

## A Review of the Monotypic Indo-Malayan Labrid Fish Genus *Xenojulis*<sup>1</sup>

JOHN E. RANDALL<sup>2</sup> and THOMAS A. ADAMSON<sup>3</sup>

**ABSTRACT:** The labrid fish genus *Xenojulis* de Beaufort seems most closely related to *Macropharyngodon* Bleeker, differing principally in the pharyngeal dentition. It consists of a single species, *X. margaritaceus* (Macleay), which is known from New Guinea, the Philippines, and Western Australia. *Xenojulis montillai* de Beaufort is a junior synonym based on the terminal male form.

THE LABRID FISH GENUS *Xenojulis* was established by de Beaufort (1939), based on two specimens from the Philippines. One he identified as *X. margaritaceus*, a species described by Macleay (1884) (as *PlatyGLOSSUS margaritaceus*) from a single specimen from New Guinea, and the other he named *X. montillai*. He designated the latter as the type species because of the presumed abnormal dorsal spine count of VII for the holotype of *X. margaritaceus*.

De Beaufort's description of the genus *Xenojulis* was not detailed. Of the relationships to other wrasse genera he wrote, "*Xenojulis* is related to *Halichoeres* and to *Stethojulis*, perhaps more to the latter than to the former" (1939:418). He differentiated *Xenojulis* from *Halichoeres* by its having scales on the thorax and before the dorsal fin not smaller than those on the sides of the body. Actually, they are distinctly smaller. He separated *Xenojulis* from *Stethojulis* by its dentition. This is certainly correct, but his description of the dentition of *Xenojulis* needs modification. He stated "the anterior teeth are much larger than the posterior teeth, forming well-developed canines. In this respect *Xenojulis* again agrees with *Halichoeres*" (de Beaufort 1939:419). The large anterior teeth of *Xenojulis* are not typical canines because they are compressed and thus are very dif-

ferent from the teeth of *Halichoeres*. In our opinion, *Xenojulis* is not related to *Stethojulis*; its closest relative is *Macropharyngodon* Bleeker (revised by Randall 1978). Furthermore, we believe that there is but one species of *Xenojulis*.

We have found only twelve specimens of *Xenojulis* in museums: the holotype of *X. margaritaceus* (X ray provided) at the Australian Museum, Sydney (AMS); one specimen from the Bernice P. Bishop Museum, Honolulu (BPBM); five from the Natural History Museum of Los Angeles County (LACM); one from the U.S. National Museum of Natural History, Washington, D.C. (USNM); and four from the Western Australian Museum, Perth (WAM). The nine largest of these specimens form the basis for the diagnosis of the genus and the description of *X. margaritaceus* below.

### METHODS

Standard length (SL) is measured from the anterior end of the snout in the median 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 from the base of the dorsal spines to the ventral margin of the abdomen (correcting for any obvious malformation of preservation). Width of body is measured immediately posterior to opercular flap. Orbit diameter is the greatest fleshy diameter, but interorbital width is the least bony

<sup>1</sup> Manuscript accepted 21 September 1981.

<sup>2</sup> Bernice P. Bishop Museum, P.O. Box 19000-A, Honolulu, Hawaii 96819.

<sup>3</sup> Natural History Museum of Los Angeles County, Los Angeles, California 90007.

TABLE 1  
 PROPORTIONAL MEASUREMENTS OF SPECIMENS OF *Xenojulis margaritaceus*  
 EXPRESSED AS PERCENTAGES OF STANDARD LENGTH

	WAM P27004-001	WAM P27004-001	USNM 224426	LACM 37434-14	BPBM 22747	WAM P25107-011	WAM P25107-011	LACM 37434-14
Standard length (mm)	64.9	66.2	78.0	79.5	80.0	82.2	83.2	91.4
Depth of body	34.1	34.8	36.2	36.4	37.3	36.8	34.3	38.6
Width of body	13.1	13.0	13.2	13.2	12.7	12.8	12.0	13.9
Head length	35.4	35.2	33.7	33.7	34.8	33.8	34.0	34.1
Snout length	11.9	11.0	10.8	10.9	11.1	10.6	10.8	11.0
Orbit diameter	7.1	7.2	6.0	6.0	5.9	6.3	6.4	5.8
Interorbital width	7.2	7.1	7.7	7.3	7.9	7.4	7.2	7.8
Depth of caudal peduncle	19.9	19.3	20.1	20.1	19.8	20.4	20.6	20.5
Length of caudal peduncle	9.5	9.4	9.4	9.9	9.3	9.7	10.1	9.6
Length of first dorsal spine	7.9	7.6	7.6	7.0	7.4	6.8	7.1	8.0
Length of second dorsal spine	9.2	9.4	9.1	8.8	8.9	Broken	8.8	9.6
Length of third dorsal spine	9.6	9.5	9.6	9.4	9.4	8.6	9.4	10.1
Length of fourth dorsal spine	8.5	8.5	9.2	8.2	9.1	8.5	8.5	9.1
Length of fifth dorsal spine	9.1	8.6	9.0	7.9	9.8	8.8	8.5	9.5
Length of ninth dorsal spine	13.1	12.7	13.1	12.0	14.4	13.4	13.1	14.0
Length of longest dorsal ray	18.5	18.6	23.2	24.5	23.0	21.9	21.4	28.0
Length of first anal spine	5.7	5.7	5.6	5.0	6.0	6.1	6.1	5.5
Length of second anal spine	8.9	8.8	7.7	8.1	9.4	8.6	8.7	9.0
Length of third anal spine	12.9	12.8	12.6	12.0	14.0	12.8	13.1	12.1
Length of longest anal ray	17.9	18.3	21.8	21.4	24.8	20.9	18.5	24.9
Length of caudal fin	26.5	27.3	29.2	28.3	28.8	28.7	28.0	30.4
Pectoral fin length	20.0	20.9	19.9	19.3	20.0	19.6	21.3	20.8
Pelvic fin length	20.7	27.5	25.6	28.3	27.4	26.5	23.2	31.5

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 base of the caudal fin. The lengths of the fin spines and rays are measured from their distal tips to the extreme bases (the latter determined from X rays).

Pectoral-ray counts include the rudimentary upper ray. Gill-raker counts include all rudiments. Lateral-line scales are counted to the base of the caudal fin.

The proportional measurements of Table 1 are presented as a percentage of the standard length. The same data are given in the text as ratios of the standard length (body depth and head length), of the body depth (width of body), and of the head length (other measurements), rounded to the nearest 0.05.

### *Xenojulis* de Beaufort

*Xenojulis* de Beaufort, 1939: 415 [type species, *Xenojulis montillai* de Beaufort, by original designation, = *X. margaritaceus* (Macleay)]

DIAGNOSIS: Dorsal rays IX,11; anal rays III,11; pectoral rays 13; lateral-line continuous, inclined sharply downward below soft portion of dorsal fin, the pored scales 26; anterior lateral-line scales with 2 pores; head naked except for a few scales on each side of nape; scales on thorax about half as large as body scales; jaws with a row of compressed teeth which are progressively longer and more pointed anteriorly, the front teeth of lower jaw interdigitating with upper teeth when mouth closed; a canine tooth at corner of mouth; pharyngeal dentition as in *Halichoeres*, the upper pharyngeal bones with slightly enlarged molariform teeth medially and posteriorly, the lower pharyngeal bone with a large median posterior subtriangular molar and no reduction in the number of the remaining small molars and bluntly conical teeth (see Figure 4); posterior preopercular margin free dorsally to above level of mouth, and ventral margin free anteriorly nearly to a vertical at front edge of orbit; depth of body 2.6–2.9 in SL; spines of fins pungent; fourth dorsal spine shorter than third; caudal fin slightly rounded.

REMARKS: The genus *Xenojulis* is most closely related to *Macropharyngodon* Bleeker, sharing with it the same fin-ray counts, same general shape of the head and body, anterior origin of dorsal fin, the short fourth dorsal spine (not true of all species of *Macropharyngodon*), and the slightly rounded caudal fin. The distinctive dentition of the jaws, which differentiates it from all the species of *Halichoeres*, is similar to one species of *Macropharyngodon*, *M. kuiteri* Randall, the most divergent species of the genus.

*Xenojulis* differs notably from *Macropharyngodon* in the pharyngeal dentition (in this it is like *Halichoeres*). The upper pharyngeal teeth of *Macropharyngodon* are dominated by two large molars on each side preceded by only 4–8 blunt conical teeth; the lower pharyngeal bone has a single huge median posterior molar with only 1–3 small blunt conical teeth on each side and preceded on median limb by only 5–9 blunt conical teeth (Randall 1978, fig. 1). *Xenojulis* differs also in having a long free ventral margin to the preopercle (very restricted on *Macropharyngodon*), a more elevated dorsal fin, longer pelvic fins, one less lateral-line scale, and a slightly higher gill-raker count.

### *Xenojulis margaritaceus* (Macleay)

Figures 1–4

*PlatyGLOSSUS margaritaceus* Macleay, 1884: 274 (type locality, Hood Bay, New Guinea)

*Halichoeres macleayi* Jordan and Seale, 1906: 303 [replacement name for *H. margaritaceus* (Macleay) due to homonymy with *H. margaritaceus* (Valenciennes)]

*Halichoeres macleayi* Fowler, 1928: 342 (after Jordan and Seale 1906)

*PlatyGLOSSUS margaritaceus* Whitley, 1939: 274, fig. 3 (more detailed description of Macleay's holotype)

*Xenojulis margaritaceus* de Beaufort, 1939: 415, figs. 2, 3 (Philippine Islands)

*Xenojulis montillai* de Beaufort, 1939: 417, fig. 3 (type locality, Barrio Paraor, Balawan, La Union Province, Luzon)

*Xenojulis margaritaceus* de Beaufort, 1940: 170, fig. 30 (after Macleay 1884 and de Beaufort 1939)

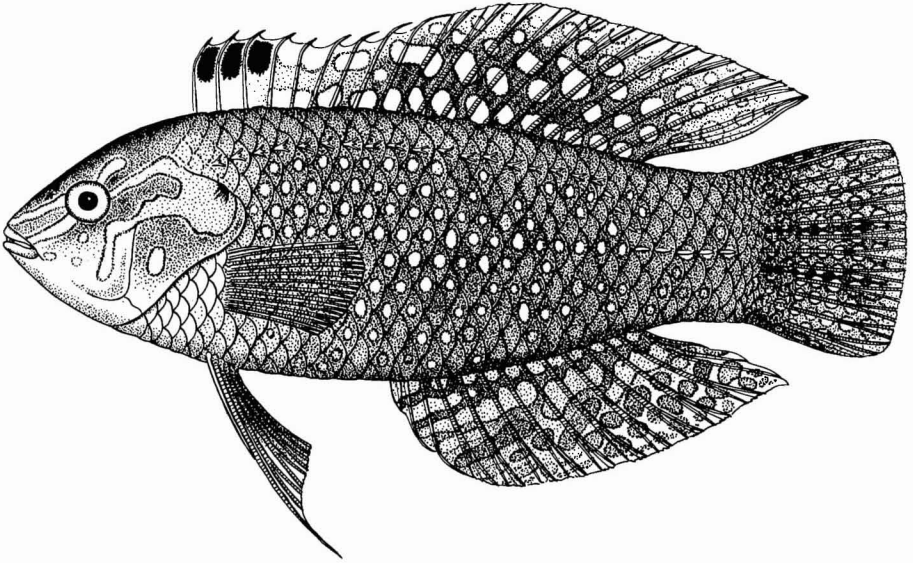


FIGURE 1. *Xenojulis margaritaceus*, ♂, LACM 37434-14, 91.4 mm SL, Philippines.

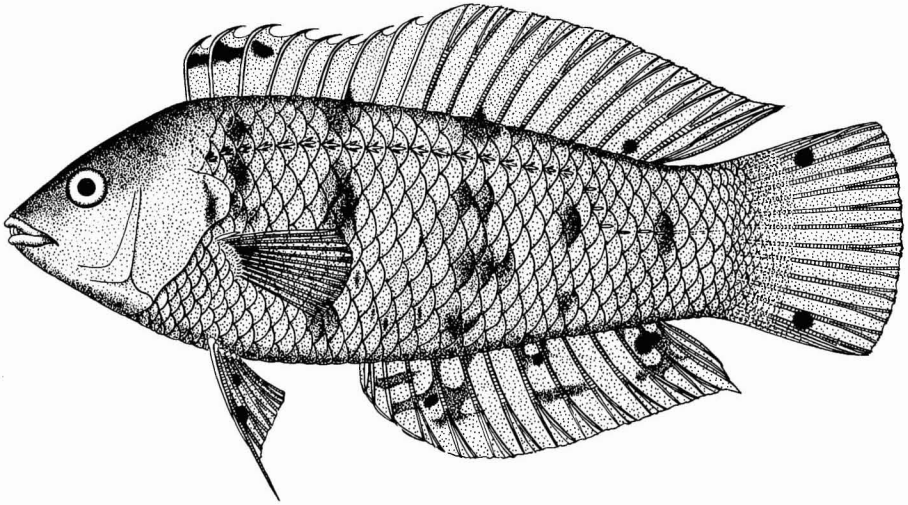


FIGURE 2. *Xenojulis margaritaceus*, ♀, WAM P25107-011, 83.2 mm SL, Western Australia.

MATERIAL EXAMINED: WAM P25107-011, 2:82.2–83.2 mm SL, Western Australia, Dampier Archipelago, Kendrew Island, G. R. Allen, 21 October 1974; WAM P27004-001, 2:64.9–66.2 mm SL, Western Australia, off Tantabuddick, Northwest Cape, lagoon weeds, 3–4 m, spear, G. R. Allen, 23 May 1976; LACM 37434-14, 2:79.5–91.4 mm SL,

Philippines, Lingayen Gulf, Pangasinan, reef off Cangaluyan Island, 1–2 m, poison, T. A. Adamson, 10 March 1978; USNM 224426, 78.0 mm SL, Philippines, Siquijor Island, west side, about  $1\frac{1}{4}$  mile northwest of Paliton Village ( $9^{\circ}10'40''$  N,  $123^{\circ}26'52''$  E), 0–1.8 m, V. G. Springer et al., 10 May 1978; BPBM 22747, 80.0 mm SL, Philippines, Bolinao

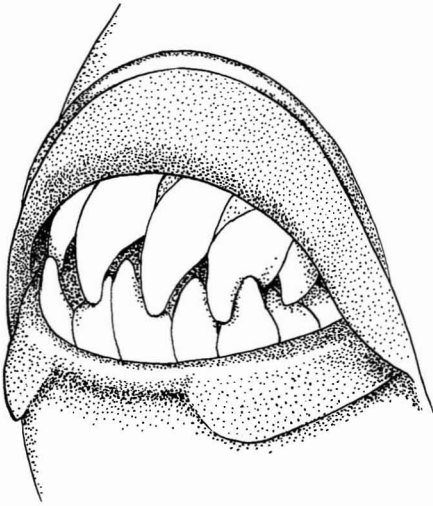


FIGURE 3. Jaw teeth of *Xenojulis margaritaceus*, LACM 37434-14, 79.5 mm SL.

market (16°25' N, 119°54' E), E. O. Murdy and C. J. Ferraris, Jr., 18 July 1979; LACM 42456-1, 39.5 mm SL, Philippines, Lingayen Gulf, Hundred Islands, coral rubble and isolated coral heads, 0–5 m, rotenone, J. Seigel, 21 June 1981; LACM 42485-1:26.0–32.4 mm SL, same locality as preceding but bottom sandy with algal-encrusted rocks and some sea grass, 0–3 m, J. Seigel, 29 June 1981.

**DESCRIPTION:** Dorsal rays IX,11 (last branched to base); anal rays III,11 (last branched to base); pectoral rays 13 (uppermost ray rudimentary, second unbranched); pelvic rays I,5; principal caudal rays 14, the median 12 branched; upper procurrent caudal rays 5 (one of nine specimens with 6); lower procurrent caudal rays 5; lateral-line scales 26 (plus 2 pored scales posterior to caudal-fin base); scales above lateral line to origin of dorsal fin 3 or 3½; scales below lateral line to origin of anal fin 8 or 8½; circumpeduncular scales 16; gill-rakers 19 or 20 (six of eight specimens with 20); branchiostegal rays 6; vertebrae 9 + 16.

Body moderately elongate, the depth 2.6–2.9 in SL and somewhat compressed, the width 2.6–2.95 in depth; head length 2.8–3.0 in SL; snout length 3.1–3.2 in head; orbit diameter 4.9–5.9 in head; interorbital space

convex, the least width 4.4–4.95 in head; caudal peduncle twice as deep as long, the depth 1.65–1.8 in head, the length 3.4–3.75 in head.

Mouth terminal, horizontal, and small, the maxilla reaching posteriorly to a vertical through internarial space; upper jaw with a series of close-set, projecting, slightly incurved, compressed teeth which are progressively longer anteriorly, the more posterior teeth rounded, the more anterior lanceolate (Figure 3); second pair of teeth in upper jaw about two-thirds as long as first pair; a prominent canine tooth posteriorly on upper jaw (at corner of mouth); lower jaw with 8 or 9 teeth on each side, similar to the uppers except the most anterior pair of teeth which are nearly straight along medial edge, the tips close together and fitting into gap between upper anterior pair of teeth when mouth closed; second pair of teeth of lower jaw as long as, or nearly as long as, first, fitting into gap between first and second upper teeth when mouth closed (Figure 3); 2 or 3 small, blunt teeth in a medial second row anteriorly in jaws.

Each upper pharyngeal bone with about 20 bluntly conical to rounded molariform teeth in 6 or 7 irregular anterior–posterior rows, the 4 medial posterior teeth as slightly enlarged elliptical molars (Figure 4a). Posterior limb of T-shaped fused lower pharyngeal bone with a very large subtriangular median posterior molar, flanked by 4 blunt conical teeth and preceded by 2 rows of small, bluntly conical to rounded molariform teeth; median limb with 2 irregular rows of small, bluntly conical to rounded molariform teeth (Figure 4b).

Posterior preopercular margin free dorsally to above level of mouth, and ventral margin free anteriorly nearly to a vertical at front edge of orbit.

Nostrils in front of upper third of eye, the anterior in a membranous tube, the posterior covered by a flap from its anterior edge. Suborbital pores from midposteriorly to orbit to below front edge of orbit 11–14; pores along free margin of preopercle 10–12.

Gill membranes broadly attached to isthmus with a free fold across. Gill filaments on first gill arch relatively long, the longest three-fourths or more of orbit diameter; gill-rakers

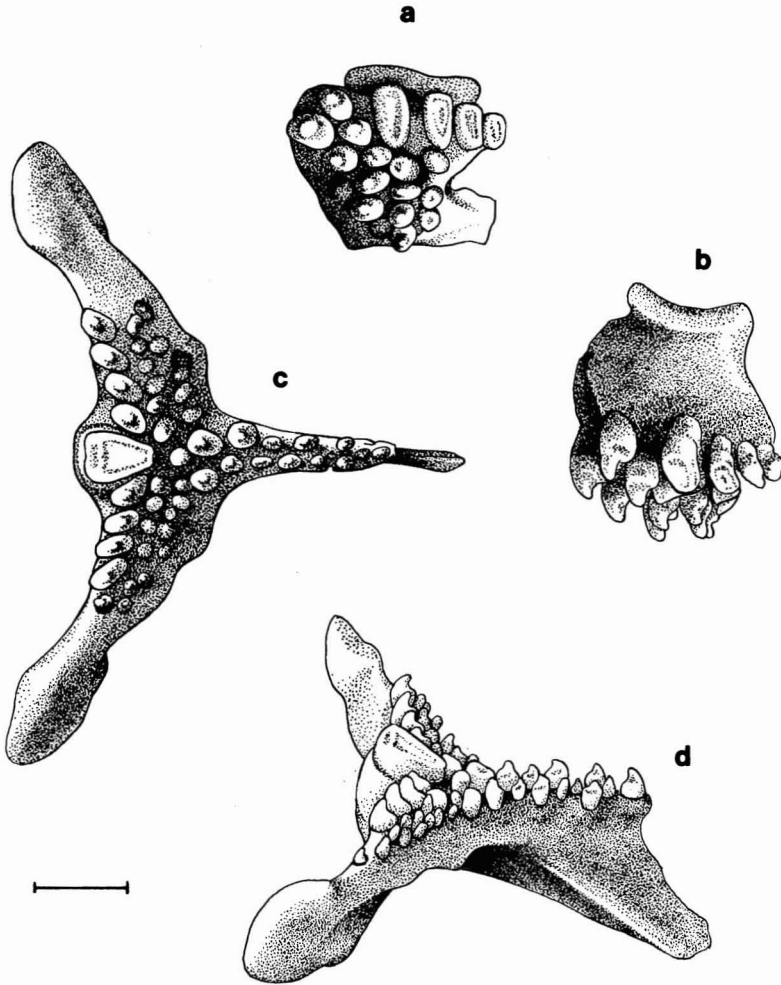


FIGURE 4. *Xenojulis margaritaceus*, LACM 37434-14, 79.5 mm SL. *a*, *b*, upper pharyngeal teeth; *c*, *d*, lower pharyngeal teeth.

moderate, the longest on first arch about one-third length of longest gill filaments.

Most scales of anterior part of lateral line with 2 pores; most scales of descending and straight peduncular portion of lateral line with 1 pore.

Head naked except for 11 or 12 scales in three near-vertical rows on each side of nape, the 2 or 3 scales of first row small and partially embedded. Scales of side of thorax about half or slightly more than half as high as largest scales on side of body; ventroanterior part of thorax naked. Fins naked except for small

scales basally on caudal fin and a single sub-triangular scale midventrally at base of pelvic fins.

Origin of dorsal fin above first lateral-line scale; membranes of spinous portion of dorsal fin extending well above spine tips, particularly anteriorly, each supported by an attenuate rodlike structure which curves upward and posteriorly from just behind tip of each spine; first dorsal spine 4.3-4.95 in head; third dorsal spine longer than second, 3.4-3.9 in head; fourth dorsal spine shorter than third, 3.65-4.2 in head; remaining spines

progressively longer, the ninth 2.4–2.8 in head; longest dorsal soft ray (third in females, penultimate in males) 1.4–1.9 in head of females and 1.2–1.6 in males; first anal spine slender, 5.55–6.7 in head; second anal spine 3.7–4.4 in head; third anal spine 2.5–2.8 in head; third or fourth anal soft rays usually longest, 1.35–2.0 in head (longer, in general, in males); caudal fin slightly rounded, 1.1–1.35 in head; pectoral fins short and broadly rounded, the third and fourth rays slightly the longest, 1.6–1.75 in head; pelvic fins long, reaching or nearly reaching anus in females and extending posterior to origin of anal fin in males, the first ray longest, 1.1–1.7 in head.

Color of females in preservative: pale with five irregular dusky bars on side of body, the first centered beneath third dorsal spine and the fifth on caudal peduncle; anterior edge of orbit narrowly dark brown; fins pale, the dorsal with a black spot on outer part of each of first three interspinous membranes and a black spot basally on ninth dorsal ray or on membrane between eighth and ninth ray; anal fin with three black spots, one between first and second soft rays in middle of fin, one between fifth and sixth rays nearer the base, and one between ninth and tenth rays still nearer the base; caudal fin with two black spots nearly halfway out in fin, one between the upper two branched rays and the other between the lower two branched rays; pelvic fins with two black spots, one between first and second soft rays and the other between the second and third rays. The two smallest female paratypes have a tiny dusky spot mid-dorsally on front of snout and a faint diagonal dusky streak extending from front of orbit toward mouth.

Color in life of females unknown.

Color of males in preservative: body dusky to blackish with numerous dark-edged pale spots varying from round to ovoid or elliptical (long axis vertical; spots size of pupil and larger, but none as large as eye); head dusky dorsally and on opercle, pale on cheek and ventrally, some specimens showing dark-edged pale bands radiating from eye, two of which pass to upper lip; a large dusky spot on opercular flap, rimmed with a dark-edged pale band, the inner dark line of the pale band

black dorsoanteriorly on flap; spinous portion of dorsal fin pale with the same three black spots as on females but larger, and an irregular median longitudinal dark-edged dusky band passing from fourth spine into soft portion of fin; soft portion of dorsal fin dusky to blackish, becoming pale distally, with four longitudinal rows of dark-edged pale spots; anal fin dusky to blackish with three rows of dark-edged pale spots, the spots of the middle row confluent to form an irregular band; outer part of fin dusky with narrow pale diagonal bands; caudal fin pale with faint dark-edged pale spots, the upper and lower margins dusky and the membranes to each side of middle membrane dusky; some specimens still retaining the two black spots as seen on caudal fin of females; paired fins pale.

Color of males when fresh, from field notes of specimens collected in the Philippines by the junior author: ground color of body burgundy, becoming paler on thorax; five to seven irregular rows of bright-yellow to greenish spots thinly bordered with black along flanks from head to base of caudal fin; head irregularly striped with green and burgundy, with a yellow area on upper part of operculum, iris yellow; dorsal fin with three black spots between spines I–IV; remainder of fin, as well as anal and caudal, burgundy with irregular rows of narrowly dark-bordered green spots and blotches; pectoral fins clear, green basally.

REMARKS: The holotype of *Xenojulis margaritaceus* (Macleay), 74 mm SL, 95 mm TL, was first housed at the Macleay Museum of the University of Sydney, but is now at the Australian Museum. As suspected by de Beaufort (1939), it is aberrant in having VII dorsal spines. This is clear from the X ray of the holotype from the posterior position of the origin of the dorsal fin by a distance equivalent to that which would be taken by two dorsal spines. In all other specimens the pterygiophores of the first two dorsal spines extend into the space between the second and third neural spines; on the holotype of *X. margaritaceus* there are no pterygiophores at this location. Also, the holotype is illustrated with only a single black spot on the first interspin-

ous membrane of the dorsal fin, whereas all other specimens have one spot on each of the first three membranes.

Jordan and Seale (1906) proposed the name *Halichoeres macleayi* for *Xenojulis margaritaceus* because the latter becomes a secondary homonym if it is placed in the genus *Halichoeres*. *Julis margaritaceus* Valenciennes in Cuvier and Valenciennes (1839) is a valid species of *Halichoeres* (Kuitert and Randall 1981).

Originally described from New Guinea, *Xenojulis margaritaceus* was reported from the Philippines by de Beaufort (1939). We here extend the range south on the Western Australian coast to North West Cape (22° S).

The three collections of this species for which we have depth data were obtained in very shallow water (0–3 or 4 m). The habitat was given for one Australian collection as “lagoon weeds” (presumably sea grass). The two LACM Philippine specimens were taken in an area of dense coral growth on coral rubble and sand. It is surprising that so few specimens have been obtained in view of the occurrence of this fish in shallow water.

#### ACKNOWLEDGMENTS

We thank Barry C. Russell of the Australian Museum for sending the X ray of the holotype of *Xenojulis margaritaceus*; E. O. Murdy and Carl J. Ferraris, Jr., formerly of the Peace Corps, for providing a specimen and photograph of this species from the Philippines; Gerald R. Allen of the Western Australian Museum for the loan of specimens collected by him in Western Australia; and Victor G. Springer and Susan Jewett of

the U.S. National Museum of Natural History for the loan of the specimens collected by Springer in the Philippines. Thanks are also due Arnold Y. Suzumoto of the Bernice P. Bishop Museum for radiography and Mary Butler of the Natural History Museum of Los Angeles County for the drawings.

#### LITERATURE CITED

- DE BEAUFORT, L. F. 1939. *Xenojulis*, a new genus of labroid fishes. *Philipp. J. Sci.* 69(4): 415–421.
- . 1940. The fishes of the Indo-Australian Archipelago. *Percomorphi* (continued) *Cirrhitidae*, *Labriformes*, *Pomacentriformes*. Vol. 8. E. J. Brill, Leiden.
- CUVIER, G., and A. VALENCIENNES. 1839. *Histoire naturelle des poissons*. Vol. 13. Pitois-Levrault, Paris.
- FOWLER, H. W. 1928. The fishes of Oceania. *Mem. Bernice P. Bishop Mus.* 10: 1–540.
- JORDAN, D. S., and A. SEALE. 1906. The fishes of Samoa. *Bull. Bur. Fish.* 25: 175–488.
- KUITERT, R. H., and J. E. RANDALL. 1981. Three look-alike Indo-Pacific labrid fishes, *Halichoeres margaritaceus*, *H. nebulosus* and *H. miniatus*. *Rev. Franç. d'Aquariol.* 8(1): 13–18.
- MACLEAY, W. 1884. Contribution to a knowledge of the fishes of New Guinea. *Proc. Linn. Soc. N. S. W.* 8: 252–280.
- RANDALL, J. E. 1978. A revision of the Indo-Pacific labrid fish genus *Macropharyngodon*, with descriptions of five new species. *Bull. Mar. Sci.* 28(4): 742–770.
- WHITLEY, G. P. 1939. Studies in ichthyology. No. 12. *Rec. Austral. Mus.* 20(4): 264–277.