A New Genus and New Species of Hawaiian Gobiid Fish[1]

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RECENT FISH COLLECTIONS made primarily in shallow water in the southeast sector of Kaneohe Bay and near Coconut Island, Oahu, have provided several series of specimens of an undescribed goby. This new form was first recognized in the late 1930s by Gordon B. Mainland, then a student of the University of Hawaii. Mainland (1939) subsequently described this form in his Master's thesis and placed it in the genus *Paroxyurichthys.*

The first published record concerning the existence of this new form appeared in Edmondson (1946) who listed it under the generic name *Paraxyurichthys,* an obvious misspelling or typographical error for *Paroxyurichthys.* No descriptive data were given by Edmondson.

Since Mainland (1939) never published his findings and Edmondson (1946) gave no description or distinguishing characters concerning Mainland's new species, the published name *Paraxyurichthys edmondsoni* constitutes a *nomen nudum* and is therefore not a valid name.

Material studied was loaned from the United States National Museum, Washington, D.C. (USNM); Bernice P. Bishop Museum, Honolulu, Hawaii (BPBM); Australian Museum, Sydney, New South Wales (AM).

METHODS

The counts and measurements are standard and were taken from the holotype USNM 206174, and the paratype series USNM 206175. The measurements are expressed in thousandths of standard length. The scale counts, scale drawings, and the diagram of the sensory papillae were taken from five cleared and alizarin-stained specimens, part of the paratype series BPBM 10864. Also, the vertebral count was taken from one partially dissected alizarin-stained specimen from this series. The value for the holotype is shown in parentheses and the values for the paratypes follow.

Psilogobius new genus

Body naked anterior to first dorsal fin and on belly anterior to anal origin. All scales strongly ctenoid (Fig. 1), firmly attached, small, and covering most of body posterior to first dorsal origin. Scales not quite reaching bases of dorsal and anal fins. Anterior scales small, widely spaced, and increasing in size toward tail.

Dorsal fin VI-I, 10; anal fin I, 9; pectoral fin 15 to 17, pelvic fin typically five. Vertebral count, 10 precaudal, 15 caudal.

Teeth in both jaws, sharp, depressible, and recurved. Anterior teeth of upper jaw in four to five rows (Fig. 2), the outer row of enlarged canines, inner rows of small, sharp, conical teeth. Lateral teeth of upper jaw in two rows with the outer row of slightly enlarged canines reaching corner of jaw. Anterior teeth of lower jaw in villiform bands, small, sharp, and conical, in three, occasionally four, rows. Lateral teeth of lower jaw in two rows, the outer row similar to anterior teeth, the inner row of six to nine enlarged canine teeth. No teeth on vomer or palatines.

Body slender, compressed, width at origin of first dorsal equal to or slightly less than half the depth. Head robust, nearly cylindrical behind eyes. Mouth moderately large, jaws equal, lips somewhat prominent. Eyes dorsal-lateral, extending above profile of head. Ventral margin of eye slightly above level of anterior upper lip. Gill openings large, connected to the isthmus without a membranous fold. Upper edge of gill opening reaching upper pectoral base or slightly above.

Most of head covered by a complex system

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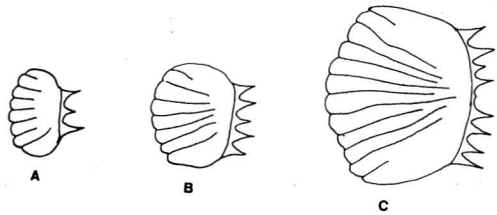

FIG. 1. Diagrammatic drawing of the ctenoid scales removed from *Psilogobius mainlandi*. *A*, anterior scale; *B*, mid-body scale; *C*, caudal peduncle scale.

of small sensory papillae (Fig. 3). Several sensory pores, one above the other, on the upper preopercular margin. An additional pair on top of head behind each eye and a single pore above and adjacent to each posterior nostril. Pelvic fins forming a disc, the inner rays longest and joined their entire length by a thin membrane and with a smooth-edged frenum anteriorly. Caudal fin lanceolate, equal to or slightly longer than head. No barbels or fleshy flaps on head and body and no serrations on preopercle.

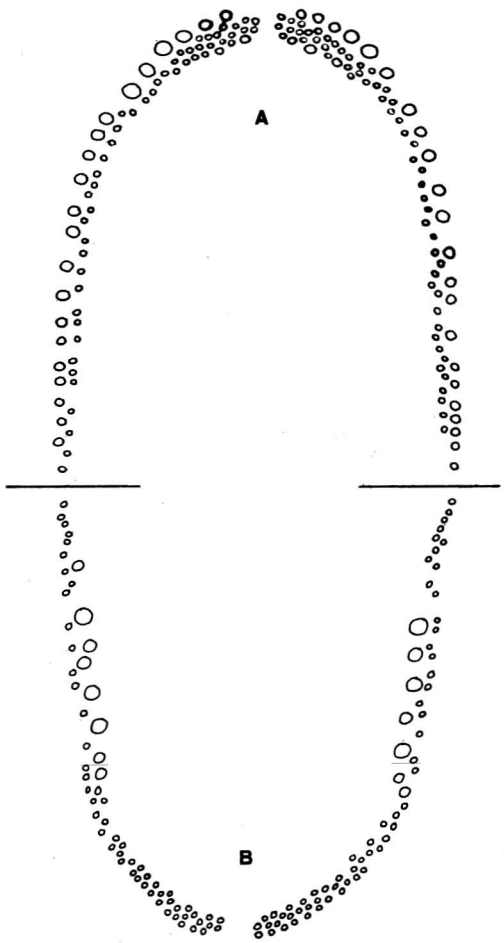

FIG. 2. Diagram of the tooth pattern of the upper and lower jaw of *Psilogobius mainlandi*. *A*, upper jaw; *B*, lower jaw.

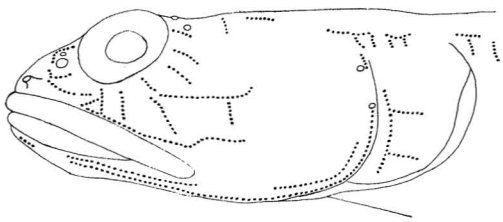

FIG. 3. Diagram of the sensory papillae pattern on the head of *Psilogobius mainlandi*.

Psilogobius, from the Greek *psilos*, meaning bare or naked, in reference to the lack of scales on the anterior body.

Type species: *P. mainlandi* new species.

Psilogobius mainlandi new species

Fig. 4

Holotype

USNM 206174, adult male, 33.1 mm standard length, collected from a shallow saltwater pond on the west side of Coconut Island, Kaneohe Bay, Oahu, 9 May 1968, W. J. Baldwin and party.

Paratypes

USNM 206175, 21(20.0–34.1 mm), same data as holotype. BPBM 10864, 26(22.1–37.0 mm), collected on west side of Coconut Island, 7 December 1967, W. J. Baldwin and J. Richards. BPBM 10865, 5(13.0–21.0 mm), off Kahaluu, Kaneohe Bay, depth 30 ft, 12 July 1968, W. J. Baldwin and J. E. Randall. BPBM 10862, 1(36.0 mm), west side of Coconut Island, 1 April 1968, J. E. Randall and party.

In addition to the above paratypes, the following four collections here designated as paratypes are from the Bernice P. Bishop Museum and were originally catalogued under Mainland's manuscript name. All were collected in

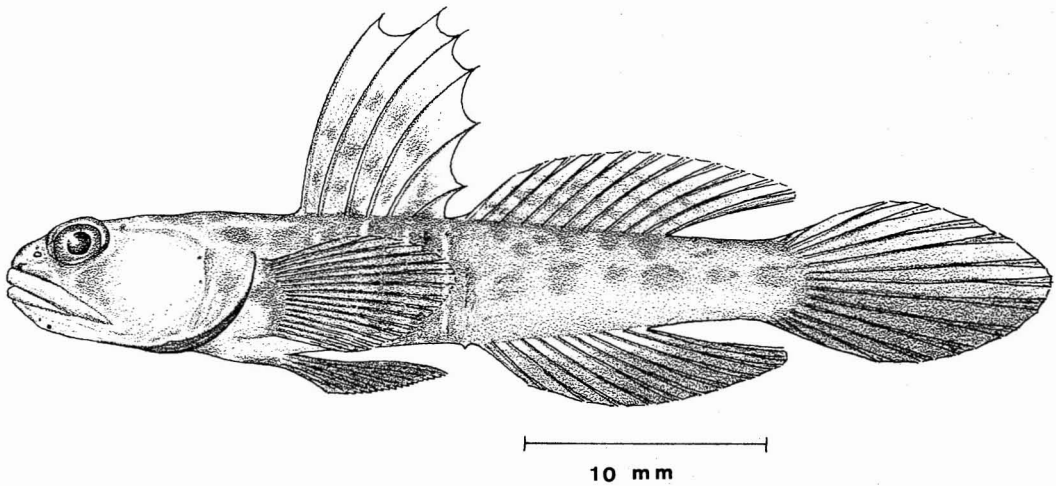

FIG. 4. *Psilogobius mainlandi,* new species. Holotype USNM 206174, adult male, 33.1 mm standard length, Coconut Island, Kaneohe Bay, 9 May 1968.

the southeast sector of Kaneohe Bay on the shallow mud flats in 1939 by G. B. Mainland and C. H. Edmondson. They are: BPBM 5522 1(40.3 mm); BPBM 5523 2(28.9–30.3 mm); BPBM 5524 17(9.4–41.0 mm); BPBM 5525 11(9.3–21.1 mm).

DESCRIPTION

Head length (317) 297–332; head width (169) 144–178; body depth (151) 140–204; eye diameter (084) 063–087; caudal peduncle depth (091) 083–104; pectoral fin length (242) 217–275; pelvic fin length (239) 234–274; caudal fin length (308) 273–328.

Dorsal fins (VI-I, 10) VI-I, 10; anal fin (I, 9) I, 9; pectoral fin (17) 15–17; number of white bars on side of body posterior to pectoral base (6) 0–7.

The following characters are in addition to those listed under the generic account. Snout short, blunt, the dorsal profile notably convex. Length of snout (4.6) 4.2–4.8 into head length and slightly less than diameter of eye. Interorbital narrow, concave (4.0) 3.5–4.2 into diameter of eye.

First dorsal high, the third and fourth spines longest (1.2) 1.1–1.5 into head length, slender and flexible. Spines when depressed reach base of third or fourth second dorsal soft ray and are twice their length. Second dorsal not elevated, all soft rays branched in adults with the longest (1.8) 1.7–2.0 into head length. The depressed second dorsal fin reaching base of upper caudal rays. All anal rays branched in adults except for the first small flexible spine. Dorsal and anal soft rays equal in length.

Live Coloration

A beautiful fish when alive but fades rapidly in preservative. Body color light tan with a series of usually 10 prominent, round, orange-brown markings along middle of sides from pectoral base to caudal fin base. Spots tend to alternate in size with the largest equal to diameter of eye. Adults have a series of small, bright, iridescent blue spots on body usually encircling the orange-brown markings. Occasionally these blue spots may be randomly scattered along body but always distinct in live material. Similar spots on preopercle and opercle. Head same color as body and often with a noticeable narrow, orange bar running diagonally back from upper lip below eye. Several indistinct bright orange markings on sides and top of snout. Sides of body posterior to pectoral base usually with a series of narrow, bluish-white bars usually extending from dorsal base to mid-ventral line in adults, equally spaced two-thirds to one eye diameter apart. These markings frequently fade in preservative but their outline is usually detectable even in older

material stored in alcohol. Branchiostegal membranes dusky to moderately dark. Anal fin and pelvics dusky, occasionally dark. Caudal and pectoral fins with a tinge of light orange, lower half of caudal dusky. First and second dorsal fins with a series of diagonal orange markings, occasionally bright to hardly noticeable. Both fins often with a narrow, light orange margin. Eye silvery with several blue and orange markings near margin.

Preserved Coloration

Overall light tan and lacking the bright orange and bright blue colors mentioned above. Branchiostegal membranes dusky to dark. Lower half of anal and caudal dusky. The series of orange-brown body markings along mid-body remain as light dusky markings, occasionally lost after preservation. The characteristic, narrow, light bars on body posterior to pectoral base are usually retained in most specimens but are less distinct. These bars are occasionally lacking, even in fresh material.

Remarks

There appears to be little doubt that *Psilogobius mainlandi* constitutes a new genus and a new species of Gobiidae found as yet only within Kaneohe Bay, Oahu. It will no doubt be collected elsewhere in the Hawaiian Islands.

Observations on the behavior of *P. mainlandi* indicate that it lives in alpheid shrimp burrows on the shallow reef flats around Coconut Island. This interesting commensal behavior with the alpheid shrimp is presently under study and will be reported on at a later date (Lynn Moehring, personal communication).

Judging from the characters given by Norman (1966) and Koumans (1953), I believe the genus *Psilogobius* to be most closely related to *Cryptocentrus, Cryptocentroides,* and *Paroxyurichthys.* It is distinct from these genera by having only ctenoid scales, naked anterior body, different dorsal and anal counts, and a distinctive tooth pattern. All known Hawaiian gobies (Gosline, 1959; Gosline and Brock, 1960) can be distinguished from *Psilogobius mainlandi* by the above combination of characters.

This new species is named for the late Gordon B. Mainland in recognition of his studies on Hawaiian fishes while a student at the University of Hawaii.

ACKNOWLEDGMENTS

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