

Two New Indo-Pacific Labrid Fishes of the Genus *Halichoeres*, with Notes on Other Species of the Genus¹

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ABSTRACT: Two new wrasses of the genus *Halichoeres* are described: *H. chrysus*, a bright-yellow species with one to three black spots in the dorsal fin and one at the upper base of the caudal fin, which occurs in the western Pacific and at Christmas Island in the Indian Ocean; and *H. melasmapomus*, which is distinctive in having a large blue-edged black spot on the opercle, and occurs in Oceania, the western Pacific, and at Christmas and Cocos-Keeling Islands in the Indian Ocean. *Halichoeres leparensis* is shown to be the female of *H. argus*. The male and female color phases of *H. melanurus* are differentiated. *Halichoeres gymnocephalus* is synonymized as the female of *H. chloropterus* and *H. kawarin* as the male of *H. timorensis*. The very different juvenile color patterns of *H. podostigma* and *H. prosopeion* are described.

FOR SEVERAL YEARS the author has been accumulating specimens of two unidentified species of labrid fishes of the genus *Halichoeres* in Oceania and the western Pacific. Both are relatively common, though not often taken in less than 20 m. They have remained on museum shelves identified only as *Halichoeres* sp., with the expectation that names for them would eventually be found in the literature. One of these fishes, distinctive in possessing a large ocellated black spot on the opercle, was first collected in the Tuamotu Archipelago in 1957; the other, which is bright yellow in life, was obtained initially in the Caroline Islands in 1968. In recent years, other fish enthusiasts have collected specimens of these two wrasses. Unexpectedly, both species have been found at Christmas Island in the eastern Indian Ocean and one at the Cocos-Keeling Islands as well. It is now apparent that these two

Halichoeres represent new species. The primary purpose of the present paper is to describe them. In addition, illustrations and discussions are presented on the sexual color phases and juvenile forms of other Indo-Pacific species of the genus.

MATERIALS AND METHODS

Type specimens of the new species have been deposited at the following institutions: Academy of Natural Sciences of Philadelphia (ANSP); Australian Museum, Sydney (AMS); California Academy of Sciences, San Francisco (CAS); Museum National d'Histoire Naturelle, Paris (MNHN); Seto Marine Biological Laboratory, Shirahama, Wakayama Prefecture (SMBL); U.S. National Museum of Natural History, Washington, D.C. (USNM); and the Western Australian Museum, Perth (WAM).

In descriptions of the new species, data in parentheses refer to paratypes. More measurement data are presented in the tables than are summarized in the text. Proportional measurements in the text are rounded to the nearest 0.05.

Standard length (SL) is measured from the most anterior end of the snout in the median

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line (either upper lip or upper canines, whichever is more anterior) to the base of the caudal fin (posterior end of hypural plate). Head length is measured from the same anterior point to the posterior end of the opercular flap. Body depth is the greatest depth, taken from the base of the dorsal spines to the ventral margin of the abdomen (though correcting for any obvious malformation of preservation). Width of body is measured just posterior to the gill opening. Orbit diameter is the greatest fleshy diameter, but the interorbital width is the least bony width. The length of the upper jaw is measured from the front of the snout to the end of the maxilla (dissection was often necessary on larger specimens to expose maxilla). The depth of the caudal peduncle is the least depth; the length of the peduncle is measured horizon-

tally between verticals at the rear base of the anal fin and base of the caudal fin. The lengths of the fin spines and rays are taken to their extreme bases (from X rays or by transmitting bright light through bases of fins). Length of pectoral fin is taken from the distal tip of the longest ray to the extreme base of that ray. The upper rudimentary pectoral ray is included in the counts of the rays of these fins. Gill-raker counts include all rudiments.

Halichoeres chrysus, n. sp.

Figures 1, 2

Thalassoma lutescens (non Lay and Bennett) Burgess and Axelrod, 1974, Pac. Mar. Fishes, Book 4, p. 883, fig. 75

TABLE 1

PROPORTIONAL MEASUREMENTS OF TYPE SPECIMENS OF *Halichoeres chrysus* (EXPRESSED AS A PERCENTAGE OF STANDARD LENGTH)

	PARATYPES							
	HOLOTYPE BPBM 16151	BPBM 22224	BPBM 15591	BPBM 19121	BPBM 19617	BPBM 9358	BPBM 22182	BPBM 16088
Standard length (mm)	79.4	21.7	36.9	45.0	49.8	56.2	67.1	78.0
Depth of body	28.2	26.3	26.8	26.9	28.7	27.6	29.5	27.5
Width of body	12.9	14.0	13.2	11.0	13.1	10.8	11.8	12.2
Head length	31.5	36.4	34.7	34.9	33.1	33.5	31.2	31.4
Snout length	11.3	10.9	10.3	10.9	10.2	11.1	10.7	11.2
Orbit diameter	6.2	10.2	9.2	7.5	7.4	8.0	6.3	6.1
Bony interorbital width	7.1	7.8	7.3	7.1	6.7	7.4	7.0	6.7
Length of upper jaw	9.1	9.7	8.7	8.9	8.7	8.9	8.5	9.8
Least depth of caudal peduncle	15.5	15.2	14.7	14.4	15.0	15.8	15.8	15.9
Length of caudal peduncle	8.2	8.9	7.9	8.0	8.2	8.5	7.9	8.6
Predorsal length	30.5	36.1	36.0	32.6	30.1	32.7	30.0	30.2
Preanal length	54.8	60.0	61.8	61.0	56.2	58.3	56.8	55.4
Prepelvic length	32.6	36.7	34.6	33.4	32.1	34.2	32.3	32.7
Length of first dorsal spine	7.1	5.8	5.9	6.7	Broken	7.2	6.7	6.7
Length of second dorsal spine	8.8	7.8	8.1	7.8	7.1	8.7	7.8	8.1
Length of ninth dorsal spine	10.7	12.4	12.4	11.1	10.5	10.8	10.9	10.4
Length of longest dorsal ray	12.8	13.8	13.6	13.1	13.1	14.1	13.7	13.0
Length of dorsal fin base	64.5	56.7	58.0	61.2	63.6	61.2	63.1	63.0
Length of first anal spine	4.1	4.6	4.6	4.2	4.1	3.9	4.1	4.4
Length of third anal spine	8.7	9.4	8.2	8.2	8.1	8.9	8.2	7.7
Length of longest anal ray	11.6	12.9	12.3	11.8	11.5	13.2	12.4	11.6
Length of anal fin base	36.9	31.8	35.5	33.0	35.1	35.0	37.4	34.4
Length of caudal fin	22.3	25.0	24.5	24.2	22.9	24.6	22.7	23.1
Length of pectoral fin	19.0	20.0	20.4	19.8	19.2	22.0	25.8	19.6
Length of pelvic spine	12.8	10.9	11.7	11.8	10.1	12.7	11.9	13.1
Length of pelvic fin	19.0	14.3	16.5	16.3	15.5	17.9	17.2	20.7

(southern Taiwan); Mayland, 1975, *Korallenfische und Niedere Tiere*, p. 223, fig. 161; Burgess and Axelrod, 1975, *Pac. Mar. Fishes*, Book 6, p. 1573, fig. 399 (Madang, New Guinea).

Halichoeres sp. Masuda, Araga, and Yoshino, 1975. Coastal fishes of southern Japan, p. 303, pl. 109-F (southern Japan).

Halichoeres sp. 1 Allen and Steene, 1979, *Spec. Publ. Austral. Nat. Parks Wildl. Serv.* 2: 49, pl. 15 (mislabelled 14) (Christmas Island, Indian Ocean).

HOLOTYPE: BPBM 16151, 79.4 mm SL, male, Solomon Islands, Florida Island, Sandfly Passage, reef in 7 m, spear, J. E. Randall, 20 July 1973.

PARATYPES: BPBM 17707, 54.0 mm SL, Caroline Islands, Ulithi Atoll, Falalop Island, south side off boat landing, spear, 9 m, J. E. Randall, 18 June 1968; BPBM 8671, 53.5 mm SL, Philippine Islands via Modern Pet Shop, Honolulu, G. R. Allen, April 1969; AMS I.15682-028, 70.7 mm SL, Great Barrier Reef, Capricorn Group, One Tree Island, south side of reef, 29 m, F. H. Talbot et al., 27 November 1969; WAM P26850-001, 47.2 mm SL, Philippine Islands via Modern Pet Shop, Honolulu, G. R. Allen, 1970; ANSP 144094, 2:44.0–53.8 mm SL, same data as preceding; BPBM 9358, 56.2 mm SL, Palau Islands, Augulpelu Reef, southwest end, edge of drop-off, 8 m, spear, J. E. Randall, 13 April 1970; MNHN 1980-1309, 47.3 mm SL, Palau Islands, Ngemelis Island (2 mi northeast of Bairakaseru Island), sand and reef in 6 m, rotenone, J. E. Randall, 23 April 1970; CAS 39124, 51.2 mm SL, Marshall Islands, Enewetak Atoll, off northeast end of Enewetak Island, patch reefs and sand in lagoon at 12 m, P. M. Allen, 5 July 1973; BPBM 16088, 78.0 mm SL, Solomon Islands, Savo Island, southwest side, reef in 34 m, spear, J. E. Randall, 16 July 1973; BPBM 15591, 3:36.9–69.2 mm SL, Solomon Islands, Savo Island, southwest side, small coral head on rubble bottom, 46 m, dynamite, B. Goldman, J. E. Randall, and G. R. Allen, 17 July 1973; BPBM 22959, 70.4 mm SL, same data as holotype; BPBM 15867, 2:58–62.9 mm SL,

New Guinea, Madang, south side of Rausch Pass, small isolated coral heads on sloping sand bottom, 30–34 m, rotenone, J. E. Randall and R. C. Steene, 18 August 1973; BPBM 19617, 2:49.8–51.7 mm SL, Marshall Islands, Enewetak Atoll, lagoon off northeast end of Enewetak Island, small patch reef on sand, 12.5 m, P. M. Allen, 10 August 1973; SMBL-F 73386, 55.2 mm SL, Japan, Honshu, near Cape Shiono-misaki, rocky reef, 15 m, M. Irie, November 1973; USNM 221623, 2:23.4–70.0 mm SL, Marshall Islands, Enewetak Atoll, Japtan (David) Island, small patch reef on sand in lagoon, 18.5 m, rotenone, J. E. Randall, R. M. McNair, and P. Lamberson, 13 December 1974; BPBM 19267, 2:27.6–42.7 mm SL, Indonesia, Molucca Islands, Ambon, south side at Latuhalet, coral block off fringing reef in 36.5 m, rotenone, J. E. Randall and G. R. Allen, 21 January 1975; BPBM 19121, 45.0 mm SL, Ryukyu Islands, Okinawa, Sesoko Island, west side, rubble slope with patch reef, 30 m, spear, J. E. Randall, 30 May 1975; BPBM 22182, 67.1 mm SL, Philippine Islands, Negros, Dumaguete City, off pier, 25 m, spear, J. E. Randall, 30 August 1977; BPBM 22224, 4:12.8–21.7 mm SL, Philippine Islands, Luzon, Caban Island (near Maricaban Island), north side, sand-rubble slope, 30 m, rotenone, J. E. Randall, K. E. Carpenter, and W. Einziger, 2 September 1977; WAM P26082-004, 3:29–53 mm SL, Christmas Island (Indian Ocean), off Ethel Beach, 30–40 m, rotenone, G. R. Allen and R. C. Steene, 19 May 1978; WAM P26087-009, 4:28–60 mm SL, same as preceding but in 40–45 m, 22 May 1978; WAM P26099-019, 50 mm SL, Christmas Island, Flying Fish Cove, 25–35 m, rotenone, G. R. Allen and R. C. Steene, 27 May 1978; WAM P26125-007, 42 mm SL, same data as WAM P26082-004 but at 55–65 m, 12 June 1978; BPBM 22455, 3:39.5–61.5 mm SL, Philippine Islands, Luzon, Caban Island, southwest side, 30 m, rotenone, J. E. Randall, K. E. Carpenter, G. W. Tribble, and R. P. H. Rutherford, 28 July 1978.

DESCRIPTION: Dorsal rays IX,12; anal rays III,12, rarely 11 (23 paratypes with 12,

one with 11); pectoral rays usually 13 (one of 24 paratypes with 12 and one with 14); pelvic rays I,5; principal caudal rays 14 (middle 12 branched); upper and lower procurrent caudal rays 5; lateral-line scales 27 (plus one pored scale posterior to hypural plate); scales above lateral line to origin of dorsal fin 5; scales below lateral line to origin of anal fin $10\frac{1}{2}$; circumpenduncular scales 20; branchiostegal rays 6; gill rakers 17 (14–19; $n = 25$; $\bar{x} = 15.8$); vertebrae 25.

Body moderately elongate, the depth 3.55 (3.4–3.8) in SL, and somewhat compressed, the width 2.2 (1.9–2.5) in depth; head length 3.2 (2.75–3.2) in SL (tending to decrease with age); snout length 2.8 (2.85–3.35) in head; orbit diameter 5.1 (3.6–5.15) in head; interorbital space convex, the least bony width 4.45 (4.45–4.95) in head; caudal peduncle about twice as deep as long, the least depth 2.05 (1.95–2.5) in head.

Mouth terminal, the gape slightly oblique, the maxilla not reaching a vertical at front edge of orbit; lower lip with a downward-projecting flap along the side; inner surface of upper lip strongly plicate. Gill membranes broadly attached to isthmus.

Front of jaws with a pair of large, projecting, slightly recurved canine teeth (upper canines and one of two lowers broken on holotype) about twice as long as adjacent posterior teeth; side of upper jaw with 8–10 and of lower jaw with 9–12 somewhat compressed conical teeth which are progressively shorter, less projecting, and with tips more rounded posteriorly; a large canine tooth (sometimes two) at corner of mouth extending obliquely downward and anterior from posterior end of upper jaw (on adults this canine as large as anterior canines, on some there is a medial barb); a pair of small moderately compressed teeth with rounded tips anteriorly in jaws medial to large canines, the upper jaw usually with a smaller medial tooth on each side posterior to anterior pair and the lower jaw with 1–3 lingual teeth posterior to anterior pair.

Pharyngeal dentition of largest paratype: each subtriangular half of upper pharyngeal plate with 15 small teeth in four anterior-to-posterior rows, the medial and posterior

teeth molariform, the anterior and lateral teeth bluntly conical; lower T-shaped pharyngeal plate with a large median posterior ovoid molariform tooth; remaining teeth molariform to bluntly rounded except most lateral and most anterior, which are conical; 12–14 teeth on posterior limb on each side of large molar (the adjacent molar the largest and rather elongate in cross section); 13 teeth on median limb anterior to large molar, mostly in two rows.

Lower free margin of preopercle reaching to, or anterior to, a vertical at front edge of orbit; upper free margin of preopercle reaching to, or above level of, corner of mouth (on some, nearly to level of ventral margin of orbit).

Nostrils small, in front of upper fourth of eye, the anterior in a short membranous tube, the posterior diagonally upward and behind the anterior nostril, nearly covered by a flap from ventro-anterior margin.

Suborbital pores rimming eye from mid-posteriorly to below front edge of orbit 10 (6–12).

Lateral line complete, the anterior part broadly curved, bending sharply ventrally beneath posterior portion of dorsal fin to straight peduncular part; anterior lateral-line scales with branched tubules, the pores varying from two to four (usually two or three); scales of peduncular portion of lateral line usually with one pore.

Head naked except for a triangular zone of small scales on nape, the median apex of which extends to a vertical between upper end of preopercular margin and posterior edge of orbit; no narrow naked median zone on nape (though median anterior scales may be partially embedded, especially on larger specimens); scales on midside of thorax less than half as high as those on side of body, becoming still smaller ventrally and anteriorly; fins naked except for small scales at extreme base of dorsal and anal fins, progressively smaller scales on basal one-third to two-fifths of caudal fin, and a median row of three scales directed posteriorly from between base of pelvic fins (the most posterior scale is triangular).

Origin of dorsal fin above first lateral-line

scale; dorsal spines progressively longer, the first 4.45 (4.65–6.3) and the ninth 2.95 (2.8–3.15) in head; third to tenth dorsal soft rays subequal (except smallest specimens in which the first ray is longest), 2.45 (2.2–2.65) in head; all dorsal and anal soft rays branched, the last to base; origin of anal fin below base of first dorsal soft ray; first anal spine slender and short, 7.7 (7.1–8.6) in head; third anal spine about twice as long as first, 3.6 (3.75–4.25) in head; second to fifth anal soft rays longest, 2.7 (2.5–2.95) in head; caudal fin slightly to moderately rounded, 1.4 (1.35–1.45) in head; pectoral fins 1.65 (1.2–1.8) in head, the third ray longest (but second and fourth nearly as long, the first ray rudimentary, the second unbranched); origin of pelvic fins below lowest extent of pectoral base; pelvic spine slender, flexible distally; pelvic fins not reaching anus, their length 1.65 (1.5–2.45) in head.

Color of holotype (a male) in alcohol: pale with a vertically elongate dark-brown spot behind eye (nearly as tall as height of eye, its rear margin in line with upper preopercular margin); small scales of nape with broad dusky margins; a median dorsal dusky band from upper lip to dusky scaled region of nape, narrowing at anterior and posterior ends of interorbital space; a faint dusky band from front of snout (where joined to middorsal band) across upper edge of orbit onto postorbital side of head, merging partially with dark nape region; a third dusky band from front of snout (also connecting with above-mentioned bands) beneath orbit to edge of operculum at level of upper part of pectoral base; a faint dusky band from chin below corner of mouth across cheek to edge of operculum at level of lower part of pectoral base; a short longitudinal dusky band on interopercle; fins pale except for a blackish spot on outer half of first interspinous membrane of dorsal fin (also first spine dusky) and a small dusky spot on last scale on base of caudal fin between fourth and fifth branched rays. Three other large males (69.2–78 mm SL) have the same coloration as the holotype, but four smaller males (53.5–61.5 mm SL) have a second small blackish spot on the soft portion of the

dorsal fin between the second and third rays.

Color of holotype in life: body bright yellow; head and thorax yellow-orange; a three-part spot of bright green, black, and bright yellow behind eye; head with irregular light-green bands (the dusky bands described above from the preserved specimen); not apparent on the preserved specimen is a green band passing posteriorly from postorbital spot, bifurcating, and extending to end of opercular membrane and two green bands on thorax, the ventral one more prominent and irregular, the upper one commencing on pectoral base (both continue faintly onto anterior abdomen); lips light greenish; dorsal fin yellow with a median longitudinal yellow-orange band; first dorsal spine greenish; a large black spot covering most of outer half of first interspinous membrane of dorsal fin, rimmed posteriorly with whitish; soft portion of dorsal fin with a narrow faint light-bluish margin and a yellow-orange submarginal band; anal fin orange-yellow with a median greenish band and light-bluish margin; caudal fin colored like body on basal scaled portion, with a small blackish spot on outer part of scaled portion between fourth and fifth branched rays; unscaled part of caudal fin light bluish with converging bands of light greenish and orange (partially obscured in middle of fin by streaks of orange along rays to posterior margin); pectoral fins clear, the rays whitish and narrowly edged in reddish; pelvic fins with a streak of orange on first soft ray and part of adjacent membrane; rest of fins mostly clear with light-bluish rays.

Females are also pale in alcohol with a blackish spot behind the eye, one at the front of the dorsal fin and a small one at upper caudal base. All have a second black spot between the second and third soft rays of the fin. In addition, they have two small dusky spots dorsally on front of snout; juveniles and smaller females have a third blackish spot in the dorsal fin on the penultimate membrane (extending onto adjacent rays in juveniles).

In life, females are bright yellow overall; the second black spot in the dorsal fin is rimmed with a lighter yellow than the rest of

the fin; the pectoral and caudal rays may be faintly pink; the margins of the dorsal and anal fins are clear.

REMARKS: Named *chrysus* from the Greek for "golden," in reference to the bright-yellow color of both the males and females of the species.

This species has been collected in the depth range of 7–60 m. However, it is rarely seen in less than about 20 m. The typical habitat is small isolated coral heads on sand, or sand and rubble bottoms. Individual fish readily cross open sand areas from one coral patch to another. Males have been observed in courtship, at which time the dorsal fin is fully elevated.

Halichoeres chrysus is broadly distributed in the western Pacific from the Ryukyu Islands and Taiwan in the north through the Philippines, Indonesia, New Guinea, and Solomon Islands to New South Wales. The southernmost record is Montague Island, N.S.W. (36°15' S, 150°12' E). An underwater photograph of a juvenile taken in 20 m at this island by Rudie H. Kuiter was sent to the author. Kuiter has not seen any adults at this locality. A juvenile of about 12 mm total length collected by Kuiter at Seal Rocks, N.S.W. (31°26' S, 152°32' E), in October 1971 was observed by the author in Kuiter's aquarium in Sydney in early March 1973, at which time it was about 85 mm total length.

This species also ranges into Micronesia. Specimens are here reported from the Palau Islands, Caroline Islands, and Marshall Islands. It seems to be absent from Polynesia. Although it might be expected from the Samoa Islands, no individuals have been seen or taken there in spite of the extensive collecting by Richard C. Wass and associates (a checklist of the fishes of Samoa has now been completed by Wass).

In 1972, the author was shown a tank of reef fishes at the Steinhart Aquarium in San Francisco by the late Earl S. Herald. All these fishes had supposedly been collected during a recent trip to Maui, Hawaiian Islands. Among them were three *Halichoeres chrysus*. When doubt was expressed that these three wrasses had been caught in Ha-

waiian waters, Herald checked with Lloyd Gomez who had directed the collecting operation. The latter insisted that all had been taken near Lahaina, Maui, on 20 June 1972. Aquarium fish collectors and other divers in Hawaii have been asked to be on the alert for additional individuals of this wrasse, but none have been reported.

Halichoeres chrysus is a popular aquarium fish. It is often brought into Hawaii and the mainland United States from the Philippines. Four of the paratypes reported herein were obtained after they died at a marine aquarium shop in Honolulu. Possibly, the ones collected in Maui were aquarium releases, though it is difficult to imagine how three from such a source could be taken in one collecting trip on the same day.

This species is also imported to Europe as an aquarium fish, where it is sometimes misidentified as *Halichoeres solorensis* (Bleeker). However, *H. solorensis* is a different species. Although it has two dark spots in the dorsal fin in the female phase (reduced to one in the male) and one at the upper base of the caudal fin, there is little else of resemblance to *H. chrysus*. It is a greenish fish with red bands on the head and red markings in the median fins. The black spot anteriorly in the dorsal fin extends over the first two inter-spinous membranes [not on the second and third as illustrated in Bleeker (1862, pl. 40, fig. 2)]. The second black spot of the dorsal fin lies mainly between the fifth and sixth dorsal soft rays. In addition, there is a wedge-shaped black bar at the pectoral base (no dark marks appear at the base of pectoral fins of *H. chrysus*). Also, there are 14 pectoral rays, in contrast to 13 for *H. chrysus*. The holotype of *Julis (Halichoeres) solorensis* Bleeker, RMNH 6598, 71 mm SL, was examined at the Rijksmuseum van Natuurlijke Historie in Leiden. *Halichoeres amboinensis* (Bleeker) is a junior synonym of *H. solorensis*, based on the male phase.

The closest relative of *Halichoeres chrysus* is a species described in a paper on western Indian Ocean *Halichoeres* by the author and Margaret M. Smith (in press). This fish is remarkably similar to *H. chrysus*, differing principally in the lower half of the body

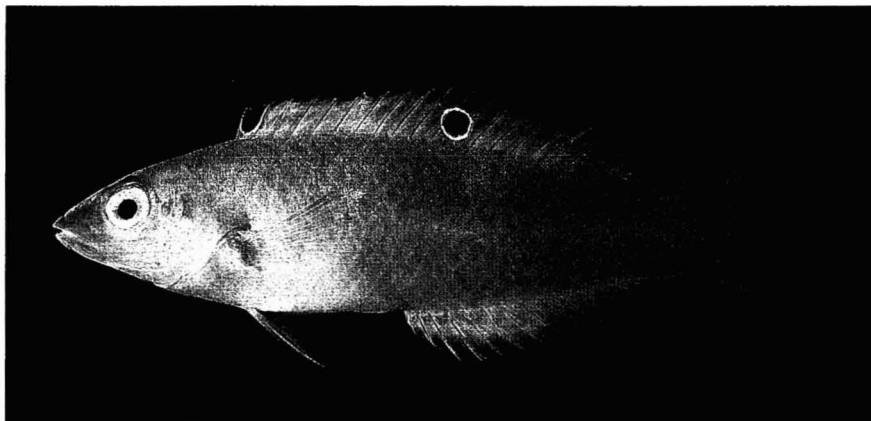


Figure 1. *Halichoeres chrysus*, paratype, ♀, BPBM 9358, 56.2mm SL, Palau Islands.



Figure 2. *Halichoeres chrysus*, holotype, ♂, BPBM 16151, 79.4mm SL, Solomon Islands.



Figure 3. *Halichoeres melasmapomus*, paratype, ♀, BPBM 9631, 46.9mm SL, Palau Islands.

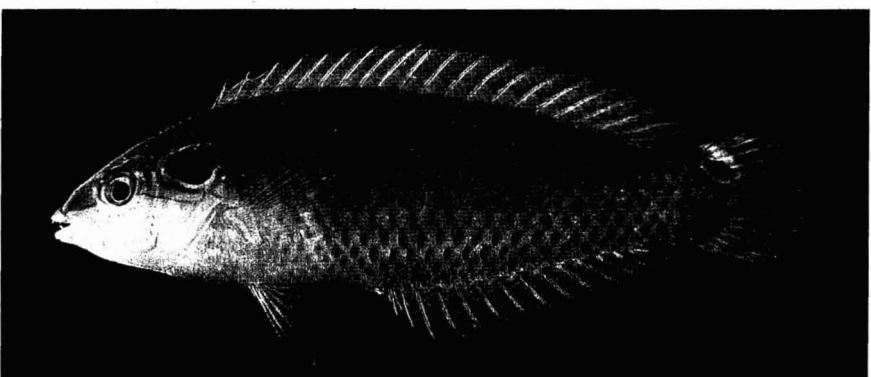


Figure 4. *Halichoeres melasmapomus*, holotype, ♂, BPBM 16899, 68.0mm SL, Pitcairn Island.

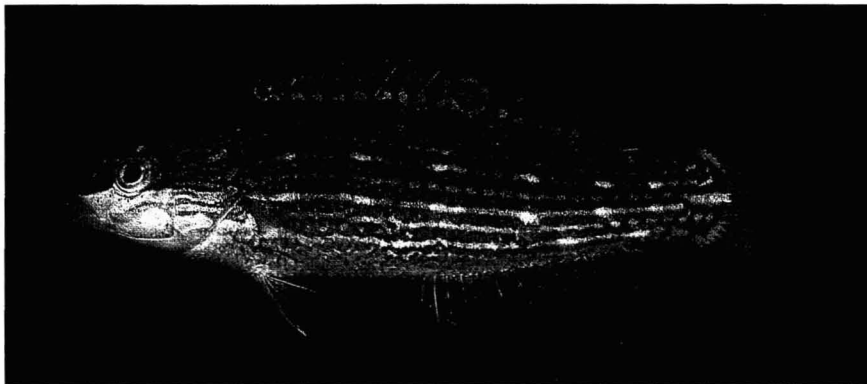


Figure 5. *Halichoeres argus*, ♀, BPBM 16046, 60mm SL, Solomon Islands.



Figure 6. *Halichoeres argus*, ♂, BPBM 18818, 52mm SL, Sri Lanka.



Figure 7. *Halichoeres melanurus*, ♀, BPBM 7994, 64mm SL, Marshall Islands.



Figure 8. *Halichoeres melanurus*, ♂, BPBM 8060, 65mm SL, Marshall Islands.

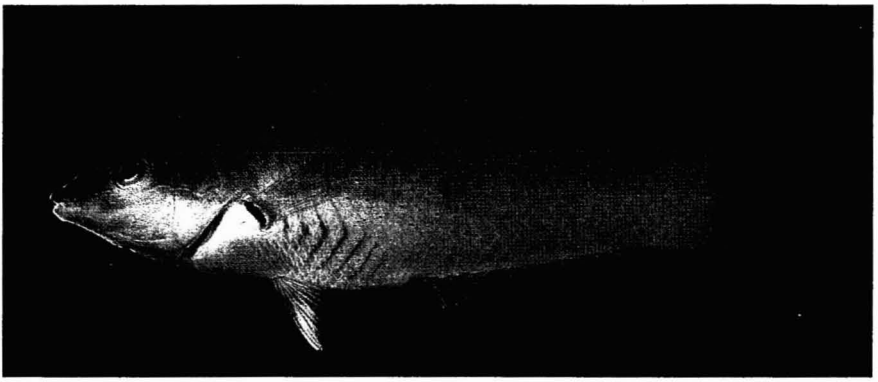


Figure 9. *Halichoeres chloroapterus*, ♀, BPBM 9566, 66mm SL, Palau Islands.



Figure 10. *Halichoeres chloroapterus*, ♂, BPBM 19536, 112mm SL, Seribu Islands, Java.



Figure 11. *Halichoeres timorensis*, ♀, BPBM 19032, 78mm SL, Sri Lanka.



Figure 12. *Halichoeres timorensis*, ♂, BPBM 19032, 105mm SL, Sri Lanka.

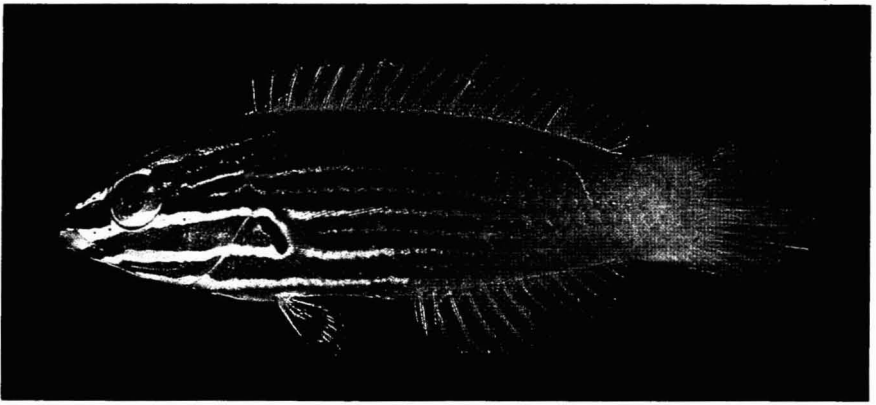


Figure 13. *Halichoeres podostigma*, juv., BPBM 20921, 29mm SL, Bali.



Figure 14. *Halichoeres podostigma*, ♀, BPBM 19262, 97mm SL, Molucca Islands.

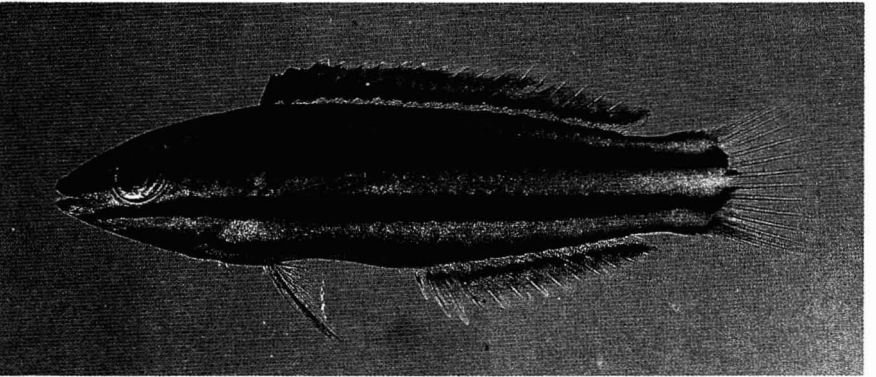


Figure 15. *Halichoeres prosopeion*, juv., BPBM 17560, 34mm SL, Samoa Islands.

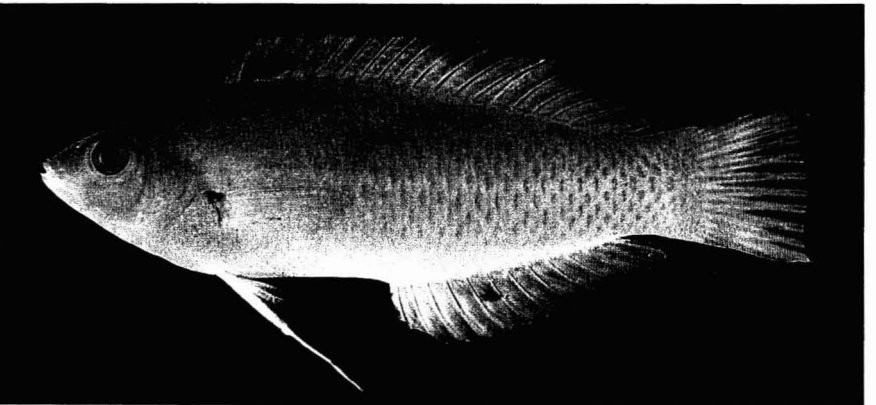


Figure 16. *Halichoeres prosopeion*, ♂, BPBM 9627, 97mm SL, Palau Islands.

TABLE 2

PROPORTIONAL MEASUREMENTS OF TYPE SPECIMENS OF *Halichoeres melasmapomus* (EXPRESSED AS A PERCENTAGE OF STANDARD LENGTH)

	HOLOTYPE	PARATYPES							
	BPBM 16899	BPBM 13724	BPBM 12178	BPBM 17552	BPBM 24112	BPBM 17552	BPBM 18466	BPBM 16702	BPBM 16702
Standard length (mm)	68.0	19.5	37.7	57.8	70.0	88.0	98.9	107.7	118.2
Depth of body	30.5	30.2	30.7	30.5	32.0	31.4	33.9	32.6	31.4
Width of body	12.4	10.2	12.5	13.6	13.5	13.8	14.3	13.5	14.5
Head length	33.0	37.9	34.5	33.2	34.6	33.9	32.9	33.4	33.8
Snout length	10.1	10.8	10.2	9.9	11.1	11.1	10.7	10.8	11.7
Orbit diameter	6.5	11.8	8.9	7.3	7.0	6.3	5.5	5.5	5.3
Bony interorbital width	6.6	7.7	6.6	6.6	7.2	6.8	7.2	7.0	7.2
Length of upper jaw	8.9	9.4	8.9	8.7	9.8	9.9	9.9	9.1	9.4
Least depth of caudal peduncle	14.7	15.2	16.5	15.2	14.0	15.8	17.0	15.2	16.7
Length of caudal peduncle	8.5	10.8	8.4	8.9	7.9	8.1	8.1	7.4	8.5
Predorsal length	32.3	38.4	33.7	31.1	32.8	32.8	31.0	34.0	33.9
Preanal length	57.6	57.5	57.2	56.4	57.0	57.1	56.2	56.3	56.6
Prepelvic length	33.8	37.9	33.7	32.1	33.0	33.8	33.2	33.3	34.2
Length of first dorsal spine	6.9	6.7	7.1	Broken	6.8	7.1	6.6	6.3	7.0
Length of second dorsal spine	8.0	9.5	10.1	Broken	8.9	8.8	8.1	8.0	9.2
Length of ninth dorsal spine	11.4	11.8	13.2	12.3	Aberrant	11.6	11.9	10.8	12.2
Length of longest dorsal ray	15.9	17.4	16.1	16.0	15.2	16.2	15.9	16.1	16.9
Length of dorsal fin base	65.3	58.6	63.7	63.2	65.6	65.8	67.8	65.3	65.2
Length of first anal spine	4.0	3.9	4.0	4.6	3.5	4.1	3.7	3.8	4.6
Length of third anal spine	9.3	10.7	9.2	9.9	8.0	9.0	8.3	8.3	8.1
Length of longest anal ray	14.5	16.4	14.7	15.5	13.6	14.5	14.7	15.1	15.8
Length of anal fin base	37.0	36.8	35.9	36.0	36.9	38.1	38.2	36.2	37.1
Length of caudal fin	24.4	27.5	22.8	23.4	22.9	21.6	22.7	22.8	22.0
Length of pectoral fin	22.2	23.6	22.0	23.3	21.9	22.4	22.2	22.6	22.4
Length of pelvic spine	13.4	9.8	12.7	13.6	12.8	14.1	14.2	14.7	13.5
Length of pelvic fin	18.7	16.4	19.3	18.7	18.3	21.1	22.4	20.9	21.7

being abruptly white (or pinkish white); females appear to lack the pair of dark spots dorsally on the front of the snout. Males may retain the third small blackish spot on the penultimate dorsal fin membrane. Also, the thorax of males is white instead of yellow-orange with yellowish-green bands. No obvious differences were apparent in measurement and meristic data. However, if more than three specimens of the yellow and white species were available, some differences might be detected. There is a suggestion of a divergence in gill-raker counts. The three yellow and white specimens have 16, 17, and 18 gill rakers. Gill-raker counts of 25 specimens of *H. chrysus* ranged from 14 to 19 (none with 18 and one with 19); the mean count is 15.76.

If these two fishes were geographically separated, they would surely be regarded as

subspecies of a single species. However, their distributions overlap. The yellow and white species is known from east Java, southwest Thailand, and the Maldives Islands. *Halichoeres chrysus*, as documented above, is found in Indonesia and at Christmas Island, Indian Ocean. It may be noteworthy to mention that the author has not seen the two species at the same general locality.

Halichoeres chrysus is a relatively small species; the largest specimen examined is the holotype, 79.4 mm SL.

Halichoeres melasmapomus, n. sp.

Figures 3, 4

Halichoeres sp. Randall, 1973, Occ. Pap. B. P. Bishop Mus. 24(11):196 (Society Islands).

Halichoeres sp. 2 Allen and Steene, 1979, Spec. Publ. Austral. Nat. Parks Wildl. Serv. 2:49, pl. 14 (mis-labeled 15) (Christmas Island, Indian Ocean).

HOLOTYPE: BPBM 16899, 68.0 mm SL, Pitcairn Island, reef on north side off Gannet Ridge, 40–44 m, rotenone, J. E. Randall, D. B. Cannoy, J. R. Haywood, R. R. Costello, J. D. Bryant, and S. Christian, 6 January 1971.

PARATYPES: BPBM 9101, 2:58.0–66.6 mm SL, Tuamotu Archipelago, Tikahau Atoll, outside reef just north of pass, 18–27.5 m, spear, J. E. Randall, 15 June 1957; BPBM 9631, 46.9 mm SL, Palau Islands, Augulpelu Reef, southwest end, base of drop-off in 34–52 m, rotenone, J. E. Randall, A. R. Emery, and E. S. Helfman, 24 April 1970; BPBM 16702, 2:107.7–118.2 mm SL, same locality as holotype, 40 m, spear, J. E. Randall, 28 December 1970; BPBM 13671, 39.0 mm SL, Austral Islands, Tubuai, outside barrier reef 1 mi southwest of anchorage off pass, 37 m, spear, D. B. Cannoy, 26 February 1971; BPBM 13724, 19.5 mm SL, Austral Islands, Rurutu, west side off Areva, 45° coral slope with little sand, 46–58 m, rotenone, J. E. Randall, D. B. Cannoy, D. M. Devaney, R. M. McNair, and J. R. Haywood, 28 February 1971; CAS 39122, 66.0 mm SL, Tuamotu Archipelago, Manihi Atoll, outside reef $\frac{1}{4}$ mi southeast of pass, 33.5 m, spear, J. E. Randall, 11 April 1971; BPBM 11872, 89.0 mm SL, Marquesas Islands, Fatu Hiva, off point at south end of Eeu Bay, 23 m, spear, J. E. Randall, 22 April 1971; BPBM 13836, 42.0 mm SL, Palau Islands, Augulpelu Reef, drop-off in 38–46 m, rotenone, W. A. Starck, II, G. R. Allen, and J. Condit, 26 January 1972; BPBM 12178, 37.7 mm SL, Marshall Islands, Enewetak Atoll, sea side of Rigili (Leroy) Islet, entrance to cave in steep drop-off, 46 m, rotenone, J. E. Randall and R. M. McNair, 3 February 1972; BPBM 14981, 65.3 mm SL, Society Islands, Tietiaroa Atoll, outside reef off Tiarauna Islet, 35 m, spear, J. E. Randall, 20 April 1973; AMS I.21502-001, 65.2 mm SL, Marshall Islands, Enewetak Atoll, Rigili (Leroy) Islet, outer reef drop-off, 43 m, spear, P. M. Allen, 27 July 1973; BPBM

19615, 58.5 mm SL, same locality and collector, 38 m, 31 July 1973; BPBM 19627, 3:40.0–63.2 mm SL, same data as preceding, except 19 August 1973; ANSP 134490, 61.2 mm SL, Cocos-Keeling Islands, Turk Reef, north side, drop-off, 46 m, spear and quinaldine, W. F. Smith-Vaniz and P. L. Colin, 23 March 1974; ANSP 134491, 9:35.7–80.4 mm SL, same locality and collectors, dynamite, 24 March 1974; BPBM 17552, 2:57.2–88.0 mm SL, Samoa Islands, Tutuila, Larsen Bay, outer part of bay on west side, coral head in 37–38 m, spear, J. E. Randall, 11 May 1974; WAM P25233-006, 80.0 mm SL, Indonesia, Molucca Islands, Ambon, south side off Lathualat, 25 m, spear, G. R. Allen, 21 January 1975; BPBM 18466, 98.9 mm SL, Philippine Islands, Mactan Island (near Cebu), off marine station of the University of San Carlos, base of vertical drop-off on rubble bottom, 35 m, spear, J. E. Randall, 26 June 1975; BPBM 24112, 70.0 mm SL, Samoa Islands, Tutuila, Larsen Bay, 40 m, R. C. Wass, 18 November 1975; BPBM 19960, 33.0 mm SL, Marshall Islands, Kwajalein Atoll, outside reef off south end of atoll 100 m northwest of small boat passage (just southeast of Enebuju Islet), 70° drop-off with caves, 46–55 m, rotenone, J. E. Randall, N. A. Bartlett, P. Bartlett, and K. Burnett, 7 April 1976; MNHN 1976-134, 48.0 mm SL, same locality as preceding, 43–46 m, rotenone, J. E. Randall, N. A. Bartlett, K. Burnett, and R. Hergenrother, 8 April 1976; BPBM 22070, 80.2 mm SL, Philippine Islands, Mactan Island, off marine station of University of San Carlos, base of near vertical drop-off, coral rubble in 38 m, spear, J. E. Randall, 21 August 1977; USNM 219866, 72.0 mm SL, Philippine Islands, Pamilacan Island, southwest tip, reef face, 0–24 m, rotenone, V. G. Springer et al., 12 June 1978; BPBM 22961, 2:47.5–60.8 mm SL, Celebes, Manado Tua Island (11 mi northwest of Manado), southeast side, drop-off in 17–30 m, spear, J. E. Randall and G. W. Tribble, 30 August 1978.

DESCRIPTION: Dorsal rays IX,12; anal rays III,12; pectoral rays 13; pelvic rays 1,5; principal caudal rays 14 (middle 12 branched);

upper and lower procurent caudal rays 5; lateral-line scales 27 (plus one pored scale posterior to hypural plate); scales above lateral line to origin of dorsal fin 5 ($4-5\frac{1}{2}$); scales below lateral line to origin of anal fin 9 (9–10); circumpeduncular scales 19 (19–21); branchiostegal rays 6; gill rakers 16 (14–18; $n = 22$; $\bar{x} = 15.8$); vertebrae 25.

Body slightly elongate, the depth 3.3 (2.95–3.3) in SL, moderately compressed, the width 2.45 (2.15–2.95) in depth; head length 3.0 (2.65–3.15) in SL; snout length 3.3 (2.8–3.5) in head; orbit diameter 5.1 (3.2–6.4) in head; interorbital space convex, the least bony width 5.0 (4.55–5.2) in head; caudal peduncle about twice as deep as long, the least depth 2.25 (1.9–2.5) in head.

Mouth terminal, the gape horizontal, the maxilla not reaching a vertical at front edge of orbit; lower lip with a downward-projecting flap along the side; inner surface of upper lip strongly plicate. Gill membranes broadly attached to isthmus.

Front of jaws with a pair of large projecting nearly straight canine teeth; second pair of teeth about two-thirds as long as anterior canines; side of upper jaw with 7–10 and of lower jaw with 9–12 somewhat compressed conical teeth which are progressively smaller posteriorly; a large canine tooth at corner of mouth projecting anteriorly and slightly ventrally from posterior end of upper jaw; a pair of small, somewhat compressed, blunt conical teeth medial to anterior canines, followed closely by one or two nodular lingual teeth.

Pharyngeal dentition of 107.7-mm paratype: each subtriangular half of upper pharyngeal plate with nine teeth in four anterior-to-posterior rows, the posterior medial three on each side large, oval-shaped molars; middle molar with a small molar lateral to it; anterior molar with two small lateral blunt conical teeth; remaining four small teeth of first row bluntly conical. T-shaped lower pharyngeal plate with a very large median posterior ovoid molar flanked by five small molars on each side (the adjacent tooth on each side notably larger than the others); median limb with ten teeth anterior to large molar, molariform except the most anterior, which are very bluntly conical.

Lower free margin of preopercle extending

to, or anterior to, a vertical at front edge of orbit; upper free margin of preopercle not reaching, or just reaching, level of corner of mouth.

Nostrils small, in front of upper fifth of eye, the anterior in a small membranous tube, the posterior obliquely dorsal and behind the anterior; the opening nearly covered by a flap from ventro-anterior margin.

Suborbital pores rimming eye from mid-posteriorly to below front edge of orbit 10 (9–13).

Lateral line complete, the anterior part following curvature of back (except first few scales), then bending sharply ventrally below posterior portion of dorsal fin to straight peduncular part; anterior lateral-line scales with two to seven pores (larger specimens, in general, with more); peduncular lateral-line scales with one or two pores.

Head naked except for small scales in a triangular zone on nape, the median apex of which reaches anteriorly to a vertical between upper end of preopercular margin and posterior rim of orbit; no narrow median naked zone on nape; scales on midside of thorax about half as high as scales on side of body, becoming still smaller anteriorly and ventrally; fins naked except for a few small scales basally on dorsal and anal fins (more evident when fins fully elevated), basal two-fifths of caudal fin (scales progressively smaller posteriorly) and three median ventral scales at base of pelvic fins (the most posterior scale is triangular and much the largest).

Origin of dorsal fin above or very slightly posterior to upper end of gill opening; dorsal spines progressively longer posteriorly, the first 4.8 (4.57–5.65) and the ninth 2.9 (2.6–3.2) in head; penultimate dorsal soft ray longest on adults, 2.1 (2.0–2.3) in head; all dorsal and anal soft rays branched, the last to base; origin of anal fin below base of first dorsal soft ray; first anal spine small and slender, 8.3 (7.2–9.9) in head; third anal spine twice or nearly twice as long as first anal spine, 3.55 (3.35–4.45) in head; penultimate anal soft ray longest on large adults (second to eighth rays longest on smaller individuals), 2.3 (2.15–2.55) in head; caudal fins slightly to moderately rounded, its

length 1.35 (1.4–1.55) in head; pectoral fins 1.5 (1.4–1.6) in head, the second and third rays longest, the upper ray rudimentary, the second ray unbranched; origin of pelvic fins below lower base of pectoral fins; pelvic fins of large adults reaching or nearly reaching anus, their length 1.75 (1.45–2.3) in head.

Color of holotype (a male, but with regressing ovarian tissue) in alcohol: brown with a black spot as large as eye on upper posterior part of opercle; a dark spot (smaller than pupil) directly behind eye; fleshy rim of orbit narrowly dark brown; a small faint dark spot middorsally at front of snout; fins pale except for a blackish spot about as large as pupil at base of caudal fin between second and fourth branched rays and a faint submarginal dark line posteriorly in caudal fin.

Fully developed males lack the black spot at the upper base of the caudal fin and the dusky spot anterodorsally on the snout.

The color of the holotype when fresh is shown in Figure 4.

Color of the 118.2-mm male paratype when fresh: reddish brown dorsally, reddish ventrally, the edges of scales paler than centers; head brownish yellow dorsally, yellow ventrally, with green bands (edged in dark reddish), the broadest from chin and upper lip across cheek below eye to opercular flap; a black spot about twice as large as eye on upper opercle, narrowly rimmed with reddish and more broadly with blue; a small blue-green spot behind eye, followed by a narrow black one, and then a bright-yellow spot; dorsal fin yellow with two rows of large irregular green spots edged with reddish, one spot above the other in each membrane; margin of fin light blue with a narrow dark-reddish submarginal line; anal fin orange basally, yellow distally (except for blue margin and dark-reddish submarginal line), with a median band of interconnected irregular green spots edged with reddish; caudal fin mainly red with a diagonal greenish band in upper central part of fin and a comparable one in lower central part of fin; two greenish spots midlaterally between the green bands; broad outer region of caudal fin light blue, the blue more intense as a margin to curved posterior edge of red region (blue and red separated

by a dark line); pectoral fins pale yellowish, the base of fins yellow; pelvic fins pale with a broad streak of orange on first soft ray.

Large females (to 107.7 mm SL) are similar in color to males but have a black spot between third and fifth (or second to sixth) branched caudal rays centered over the most distal scales of base of fin; smaller females have three black spots in the dorsal fin nearer base than distal margin, the first mainly on second interspinous membrane, the second mainly between the second and fourth soft rays, and the last between the ninth and eleventh rays; they also have an oval blackish spot middorsally at front of snout.

Color in life of the two females of *BPBM* 9101 (taken in the Tuamotus in 1957): yellowish brown dorsally, pale blue ventrally, the centers of the scales broadly red (thus, the overall color is primarily reddish); dorsal part of head dark yellowish green with blue markings; a brilliant iridescent green band from rictus beneath eye to end of opercle, this band narrowly edged inwardly with pale blue and outwardly with brownish red; below green band a narrower band of yellow, also edged in reddish; a large black spot on upper opercle narrowly edged with red and broadly with blue; caudal fin with a broad central crescentic region of bright red edged anteriorly and posteriorly with blue, preceded in its upper part by a blue-edged black spot; broad posterior border of fin pale blue; dorsal fin yellow with small red-edged pale-blue spots and a narrow pale-blue margin; anal fin similar, the blue spots forming three longitudinal bands, the middle one largest with spots coalesced; pectoral fins hyaline with red-edged rays; pelvic fins pale blue with a band of red near lateral edge; iris yellow-green with a dorsal band of red.

REMARKS: Named *melasmapomus* from the Greek in reference to the large black spot on the opercle, the most characteristic color marking at all stages.

Halichoeres melasmapomus has been collected at, or can be expected from, every island group of Oceania except the Hawaiian Islands, Easter Island, and Lord Howe

Island. In the western Pacific it is known from the Philippines, Indonesia, and Palau Islands. Although no specimens have been taken yet in Melanesia, an individual was sighted by the author at 46 m off Alite Reef in the Solomon Islands in July 1973. Another was observed at 52 m at Guam, Mariana Islands in April 1970. The species might be expected to range as far north as the Ryukyu Islands and south at least to the northern Great Barrier Reef. It seems to penetrate the Indian Ocean only to Christmas Island and the Cocos-Keeling Islands.

Halichoeres melasmapomus is a relatively common species, but it is not often collected because of its predilection for deep water. All but 7 of the 39 type specimens have been taken at depths greater than 33 m. The species is closely tied to reefs or rubble bottoms near reefs and is often associated with steep drop-offs.

It is a moderately large species, the largest being a male, 118.2 mm SL, from Pitcairn Island. The largest female, 107.7 mm SL, is also from Pitcairn. The large size at this island might be related to the cooler sea temperatures there than elsewhere in the known range. Pitcairn lies at 25°S.

Halichoeres melasmapomus is distinctive among the species of the genus and seems not to be closely related to any one or a complex of species.

Halichoeres argus

Figures 5, 6

Labrus guttatus (non Gmelin in Linnaeus, 1788) Bloch, 1791. Nat. Ausländ. Fische 5:149, pl. 287, fig. 2 (locality not given).

Labrus argus Bloch and Schneider, 1801, Syst. Ichthy., p. 263 (Australia).

Julis (*Halichoeres*) *leparensis* Bleeker, 1852, Nat. Tijdschr. Ned. Indië 3:730 (type locality, Lepar).

Julis (*Halichoeres*) *polyphthalmus* Bleeker, 1852, Nat. Tijdschr. Ned. Indië 3:731 (type locality, Lepar and Cauer, western Sumatra).

Halichoeres leparensis Bleeker, 1862, Atlas ichthyologique . . . , vol. 1, p. 119, pl. 42, fig. 5.

Halichoeres guttatus Bleeker, 1862, Atlas ichthyologique . . . , vol. 1, p. 124, pl. 35, fig. 1.

Halichoeres fijiensis Herre, 1935, Field Mus. Nat. Hist., Zool. Ser. 18:410 (type locality, Ovalau, Fiji Islands).

DIAGNOSIS: Dorsal rays IX,11 or 12 (usually 12); anal rays III,11 or 12 (usually 12); pectoral rays 14; lateral-line scales 27 + 1; anterior lateral-line scales with one to three pores (usually two); suborbital pores five or six; gill rakers 17–19.

Depth of body 3.15–3.7 in SL (deeper, generally in larger specimens); caudal fin moderately rounded; anterior dorsal and anal soft rays longer than posterior rays; pelvic fins of males relatively short, not reaching anus.

Color of females in alcohol: pale, the edges of scales dorsally and on sides dusky, often with a greater concentration of pigment in zones to form about five diffuse dark bars on body; scales on abdomen and thorax edged in silvery white (more evident in life, may not persist in preservative); pale centers of scales producing a faint longitudinal banding (in life two rows of about six spots on side of body much whiter than others); a vertically elongate black spot behind eye and a dark band on side of snout; a pale-edged black spot about as large as pupil on upper caudal base; a small black spot on first interspinous membrane of dorsal fin and a second larger spot on soft portion of dorsal fin between second and third rays (both spots edged with pale blue and yellow in life, the one on soft dorsal sometimes with a blue center).

Color of males in alcohol: body dark brown below lateral line with a pale spot on each scale (red, edged with blue and black in life); body above lateral line pale with a dark-brown spot on each scale, this pattern interrupted in five places by pale bars; dark spot behind eye continuous with a bifurcating dark band extending ventrally; a dark-brown spot on opercle, with a short dark band above it; a dark band on snout from upper lip to eye (dark bands on head orange-red in life, narrowly edged with black and

blue); dorsal and anal fins dark with two rows of pale spots; unscaled part of caudal fin pale; dark spot at upper caudal base present or absent; paired fins pale, the pelvic tips dusky.

REMARKS: Weber (1913:373–374, fig. 75) and de Beaufort (1940:230–232, fig. 34) noted intermediate specimens between *Halichoeres leparensis* and *H. argus*, and suggested that these might be hybrids. De Beaufort stated that *H. fijiensis* Herre was named for this intermediate form; he placed it in the synonymy of *H. argus*.

Halichoeres leparensis, however, is the female and *H. argus* the male of the same species. Six lots of *H. argus* at the Bishop Museum (from the Philippines, Solomon Islands, Malaysia, New Guinea, Indonesia, and Sri Lanka) consist of 10 males in the *argus* form (46–78 mm SL), 18 females in the *leparensis* form (26–64 mm SL; ones as small as 35 mm SL fully mature), and 9 of intermediate color of which 3 are females (38–44 mm SL) and 6 are males (49–52 mm SL).

Halichoeres argus is known in the western Pacific from Taiwan to northern Australia, ranging into the Indian Ocean to Sri Lanka. It is a shallow-water species, usually found in relatively protected waters.

Halichoeres melanurus

Figures 7, 8

Julis (Halichoeres) melanurus Bleeker, 1851, Nat. Tijdschr. Ned. Indië 2:251 (type locality, Banda Neira).

PlatyGLOSSUS melanurus Bleeker, 1862, Atlas ichthyologique . . . , vol. 1, p. 109, pl. 46, fig. 1.

Halichoeres hoeveni (non Bleeker) Schultz, 1960, Bull. U.S. Nat. Mus. 202(2):235, pl. 106B (Marshall Islands).

Halichoeres hoevenii (non Bleeker) Randall, 1969, Abstr., 49th Meet., Amer. Soc. Ichth. Herp., New York, p. 46.

Halichoeres kallochroma (non Bleeker) Schultz, 1960, Bull. U.S. Nat. Mus. 202(2):236, pl. 104D (Marshall Islands); Masuda, Araga, and Yoshino, 1975,

Coastal fishes of southern Japan, p. 303, pl. 109C,D (Ryukyu Islands).

DIAGNOSIS: Dorsal rays IX,12; anal rays III,12; pectoral rays 14; lateral-line scales 27 + 1; anterior lateral-line scales with one to four pores (usually two); gill rakers 17–20 (19 specimens).

Depth of body of adults 3.1–3.6 in SL; anterior dorsal and anal soft rays longer than posterior rays; caudal fin moderately rounded; pelvic fins of males reaching to or beyond anus (fins of one slightly posterior to origin of anal fin).

Color of females in alcohol: pale with brown stripes (blue in life) following scale rows (pale interspaces orange-yellow in life); a dark spot behind eye; fins pale (or dorsal and anal fins faintly banded) except for a small black spot basally on first interspinous membrane of dorsal fin, an ocellated black spot between or extending slightly beyond second to third soft dorsal rays, and a pale-edged black spot at upper base of caudal fin between second and fifth branched rays (dorsal and caudal spots edged with blue in life).

Color of males in alcohol: body pale with faint longitudinal bands except anteriorly and on head where there are dark-brown stripes extending to a vertical at about base of fourth dorsal spine, two ventral stripes on thorax continue to end of abdomen (stripes on body blue-green and orangish in life, becoming salmon pink and green anteriorly and on head); a large dark-brown spot beneath middle of pectoral fin; a dark spot behind eye largely contained within a brown band that bifurcates as it passes posteriorly on opercle; dorsal and anal fins with longitudinal bands, the dorsal with a dusky streak on first three or four interspinous membranes; caudal fin pale with a large submarginal blackish area posteriorly (within which one can see dark-edged pale bands that extend dorsally and ventrally and to a lesser extent anteriorly from blackish area); pectoral fins with a wedge-shaped black bar at upper base contained within a large pale area (bright yellow in life); pelvic fins pale

except for a dusky streak (orange in life) on first soft ray and associated membranes.

REMARKS: Randall (1969) correctly linked the female and male color phases of this species but erred in using the names *Halichoeres hoevenii* and *H. kallochroma*, respectively, for these forms, following Schultz (1960).

The sex of 21 adult Bishop Museum specimens from the western Pacific was determined and compared with the color pattern. Six are males, 51–86 mm SL, with the color as described above for this phase; and 12 are females, 34.5–65 mm SL (the smallest one mature). Two have intermediate coloration. One of these, from Samoa, 62 mm SL, has lost the anterior black spot of the dorsal fin but retains the ocellus in the soft portion of the fin (though small) and the black spot at the upper caudal base; the blackish area posteriorly in the caudal fin and a small triangular spot at the upper base of the pectoral fins are present; dark-brown bands are developing on the nape. The gonad of this fish is small, mainly of testicular tissue, but remnants of ova are present. The second intermediate fish, from Ponape, 57 mm SL, is similar to the Samoan one but has lost both spots in the dorsal fin and does not exhibit any dark bands on the nape. The sex of this specimen could not be determined (badly damaged by spear). An 86-mm specimen from Enewetak, Marshall Islands (BPBM 8060) is unusual in having mainly the female pattern (only the first black spot in the dorsal fin has been lost) but a male gonad.

The Bishop Museum has 12 lots of *Halichoeres melanurus* from the Marshall Islands, Samoa Islands, Caroline Islands, Palau Islands, and Solomon Islands. All were collected on coral reefs or rubble-sand bottoms near reefs in the depth range of 2–15 m. The species is also known from the Ryukyu Islands, Philippines, and Indonesia.

Halichoeres melanurus is one of a complex of several closely related species occurring predominantly in the Indo-Malayan region. The females of this complex are especially difficult to separate, and more study is

needed before all can be clearly differentiated. Randall and Smith (in press) have linked the nominal *H. hoevenii* (Bleeker) and *H. vrolikii* (Bleeker) as a female-male pair of this complex, the former name having priority.

The wrasse identified as *Halichoeres melanurus* by Masuda, Araga, and Yoshino (1975: 303, pl. 109E) is *H. biocellatus* Schultz. This species is widespread in the Pacific (the Bishop Museum has numerous specimens from the Marshall Islands, Mariana Islands, Philippine Islands, Palau Islands, D'Entrecasteaux Islands (New Guinea), Solomon Islands, Fiji Islands, and Capricorn Group, Great Barrier Reef. It is difficult to understand how such a common and widely distributed fish could be unnamed until Schultz (1960) described it from the Marshall Islands, but thus far no older name has been found.

Halichoeres chloropterus

Figures 9, 10

Labrus chloropterus Bloch, 1791, Nat. Ausländ. Fische 5:151, pl. 288 (type locality given as Japan, but probably Java); Bloch and Schneider, 1801, Syst. Ichth., p. 248.

Labrus gymnocephalus Bloch and Schneider, 1801, Syst. Ichth., p. 251 (no type locality).

Julis (Halichoeres) cuvieri (non Bennett) Bleeker, 1847, Nat. Geneesk. Arch. Ned. Indië 4(2):160 (type locality, Batavia); Bleeker, 1849, Verh. Bat. Gen. 22:24.

Julis (Halichoeres) modestus Bleeker, 1847, Nat. Geneesk. Arch. Ned. Indië 4(2):160 (type locality, Batavia); Bleeker, 1849, Verh. Bat. Gen. 22:26.

Halichoeres bleekeri Günther, 1861, Ann. Mag. Nat. Hist., Ser. 3(8):386 [new name for *Julis (Halichoeres) cuvieri* Bleeker].

PlatyGLOSSUS chloropterus Bleeker, 1862, Atlas ichthyologique . . . , vol. 1, p. 125, pl. 35, fig. 3.

Halichoeres modestus Bleeker, 1862, Atlas ichthyologique . . . , vol. 1, p. 126, pl. 35, fig. 2.

PlatyGLOSSUS guttulatus Macleay, 1883,
Proc. Linn. Soc. N.S.W., p. 587 (type
locality, New Guinea).

DIAGNOSIS: Dorsal rays IX,11 (1 of 20 specimens with 10); anal rays III,11 (1 of 20 specimens with 10); pectoral rays usually 14 (3 of 20 specimens with 15, 1 with 13); lateral-line scales 27 + 1; anterior lateral-line scales with one to three pores (most anterior ones usually with two, more posterior usually one); suborbital pores 8–13; gill rakers 17–20.

Depth of body of adults (specimens 65 mm SL or larger) 2.75–3.75 in SL (depth increasing with age); caudal fin slightly rounded; anterior dorsal and anal soft rays longer than posterior rays; pelvic fins of males not reaching anus (nearly reaching on some individuals).

Color of juveniles and small females in alcohol: pale (ground color in life usually greenish gray to green) with a dark dot basally on many scales (especially dorsally and posteriorly on body; dark dots often present in dorsal fin as well); some juveniles with two longitudinal brown streaks in middle of body (a broad midlateral one and a narrower shorter one just below lateral line); a vertically elongate dark spot behind eye; a dusky band on side of snout from eye to edge of upper lip, darker anteriorly, where it curves slightly dorsally; a small dusky spot middorsally at front of snout; a narrow blackish bar across pectoral base; one 41-mm juvenile with a small dark spot at upper caudal base.

Large females may develop a very large oval blackish area on midside of body [as shown in Bleeker (1862: pl. 35, fig. 2)]; the dark dots dorsally and posteriorly on body are more numerous than one per scale (usually two or three per scale); the small dusky spot middorsally on snout is lost.

The dark dots are entirely lost on males; the large blackish area on the side is usually expanded dorsally; the edges of the scales anteriorly on body between the large blackish spot and head are darker than centers, particularly on upper and lower edges; head with an intricate reticulate pattern of dark

and pale bands (blue-green and blue-edged salmon pink, respectively, in life) that varies somewhat from individual to individual; anus in a small blackish spot; approximately the basal half of dorsal fin with a dark (reddish-violet in life) band containing large diagonal pale (blue-edged green in life) spots; rest of fin pale (green in life) with an irregular submarginal dusky band (reddish in life); anal fin faintly dusky (reddish) except for paler median band and edges (green in life); caudal fin pale (green in life), sometimes with irregular vertical rows of small dusky spots on rays; paired fins pale except for narrow black bar across pectoral base.

REMARKS: The conspecificity of *Halichoeres chloropterus* and *H. gymnocephalus* has long been suspected by the author, but it has taken the accumulation of a number of specimens to demonstrate that the former is the male and the latter the female of one species. The Bishop Museum now has 10 lots totaling 20 specimens from Indonesia, New Guinea, Singapore, Philippines, Solomon Islands, and Palau Islands. Nine of these in the *H. gymnocephalus* (dark-dotted) form, 51–116 mm SL, for which the sex can be determined are females; six in the *H. chloropterus* form, 108–113 mm SL, are males. One specimen somewhat intermediate in color pattern (BPBM 15736, 110 mm SL) is a male, but regressing ovarian tissue is also present; this fish has the irregular dark and pale bands fully developed on the head but faintly retains some dark dots dorsally on the body.

Halichoeres chloropterus is a shallow-water species of protected coral reefs, often where there is sand, rubble, and algae as well as coral. Bishop Museum specimens have all been collected in the depth range of 0.5 to about 10 m.

This species appears to be restricted to the Indo-Malayan region in the broad sense. In spite of the type locality of Japan [which is more likely Java; Valenciennes in Cuvier and Valenciennes (1839) and other authors have explained that some of Bloch's type localities of Japan are in error], *Halichoeres chloropterus* probably does not occur north of the Philippines; it ranges out into Oceania only

to the Solomon Islands and Palau Islands.

The specimen from Benkoelen, Sumatra, identified as *Halichoeres javanicus* by Fowler and Bean (1927) is *H. chloropterus*.

The types of *Labrus chloropterus* and *L. gymnocephalus* are apparently not extant. H.-J. Paepke of the Zoologisches Museum of Humboldt-Universität, Berlin, has written that he is unable to find any specimens that could be considered as Bloch's holotypes of these species.

Halichoeres timorensis

Figures 11, 12

Julis (Halichoeres) timorensis Bleeker, 1852, Nat. Tijdschr. Ned. Indië 3:171 (type locality, Timor).

Julis (Halichoeres) kawarin Bleeker, 1852, Nat. Tijdschr. Ned. Indië 3:172 (type locality, Timor).

Halichoeres timorensis Bleeker, 1862, Atlas ichthyologique . . . , vol. 1, p. 120, pl. 40, fig. 1.

Halichoeres kawarin Bleeker, 1862, Atlas ichthyologique . . . , p. 121, pl. 41, fig. 4.

Halichoeres nigrescens (non Bloch and Schneider) Burgess and Axelrod, 1973, Pac. Mar. Fishes, Book 3, p. 601, fig. 47 (Sri Lanka).

DIAGNOSIS: Dorsal rays IX,11; anal rays III,11; pectoral rays 14; lateral-line scales 27 + 1; anterior lateral-line scales with three to five pores; suborbital pores eight or nine; gill rakers 18–20 (8 specimens).

Depth of body 2.9–3.3 in SL; caudal fin slightly rounded; anterior dorsal and anal soft rays longer than posterior rays; pelvic fins of males long, reaching or nearly reaching anus.

Color of females in alcohol: pale brown (greenish gray in life) with groups of small dark-brown spots (two to seven spots per group) arranged in six vertical and three longitudinal rows on body; small faint pale spots and short irregular bands (orange-yellow in life) in five longitudinal rows on body, often coinciding with groups of small dark-brown spots; a vertically elongate dark spot behind eye nearly as long as orbit dia-

meter; dorsal fin with faint diagonal bands and spots (orangish in life) and a large ocellated black spot (edged with pale blue in life) between second and third soft rays and extending onto adjacent membranes; a black spot (edged in pale blue in life) the size of pupil or smaller on upper basal scaled part of caudal fin between the first or second and fourth branched rays; remaining fins pale, though the caudal and anal fins may have a faint spotting and banding (pectorals with a narrow red bar across base in life).

Color of males in alcohol: pale brown (green to blue-green in life except thorax and abdomen which are pinkish gray) with dark spots (reddish to blackish in life with blue edges) arranged to form large irregular elliptical (long axis vertical) blotches with centers of ground color in a row along side of body; a second series of dark blotches on back (more irregular and without a paler central region) more or less in vertical alignment with the series of blotches on side of body; head with irregular dark bands (reddish in life) and a vertically elongate spot behind eye; a large blackish blotch on dorsal fin between eighth spine and second or third soft ray; fin posterior to spot with a faint longitudinal dark band above middle of fin and diagonal bands extending from it to base of fin (these and other dark fin markings reddish in life, edged in blue); caudal fin pale with a large blackish area containing pale spots and markings posteriorly in fin and some faint irregular bands basally; no black spot at upper base of fin; anal fin with faint irregular longitudinal dark bands basally and distally; paired fins pale, the pectorals with a narrow whitish zone across base (orange-red in life).

REMARKS: The linking of *Halichoeres kawarin* with *H. timorensis* was achieved as a result of underwater observation in Sri Lanka and southwest Thailand where the species is common. Although only eight specimens are available for study at the Bishop Museum, all from 5–7 m in Sri Lanka, they also demonstrate the conspecificity of these wrasses. Two specimens, 98.5–107.5 mm SL, of the *H. kawarin* form are

males, whereas five, 70.5–78.4 mm SL, in the *H. timorensis* phase are females. The eighth specimen (BPBM 18811, 71 mm SL) is intermediate in color. The groups of dark-brown dots are still visible on the body but are reduced in number and infiltrated by dark blotches; the black spot in the dorsal fin lies between the ninth spine and the second dorsal ray; only a trace remains of the dark spot at the upper base of the caudal fin; and a dark area containing pale spots is developing posteriorly in the fin. The gonad of this fish consists mainly of testicular tissue, but regressing ova also appear to be present.

Male specimens of *Halichoeres nebulosus* and *H. margaritaceus* have often been misidentified as *H. kawarin*. This has resulted in attributing a greater range to *H. timorensis* than it actually has; *H. timorensis* is presently known only from Indonesia to Sri Lanka.

Halichoeres podostigma

Figures 13, 14

Julis (Halichoeres) podostigma Bleeker, 1854, Nat. Tijdschr. Ned. Indië 6:332 (type locality, Larantuka, Flores).

Halichoeres podostigma Bleeker, 1862, Atlas ichthyologique . . . , vol. 1, p. 126, pl. 32, fig. 4.

DIAGNOSIS: Dorsal rays IX,12; anal rays III,12; pectoral rays 14; lateral-line scales 27 + 1; anterior lateral-line scales with one to three pores; suborbital pores 8–13; gill rakers 19–22 (7 specimens).

Depth of body 2.75–3.2 in SL; anterior dorsal and anal soft rays longer than posterior rays; caudal fin slightly to moderately rounded; pelvic fins of male reaching anus.

Color of females in alcohol: body anterior to a vertical demarcation near front of caudal peduncle light brownish gray (pinkish gray in life) with a black spot on each scale except those on thorax and most of abdomen; caudal peduncle pale (pinkish white in life); nape dusky; head pale (light salmon in life) with a small dark spot behind eye; dorsal fin pale (orangish in life) with irregular dark-edged diagonal bands (orange-red with narrow

blackish and blue edges in life); anal fin pale (orangish in life) with diagonal black bands on basal half (blue-edged in life); caudal fin pale (fin rays whitish in life, suffused with pale salmon, the membranes clear); pectoral rays pale (edges of rays dusky in life) with a pale-edged black bar at base; pelvic fins pale with a broad transverse black band near middle.

No males were collected by the author, but they were observed underwater to have the same basic color pattern as females. The most obvious difference was in the color of the head, which is greenish with irregular light-red bands. From the illustration of a presumed male in Bleeker (1862: pl. 32, fig. 4), other differences are apparent that would be retained on preserved specimens. The black band on the pelvic fins is absent, and the one at pectoral base reduced to a small dorsal spot; the caudal peduncle has the same color as the rest of the body instead of being abruptly pale.

Color of juveniles in alcohol: body pale except a broad zone on side from pectoral base to caudal peduncle and on back in middle of body where there are dark dots following scale rows (more numerous and larger in pectoral region where they form longitudinal lines); head pale with a vertically elongate dark spot behind eye, a small dusky spot middorsally on front of snout, and a double row of three dusky spots dorsally on nape (beginning in posterior interorbital space); fins pale except for a narrow black bar across pectoral base and a blackish spot on pelvic fins.

In life juveniles are striped with red and white on head and anterior body, shading to green posteriorly; median fins light green; pectoral fins clear with a black bar at base followed by a white band; pelvic fins red basally, whitish distally, with a large blackish spot in middle.

REMARKS: *Halichoeres podostigma* is known only from Indonesia and the Philippines. The Bishop Museum specimens are from Ambon, Bali, and the vicinity of Cebu, Philippines.

There appears to be no synonym for *Halichoeres podostigma*. The account of this species is presented here mainly to document

the very different color pattern of the juvenile, which was observed and collected from the reef flat of the fringing reef off southwestern Bali.

Males were identified underwater at Ambon in January 1975 by observing courtship and, on one occasion, pair spawning (typical of labrid fishes, with a rapid upward movement culminating in the release of eggs and sperm at the peak of the rise); the male was considerably larger than the female. Fowler and Bean (1928) recorded specimens to 162 mm total length. The largest reported by Bleeker (1862) is 185 mm. This species is therefore one of the largest members of the genus. The smallest mature female among Bishop Museum specimens (BPBM 22127) measures 59 mm SL and 74 mm total length.

Halichoeres prosopeion

Figures 15, 16

Julis (Halichoeres) prosopeion Bleeker, 1853, Nat. Tijdschr. Ned. Indië 5:347 (type locality, Ambon).

Halichoeres prosopeion Bleeker, 1862, Atlas ichthyologique . . . , vol. 1, p. 122, pl. 37, fig. 2.

DIAGNOSIS: Dorsal rays IX,12; anal rays III,12; pectoral rays usually 14 (1 of 17 specimens with 13); lateral-line scales usually 27 + 1 (1 of 15 specimens with 28 + 1; 2 too damaged to count); anterior lateral-line scales with one to three pores; suborbital pores 9–11; gill rakers 17–21.

Depth of body of adults 2.85–3.4 in SL; caudal fin truncate to slightly rounded; anterior dorsal and anal soft rays longer than posterior rays; pelvic fins of males and large females very long, reaching posterior to anus, often to or beyond origin of anal fin.

Color of adults in alcohol: head and anterior body brownish gray (bluish gray in life), shading posteriorly to pale (yellowish in life), often with vertical pale lines on scales (orange-yellow in life); a vertically elongate dark spot posterior to dorsal half of eye; dorsal fin brownish anteriorly becoming paler on soft portion with a faint irregular fine banding (yellow alternating with gray in

life) and a large black spot (edged with blue in life) between the second and third or fourth spines; remaining fins pale, except pelvics, which are occasionally dusky (caudal rays yellow in life); a narrow black bar at pectoral base that broadens dorsally.

Color of juveniles in alcohol: pale (bluish anteriorly, yellow posteriorly) with four dark-brown stripes (black in life) on head and body; a black spot behind eye (contained in second brown stripe); dorsal and anal fins with a longitudinal dark-brown band near base, dusky in middle, the margins pale; a large dark-brown spot anteriorly in dorsal fin; (some juveniles, mainly the smaller ones, with a second black spot on fourth and fifth soft rays of fin); caudal fin pale except for extensions of dark body stripes onto basal scaled portion, the second stripe often ending in a black spot (an underwater photograph of a small juvenile taken in Celebes by the author shows the black stripes ending on caudal peduncle and a discrete small black spot on upper base of caudal fin).

REMARKS: There are no synonyms for *Halichoeres prosopeion*. As in the previous species, this account is presented principally to describe the strikingly different juvenile stage.

This species is unusual among the species of the genus in exhibiting no obvious color difference with sex, at least in preservative. It is possible that some subtle difference in life color exists, but this has not been noted. Color notes and color photographs at the Bishop Museum are available only for males. It was noted that there was a wash of green over the cheek of one large adult male which faded soon after death; also the dark spot behind the eye was blue-green in life. Perhaps these same colors are not apparent on females.

Mature females in the Bishop Museum series range from 49.8 to 88 mm SL and males from 79 to 96.3 mm SL.

Halichoeres prosopeion is known in the literature from Indonesia, New Guinea, and the Philippines [the latter record by Fowler and Bean (1928)]. The author has collected it

at the following new localities: Palau Islands, Samoa Islands, Fiji Islands, Solomon Islands, New Britain, and Capricorn Group, Great Barrier Reef. These fish have all been taken in a reef environment in the depth range of 5–40 m.

There are two spurious records of *Halichoeres prosopeion* from southern Japan. Schmidt (1930:83, pl. 6, fig. 1) reported the species from Okinawa, and Masuda, Araga, and Yoshino (1975:303, pl. 108I) listed it from southern Honshu. Both records are misidentifications of *Halichoeres melanochir* Fowler and Bean.

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