

## Revision of the Labrid Fish Genus *Labropsis* with Descriptions of Five New Species

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**Abstract**—The Indo-Pacific labrid fish genus *Labropsis* is characterized by having: thick plicate lips which form a tubular structure when mouth is closed; two pairs of recurved canine teeth anteriorly in upper jaw (the second pair usually half size of first); a canine at corner of mouth; no teeth along side of jaw; dorsal rays IX, 10–12; anal rays III, 9–11; pectoral rays usually 14; and a continuous lateral line of 27–49 scales. It consists of six species: *L. manabei* Schmidt from the Ryukyu Islands, Taiwan and Philippines and the following new species: *L. alleni* from Micronesia and the Indo-Malayan region, readily separated by having 27 lateral-line scales; *L. polynesica* from islands of French Polynesia and the Cook Islands, distinctive in having the second pair of upper canine teeth nearly as large as the first and 43–47 lateral-line scales; *L. xanthonota*, which ranges from East Africa to central Oceania, with 46–49 lateral-line scales, the male with an emarginate caudal fin (true also of *L. polynesica*); *L. micronesica*, from islands of Micronesia, with 35–40 lateral-line scales; and *L. australis* from the Solomon, Samoa, Fiji, Loyalty, Tonga Islands, New Hebrides, and Great Barrier Reef which is closely related to *L. micronesica*, having the same scale and finray counts, but differing in the suborbital scales not extending as far anteriorly, in the shorter ninth dorsal spine, and in having a large black spot at the pectoral base containing a dorsal orange-red spot and a smaller ventral one of the same color (pectoral base of *L. micronesica* entirely orange-red). *L. manabei*, a close relative of *L. micronesica* and *L. australis*, differs in having one fewer dorsal soft rays (11) and one fewer anal soft rays (10).

The species of *Labropsis* are all small coral reef fishes (rarely exceeding 100 mm SL). They are proterogynous hermaphrodites, commencing mature life as females. Adults appear to feed principally on coral polyps. The striped juveniles have been observed cleaning other reef fishes.

The wrasse genus *Labropsis* was proposed by Schmidt (1930) for the species *L. manabei* Schmidt from Okinawa, Ryukyu Islands. In 1957 the author collected a second species of the genus in the Society Islands and Tuamotu Archipelago. Commencing in 1966, collections in the central and western Pacific and Indian Oceans resulted in specimens of four other new species. These fishes are described in the present paper. As would be expected, they have necessitated a modification in the generic description.

As pointed out by Schmidt, the genus *Labropsis* belongs to the Labrichthyiformes of Bleeker (1861), a subfamily category which then included *Labrichthys*, *Labroides*, and *Diproctacanthus*. Norman (1957) placed *Labropsis* in the synonymy of *Diproctacanthus*, but with a question mark. Randall and Springer

(1973)<sup>1</sup> recognized it as a valid genus, described the related new genus *Larabicus* from the Red Sea, and provided a key to the five genera of these fishes. Russell (1980) classified them as the tribe Labrichthyini.

*Labrichthys*, *Diproctacanthus*, and *Larabicus* are monotypic. Randall (1958) revised *Labroides*, then a genus of four species, and Randall and Springer (1975) added a fifth species, *L. pectoralis*, from the western Pacific. With the present revision of *Labropsis*, the classification of this highly specialized group of wrasses is complete.

These five genera of fishes share the following characters: small size, dorsal rays IX, 10 to 12; anal rays II or III, 9 to 11; branchiostegal rays 5; a continuous lateral line which is deflected sharply downward beneath the posterior part of the dorsal fin, small scales on thorax compared to rest of body, 10 or more predorsal scales, mouth small, terminal; lips thick, fleshy, and plicate, forming a short tube when mouth is closed (or the lower lip bilobed); one or two pairs of large recurved canines at front of upper jaw, and a canine posteriorly on upper jaw (at corner of mouth); pharyngeal dentition reduced; preopercular margin restricted (not apparent in *Labrichthys*) and smooth; vertebrae 10+15; anterior neural prezygopophyses not fused; first neural spine reduced; epipleural ribs 15 or 16; first caudal vertebra with haemal spine; urohyal without a spine-like posteroventral process; fifth hypural reduced; well-developed frontal recess; well-developed supraoccipital crest; and ceratohyal-epihyal joint sutured.

The methods of measuring and counting of specimens of *Labropsis* are as follows: standard length (SL) is the straight-line measurement from the most anterior end of the upper lip in the median line 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, whereas the interorbital width is the least bony width. The depth of the caudal peduncle is the least depth; the length of the caudal peduncle is measured horizontally between verticals at the rear base of the anal fin and the base of the caudal fin. The lengths of the fin spines and rays are taken to their extreme bases (i.e., below body contour). Length of the caudal fin is the greatest horizontal length; caudal concavity (of fish with emarginate caudal fins) is the horizontal distance between verticals at the distal tips of the longest and shortest caudal rays. The pectoral fin length 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 count of the rays of this fin. Counts of suborbital pores were made from midposteriorly at hind edge of orbit to below front edge of orbit. Counts of the preopercular series of pores were made along the margin of the

<sup>1</sup> Randall and Springer commented that the holotype of *Labrichthys cyanotaenia* Bleeker [= *L. unilineatus* (Guichenot)] could not be located. M. Boeseman (pers. comm., January 1974), however, found the type specimen at the Rijksmuseum van Natuurlijke Historie at Leiden. It is registered as RMNH 6540 and measures 102 mm SL and 127 mm TL.

preopercle from posterior to the corner of the mouth (vertical series) to below level of corner of mouth (lower horizontal series).

In the descriptions below, the data for paratypes are in parentheses. More proportional measurements are given in the tables than are summarized in the species accounts. The proportional measurements presented in the text are rounded to the nearest .05. The paratypes selected for the measurements of Tables 2–6 are of different size groups arranged from smallest to largest (left to right) so that any progressive changes with size can be noted. Characters given in the generic description which are common to all species are usually not repeated in the species accounts.

Specimens of the new species have been deposited variously in the Academy of Natural Sciences of Philadelphia (ANSP); Australian Museum, Sydney (AMS); Bernice P. Bishop Museum, Honolulu (BPBM); British Museum (Natural History), London [BM(NH)]; California Academy of Sciences, San Francisco (CAS); Museum National d'Histoire Naturelle, Paris (MNHN); Royal Ontario Museum, Toronto (ROM); J. L. B. Smith Institute of Ichthyology, Rhodes University, Grahamstown (RUSI); Tanaka Memorial Biological Station, Miyake-jima, Japan (TMBS); U.S. National Museum of Natural History, Washington, D. C. (USNM), and Western Australian Museum, Perth (WAM).

### *Labropsis* Schmidt

*Labropsis* Schmidt, 1930, Trans. Pac. Comm. Acad. Sci. USSR, vol. 1, p. 75 (type-species, *Labropsis manabei* Schmidt, by original designation and monotypy).

**DESCRIPTION:** Dorsal rays IX, 10–12 (rarely 10), all branched, the last to base; anal rays III, 9–11 (rarely 9, all branched, the last to base, first anal spine very slender and may be difficult to detect without radiograph or dissection); pectoral rays 13–15 (usually 14, uppermost rudimentary, the second unbranched, the lowermost branched or unbranched); pelvic rays I, 5; principal caudal rays 14 (rarely 15), the uppermost and lowermost unbranched; upper and lower procurrent caudal rays 5–8 (usually 6 or 7); lateral line complete, angling sharply downward beneath posterior part of dorsal fin to straight peduncular portion, the pored scales 27–49 (not including 1 to 3 posterior to hypural plate); each lateral-line scale with a simple tubule and a single pore; gill rakers small to rudimentary, present only on lower limb, 7–11; gill membranes broadly attached to isthmus with a free fold across; branchiostegal rays 5; vertebrae 10+15; predorsal bones 1.

Body moderately elongate, the depth 3.1–3.8 in SL, and somewhat compressed, the width 1.8–2.6 in depth; head length 2.6–3.1 in SL; eye moderate, the orbit diameter 3.8–6.15 in head; interorbital space highly convex, the bony width 3.6–4.4 in head; caudal peduncle deeper than long (more than twice as deep as long on most species), the least depth 1.7–2.4 in head.

Dorsal profile of head convex, that of snout of males usually markedly convex,

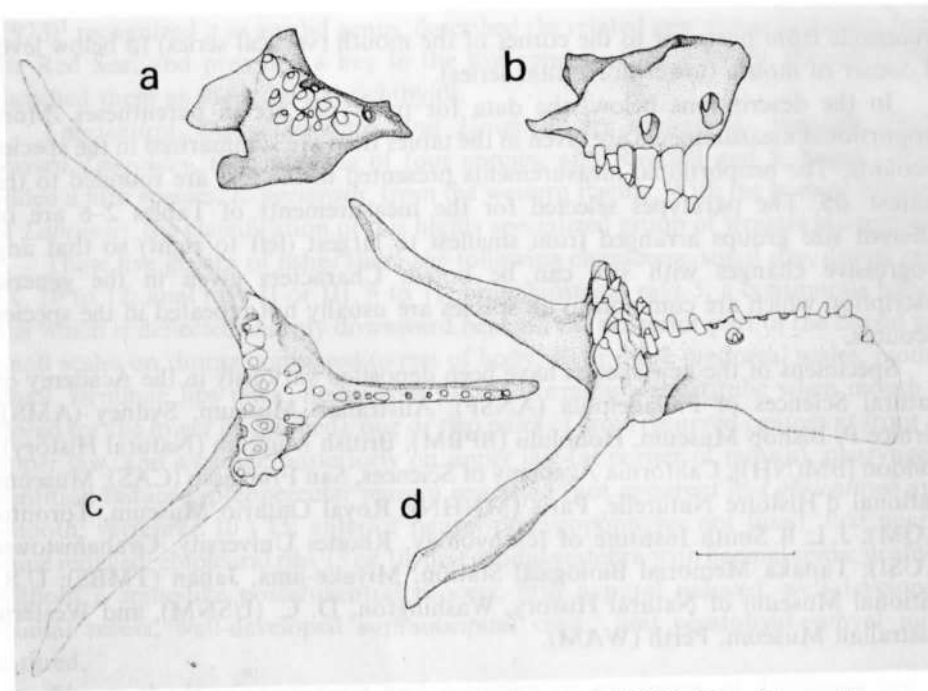


Fig. 1. Pharyngeal dentition of *Labropsis manabei*, BPBM 19091, 55 mm SL; a. and b. upper pharyngeal, right side; c. and d. lower fused pharyngeals. Scale=1 mm. Drawing by Janet R. Gomon.

thus forming an indentation with the horizontally projecting lips.

Mouth terminal, small (maxilla not reaching a vertical at anterior margin of orbit), the gape horizontal or slightly oblique, the lips very thick and fleshy, plicate externally and internally, forming a short tubular structure when closed (truncate anteriorly with a round opening). Pharyngeal cavity restricted.

Upper jaw with two pairs of moderate to large recurved canines anteriorly and one canine posteriorly at corner of mouth; no teeth along side of jaw between anterior and posterior canines; lower jaw with one pair of recurved canine teeth anteriorly, followed by one to four progressively shorter canines; pharyngeal dentition reduced (Fig. 1).

Nostrils very small, in front of upper part of eye on a diagonal line from upper edge of orbit to front of upper lip, the anterior nostril in a short membranous tube and the posterior without a rim but partially covered by a flap of skin from the anterior margin.

Opercular flap broadly rounded posteriorly (almost truncate). Upper preopercular margin smooth, free from its rounded corner to about level of rictus; no free lower preopercular margin.

Scales thin and cycloid; scales on side of thorax about half as high as those on side of body; head with small scales on operculum, nape, and partially on suborbital

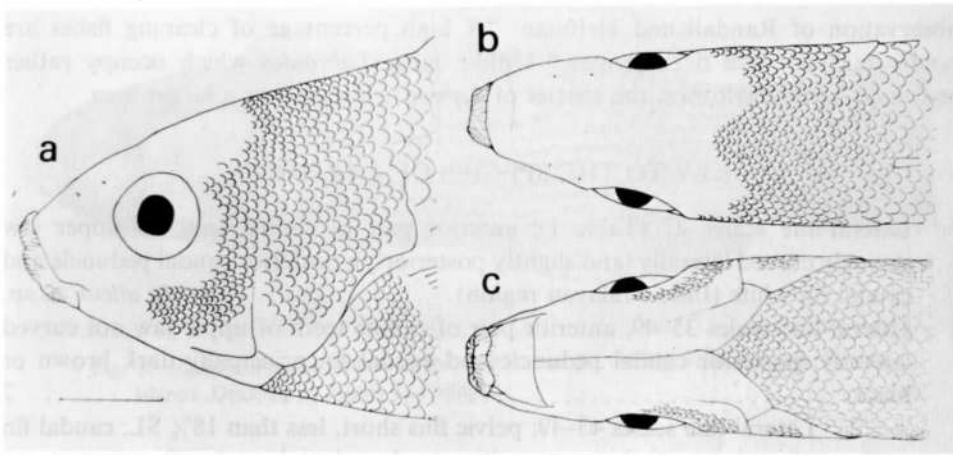


Fig. 2. Squamation of head of *Labropsis manabei*, BPBM 19091, 55 mm SL; a. lateral view; b. dorsal view; c. ventral view. Scale = 5 mm. Drawing by Janet R. Gomon.

region (Fig. 2); median fins scaled basally.

Origin of dorsal fin slightly posterior to upper end of gill opening, the fin continuous and unnotched, the membranes of spinous portion scarcely incised; dorsal spines strong, pungent, and progressively longer anterior to posterior, the ninth 2.7–3.9 in head. Origin of anal fin beneath anterior soft portion of dorsal fin, the third spine the stoutest and longest, its length 3.4–4.85 in head; caudal fin rounded (except males of two species which develop emarginate fins); pectoral fins short, broadly and symmetrically rounded, 1.8–2.2 in head; origin of pelvic fins usually beneath lower pectoral base, the fins short except for males of three species in which the fins are prolonged.

The six species of *Labropsis* are relatively small, rarely exceeding 100 mm SL. All are protogynous hermaphrodites, beginning their mature life as females. The alteration in sex is associated with a significant color change in the two species which develop emarginate caudal fins as males. The males of the three species with elongate pelvic fins have little or no change of color with sex, but they develop a marked convexity of the dorsal profile of the snout.

The species of *Labropsis* are closely tied to the coral reef environment. Their curious thick plicate lips and tubular mouths may be an adaptation for coral feeding. The small slender pharyngeal bones, reduction in the number and size of the pharyngeal teeth, and the conical shape of these teeth are also related to a diet of relatively soft animal material. Most labrid fishes prey upon mollusks, echinoderms and crustaceans with shells or hard exoskeletal elements. They have massive pharyngeal dentition for crushing these armored animals.

The young of *Labropsis* are often seen picking at the fins and bodies of other reef fishes, ostensibly to feed on their ectoparasites (Randall and Helfman, 1972) and possibly mucus as well. The striped color pattern of the juveniles is consistent with the





- and around pectoral fin (Ryukyu Islands and central and northern Philippines) . . . . . *L. manabei*
- 4'. Dorsal soft rays 12; anal soft rays 11; base of pectoral fins with or without a large dark spot, but if present, containing two prominent white areas (orange-red in life) . . . . . 5
5. Scales on suborbital region reaching to or anterior to a vertical through center of eye; ninth dorsal spine contained 2.7–3.3 times in head length; base of pectoral fin pale (orange-red in life); males with a prominent orange-red area dorsally on head (Marshall, Mariana, Caroline, and Palau Islands) *L. micronesica*, n. sp.
- 5'. Scales on suborbital region usually not reaching a vertical through center of eye; ninth dorsal spine contained 3.1–3.85 times in head length; base of pectoral fin in a large round dark brown to black spot containing two white (orange-red in life) spots; males without an orange-red area dorsally on head (Solomon, Samoa, Fiji, Loyalty and Tonga Islands and Great Barrier Reef) . . . . . *L. australis*, n. sp.

*Labropsis alleni* n. sp.

Plate 1 A; Table 2

*Labropsis* sp. Burgess and Axelrod, 1975, Pac. Mar. Fishes, Book 6, p. 1581, fig. 358 (Madang, New Guinea).

**HOLOTYPE:** BPBM 9534, female, 64.3 mm SL, **Palau Islands**, Augulpelu Reef, southwest side, base of drop-off in 34–52 m, rotenone, J. E. Randall, A. R. Emery, and E. S. Helfman, 22 April 1970.

**PARATYPES:** **Marshall Islands:** BPBM 10046, 82.2 mm SL, Enewetak Atoll, pinnacle reef in lagoon 4 miles off Chinimi Island, 29 m, spear, G. R. Allen, 4 August 1970; **Palau Islands:** CAS 46536, 66.1 mm SL, Bairakaseru Island, 34 m, quinaldine, G. R. Allen, 12 March 1972; **New Guinea:** AMS I. 21588–001, 44.6 mm SL, Madang, Kranket Island, outer reef slope, 23 m, spear and quinaldine, G. R. Allen, 9 April, 1972; USNM 208289, 45.0 mm SL, same data as preceding; BM(NH) 1980. 7. 23.4, 48.4 mm SL, same locality, 4.5 m, quinaldine, G. R. Allen, 21 April 1972; WAM P. 26906–001, 49.3 mm SL, same data as preceding; BPBM 15807, 51.5 mm SL, same locality, entrance to pass, north side, reef in 30 m, spear, J. E. Randall, 14 August 1973; **Solomon Islands:** AMS I. 17487, 55.6 mm SL, Guadalcanal, Doma Reef, 25 m, rotenone, J. E. Randall and G. R. Allen, 15 July 1973; **Indonesia:** BPBM 19303, 42.2 mm SL, Molucca Islands, Ambon, point northwest of village of Silale on southeast side of Ambon Bay, 15 m, spear, J. E. Randall, 25 January 1975; **Philippine Islands:** BPBM 18455, 52.0 mm SL, Mactan Island (near Cebu), east side, off marine station of the University of San Carlos, reef in 12 m, spear, J. E. Randall, 26 June 1975; BPBM 22071, 68.0 mm SL, same locality, face of 80° drop-off, 20 m, spear, J. E. Randall, 21 August 1977; BPBM 21110, 71.4 mm SL, Mactan Island, Buyong Beach, coral reef, 12 m, spear, K. E. Carpenter, 29 October 1977; USNM 222102, 51.8 mm

Table 2. Proportional measurements of type specimens of *Labropsis alleni* expressed as a percentage of the standard length.

	Holotype				Paratypes			
	BPBM 9534	BPBM 19303	BPBM 15807	BPBM 18455	CAS 46536	BPBM 22071	BPBM 21110	BPBM 10046
Standard length (mm)	64.3	42.2	51.5	52.0	66.1	68.0	71.4	82.2
Depth of body	31.4	31.3	30.8	29.3	28.6	27.6	30.9	28.7
Width of body	14.0	14.0	15.0	15.1	14.1	14.5	15.3	15.4
Head length	35.6	36.8	36.6	35.9	36.1	35.4	36.2	35.4
Snout length	10.8	10.7	10.4	10.0	11.5	11.4	11.1	11.7
Orbit diameter	7.0	7.9	7.6	7.5	7.5	6.8	6.8	6.8
Bony interorbital width	9.2	9.3	9.5	9.4	10.0	9.3	9.8	9.5
Least depth of caudal peduncle	17.1	16.6	16.9	16.8	16.5	17.4	17.2	18.1
Length of caudal peduncle	12.1	11.4	11.2	11.6	12.1	11.1	10.7	10.9
Predorsal length	33.0	35.2	35.2	33.2	34.4	33.8	33.7	33.3
Preanal length	65.6	65.2	69.5	67.2	68.1	67.5	68.4	65.7
Prepelvic length	35.9	36.2	36.5	36.4	36.5	35.0	34.9	35.4
Length of first dorsal spine	6.3	5.7	6.1	5.9	aberrant	broken	5.7	5.6
Length of longest dorsal spine	10.9	broken	12.2	11.6	10.8	10.7	11.6	10.4
Length of longest dorsal ray	14.9	broken	14.0	15.0	13.9	14.3	14.9	13.9
Length of dorsal fin base	57.8	57.7	52.2	56.8	55.2	55.6	56.8	54.3
Length of third anal spine	8.8	8.3	8.7	8.8	9.4	8.9	8.5	8.5
Length of longest anal ray	13.5	14.2	13.6	14.5	13.7	13.9	13.9	13.4
Length of anal fin base	23.8	24.1	22.6	23.5	25.4	25.0	25.3	25.4
Length of caudal fin	24.9	26.2	25.2	24.7	25.1	24.9	24.7	24.5
Length of pectoral fin	19.0	17.8	18.7	17.9	18.9	18.3	18.2	18.8
Length of pelvic spine	9.3	11.7	9.7	9.8	10.3	10.0	11.2	9.6
Length of pelvic fin	18.7	16.3	16.5	17.1	18.3	17.9	20.1	19.5

SL, Pamilacan Island, off southwest tip of island, 0–24 m, rotenone, V. G. Springer and others, 12 June 1978.

DESCRIPTION: Dorsal rays IX, 11 (10 or 11; one of 13 paratypes with 10); anal rays III, 9 (10); pectoral rays 14 (13–15; one of 13 paratypes with 13 and two with 15); upper and lower procurrent caudal rays usually 7; lateral-line scales 27 (plus 1 pored scale on caudal fin base); scales above lateral line to origin of dorsal fin  $5\frac{1}{2}$  ( $5-5\frac{1}{2}$ ); scales below lateral line to origin of anal fin 11 (10–11); circumpeduncular scales 24 (22–24); gill rakers 9 (8–9).

Depth of body 3.2 (3.2–3.5) in SL; width of body 2.25 (1.85–2.25) in depth; head length 2.8 (2.7–2.8) in SL; snout length 3.3 (3.1–3.6) in head; orbit diameter 5.1 (4.65–5.3) in head; bony interorbital width 3.9 (3.6–3.95) in head; least depth of caudal peduncle 2.1 (1.95–2.2) in head.

Upper jaw with two pairs of enlarged canines anteriorly, the first pair obliquely recurved and outcurved, the second pair recurved; a large forward-directed canine posteriorly on upper jaw; no small teeth on side of jaw between anterior and posterior



canines; lower jaw with an anterior pair of outcurved and slightly recurved canine teeth followed by two pairs of progressively smaller canines; no small teeth along sides of jaws; both jaws with a pair of small conical teeth anteriorly, medial to second pair of canines.

Preopercular margin free from corner to level of mouth (no lower free margin); suborbital pores 8 (7-9); preopercular pores 11 (8-11).

Postorbital head and posterior suborbital region with small scales (one or two suborbital scales may extend anterior to a vertical through center of eye); interorbital space, snout, anterior suborbital region, opercular membrane, and ventral part of head naked; small scales on nape nearly reaching a vertical at hind edge of orbit; scales on side of thorax about half as high as those on body, becoming still smaller ventroanteriorly; small scales basally on median and pectoral fins; pelvic fins with a triangular scaly process consisting of four rows of moderate scales extending posteriorly from midbase of fins.

Origin of dorsal fin above second lateral-line scale; dorsal spines progressively longer, the first 5.7 (6.0-6.35) and the ninth 3.25 (3.0-3.4) in head; first or second dorsal soft ray longest, 2.4 (2.4-2.6) in head; origin of anal fin below base of second to third dorsal soft rays; first anal spine minute (less than one-third length of second spine); second anal spine slender, about half length of third spine; third anal spine stout, 4.05 (3.85-4.45) in head; first or second anal soft ray longest, 2.65 (2.5-2.7) in head; caudal fin slightly rounded, 1.45 (1.4-1.45) in head; pectoral fins broadly rounded and short, 1.85 (1.9-2.05) in head; origin of pelvic fins below mid to lower base of pectorals, the fins short, 1.9 (1.8-2.25) in head.

Color in alcohol of females: body pale except anteriorly; head and thorax brown, becoming darker brown on nape and a broad area anterodorsally on upper side of body nearly to end of spinous portion of dorsal fin (a pale zone separates this dark area from base of dorsal fin); holotype and most specimens with an indistinct narrow dark stripe passing from posterior end of dark brown area, following middle portion of lateral line, and disappearing dorsally on caudal peduncle; many specimens with a second indistinct narrow dark stripe from level of upper pectoral base to lower caudal peduncle; a large dark brown to black spot covering all of base and axil of pectoral fin; a blackish spot nearly as large as eye ventrally on body just dorsal to origin of anal fin; edge of orbit narrowly blackish; fins pale except for a hemispherical black spot at base of second to third dorsal spines (which may extend partly onto adjacent membranes), faint narrow dark margins on dorsal and anal fins, and a narrow diagonal dark streak on some interspinous membranes of dorsal fin.

Color in alcohol of 82.2-mm male: similar to the females but lacking the dark spot above origin of anal fin, the one or two narrow dark stripes anteriorly on body, and the dark spot anteriorly on the dorsal fin.

Color of holotype (a female) from field notes made directly after capture: head, thorax, nape, and a portion of upper anterior body enclosing front of lateral line brown; rest of body orange-yellow, shading to whitish with a faint pink cast on caudal peduncle; a suffusion of greenish over ventral part of body; an irregular pale

yellow line passing from upper edge of eye to anterior portion of lateral line; a large black spot edged in yellow surrounding pectoral base and axil; a blackish spot on body above origin of anal fin; some brown pigment along lateral line continuing onto upper anterior part of caudal peduncle; dorsal, anal and pelvic fins yellowish green, the dorsal and anal with a light blue border, the dorsal with a black spot anteriorly at base; caudal fin yellowish white with a narrow transparent (except for faintly, dusky rays) posterior margin (broader at corners); pectoral fins transparent, the rays edged in light red.

The caudal peduncle and fin of some individuals were pink when removed from the sea (though appeared white underwater before capture).

Color of 82.2-mm paratype when fresh (from notes made by G. R. Allen): head purple; most of body pale yellow-green; posterior portion of body and caudal fin very pale yellow, nearly white; a large black spot enclosed in a yellow ring at pectoral base; anterior portion of dorsal and anal fin turquoise blue, rest of fin yellow-green with mottling of blue; chest and ventral surface dusky and slightly purple.

REMARKS: Named in honor of Dr. Gerald R. Allen of the Western Australian Museum who collected six of the 14 type specimens.

This species has been observed and collected only on coral reefs in the Marshall Islands, Palau Islands, Philippine Islands, New Guinea and Indonesia. Specimens were collected in the depth range of 4.5 to 52 m.

Small individuals have been observed picking at the bodies of other fishes. The 51.5-mm paratype was cleaning *Chromis amboinensis* shortly before it was speared.

All but two of the type specimens are females, the largest 71.4 mm SL. One 66.1-mm specimen appears to be a male; its color pattern is like that of females. The largest male, 82.2 mm SL, does differ somewhat in color from the females as described above, although not to the degree of the following two species.

*L. allenii* is the most diverse of all the species of *Labropsis* as can be surmised from its low lateral-line scale count (in this respect it would seem closer to the genus *Labrichthys* than other species of *Labropsis*) and distinctive color pattern.

*Labropsis polynesica* n. sp.

Fig. 3; Plate 1 B, C; Table 3

*Labropsis* sp. Randall, 1973, Occ. Pap. B. P. Bishop Mus., vol. 24, no. 11, p. 197 (Society Islands).

HOLOTYPE: BPBM 9298, 87.2 mm SL, male, **Society Islands**, Moorea, outside barrier reef 300 m east of pass to Papetoai Bay, 18 m, coral reef, spear, J. E. Randall, 16 March 1957.

PARATYPES: **Society Islands**: BPBM 9093, 74.4 mm SL, same data as holotype except depth of 24.5 m; BPBM 6934, 2: 44.8–77.3 mm SL, Tahiti, Papara, Popote Bay, 24.5–27.5 m, spear and quinaldine, J. E. Randall, 2 March 1969; CAS 46535,

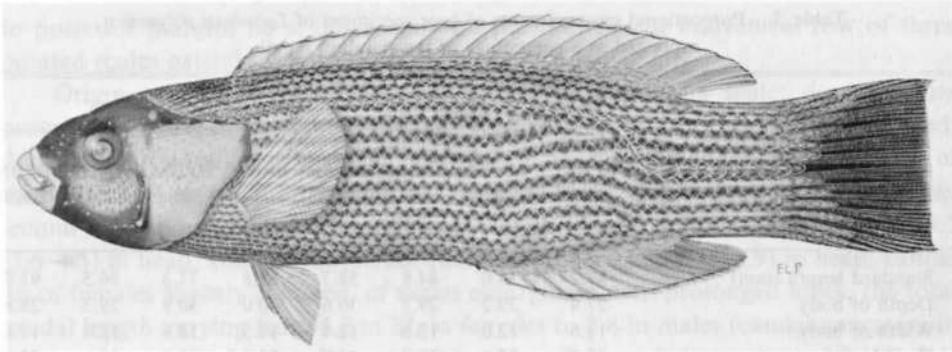


Fig. 3. *Labropsis polynésica*, holotype, ♂, 87.2 mm SL, BPBM 9298, Moorea, Society Islands. Drawing by Fanny L. Phillips.

41.0 mm SL, and USNM 208290, 55.0 mm SL, same data as preceding; AMS I. 21589-001, 33.6 mm SL, Tetiaroa Atoll, outside reef off Tiarauna Islet, 38 m, rotenone, J. E. Randall and R. M. McNair, 21 April 1973; BPBM 20691, 3: 69.8-93.0 mm SL, Moorea, reef front off Irioa Island, 15-20 m, spear, B. Goldman, 27 June 1976; **Tuamotu Archipelago:** BPBM 9100, 60.4 mm SL, Tikahau Atoll, outside reef just north of pass, 25 m, spear, J. E. Randall, 14 June 1957; BPBM 13506, 99.0 mm SL, Gambier Islands, Temoe Atoll, north side, reef in 30.5 m, spear, J. E. Randall, 16 December 1970; MNHN 1980-1343, 86.5 mm SL, Rangiroa Atoll, outside reef 2 miles east of Avatoru Pass, 60° drop-off, coral, rock and sand in 33.5 m, spear, J. E. Randall, 10 April 1971; ANSP 144103, 58.7 mm SL, Takaroa Atoll, outside reef 2 miles north of pass, 15 m, spear, D. B. Cannoy, 14 April 1971; **Austral Islands:** BPBM 13674, 34.0 mm SL, Tubuai, outside barrier reef 1 mile southwest of anchorage off pass, 30.5 m, spear, J. E. Randall, 26 February 1971; **Cook Islands:** BM(NH) 1980. 7. 23.2, 82.5 mm SL, Rarotonga, 300 m east of Avaavaroa Pass, 37 m, spear, J. E. Randall, 6 March 1971.

**DESCRIPTION:** Dorsal rays IX, 11; anal rays III, 10 (10 or 11; one of 14 paratypes with 11); pectoral rays 14 (13 or 14; two of 14 paratypes with 13); upper and lower procurrent caudal rays usually 7; lateral-line scales 45 (43-47, plus 2 or 3 pored scales on caudal fin base); scales above lateral line to origin of dorsal fin 6 ( $5\frac{1}{2}$ - $6\frac{1}{2}$ ); scales below lateral line to origin of anal fin 12 (12-14); circumpeduncular scales 24 (24-26); gill rakers 8 (6-8).

Depth of body 3.65 (3.25-3.4) in SL; width of body 2.35 (2.4-2.6) in depth; head length 3.1 (2.65-3.05) in SL; snout length 3.0 (3.05-3.5) in head; orbit diameter 5.3 (4.15-6.1) in head; bony interorbital width 4.05 (4.1-4.4) in head; least depth of caudal peduncle 1.8 (1.7-2.2) in head.

Two pairs of large recurved canine teeth of nearly equal size anteriorly in upper jaw with a pair of small sharp conical teeth medial to the second pair; a large recurved canine tooth (some males with two) posteriorly on upper jaw projecting laterally and

Table 3. Proportional measurements of type specimens of *Labropsis polynesica* expressed as a percentage of the standard length.

	Holotype				Paratypes			
	BPBM 9298	BPBM 13674	BPBM 6934	ANSP 144103	BPBM 20691	BPBM 6934	MNHN 1980- 1343	BPBM 20691
Standard length (mm)	87.2	34.0	44.8	58.7	69.8	77.3	86.5	93.0
Depth of body	27.4	29.2	29.7	30.6	30.0	30.9	29.3	28.8
Width of body	11.6	12.0	12.5	12.4	11.5	12.8	12.0	11.8
Head length	32.3	37.6	35.9	33.9	33.4	32.8	33.0	33.6
Snout length	10.8	11.4	10.3	10.4	10.4	10.3	10.9	10.7
Orbit diameter	6.1	9.1	8.6	7.7	6.5	6.5	6.0	5.5
Bony interorbital width	8.0	8.5	8.1	8.1	7.9	8.0	7.7	8.1
Least depth of caudal peduncle	17.9	17.1	17.5	17.8	17.7	19.1	17.7	18.1
Length of caudal peduncle	8.9	9.1	8.7	8.2	8.4	8.2	8.1	8.4
Predorsal length	30.5	35.2	35.0	32.4	32.0	31.9	32.5	30.6
Preanal length	65.9	70.5	67.0	68.2	68.0	65.9	68.3	66.3
Prepelvic length	33.4	37.9	36.3	34.1	32.8	33.0	34.9	34.8
Length of first dorsal spine	5.6	5.0	5.8	5.5	5.0	6.0	5.7	4.9
Length of longest dorsal spine	10.2	9.6	10.7	10.2	10.1	10.2	10.1	10.2
Length of longest dorsal ray	13.0	13.8	13.7	13.4	13.0	13.1	12.4	12.6
Length of dorsal fin base	58.4	56.4	58.1	57.7	58.8	60.8	56.6	59.3
Length of third anal spine	9.3	8.3	9.6	8.8	9.3	9.0	9.2	9.1
Length of longest anal ray	12.9	12.9	13.5	13.3	13.2	13.9	12.7	12.8
Length of anal fin base	24.2	22.1	25.0	23.8	23.2	27.2	23.1	27.1
Length of caudal fin	23.6	26.5	25.8	24.4	23.9	33.0	36.2	36.0
Length of pectoral fin	17.1	17.7	18.5	17.5	18.4	17.5	17.1	18.6
Length of pelvic spine	8.6	9.7	9.4	9.5	9.0	8.9	9.1	8.5
Length of pelvic fin	15.3	15.0	14.8	15.5	15.9	15.4	15.4	15.0

slightly ventrally; most males with a second large curved canine at corner of mouth adjacent and in front of first canine which projects anteriorly; no teeth on sides of jaw between anterior and posterior canines; two pairs of slightly recurved canine teeth anteriorly in lower jaw, often with a third lesser pair just posterior to first two (especially on males); no teeth on side of jaw or medially at front of jaw.

Preopercular margin free from its corner to level of mouth (no free lower margin); preopercular pores 11 (7-11); suborbital pores 9 (9-11).

Small scales on nape, opercle and preopercle, those on suborbital region in four horizontal rows, reducing to two rows anteriorly which extend slightly anterior to front edge of orbit; rest of head, including broad region of opercular membrane, naked; scales dorsally on nape nearly reaching a vertical at hind edge of orbit; scales on side of thorax slightly more than half as high as largest scales on side of body, becoming a little smaller ventroanteriorly on thorax; dorsal and anal fins with scales extending nearly half distance from base to distal margin (except anteriorly on dorsal fin); progressively smaller scales extending outward on caudal fin nearly half distance

to posterior margin; no scales basally on pectoral fins; a midventral row of three pointed scales extending posteriorly from base of pelvic fins.

Origin of dorsal fin over third or fourth lateral-line scale; dorsal spines progressively longer, the first 5.75 (5.45–7.55) and the ninth 3.15 (3.6–4.5) in head; dorsal rays subequal, the longest 2.5 (2.5–2.7) in head; origin of anal fin below base of third anal soft ray; first anal spine very slender, about half as long as second spine; second anal spine about two-thirds length of third anal spine; third anal spine 3.5 (3.6–4.5) in head; anal soft rays subequal, the longest 2.5 (2.35–2.9) in head; caudal fin of females slightly rounded, of males emarginate with prolonged lobes, the total caudal length varying from 4.2 in SL in females to 2.8 in males (caudal concavity in large males up to 1.9 in head); pectoral fins broadly rounded and short, 1.9 (1.8–2.1) in head; origin of pelvic fins below lower base of pectoral fins, the fins short, 2.1 (2.1–2.5) in head.

Color of holotype in alcohol: body pale brown with narrow dark brown stripes a little broader than pale interspaces following scale rows (within each dark brown stripe a darker zigzag pattern is evident); head dark brown except for a large pale area covering opercle and opercular membrane and a broad abruptly pale region around mouth (including lips); some large males with a small blackish spot on lower lip just below corner of mouth; basal scaled portion of median fins colored much like body; naked part of dorsal and anal fins translucent dusky with a narrow pale margin and black submarginal line; naked part of caudal fin blackish, the upper and lower margins narrowly black, the median posterior border narrowly pale; paired fins pale, the pelvics with a faint dusky lateral margin.

Juveniles and small females dark brown with a small pale spot (yellow in life) on each scale of body (spots faint posteriorly); three narrow black stripes (brilliant blue in life), the first extending from front of snout across upper edge of eye to below rear base of dorsal fin, the second from lower edge of eye to or beyond middle of body, and the third from cheek below front edge of eye to above anal fin (stripes attenuate and faint posteriorly); front of mouth white. Larger females approach the color pattern of males but lack the large pale area on postorbital head.

Color of holotype in life: dark brown with about 18 lengthwise greenish yellow lines; head yellowish brown with a very large orange area on opercle sharply set off from the brown; lips and a broad region adjacent to lips pale blue with a small dark blue spot at corner of mouth; dorsal and anal fins yellowish green with a pale blue margin and black submarginal line; caudal fin dark brown, almost black, with a narrow pale blue edge; pectoral fins orange; pelvic fins orangish with a blackish lateral edge. Underwater, the greenish yellow lines look golden.

**REMARKS:** Named *L. polynesica* in reference to the known localities for the species—all islands of Polynesia. These are the Society Islands, Tuamotu Archipelago (from Takaroa in the north to Temoe in the south), Austral Islands, and Cook Islands. The species has not been observed in the Marquesas Islands, Pitcairn Group, Rapa, or the Samoa Islands in spite of extensive diving and collecting.



Specimens have been obtained from the depth range of 15 to 38 m, always on coral reefs. Half-grown and adult individuals were observed feeding on live coral. Although there are no field notes attesting to cleaning behavior of juveniles or subadults, the author has a recollection of having observed this.

The largest specimens (BPBM 13506) is a male 99 mm SL (nearly 102 mm SL before preservation) from Temoe Atoll.

*L. polynesica* is most closely related to the allopatric *L. xanthonota*. The two species are readily distinguished by the near-equal size of the two pairs of canine teeth anteriorly in the upper jaw of *L. polynesica* (second pair of *L. xanthonota* about half as large), the lower average lateral-line scale count of *L. polynesica*, and by color.

***Labropsis xanthonota* n. sp.**

Plate 2A–C; Table 4

*Labropsis* sp. Shepard and Meyer, 1978, UO, no. 29, p. 37, fig. 4 (Miyake-jima, Izu Islands, Japan).

*Labropsis* sp. Allen and Steene, 1979, Spec. Publ. Austral. Natl. Parks. Wildl. Serv. 2, p. 50 (Christmas Islands, Indian Ocean).

**HOLOTYPE:** BPBM 15001, male, 68.7 mm SL, **Samoa Islands**, Tutuila, Fagatele Bay, east side, coral and rubble bottom, 27 m, quinaldine, J. E. Randall and S. N. Swerdloff, 28 April 1973.

**PARATYPES:** **Marshall Islands:** BPBM 9284, 43.0 mm SL, Enewetak Atoll, Rigili (Leroy) Islet, outer reef on sea side, 10.5 m, spear, J. E. Randall, 19 April 1968; BPBM 19957, 35.8 mm SL, Kwajalein Atoll, south end, outside reef 100 m northwest of small boat passage (just southeast of Enebu Islet), 7 m, spear, J. E. Randall, 7 April 1976; **Mariana Islands:** BPBM 6954, 28.8 mm SL, Guam, west coast, off Two Lover's Leap (south of NCS Beach), rock, sand and coral bottom in 9 m, quinaldine, J. E. Randall and H. T. Kami, 23 June 1968; BPBM 9274, 48.3 mm SL, Guam, west coast, Double Reef (about 1 mile northeast of Haputu Point), bottom mainly rock with heavy growth of *Padina*, some coral and a little sand, 27.5 m, quinaldine, J. E. Randall, 27 June 1968; BPBM 9280, 14.7 mm SL, same data as preceding but depth 18 m; BPBM 7278, 77.0 mm SL, Guam, outside reef northwest of Cocos Island, 15 m, spear, J. E. Randall, 30 June 1968; BPBM 9278, 64.5 mm SL, same locality as preceding, 23–30.5 m, rotenone, J. E. Randall, R. S. Jones, H. T. Kami, A. J. Stark, and G. E. Fosse, 30 June 1968; BPBM 9279, 60.2 mm SL, Guam, south of Uruno Point (about 10 miles northeast of Agana), 21.5 m, spear, J. E. Randall, 1 July 1968; **Caroline Islands:** BPBM 7515, 26.3 mm SL, Truk, north side, lagoon end of Northeast Pass, 9.5 m, spear, J. E. Randall, 9 July 1969; USNM 224421, 58.3 mm SL, Ponape, just east of entrance to Jokaj Passage, depth to 15 m, rotenone, V. G. Springer and others, 8 September 1980; **New Guinea:** USNM 207467, 46.5 mm SL, Madang Harbor, south edge of Massas Island, 3–15 m, rotenone, B. B. Collette, B. Goldman and G. Palmer, 27 May 1970; BPBM 13439, 86.0 mm SL, Madang, outer



Table 4. Proportional measurements of type specimens of *Labropsis xanthonota* expressed as a percentage of the standard length.

	Holotype			Paratypes				
	BPBM 15011	BPBM 6954	BPBM 19957	BPBM 9274	BPBM 9279	BPBM 9278	BPBM 7278	BPBM 24114
Standard length (mm)	68.7	28.8	36.2	48.3	60.2	64.5	77.0	88.3
Depth of body	29.4	29.0	29.0	27.8	27.2	29.4	26.4	28.3
Width of body	12.0	13.2	13.5	12.4	12.1	11.3	11.3	11.7
Head length	33.5	38.2	37.7	34.7	34.7	34.6	33.7	33.3
Snout length	10.5	10.1	11.3	10.4	11.2	10.3	10.6	10.9
Orbit diameter	6.7	8.8	8.3	7.1	6.8	6.7	6.1	5.9
Bony interorbital width	8.3	9.3	9.0	8.9	8.3	8.8	8.1	8.5
Least depth of caudal peduncle	17.8	17.1	17.3	16.1	15.7	17.5	17.0	16.7
Length of caudal peduncle	7.7	7.6	8.2	7.7	8.1	7.9	7.9	7.6
Predorsal length	31.7	35.4	36.0	32.8	36.5	33.4	31.5	31.6
Preanal length	67.7	66.0	66.4	69.5	68.2	68.7	67.0	66.9
Prepelvic length	34.2	37.9	37.9	35.2	33.2	35.2	34.2	33.0
Length of first dorsal spine	5.9	6.2	5.6	6.0	6.3	5.8	5.5	5.3
Length of longest dorsal spine	10.2	11.4	11.3	10.9	10.7	10.2	9.7	8.9
Length of longest dorsal ray	13.4	14.8	14.5	13.2	13.3	13.3	12.0	11.2
Length of dorsal fin base	58.8	56.0	58.5	59.2	59.8	59.5	56.0	60.0
Length of third anal spine	9.3	11.2	9.6	9.9	9.1	8.5	8.9	8.5
Length of longest anal ray	14.4	15.6	15.2	14.9	13.6	13.5	12.1	11.9
Length of anal fin base	24.5	25.8	24.6	26.8	24.7	24.4	damaged	26.2
Length of caudal fin	30.6	23.3	23.2	23.5	21.3	22.2	24.8	33.4
Length of pectoral fin	18.1	17.8	17.2	17.6	17.9	17.4	16.0	17.0
Length of pelvic spine	8.9	9.4	9.2	8.7	8.6	8.1	9.1	8.2
Length of pelvic fin	15.3	14.2	15.4	15.1	14.9	14.9	15.6	17.9

reef off Tab Island, 12 m, spear, G. R. Allen, 16 May 1972; MNHN 1980-1344, 65.7 mm SL, Yanaba Islands, Egum Atoll, outer reef in 9.5 m, rotenone, G. R. Allen, W. A. Starck, II, and J. Harding, 6 June 1972; BPBM 15805, 58.9 mm SL, Madang, entrance to pass at north end of Kranket Island, 8 m, spear, J. E. Randall, 14 August 1973; **Samoa Islands:** BPBM 11300, 25.7 mm SL, Tutuila, Fagfue Bay, east side, coral reef in 12 m, quinaldine, J. E. Randall, 3 August 1971; BPBM 17464, 78.5 mm SL, Tutuila, Anuu Islet, west side, reef in 15 m, spear, J. E. Randall, 25 April 1974; BPBM 24114, 88.3 mm SL, Tutuila, Fagatele Bay, 21 m, rotenone, R. C. Wass, 2 January 1976; **Mauritius:** RUSI 456, 77.2 mm SL, off Grand Baie, reef in 18 m, spear, J. E. Randall, 10 November 1973; **Solomon Islands:** AMS I. 17495-008, 62.0 mm SL, Alite Reef (off Malaita), spear, J. E. Randall, G. R. Allen, and B. Goldman, 25 July 1973; BPBM 15634, 62.7 mm SL, Alite Reef (off Malaita), west end of reef in 10 m, spear, J. E. Randall, 26 July 1973; **New Britain:** BM(NH) 1980.7.23.5, 60.0 mm SL, off former submarine base, reef, 12 m, spear, J. E. Randall, 9 August 1973; **Cocos-Keeling Islands:** ANSP 134518, 32.0 mm SL, West Island, off north end, outside barrier reef, 12 m, rotenone, W. F. Smith-Vaniz and others, 26 February 1974; ANSP

134517, 66.4 mm SL, Horsburgh Island, reef east of island, ocean side near drop-off, dynamite, W. F. Smith-Vaniz and others, 10 March 1974; **Indonesia**: BPBM 19522, 72.0 mm SL, Java, Seribu Islands, Pulau Putri, coral slope in 10 m, spear, J. E. Randall, 15 February 1975; **Australia**: AMS I. 19472.048, 44.7 mm SL, Great Barrier Reef, Carter Reef, Yonge Passage, 7–15 m, R. H. Kuitert, hand net, 23 November 1975; **Loyalty Islands**: BPBM 19899, 28.2 mm SL, Îlot Dudune (8 miles northwest of Mare), 55 m, rotenone, P. Laboute and Y. Magnier, 24 November 1975; MNHN 1980–574, 42.2 mm SL, Pleiades du Nord, coral reef, 10–15 m, rotenone, J. E. Randall and L. A. Maugé, 5 January 1979; **Japan**: TMBS 760925–2, 32.5 mm SL, Izu Islands, Miyake-jima, Igaya, lava rock canyon, 16 m, screen net, J. T. Moyer, 25 September 1976; **Christmas Island** (Indian Ocean): WAM P26085–003, 100.5 mm SL, off Ethele Beach, 15–20 m, G. R. Allen and R. C. Steene, 20 May 1978; CAS 46537, 2: 29.9–66.0 mm SL, same data as preceding; **Chagos Archipelago**: ROM 35941, 40.0 mm SL, Salomons, east tip of northernmost island (Isle de la Passe), drop-off on ocean side, sand, rock and coral, 18–25 m, rotenone, A. R. Emery, R. Winterbottom, A. Ryan, and B. Simm, 23 March 1979; ROM 35938, 38.5 mm SL, Salomons, Isle Boddam, off northwest tip on drop-off, 18–25 m, rotenone, A. R. Emery, R. Winterbottom, A. Ryan, R. Perry, and B. Simm, 24 March 1979.

**DESCRIPTION:** Dorsal rays IX, 11; anal rays III, 10; pectoral rays 14 (14 or 15; one of 24 paratypes with 15); upper and lower procurent caudal rays usually 7; lateral-line scales 48 (46–49, plus 2 pored scales posterior to caudal base); scales above lateral line to origin of dorsal fin  $6\frac{1}{2}$  ( $5\frac{1}{2}$ – $6\frac{1}{2}$ ); scales below lateral line to origin of anal fin 18 (16–18); circumpeduncular scales 30 (27–31); gill rakers 9 (7–9).

Depth of body 3.4 (3.45–3.8) in SL; width of body 2.45 (2.15–2.6) in depth; head length 3.0 (2.6–3.0) in SL; snout length 3.2 (3.05–3.8) in head; orbit diameter 5.0 (4.35–5.65) in head; bony interorbital width 4.05 (3.9–4.25) in head; least depth of caudal peduncle 1.9 (1.95–2.2) in head.

Upper jaw with two pairs of recurved canine teeth anteriorly, the second pair slightly more than half as long as the first; a forward-directed canine tooth posteriorly on upper jaw; no teeth along side of jaw between anterior and posterior canines; lower jaw with a pair of large recurved canine teeth anteriorly followed by three or four lesser canines (the second less than half length of anterior canine); a pair of small sharp conical teeth medially at front of both upper and lower jaws.

Preopercular margin free from its corner to below level of rictus (no lower free margin); suborbital pores 5 (5–10); preopercular pores 8 (8–10).

Postorbital head and posterior suborbital region with small scales (usually no suborbital scales extend anterior to a vertical through center of eye); interorbital space, snout, anterior suborbital region, opercular membrane, and ventral part of head naked; small scales on nape nearly reaching a vertical at hind edge of orbit; scales on side of thorax about half as high as those on side of body, becoming still smaller ventroanteriorly; median fins with scales extending nearly half distance to outer margins; no scales on pectoral fins; pelvic fins with a triangular scaly process of

about six scales extending posteriorly from median base of fins.

Origin of dorsal fin over third lateral-line scale; dorsal spines progressively longer, the first 5.65 (5.5–6.75) and the ninth 3.3 (3.2–3.75) in head; third to seventh dorsal soft rays longest, 2.5 (2.55–2.95) in head; origin of anal fin below base of third dorsal soft ray; first anal spine very slender, about two-thirds length of second spine; second anal spine about two-thirds length of third spine; third anal spine stout, 3.6 (3.4–4.05) in head; third to sixth anal soft rays longest, 2.35 (2.35–2.8) in head; caudal fin rounded in juveniles and females, emarginate in males, the length of fin of females 1.5–1.65 in head and of males 1.1 (1.0–1.4) in head; caudal concavity of males as great as 2.3 in head; pectoral fins broadly rounded and short, 1.85 (1.95–2.2) in head; origin of pelvic fins below lower base of pectoral fins; pelvic fins short, 2.2 (1.85–2.7) in head.

Color of holotype (a male) in alcohol: body dark brown with a pale spot on each scale; head brown with broad dark brown bands (one across front of interorbital space continuing ventrally anterior to orbit, and a second across front of snout, both merging on side of snout; a transverse one on chin; a very broad horizontal one on suborbital linking to a vertical one along preopercular margin and a very dark one posteriorly on operculum—except for a pure white margin on edge of opercular membrane from the flap to below level of pectoral fin); preopercular and opercular dark bands linked by a dark band across dorsal part of opercle to upper edge of eye; scaled basal part of median fins colored like body; naked part of dorsal and anal fins brown with a narrow white margin and dark brown submarginal line; caudal lobes dark brown with narrow upper and lower whitish edges and a large V-shaped whitish area centroposteriorly in fin; pectoral fins pale except edges of rays which are brown and a broad dark brown bar at base; pelvic fins with brown rays and pale membranes.

Color of juveniles and females: body brown to dark brown (except back along base of dorsal fin which is paler) with five dark brown longitudinal lines which extend onto head; interorbital space with four longitudinal dark bands which extend onto dorsal part of snout; membranous edge of operculum dark brown; front of lips whitish; dorsal fin pale, faintly marbled with brown except posteriorly on last few rays and membranes where mainly brown and first two membranes which are largely covered by a dark brown to black spot; anal and caudal fins dark brown with a pale margin; pectoral fins pale except edges of rays which are brown and an indistinct broad dark brown bar at base; pelvic fins with brown rays and pale membranes.

Color of holotype in life: body brown, the center of each scale with a golden yellow spot; head orangish brown shading posteriorly to dark brown; opercular membrane below its most posterior projection bright yellow; broad dark blue bands on head (the dark brown bands described above for the specimen in preservative); a broad blue band midventrally on thorax; front of lips white, the middle region blackish, and orangish basally; unscaled part of dorsal and anal fins orangish brown with a pale blue margin, black submarginal line and below this a narrow zone of dull orange; a large indistinct blackish spot anteriorly in dorsal fin; caudal lobes dark brown, a little orange at tips; a large V-shaped region of bluish white in posterior

central part of caudal fin; pectoral fins clear with dusky rays and a large dark brown bar covering all of base; pelvic fins with clear membranes, orange rays, and a narrow brown lateral edge.

Color in life of females: head and lower part of body bluish black, becoming brown on sides, with an orange spot in the center of each scale; orange spots progressively larger and lighter dorsally, the scales edged with greenish yellow on back below dorsal fin; head and body with slightly irregular longitudinal pale blue lines (except dorsally on head and nape where greenish yellow); irregular dotted pale blue lines bisecting interspaces between solid blue lines; dorsal fin yellow except posteriorly where dusky, with a light blue margin, irregular pale yellow markings basally, and a large pale-edged black spot anteriorly; anal and caudal fins bluish black, the scales at base with orangish brown centers and some blue on edges, the distal margin of the anal fin light blue and the posterior margin of the caudal fin clear (broader at corners where faintly blue); membranes of paired fins hyaline, the pectoral rays edged with dusky, the pelvic rays brownish.

Color in life of the 14.7-mm paratype: bluish black with a middorsal yellow stripe; a second yellow stripe passing from upper lip through dorsal edge of orbit and ending beneath posterior part of dorsal fin; a pale blue stripe passing from lower lip through ventral edge of orbit, along middle of body and ending in a faint blue reticulum on caudal peduncle; another pale blue stripe from chin to ventral part of caudal peduncle, and a last blue stripe midventrally; a pale yellow line on head and nape between two dorsal yellow stripes and another on head posterior to eye bisecting the space between the pale stripes passing through the upper and lower edges of orbit; dorsal fin yellow anteriorly and black posteriorly, the black beginning as a margin posteriorly on spinous portion of fin and broadening as it passes backward; a row of black spots in yellow portion of dorsal fin; anal and caudal fins black, the caudal with a broad pale posterior border.

**REMARKS:** Named *L. xanthonota* from the Greek for the yellow of the upper back and dorsal fin of females, the most conspicuous color marking of the species underwater.

*L. xanthonota* occurs in Oceania as far east as the Marshall Islands and Samoa Islands. Specimens have also been obtained from the Mariana Islands, Caroline Islands, Loyalty Islands, Great Barrier Reef, Solomon Islands, New Britain, New Guinea, and Indonesia. The species is not yet known from the Philippines or Ryukyu Islands but it might be expected from there because it was recorded (as *Labropsis* sp.) from the Izu Islands, southern Japan, by Shepard and Meyer (1978). It is the only member of the genus which occurs in the Indian Ocean where it is wide-ranging. Although specimens have been examined only from Cocos-Keeling Islands, Christmas Island, Mauritius, and Chagos Archipelago, the author has observed this fish at Réunion, Mafia Island (Tanzania), the coast of Kenya, and the Maldive Islands. Underwater photos were taken at Kenya.

Specimens have been collected in the depth range of 7 to 55 m. The typical

habitat is a well-developed coral reef in clear water. Adults and subadults have been observed feeding on coral polyps. Small individuals are often seen picking at the bodies and fins of larger reef fishes (among those noted as being cleaned are *Chromis iomelas*, *C. agilis*, *Scarus sordidus*, and *Zebbrasoma scopas*). Before it was collected at Guam, the 14.7-mm paratype was observed to clean two large *Amphiprion chrysopterus* directly above their anemone and a subadult *Labroides dimidiatus*.

The male of *L. xanthonota* is strikingly different from the female, as may be noted above from the descriptions of color and caudal fin shape. The deeply emarginate caudal fin of the male is accentuated by the dark lobes and pale triangular area midposteriorly in the fin. At first glance the male is suggestive of a *Thalassoma*; it was some time before it was linked as the male of the far more common yellow-back female phase.

Females as large as 72 mm SL have been collected; the male specimens range from 68.7 to 100.5 mm SL. The 60.2-mm paratype from Guam (BPBM 9279) was intermediate in color to the female and male phases. The pale yellow and blue lines were absent except for a few on nape and dorsally on the head; a faint pattern of dark brown bands was apparent on the head which is the precursor of the broad blue reticulum of fully developed males; the opercular membrane was yellow (but not the bright yellow of the male); the dorsal fin was dull yellow with a pale blue margin, black submarginal line and anterior black spot; the caudal fin has developed blackish lobes and the bluish white triangular area in the centroposterior part of the fin. The caudal fin shape is truncate, hence intermediate to the rounded fin of females and emarginate shape of males.

Of the species of *Labropsis*, *L. xanthonota* is most closely related to *L. polynesica* with which it is not known to coexist (see Remarks under *L. polynesica*).

### *Labropsis manabei* Schmidt

Figs. 1-2; Plate 3 A-C

*Labropsis manabei* Schmidt, 1930, Trans. Pac. Comm. Acad. Sci. USSR, vol. 1, p. 76, figs. 3 and 4 (type locality, Itoman, Okinawa).

*Labropsis manabei* Okada, K. 1965, Illustr. Encycl. Fauna Japan, p. 382, fig. 937 (erroneous localities, in Japanese).

*Labropsis manabei* Masuda, Araga and Yoshino, 1975, Coastal Fishes S. Japan, p. 301, pl. 106 I, J (Okinawa and Yaeyama Islands).

*Labropsis manabei* Shen and Choi, 1976, Rept. Inst. Fishery Biol. Min. Econ. Aff. Natl. Taiwan Univ., vol. 3, no. 2, p. 105, fig. 50 (Taiwan).

DIAGNOSIS: Dorsal rays IX, 11; anal rays III, 10; pectoral rays 14; lateral-line scales 35-41 (plus 2 pored scales on caudal base); gill rakers 8-11.

Depth of body 3.05-3.7 in SL; head length 2.7-2.8 in SL; snout 2.7-3.3 in head (dorsal profile of snout of large males strongly convex); caudal fin rounded at all stages; penultimate dorsal soft ray longest, ranging from 2.5 in head length of small



females to 1.6 in head length of large males; pelvic fins of small females relatively short, about 2.1 in head length, but becoming longer in males (to 1.2 in head length).

Upper jaw with two pairs of large recurved canines anteriorly, the second pair about half as large as the first, and a canine (rarely two) posteriorly on jaw (extending forward from corner of mouth); lower jaw with a pair of recurved anterior canines followed by two or three lesser recurved canines on each side.

Small scales on suborbital region usually reaching slightly anterior to a vertical through center of eye, rarely to front edge of orbit; median fins broadly scaled basally; pectoral fins with very small scales at base; pelvic fins with two enlarged scales midventrally, extending posteriorly from base.

Color of males in preservative: brown, the centers of the scales a little paler (orangish in life) than edges, particularly in pectoral region where there is usually a large area dominated by orange; head brown (the head of some alcoholic specimens suffused with blue-green), the lips, chin, and throat darkest (in life the head is purplish brown, the lips, chin, and throat dark bluish); median fins dark brown with pale distal margins (blue in life), the caudal border very broad (broader at corners where the width is as great as orbit diameter); a black spot usually present anteriorly on dorsal fin (but may be obscure); pectoral fins pale with a large round black spot at base (and extending anterior to base); pelvic fins pale (blue in life) with a brown band on first two soft rays and associated membranes (orange-brown in life).

Large females (to about 70 mm SL) are colored like the males except the large orange area beneath and around the pectoral fin is not present (though there may be a little more orange-yellow in scale centers anteriorly on side of body) and the black spot on the first two interspinous membranes of the dorsal fin is more evident. Color in life of a 59-mm female (BPBM 9276) collected by the author at Ishigaki, Ryukyu Islands in 1968: body olive, the edges of the scales broadly dark brown; inconspicuous stripes on head as follows: a broad middorsal brown band on head with a narrower bluish band below it; a broad brown band through eye and a narrower blue band below this which leads to pale blue on upper lip; lower part of head, including lower lip, brown; dark and pale longitudinal bands of head continue faintly onto body; dorsal and anal fins brown with a pale blue margin (broader on anal fin); most of caudal fin colored like body, the posterior margin broadly light blue, this color curving around corners of fin; pectoral fins pale with a large black spot at base and in axil, rimmed posteriorly with yellow and green; pelvic fins blackish with blue edges; inside of mouth blue.

Small females and juveniles have three broad dark brown (black in life) stripes on the head and body separated by narrower pale stripes (pale bluish in life).

**REMARKS:** *L. manabei* Schmidt was described from two specimens from Okinawa in 1930; the standard length of one was given as 110 mm. The Bishop Museum has five lots of this species collected by the author in the Ryukyu Islands and two from the Philippines. The latter (BPBM 22168, 2: 49–62 mm SL, Sumilon Island off south end of Cebu; and BPBM 22256, 2: 71–90 mm SL, Batangas, Luzon) represent a range



extension.

Specimens of *L. manabei* were collected at depths of 15 to 30 m on coral reefs.

Largest specimen examined, 117 mm SL, a male in the collection of the Zoological Museum of the University of Tokyo (no. 21962) from the Ryukyu Islands. The smallest mature female (BPBM 6960), from Okinawa, measures 39 mm SL.

*Labropsis micronesica* n. sp.

Plate 4 A-C; Table 5

**HOLOTYPE:** BPBM 9271, male, 82.0 mm SL, **Marshall Islands**, Enewetak Atoll, small patch reef in lagoon west of north end of Enewetak Island, 20 m, rotenone, J. E. Randall, G. R. Allen, and B. A. Baker, 30 November 1968.

**PARATYPES:** **Caroline Islands:** CAS 15592, 79.8 mm SL, Ifaluk Atoll, Falarik Islet, reef in center of lagoon off Paugob canoe house, R. R. Harry, 3 October 1953; **Palau Islands:** BPBM 9353, 96.1 mm SL, Babelthuap Island, east side, off Namai Bay, outer reef terrace in 26 m, spear, J. E. Randall, 29 September 1966; **Marshall Islands:** BPBM 8228, 94.5 mm SL, Enewetak Atoll, Enewetak Island, lagoon drop-off, 12–18 m, coral rubble bottom, rotenone, G. R. Allen and S. N. Swerdloff, 19 June 1968; USNM 208286, 52.0 mm SL, same data as preceding; BPBM 9269, 59.4 mm SL, Enewetak Atoll, lagoon, off marine pier at north end of Enewetak Island, coral head in 15 m, spear, J. E. Randall, 26 April 1968; BPBM 7370, 77.3 mm SL, Enewetak Atoll, patch reef between Enewetak and Parry Islands, 9 m, spear, J. E. Randall, 28 November 1968; BPBM 6965, 32.9 mm SL, same locality as preceding, rotenone, J. E. Randall and G. R. Allen, 28 November 1968; BPBM 9268, 2: 44.5–48.2 mm SL, Enewetak Atoll, Enewetak Island, patch reef in lagoon off north end, 20 m, spear and rotenone, J. E. Randall, 30 November 1968; BPBM 9270, 68.6 mm SL, same locality as preceding, 7.5 m, spear, J. E. Randall, 1 December 1968; BPBM 10152, 2: 32.2–52.3 mm SL, Enewetak Atoll, Parry Island, pinnacle reef in lagoon, 23 m, quinaldine, G. R. Allen, 26 August 1970; BM(NH) 1980. 7. 23.3, 72.5 mm SL, Kwajalein Atoll, patch reef in southern part of lagoon, 20 m, spear, J. E. Randall, 19 December 1974; **Mariana Islands:** MNHN 1980–1342, 46.8 mm SL, Guam, south end of Cocos Island, 30.5 m, spear, J. E. Randall, 7 April 1970.

**DESCRIPTION:** Dorsal rays IX, 12; anal rays III, 11; pectoral rays 14; upper and lower procurrent caudal rays usually 6; lateral-line scales 40 (35–40) (plus 2 pored scales posterior to caudal base); scales above lateral line to origin of dorsal fin  $6\frac{1}{2}$  ( $6\frac{1}{2}$ –8); scales below lateral line to origin of anal fin  $17\frac{1}{2}$  (16– $18\frac{1}{2}$ ); circumpeduncular scales 28 (27–28); gill rakers 10 (9–11).

Depth of body 3.3 (3.1–3.2) in SL; width of body 2.15 (2.05–2.5) in depth; head length 2.75 (2.6–2.8) in SL; snout length 2.8 (2.7–3.15) in head; dorsal profile of snout of large males usually strongly convex; orbit diameter 5.15 (3.8–6.15) in head; bony interorbital width 3.75 (3.7–4.05) in head; least depth of caudal peduncle 2.05 (2.05–2.4) in head.

Table 5. Proportional measurements of type specimens of *Labropsis micronesica* expressed as a percentage of the standard length.

	Holotype				Paratypes			
	BPBM 9271	BPBM 6965	BPBM 9268	BPBM 9269	BPBM 9270	BPBM 7370	BPBM 8228	BPBM 9353
Standard length (mm)	82.0	32.9	44.5	59.4	68.6	77.3	94.5	96.1
Depth of body	30.1	32.5	31.1	31.6	31.3	32.0	31.7	31.3
Width of body	14.0	13.1	13.7	13.0	14.4	14.1	15.4	13.3
Head length	36.5	37.6	36.4	38.2	37.8	36.3	36.0	37.0
Snout length	13.0	12.0	11.5	12.5	12.9	12.5	13.2	13.7
Orbit diameter	7.1	9.9	8.8	8.9	8.3	7.3	6.3	6.0
Bony interorbital width	9.8	9.3	9.0	9.2	9.9	9.2	9.8	9.9
Least depth of caudal peduncle	17.8	17.2	16.2	16.3	16.6	17.5	17.3	15.6
Length of caudal peduncle	7.7	7.6	7.9	7.8	7.4	7.2	7.5	7.4
Predorsal length	35.4	38.7	36.4	37.0	37.7	34.9	34.1	34.3
Preanal length	66.0	73.0	68.7	70.5	66.9	68.8	69.8	68.5
Prepelvic length	37.8	39.8	38.2	38.5	37.4	38.7	38.0	40.0
Length of first dorsal spine	5.5	5.7	5.7	5.9	5.6	6.2	6.0	5.9
Length of longest dorsal spine	12.3	11.5	12.2	12.4	11.9	13.5	12.3	11.1
Length of longest dorsal ray	19.8	15.3	18.1	18.0	18.2	19.1	19.3	18.3
Length of dorsal fin base	58.5	54.2	58.0	57.2	59.6	56.8	60.7	60.8
Length of third anal spine	7.8	8.9	8.9	8.6	7.9	9.0	7.4	7.6
Length of longest anal ray	18.2	14.9	17.5	16.5	15.9	18.0	16.5	17.2
Length of anal fin base	27.2	25.3	26.0	24.9	26.3	24.8	25.2	24.8
Length of caudal fin	24.4	25.8	25.0	25.3	25.2	24.4	21.7	22.0
Length of pectoral fin	19.8	20.1	19.5	19.2	19.0	19.2	18.9	18.4
Length of pelvic spine	12.1	10.7	10.9	10.5	11.3	12.1	12.0	10.4
Length of pelvic fin	25.8	17.7	18.2	22.1	29.2	28.3	31.2	31.0

Upper jaw with two pairs of large recurved canine teeth anteriorly, the second pair slightly larger than half length of first; a large curved forward-projecting canine posteriorly on upper jaw; no teeth along side of jaw between anterior and posterior canines; lower jaw with a pair of large recurved canine teeth anteriorly followed by two or three lesser recurved canines, the second pair about half as large as first; a pair of small sharp recurved conical teeth medially at front of both upper and lower jaws.

Preopercular margin free from its corner nearly to or just to level of rictus (no lower free margin); suborbital pores 11 (9-11); preopercular pores 9 (9-11).

Postorbital head and posterior suborbital region with small scales (those on suborbital reaching to or slightly anterior to a vertical through center of eye); interorbital space, snout, anterior suborbital region, opercular membrane, and ventral part of head naked; small scales on nape nearly reaching a vertical at hind edge of orbit; scales on side of thorax about half as high as those on side of body, becoming still smaller ventroanteriorly; median fins with scales extending a maximum of about half the distance to distal margin; small scales basally on pectoral fins; pelvic fins with a triangular scaly process of about six scales extending posteriorly from

median base of fins.

Origin of dorsal fin over second lateral-line scale; dorsal spines progressively longer, the first 6.65 (6.4–6.75) and the ninth 2.95 (2.7–3.3) in head; penultimate dorsal soft ray longest, 1.85 (1.85–2.45) in head (longest in large males); origin of anal fin below base of second soft dorsal ray; first anal spine very slender, about two-thirds length of second spine; second anal spine slightly more than half as long as third; third anal spine very stout, 4.7 (4.0–4.85) in head; penultimate anal soft ray longest, 2.0 (2.0–2.5) in head; caudal fin rounded in all stages, 1.5 (1.45–1.7) in head; pectoral fins slightly rounded, 1.85 (1.85–2.0) in head; pelvic fins originating below lower base of pectorals, 1.4 (1.15–2.1) in head (notably longer in males).

Color of holotype (a male) in preservative: body brown dorsally and posteriorly, pale on sides and ventrally, the edges of the scales narrowly brown; scaled part of head pale, naked part brown except base of upper lip which is pale; median fins brown with pale distal margins (broadest at corners of caudal fin); a large dark brown blotch covering most of first two interspinous membranes of dorsal fin; pectoral fins pale with a short dark line at midbase; pelvic fins brown, the fourth and fifth interradiial membranes hyaline.

Color of juveniles in alcohol: pale with three broad dark brown stripes on head and body (narrowing anteriorly on head), the first beginning dorsally on snout passing above eye along nape and base of spinous dorsal fin, merging into the dark brown of the soft portion of the fin and continuing dorsally on caudal peduncle to caudal fin; second stripe commencing on upper lip, passing through center of eye, and extending midlaterally to base of caudal fin; and the third stripe passing from lower lip along lower cheek across thorax and abdomen, adjacent to base of anal fin, and along ventral edge of caudal peduncle to caudal fin; a brown stripe midventrally from below front of eye (where narrow) to anus (broadening on thorax and abdomen); dorsal fin light brown with a zone of dark brown at base which broadens as it passes posteriorly such that most of soft portion of fin is dark brown; a dark brown spot on first two membranes of dorsal fin; anal fin dark brown except anterior margin which is hyaline; caudal fin dark brown except for extensions of pale body color above and below lateral dark stripe basally in fin and hyaline posterior border; paired fins pale.

Small females have the same stripes as juveniles, but the stripes are fainter and most of the caudal peduncle and all of the caudal fin except the pale posterior border are dark brown. Larger females (to about 60 mm SL) lose the dark stripes and approach the coloration of the male.

Color of holotype when fresh: reddish brown, the scales of the side of the body with large golden yellow centers (the edges thus narrowly brown); scales along back, posteriorly and ventrally on body with faint yellowish centers; thorax, operculum and nape reddish brown (except for a large middorsal roundish patch of orange-red mottled faintly with brown on nape); dorsal part of head anterior to red patch dark bluish gray; lower part of head, including unscaled portion of cheek, chin, and lower lip bluish gray; upper lip bright blue on basal half, bluish gray on outer half; a small blue blotch on side of snout in front of eye; dorsal fin reddish brown, the basal scaled

portion with small elongate greenish yellow spots (upper part of back with similar but rounder spots, especially below spinous portion of dorsal fin); dorsal fin with a light blue margin, a dark brown submarginal line, proximal to this a faint yellowish zone; some streaks of purplish blue on remaining reddish brown part of fin; a large indistinct blackish area anteriorly on dorsal fin; anal fin reddish brown with a light blue border, a brown submarginal line, and a few bluish blotches distally; caudal fin reddish brown (the rays more red, the membranes dark brown) with a posterior blue border broadening toward corners; pectoral fins with a large bright orange-red area at base preceded by yellowish and followed by bluish; rest of fins colorless; pelvic fins with blue rays, the first three membranes brownish red, the last two transparent bluish.

Color of 32.9-mm juvenile when fresh: three black stripes on head and body and a fourth fainter stripe midventrally from thorax to anus (nearly broken on thorax); first and third stripes merging with black soft portions of dorsal and anal fins, respectively, and the second (midlateral) stripe with the black of the caudal fin; head between black stripes light yellowish green, shading ventrally to pale bluish; thorax also pale bluish; rest of body between stripes light dull orangish yellow; dorsal fin dull orangish yellow, shading to black on soft portion, with a light bluish margin; a round black spot edged in greenish on second interspinous membrane of fin and a faint blackish spot on first membrane; anal fin black with a pale bluish gray margin (broader anteriorly); caudal fin black except for a region of greenish yellow which extends into base of fin above and below midlateral stripe from orangish yellow portion of body, and outer corners which are pale bluish gray; pectoral fins transparent, the edges of the rays narrowly blackish; pelvic fins faintly orangish with a little dusky pigment.

Color of 44.5 and 48.2-mm female paratypes when fresh: three dark brown stripes as described above for juveniles, the midlateral one with a yellow spot in the center of each scale; a fourth brownish stripe midventrally from chin to anus; side of body between dark stripes yellow, the scales with brownish edges (posteriorly the edges of the scales are blackish and the yellow centers more restricted); head between first and third stripes greenish gray and between third and fourth light bluish; upper lip pale blue with a gray edge; a light blue blotch behind corner of mouth; dorsal fin greenish, the basal scales with blackish edges, with a pale bluish margin and a blackish spot anteriorly; anal fin similar to the dorsal but darker; caudal fin dark reddish brown, some scales in centrobasal part with yellow centers, the posterior margin pale bluish; pectorals pale, yellow-orange at base; pelvics light bluish with a broad zone of dusky orange on first two rays and adjacent membranes.

Larger females gradually lose the stripes, the large spot at the pectoral base becomes orange-red, and the centers of the scales in a large area of the nape develop the same color.

**REMARKS:** *L. micronesica* is known only from the Marshall Islands, Mariana Islands, Caroline Islands, and Palau Islands—the major archipelagoes of Micronesia.

It is most closely related to the allopatric *L. manabei* and *L. australis* (see Remarks under the latter).

As is true of other *Labropsis*, *L. micronesica* is a coral reef species, though it may be found over rubble or rubble-sand bottoms near reefs. It occurs more often in a lagoon environment than exposed outer reef areas. Specimens were collected from the depth range of 7.5–30.5 m. The young have been observed "cleaning" other fishes; on occasions adults will also. One of an estimated 80 mm total length was seen picking at the body of a *Naso vlamingii*.

There is no sharp distinction in color between juveniles and mature females and between females and males. The dark stripes on females become progressively fainter with age due both to less intensity of black pigment and to the scales within the stripes developing yellow centers. The stripes are still very evident on the two paratypes of BPBM 9268, 44.5–48.2 mm SL; both are ripe females (the preserved transparent ova measure about 0.6–0.7 mm in diameter). The largest female among the paratypes is BPBM 9269 which measures 59.4 mm SL. As may be noted from the color note of this fish given in the description, its color is essentially that of males of the species. Large males, however, can be distinguished by the marked convexity of the dorsal profile of the forehead, resulting in a distinct indentation in the profile between the nearly horizontal upper lip and the forehead. The largest male collected (BPBM 9353), from Palau, measures 96.1 mm SL (99 mm when fresh).

*Labropsis australis* n. sp.

Plate 5 A–C; Table 6

**HOLOTYPE:** BPBM 14395, 81.0 mm SL, male, **Australia**, Great Barrier Reef, Capricorn Group, One Tree Island, west side, outside reef, 27.5 m, spear, J. E. Randall, 13 January 1973.

**PARATYPES:** **Tonga Islands:** ANSP 136136, 2: 91.5–100.0 mm SL, Vava'u, Neiafu (18°39'S, 174°0'3''W), 0–16 m, Te Vega Sta. 308, 28 June 1965; **Australia:** AMS I. 15461–001, 2: 40.5–46.2 mm SL, Great Barrier Reef, Capricorn Group, Heron Island, J. H. Choat, 1965–1968; BPBM 9404, 3: 19.5–80.3 mm SL, same locality as preceding, outer reef slope, 9 m, J. H. Choat, 22 May 1966; USNM 208287, 37.5 mm SL, same data as preceding except depth 3.5 m; AMS I. 15423–001, 91.8 mm SL, same locality, J. H. Choat, 8 December 1966; AMS I. 15647–083, 5: 57.5–77.2 mm SL, Great Barrier Reef, Capricorn Group, One Tree Island, F. H. Talbot and others, 9 October 1968; AMS I. 15647–058, 41.8 mm SL, same data as preceding; AMS I. 15681–056, 62.0 mm SL, same locality, outer edge of coral spurs, F. H. Talbot and others, 25 November 1969; BM(NH) 1980. 7. 23.1, 40.6 mm SL, Great Barrier Reef, Flynn Reef (off Cairns), 15.5 m, spear, G. R. Allen, 15 August 1972; BPBM 14376, 61.8 mm SL, and CAS 46534, 68.4 mm SL, same data as holotype except 12 January 1973; BPBM 14505, 36.3 mm SL, same locality as preceding but in lagoon, patch reef, 2 m, quinaldine, J. E. Randall, 19 January 1973; BPBM 14524, 19.5 mm SL, Great Barrier Reef, Capricorn Group, Wistari Reef, east side in 22 m, rotenone, J. E. Randall, 22 January 1973; AMS I. 18196 3/4–008, 26.5 mm SL, Great Barrier Reef,



Table 6. Proportional measurements of type specimens of *Labropsis australis* expressed as a percentage of the standard length.

	Holotype				Paratypes			
	BPBM 14395	BPBM 14504	BPBM 11347	BPBM 15573	BPBM 14376	BPBM 11347	BPBM 15633	ANSP 136136
Standard length (mm)	81.0	36.3	41.7	53.3	61.3	74.2	83.9	91.5
Depth of body	31.4	32.6	32.0	29.7	31.4	30.3	29.7	28.9
Width of body	13.7	13.6	14.1	14.1	13.1	14.5	14.2	14.5
Head length	37.7	41.0	38.8	36.9	36.2	36.3	37.6	35.6
Snout length	13.1	12.8	12.0	12.5	11.7	12.7	12.6	11.8
Orbit diameter	6.7	9.8	9.0	8.2	7.7	7.4	6.3	6.2
Bony interorbital width	10.2	9.6	9.5	9.8	9.3	10.1	9.7	9.9
Least depth of caudal peduncle	17.3	17.7	16.7	16.8	15.5	17.5	17.4	16.9
Length of caudal peduncle	8.3	8.7	7.3	6.9	7.7	7.5	7.9	8.1
Predorsal length	35.7	38.6	36.3	36.4	35.6	35.4	34.5	34.0
Preanal length	69.5	69.7	69.5	71.0	71.8	69.8	69.3	70.5
Prepelvic length	38.8	39.4	38.3	38.5	39.4	37.8	39.1	36.8
Length of first dorsal spine	5.8	5.6	6.1	5.5	6.2	5.9	6.2	5.2
Length of longest dorsal spine	9.9	10.6	11.2	11.5	10.8	11.7	11.5	10.6
Length of longest dorsal ray	16.8	16.9	16.8	16.5	17.5	17.5	17.7	18.4
Length of dorsal fin base	60.1	52.0	53.2	57.7	59.2	57.5	59.4	59.7
Length of third anal spine	7.9	8.9	8.2	8.6	7.9	8.4	9.2	8.6
Length of longest anal ray	15.9	15.5	14.4	14.2	14.0	abnormal	16.0	15.3
Length of anal fin base	25.0	27.4	24.0	23.9	22.7	25.2	24.4	23.7
Length of caudal fin	23.1	23.2	23.7	22.3	21.4	21.4	20.5	21.5
Length of pectoral fin	18.8	18.5	19.4	19.2	17.8	17.7	17.3	17.7
Length of pelvic spine	10.3	11.2	10.6	11.3	10.3	11.1	11.4	11.3
Length of pelvic fin	27.3	18.3	18.0	21.4	abnormal	23.3	26.4	22.0

Capricorn Group, One Tree Island, R. H. Kuitert, 22 September 1974; AMS I. 19462-037, 81.9 mm SL, Great Barrier Reef, Lizard Island, 15 m, Australian Museum party, November 1975; AMS I. 21495-015, 48.9 mm SL, Queensland, Lady Musgrave Lagoon, 5 m, B. C. Russell and J. Bell, 20 February 1980; AMS I. 21490-016, 61.5 mm SL, Great Barrier Reef, Capricorn Group, Fairfax Reef, northwest end, 6 m, B. C. Russell and D. Pollard, 21 February 1980; **Fiji Islands:** BPBM 11347, 2: 41.7-74.2 mm SL, Viti Levu, Makaluva Island, southeast side at edge of pass, 15 m, spear and quinaldine, J. E. Randall, 6 August 1971; **New Hebrides:** AMS I. 17474-001, 45.1 mm SL, Efate, Undine Bay, 25 m, spear, G. R. Allen and W. A. Starck, II, 24 June 1973; **Solomon Islands:** BPBM 15573, 53.3 mm SL, Guadalcanal, 7 miles west of Honiara, reef near wreck of Japanese transport ship, 25 m, spear, J. E. Randall, 9 July 1973; BPBM 15633, 83.9 mm SL, Alite Reef (off Malaita), lagoon reef in 7 m, spear, J. E. Randall, 26 July 1973; **Loyalty Islands:** BPBM 19900, 2: 40.6-55.0 mm SL, Îlot Dudune (8 miles northwest of Mare), reef in 55 m, rotenone, P. Laboute and Y. Magnier, 24 November 1975; MNHN 1980-1341, 45.2 mm SL, same data as preceding; **Samoa Islands:** BPBM 24125, 3: 47.2-80.2 mm SL, Tutuila, spear, R. C.



Wass, 1976–1977.

**DESCRIPTION:** Dorsal rays IX, 12; anal rays III, 11; pectoral rays 14 (13–15; one of 19 paratypes with 13 and two with 15); upper and lower procurent caudal rays usually 6; lateral-line scales 39 (35–40, plus 2 pored scales posterior to caudal base); scales above lateral line to origin of dorsal fin  $8\frac{1}{2}$  ( $6\frac{1}{2}$ – $8\frac{1}{2}$ ); scales below lateral line to origin of anal fin 17 (15– $17\frac{1}{2}$ ); circumpeduncular scales 28 (28–30); gill rakers 8 (7–8).

Depth of body 3.2 (3.15–3.45) in SL; width of body 2.3 (2.0–2.4) in depth; head length 2.65 (2.45–2.8) in SL; snout length 2.9 (2.85–3.2) in head; dorsal profile of snout of large males strongly convex; orbit diameter 5.65 (4.2–5.75) in head; bony interorbital width 3.7 (3.6–4.25) in head; least depth of caudal peduncle 2.2 (2.05–2.35) in head.

Upper jaw with two pairs of large recurved canine teeth anteriorly, the second pair about half as large as the first; a large curved forward-projecting canine posteriorly on upper jaw; no teeth along side of jaw between anterior and posterior canines; lower jaw with a pair of large recurved canine teeth anteriorly, followed by two or three lesser canines, the second pair about half as large as anterior canines; a pair of small sharp recurved conical teeth medially at front of both upper and lower jaws.

Preopercular margin free from its corner to about level of rictus (no lower free margin); suborbital pores 9 (8–10); preopercular pores 8 (8–10).

Postorbital head and posterior suborbital region with small scales (those on suborbital usually extending only slightly anterior to posterior edge of orbit, rarely to a vertical through center of eye); interorbital space, snout, anterior suborbital region, opercular membrane, and ventral part of head naked; small scales on nape reaching a vertical between upper end of preopercular margin and posterior edge of orbit; scales on side of thorax about half as high as those on side of body, becoming still smaller anteroventrally; median fins with scales extending a maximum of about half distance to distal margin; small scales basally on pectoral fins; pelvic fins with a triangular scaly process of six or seven scales extending posteriorly from median base of fins, the last scale notably large and pointed.

Origin of dorsal fin over second lateral-line scale; dorsal spines progressively longer, the first 6.5 (5.85–7.3) and the ninth 3.8 (3.1–3.85) in head; penultimate dorsal soft ray longest, 2.25 (2.35–2.7) in head; origin of anal fin below base of second or third dorsal soft ray; first anal spine very slender, about one-half to two-thirds length of second spine; second anal spine slightly more than half length of third spine; third anal spine very stout, 4.8 (4.1–4.6) in head; penultimate anal soft ray longest, 2.35 (2.35–2.7) in head; caudal fin rounded in all stages, 1.65 (1.65–1.85) in head; pectoral fins slightly rounded, 2.0 (1.9–2.2) in head; pelvic fins originating below lower base of pectorals, 1.4 (1.4–2.25) in head (longer in males).

Color of holotype (a male) in alcohol: head and dorsoanterior body (anterior to base of about fourth dorsal spine) dark brown (almost black on a large triangular

region on opercle); base of upper lip slightly pale; thorax dark brown; rest of body pale (large areas light blue-green, as if stained) except for a zone of brownish above lateral line along base of spinous portion of dorsal fin and posteriorly on caudal peduncle where edges of scales are brown; dorsal fin brown, the basal scaled portion somewhat bluish, with a large black area on first two interspinous membranes, a blue margin, and a narrow dark submarginal line; basal scaled portion of anal fin pale, rest of fin brown, becoming paler outwardly, with a blue margin and narrow dark submarginal line; caudal fin dark brown with a posterior blue border which is notably broader at corners, the basal scales with some bluish hues; pectoral fins pale with a large black spot enclosing base and axil but containing within it a prominent white spot on upper half of base and a small whitish one at lower edge (both white spots extending into axillary region); pelvic fins pale with an irregular brown streak passing longitudinally through middle of fin and linking at filamentous tip with a narrow brown lateral edge.

Color of juveniles (19.5–36.3 mm SL) in alcohol: pale with three broad dark brown stripes on head and body (narrowing as they pass anteriorly on head), the first passing from middorsally near front of snout, above eye, along back at base of spinous portion of dorsal fin, gradually narrowing along base of soft portion of fin, and continuing dorsally on caudal peduncle to caudal fin; second stripe midlateral from front of upper lip, through eye, to caudal fin; third stripe commencing at tip of chin, passing along lower cheek, across thorax and abdomen, narrowing adjacent to base of anal fin, and passing along midventral edge of caudal peduncle to caudal fin; a midventral dark brown stripe from below front of orbit to anus (narrow on head but broadening on thorax); dorsal and anal fins dark brown except pale margin which is broad anteriorly; caudal fin dark brown except for an extension of pale body color well into base of fin above and below dark brown lateral stripe and a pale posterior border; paired fins pale. The 36.3-mm juvenile is just developing a dark spot at the front of the dorsal fin and a dark bar at the pectoral base.

A 41.7-mm mature female is light brown with the stripes of the juvenile pattern still showing well (though not as dark) on head but faint on body, the midlateral stripe nearly absent except posteriorly; the black spot is now conspicuous anteriorly on the dorsal fin and there is a large round brown spot at base of pectoral fin with a lighter spot developing in the dorsal part of it.

The head of a 53.3-mm female has darkened such that the dark brown stripes are barely visible; the midlateral stripe on the body has been lost except for a trace of it posteriorly; the first and third stripes have nearly disappeared; oddly, two new brown stripes have appeared on the side of the body, one at the level of the upper end of the gill opening and the other at the level of the pectoral base; the large spot at the pectoral base is nearly black with a distinct dorsal whitish spot smaller than the pupil within it.

On 61.0 and 61.3-mm females the heads are uniformly dark and the bodies pale except for a faint vestige of the stripes on the side.

Color of holotype when fresh: head and nape brownish purple, darker over

opercle and paler ventrally and at base of upper lip; body brown, the centers of most scales of about anterior two-thirds with a small golden yellow spot; dorsal and anal fins dark brown with a blue margin, a few scales basally on spinous portion of the dorsal with yellow flecks; a dark brown spot on basal two-thirds of first two interspinous membranes of dorsal fin; caudal fin dark purplish brown with a light blue posterior border which broadens toward corners; pectoral fins pale, the rays slightly whitish with narrow brown edges, the base contained within a large round dark purplish brown spot containing in its upper part a golden yellow spot nearly as large as eye and a small one at ventral edge of fin base; pelvic fins light blue with a broad streak of deep orange extending full length of first two soft rays and adjacent membranes, the second to fifth rays with some brown pigment.

Color of 36.3-mm juvenile when fresh: three broad blackish stripes on head and body, the interspaces pale bluish on head, thorax, and abdomen and light brown above and below midlateral blackish stripe on body, the edges of the scales narrowly dark brown; much of lips and region behind corner of mouth bluish white; dorsal and anal fins brown, becoming dark brown posteriorly, with a pale blue margin, the dorsal with a dark smudge anteriorly; caudal fin blackish, the posterior corners hyaline with a pale bluish submarginal line; pectoral fins pale with a blackish bar at base containing a deep orange spot dorsally and smaller one of the same color ventrally; pelvic fins pale bluish with some dusky pigment on first soft ray and basally on spine.

The 61.3-mm female was colored when fresh as follows: light bluish violet with three blotchy dark brown stripes and an indistinct reddish area anterior to eye; body yellowish, the edges of the scales brown, with three faint brown stripes (thorax and abdomen below lowermost stripe more pale bluish than yellowish); dorsal fin yellowish brown, shading to darker brown posteriorly, with a light blue margin and a narrow blackish smudge on second spine; anal and caudal fins reddish brown, the caudal darker, with light blue distal margins (the blue more evident submarginally on the corners of the caudal) and proximal to this a dark brown line; pectoral fins pale, the edges of the rays narrowly dull red, the base enclosed in a large blackish spot containing a deep orange spot dorsally and ventrally; pelvic fins light bluish with some brown pigment on the rays and a streak of orangish centered on first soft ray.

**REMARKS:** This species is named *L. australis* for the southern location of all of the islands at which it has been taken: Solomon Islands, Samoa Islands, Fiji Islands, Loyalty Islands, Tonga Islands, and Great Barrier Reef (all lying between latitudes 9° and 23.5°S).

*L. australis* is very closely related to *L. micronesica* which is presently known only from islands in Micronesia at latitudes between 7° and 13.5°N. Although the author has collected fishes in more equatorial locations such as Celebes, Molucca Islands, New Guinea, New Britain, and the Gilbert Islands, he has not observed either of these species of *Labropsis* at any of these islands. However, more collecting is needed before the apparent geographical separation of the two species can be

established.

*L. australis* may be distinguished from *L. micronesica* in having a shorter ninth dorsal spine (9.9–11.7% SL, compared to 11.1–13.5% for *L. micronesica*), longer pelvic fins, generally, in the same size range (see Tables 5 and 6), fewer gill rakers (7 or 8, compared to 9 to 11 for *L. micronesica*), suborbital scales extending farther anteriorly, and in color as summarized in the Key and as may be seen by comparing Plates 4 and 5.

Both of these species are closely related to a third, *L. manabei*, known thus far only from the Ryukyu Islands, Taiwan and the Philippines. *L. manabei* has one more dorsal and one more anal ray than the other two species and some differences in color such as the broad area of orange in the pectoral region of the males.

Like the other *Labropsis*, *L. australis* is closely tied to the coral reef environment. Specimens were taken in the depth range of 2 to 55 m. Cleaning behavior of striped juveniles was observed at Heron Island, Great Barrier Reef, by J. H. Choat (pers. comm., 1968).

As in *L. micronesica*, the juvenile color pattern of *L. australis* is only gradually lost with age by females, and the color of large females probably does not differ significantly from males. Among the type specimens, mature females range in standard length from 41.7 to 64.7 mm and males from 74.2 to 100.0 mm.

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#### References Cited

- Bleeker, P. 1862. Conspectus generum Labroideorum analyticus. Proc. Zool. Soc. London (1861): 408–418.
- Norman, J. R. 1957. A draft synopsis of the orders, families and genera of recent fishes and fish-like vertebrates. Unpublished photo offset copies distributed by British Museum of Natural History. 649 p.
- Randall, J. E. 1958. A review of the labrid fish genus *Labroides*, with descriptions of two new species

and notes on ecology. Pac. Sci. 12(4): 327-347.

- Randall, J. E., and G. Helfman. 1972. *Diproctacanthus xanthurus*, a cleaner wrasse from the Palau Islands, with notes on other cleaning fishes. Trop. Fish Hobbyist 20(11): 87-95.
- Randall, J. E., and V. G. Springer. 1973. The monotypic Indo-Pacific labrid fish genera *Labrichthys* and *Diproctacanthus* with description of a related genus, *Larabicus*. Proc. Biol. Soc. Wash. 86(23): 279-298.
- . 1975. *Labroides pectoralis*, a new species of labrid fish from the tropical western Pacific. UO 25: 4-11, 22.
- Russell, B. C. 1980. Revision of the fish genus *Pseudolabrus* and allied genera (family Labridae) with a phylogenetic analysis of relationships. Macquarie Univ., Ph.D. Dissertation. vii + 248 pp.
- Schmidt, P. J. 1930. Fishes of the Riu-Kiu Islands. Trans. Pac. Comm. Acad. Sci. USSR 1: 19-156.
- Shen, S-C., and Y-H. Choi. 1976. Ecological and morphological study on fish fauna from waters around Taiwan and its adjacent islands. 16. Study on labrid fishes (Labridae). Rept. Inst. Fishery Biol. Min. Econ. Aff. Natl. Taiwan Univ. 3(2): 67-106.
- Shepard, J. W., and K. A. Meyer. 1978. New records of labrid fishes from Japan. UO 29: 31-40.





A. *Labropsis alleni*, holotype, BPBM 9534, ♀, 64.3 mm SL, Palau Islands.

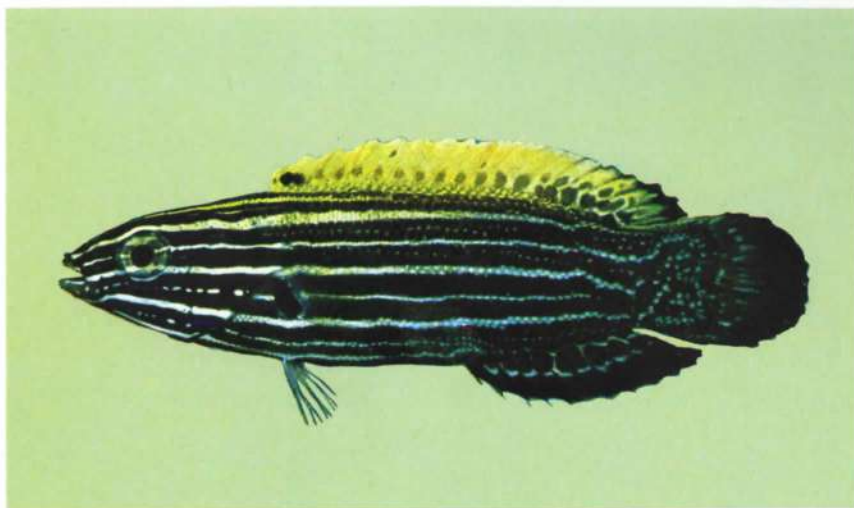


B. *Labropsis polynesica*, paratype, BPBM 6934, ♀, 44.8 mm SL, Tahiti.



C. *Labropsis polynesica*, paratype, BPBM 6934, ♂, 77.3 mm SL, Tahiti.





A. *Labropsis xanthonota*, paratype, BPBM 6954, juv., 28.8 mm SL, Guam.



B. *Labropsis xanthonota*, paratype, BPBM 9274, ♀, 48.8 mm SL, Guam.



C. *Labropsis xanthonota*, holotype, BPBM 15011, ♂, 68.7 mm SL, Samoa Islands.



A. *Labropsis manabei*. BPBM 6960, maturing ♀, 38.9 mm SL, Okinawa.



B. *Labropsis manabei*, BPBM 19194, ♀, 68.8 mm SL, Okinawa.



C. *Labropsis manabei*, BPBM 19156, ♂, 86.1 mm SL, Okinawa.



A. *Labropsis micronesica*, paratype, BPBM 6965, juv., 33.5 mm SL, Marshall Islands.



B. *Labropsis micronesica*, paratype, BPBM 10152, ♀, 52.8 mm SL, Marshall Islands.



C. *Labropsis micronesica*, holotype, BPBM 9271, ♂, 82.0 mm SL, Marshall Islands.





A. *Labropsis australis*, paratype, BPBM 14504, juv., 36.3 mm SL, Great Barrier Reef.



B. *Labropsis australis*, paratype, BPBM 14376, ♀, 61.3 mm SL, Great Barrier Reef.



C. *Labropsis australis*, holotype, BPBM 14395, ♂, 81.0 mm SL, Great Barrier Reef.