciennes, 1840[1/]
Scarus schlegeli (Bleeker, 1861)
Scarus spinus (Kner, 1868)
Scarus tricolor Bleeker, 1849
Scarus viridifucatus (Smith, 1956)
Scarus xanthopleura (Bleeker, 1853)
Scarus sp. 1 and 2

References

Bellwood, D.R. 1994. A phylogenetic study of the parrotfishes family Scaridae (Pisces: Labroidei), with a revision of genera. *Rec. Aust. Mus.*, Suppl., (20):84 p.

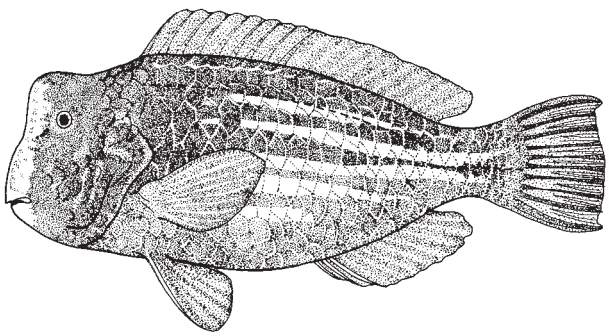
Bellwood, D.R. and J.H. Choat. 1989. A description of the juvenile phase colour patterns of 24 parrotfish species (family Scaridae) from the Great Barrier Reef, Australia. *Rec. Aust. Mus.*, 41:1-41.

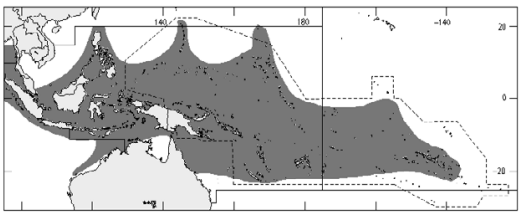
Choat J.H. and J.E. Randall. 1986. A review of the parrotfishes (family Scaridae) of the Great Barrier Reef of Australia with description of a new species. *Rec. Aust. Mus.*, 38:175-228.

Bolbometopon muricatum (Valenciennes in Cuvier and Valenciennes, 1840) **(Plate VI, 41 and 42)**

En - Green humphead parrotfish; **Fr** - Perroquet bossu vert; **Sp** - Loro cototo verde.

Largest parrotfish. Maximum size about 95 cm standard length and 1.2 m total length; commonly 60 to 80 cm standard length. Median predorsal scales 2 to 4 (may be obscured by hump); scales in cheek-scale rows 1(4-6), 2(3-6), 3(1-2); pectoral-fin rays 16 or 17. Steep profile distinctive; nodules on teeth unique. Usually in small (4) to large (more than 30) schools, often wary. Probably home ranging over large areas, often feeds in shallows on algal-covered surfaces and live corals. Monochromatic (no distinct initial and terminal phases).

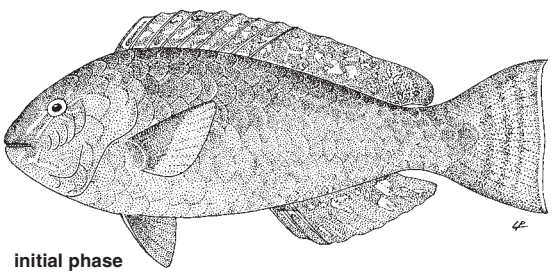




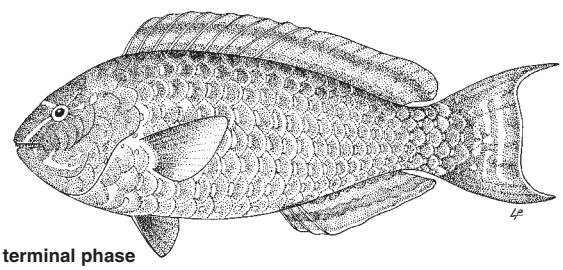
Calotomus carolinus (Valenciennes in Cuvier and Valenciennes, 1840) **(Plate VI, 43 and 44)**

En - Carolines parrotfish; **Fr** - Perroquet des Carolines; **Sp** - Loro de Carolines.

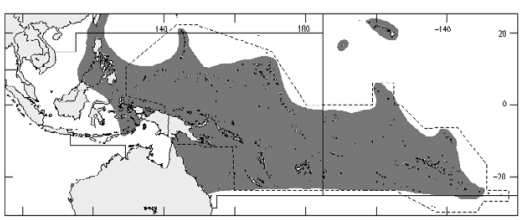
Maximum standard length about 38.9 cm, commonly 20 to 27 cm. Median predorsal scales 4 (occasionally 3); scales in cheek-scale row 1(4-5); pectoral-fin rays 13. Only species above 15 cm standard length with individual teeth visible and not fused. TP distinguished by red-pink stripes radiating from orbit. IP differs from only other species of *Calotomus* in the area, *C. spinidens*, in having a truncate caudal fin with narrow white margin. Eyes appear to bulge. Uncommon, found on coral reefs, in shallow coastal waters and seagrass beds. Solitary or in small groups. Feeds on algae and seagrasses.



initial phase



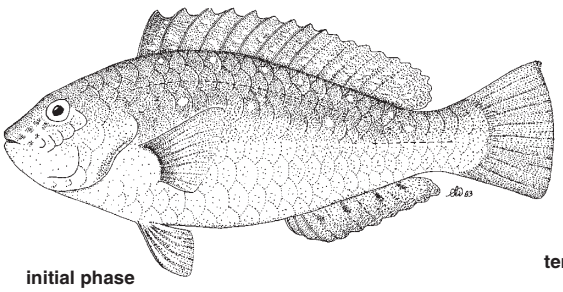
terminal phase



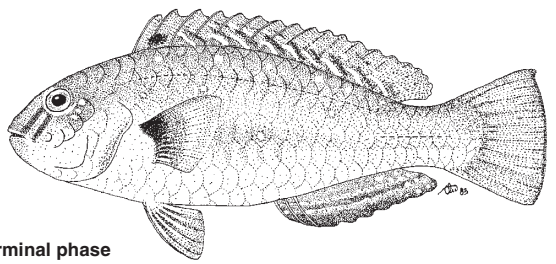
Calotomus spinidens (Quoy and Gaimard, 1824) **(Plate VI, 45 and 46)**

En - Spinytooth parrotfish; **Fr** - Perroquet dentu; **Sp** - Loro dentón.

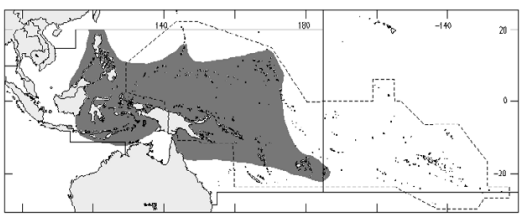
Maximum standard length about 15.4 cm, commonly 8 to 12 cm. Median predorsal scales 4; scales in cheek-scale row 1(4-5); pectoral-fin rays 13 (occasionally 12). Smaller of the 2 species of *Calotomus* in the area (both characterized by individual teeth visible and not fused). Characterized by a rounded caudal fin with no white margin. TP with 2 pink lines from eye to mouth, dark dot anteriorly on dorsal fin and dark pectoral-fin base. Often abundant in seagrass beds or dense algae. Feeds in small groups primarily on seagrasses and epiphytes.



initial phase



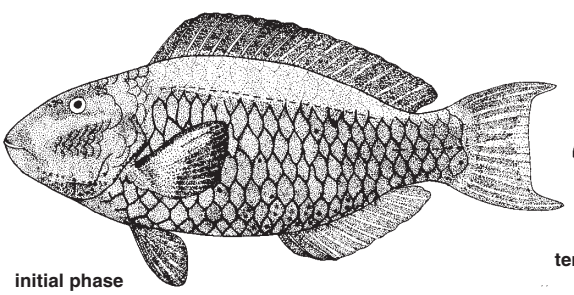
terminal phase



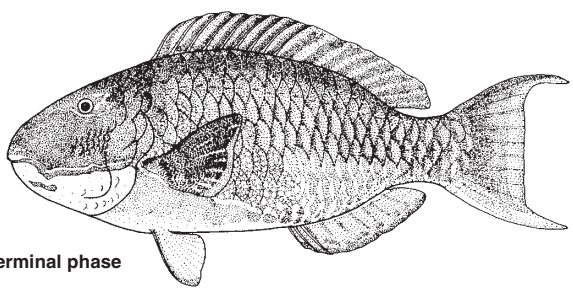
Cetoscarus bicolor (Rüppell, 1829) **(Plate VI, 47 and 48)**

En - Bicolour parrotfish; **Fr** - Perroquet à points rouges; **Sp** - Loro de manchas rojas.

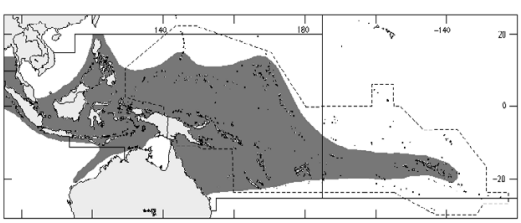
Maximum size about 37 cm standard length and 47 cm total length (1.5 kg); commonly 20 to 30 cm standard length. Median predorsal scales 5 to 7; scales in cheek-scale rows 1(6-8), 2(5-8), 3(3-7); pectoral-fin rays 14 or 15. Teeth individually visible and fused but without nodule on each tooth (found only in *Bolbometopon*). The only scarid with 2 rows of scales on the interopercle. Uncommon, usually in small groups of 1 TP and 2 to 3 IPs. Wary, feeds on epilithic algal communities, most often seen in shallow areas of exposed reefs.



initial phase



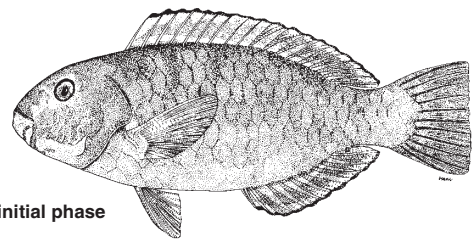
terminal phase



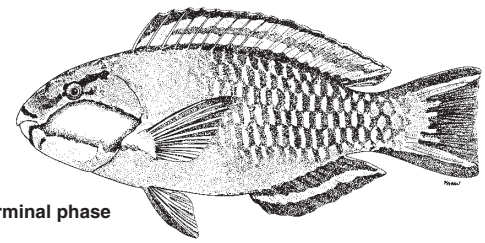
Chlorurus bleekeri (de Beaufort in Weber and de Beaufort, 1940) **(Plate VII, 49 and 50)**

En - Bleeker's parrotfish; **Fr** - Perroquet joue blanche.

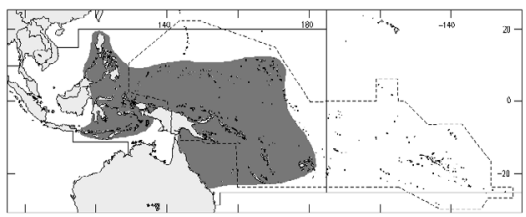
Maximum standard length about 26.8 cm, commonly 18 to 26 cm. Median predorsal scales 4; scales in cheek-scale rows 1(6-8), 2(6-8); pectoral-fin rays 15. IP difficult to separate from similar species but often characterized by pale caudal fin and caudal peduncle (and pale bars on body when alive). TP with large pale cream patch below eye bordered entirely by a thick green line. Very similar to *Chlorurus troschelii* and *C. capistratoides* (IPs almost indistinguishable), but TP distinguished by pale area on cheek entirely bordered by a green line (in *C. troschelii*, a green line is present dorsally but absent or indistinct ventrally; in *C. capistratoides*, the whole cheek is pale not just a delineated patch). These 3 species probably overlap throughout western Indonesia. IP also similar to *Scarus schlegeli* but this lacks pale caudal peduncle. Most abundant in deeper waters (5 to 25 m), solitary or in small harems. In some West-Pacific regions this is the most abundant *Chlorurus* species (Philippines) and may be a major proportion of the scarid catch.



initial phase



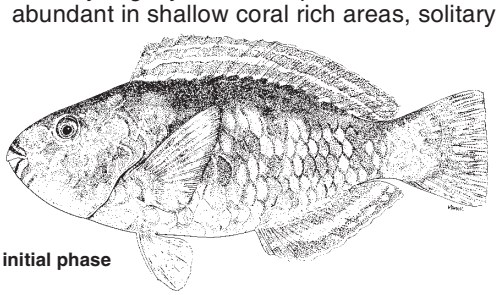
terminal phase



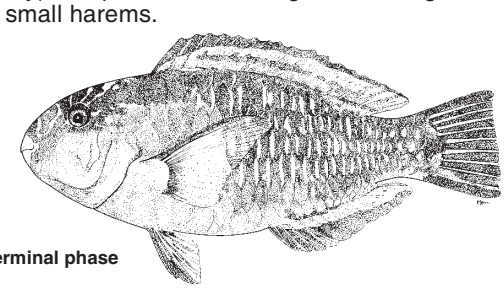
Chlorurus bowersi (Snyder, 1909) **(Plate VII, 51 and 52)**

En - Bower's parrotfish.

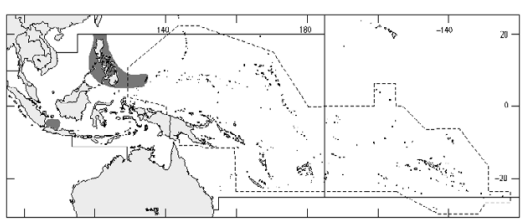
Maximum size about 25 cm standard length and 31 cm total length; commonly 18 to 23 cm standard length. Median predorsal scales 4 (occasionally 5); scales in cheek-scale rows 1(6), 2(6-7); pectoral-fin rays 15. IP difficult to separate from similar species but characterized by caudal fin with pale red rays. TP with large orange patch behind eye extending to pectoral-fin base and posteriorly to midbody near pectoral-fin tip. Similar species: all *Chlorurus* IPs may be uniformly dark and very difficult to separate, but red caudal-fin rays are found only in *C. bowseri*. The TP colour pattern is unique, the only other species with a comparable orange patch is *Scarus hypselopterus*, but in this species the patch is in the middle of the body (extending posteriorly well beyond pectoral-fin tips but only slightly in front of pectoral-fin base anteriorly) and paler. Rare throughout its range. Most abundant in shallow coral rich areas, solitary or in small harems.



initial phase



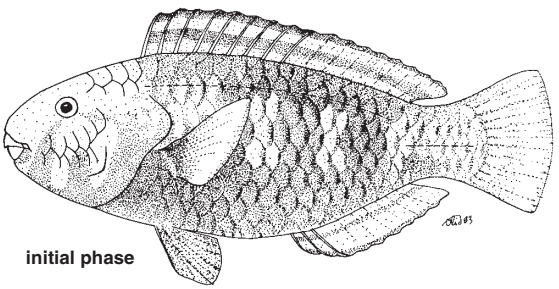
terminal phase



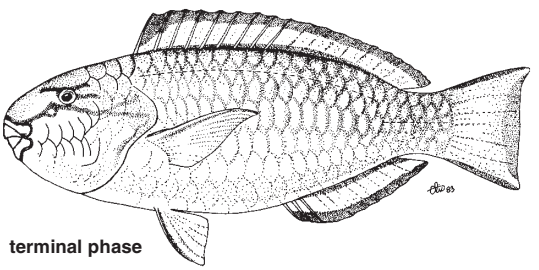
Chlorurus capistratoides (Bleeker, 1849) **(Plate VII, 53 and 54)**

En - Palecheek parrotfish; **Fr** - Perroquet à jove pâle; **Sp** - Loro rostro pálido.

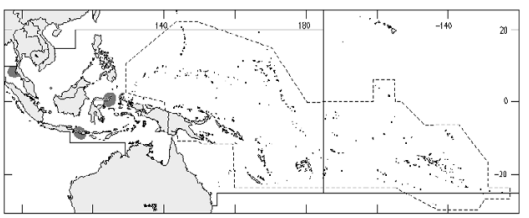
Maximum standard length about 25.2 cm, commonly 20 to 25 cm. Median predorsal scales 4 (occasionally 3); scales in cheek-scale rows 1(6-7), 2(6-8); pectoral-fin rays 15 (occasionally 14). IP difficult to separate from similar species, especially *Chlorurus bleekeri* and *C. troschelii*. TP distinguished by overall pale colour of cheek up to level of eye and blue-green line extending from eye to margin of operculum and down the opercular margin. In similar species, this line terminates at the opercular margin. In *C. bleekeri* and *C. troschelii* the pale area is restricted to a discrete area below the eye. TP may have pale patch extending over midbody. Other similar species are *C. sordidus* and *C. japanensis*. Present in western and central Indonesia. *Callyodon pyrrhurus* Jordan and Seale, 1906 is a synonym. Previously known as *Chlorurus japanensis*.



initial phase



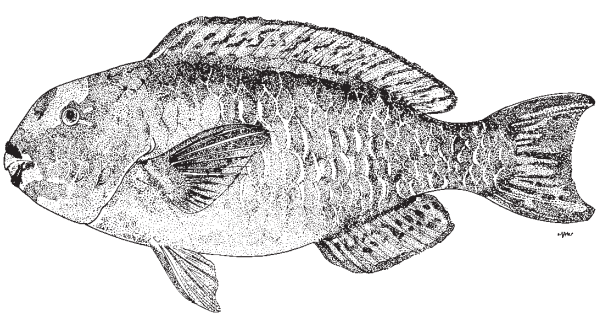
terminal phase

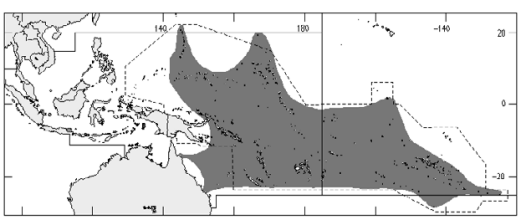


Chlorurus frontalis (Valenciennes in Cuvier and Valenciennes, 1840) **(Plate VII, 55 and 56)**

En - Pacific slopehead parrotfish.

Maximum standard length about 38 cm, commonly 25 to 35 cm. Median predorsal scales 4; scales in cheek-scale rows 1(6), 2(6); pectoral-fin rays 15. Very similar to *Chlorurus microrhinos*, especially the dark North Pacific form, but distinguished from it by absence of blue-green line extending from mouth to opercular edge. Moderately common on exposed parts of oceanic reefs. Usually occurs in small groups. Monochromatic (no distinct initial and terminal phase).





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