

OCCASIONAL PAPERS OF THE MUSEUM OF
ZOOLOGY

UNIVERSITY OF MICHIGAN

ANN ARBOR, MICHIGAN

PUBLISHED BY THE UNIVERSITY

NOTES ON THE GOBIOID FISHES OF CALIFORNIA,
WITH DESCRIPTIONS OF TWO NEW GENERA

BY CARL L. HUBBS

These notes result from our collecting along the Californian coast in 1922 and 1923.

Two new genera are here described: one, *Rhinogobiops*, based on *Gobius nicholsii* Bean; the other, *Lethops*, based on the new species *Lethops connectens*, remarkable for its similarity to the blind goby, *Typhlogobius californiensis*. *Aprolepis barbarae* Hubbs, 1921, is indicated as the young of *Gillichthys mirabilis*.

Genus 1. *Rhinogobiops*, new genus

Type: *Gobius nicholsii* Bean.

Gobius nicholsii may be taken as the type of a distinct genus, much like *Rhinogobius* Gill, but distinguished by the following characters. A fleshy ridge extending from a little behind eyes to dorsal fin. Teeth enlarged on both inner and outer edges of premaxillary and mandibular bands. Lower jaw projecting. Dorsal fin slightly elongated. Walls of inter-

orbital very high and thin. In making this contrasting diagnosis the type species of *Rhinogobius* (*R. similis*) is at hand.

The fleshy nuchal crest of *Rhinogobiops* suggests the higher crest of *Lophogobius*, but its other characters do not agree with the special features of that genus.

Description: Pelvic fins fully united, free from belly; pectoral fins normal, without silk-like rays; dorsal fins barely separated, the first of six slender but non-filamentous spines; the second of about 14 soft rays, the last one considerably elongated, free from the broadly rounded caudal fin. Body completely scaled except in predorsal midline. Head scaleless. Scales of sides with a comb-like row of marginal spines, a submarginal focus and basal radii. Body moderately compressed and rather slender; head little wider than deep; cheeks not tumid. Mouth rather small, the lower jaw projecting. Jaw teeth conical, in bands, enlarged in both an outer and an inner row. Gill-membranes with a flap-like projection of margin. Shoulder-girdle without papillae, separated by a groove from the rather wide isthmus. Tongue truncate at tip. Bony interorbital very narrow, with high, thin and nearly vertical crests on orbital margins. Eyes rather large, directed superolaterally. Rows of papillae on sides of head moderately developed. No barbels.

(*Rhinogobiops*: like *Rhinogobius*.)

1. *Rhinogobiops nicholsii* Bean

Gobius nicholsii Bean, Proc. U. S. Nat. Mus., 4, 1881, 469; Jordan and Eigenmann, *ibidem*, 9, 1886, 481; Jordan and Evermann, Bull. U. S. Nat. Mus., 47, pt. 3, 1898, 2218.

Rhinogobius nicholsii Starks and Morris, Univ. Calif. Publ. Zool., 3, 1907, 469.

Rhinogobius nicholsi Gilbert, Proc. U. S. Nat. Mus., 48, 1915, 359.

Three lots of specimens have been examined; two, comprising one specimen each, from the Santa Barbara Channel, and the other, a small series from southwest of Newport.

Genus 2. EUCYCLOGOBIUS Gill

Eucyclogobius agrees with *Lepidogobius* in the general structure of the fins, and in squamation (with the exceptions noted below), in having the papillae of the head and the flaps on the shoulder girdle well developed, and the tongue emarginate. The differences between them may be outlined as follows, in key form.

- a.¹—Cheeks naked. Bony interorbital wide, shallowly concave between moderately elevated median ridge and lateral rims. Maxillary in adult about half length of head, extending beyond posterior margin of eye. Inner premaxillary teeth in a single irregular series laterally, becoming approximately biserial anteriorly. Soft dorsal and anal short and high.

Eucyclogobius (newberryi)

- a.²—Cheeks covered with imbedded scales. Bony interorbital very narrow, deeply grooved between median keel and sharply elevated lateral rims. Maxillary in adult about two-fifths length of head, not extending to posterior margin of eye. Inner premaxillary teeth in a rather wide band throughout. Soft dorsal and anal long and many rayed.

Lepidogobius (lepidus)

2. *Eucyclogobius newberryi* Girard

The range of this species is to be extended southward to El Estero, near Carpenteria, Santa Barbara County, California, where one specimen was secured in salt water, and a series in fresh-water, on May 17, 1923.

Genus 3. GILlichTHYS Cooper

Aprolepis Hubbs, Occ. Pap. Mus. Zool., Univ. Mich., No. 99, 1921, 1.

3. *Gillichthys mirabilis* Cooper

Aprolepis barbarae Hubbs, *ibidem*, 2.

A large series of specimens taken in San Diego Bay supplies all intermediate stages connecting the very young type of *Aprolepis barbarae* with adults of *Gillichthys mirabilis*.

Genus 4. *Lethops*, new genus

Type: *Lethops connectens*, new species.

This new goby is apparently much more closely related to the well known blind goby of the California reefs, *Typhlogobius californiensis*, than is any described genus. The eyes are retained in a doubtlessly functional condition, although becoming almost rudimentary in the adult, while compensatingly the tactile organs are highly developed. The scales remain entirely undeveloped, and no definite color pattern whatever is evident, although the chromatophores remain. The cheeks are markedly enlarged and tumid, as in *Typhlogobius*. In other respects *Lethops connectens* shows no definite resemblance or approach toward *Typhlogobius californiensis*, retaining the primitive characters of the genera related more intimately to *Gobius*.

The genus *Lethops* may be diagnosed as follows. Pelvic fins fully united, free from belly; pectoral fins normal, and without silk-like rays; dorsal fins almost joined at extreme bases, the first of six rather short spines, the second of 14 soft rays, the last ray not produced, free from the broadly rounded caudal fin; dorsal and anal fins of nearly equal height throughout. Body and head without vestige of scales. Body slender, moderately compressed; head much depressed and with greatly enlarged and tumid cheeks. Mouth rather large, the upper jaw half as long as head in adult; jaws equal anteriorly. Teeth confined to jaws, conical, in a rather wide band, somewhat enlarged in an outer row in each jaw. Gill-membranes with a slightly produced angle, widely separated below. Shoulder girdle with a sharp ridge, but no dermal flaps; separated by a notch from the broad isthmus. Tongue narrowly but rather sharply emarginate at tip (as in *Typhlogobius*). Eyes very small, about one-fourth width of fleshy interorbital and without free orbital margin in the adult (better developed in the young), placed far forward and directed about equally sideward and upward. Sensory papillae of head moderately enlarged; skin with specialized folds and

flaps before and below eyes, especially in the adult; sub-orbital edge thickened and somewhat pendant, bearing a row of papillae; surface of suborbital with a horizontal crenated fold of skin; another fold below and before eye, bent at right angles; anterior nostril opening through a rather large tube; three pairs of dermal flaps on top of snout.

(Lethops: in reference to the poorly developed eyes.)

4. *Lethops connectens*, new species

Plate I

Type, Cat. No. 63281, Museum of Zoology, University of Michigan; collected in a low tide-pool at Carmel, California, on December 31, 1922, by Carl L. Hubbs and Laura C. Hubbs. A specimen 59 mm. long to caudal fin.

Paratypes, Cat. No. 63282, Museum of Zoology; collected in a very low, rich reef pool at White Point near Pt. Fermin, Los Angeles County, California, May 3, 1923, by Carl L. Hubbs. Two specimens, respectively 39 and 45 mm. long.

Dorsal rays, VI-14; anal, 13 (12 or 13, in paratypes).

Head, 3.4 (3.5) in standard length; depth of body, 7.1 (to 7.5). Eye, 17 (9.7 in smaller; 10.5 in larger, paratype) in head, 4 (2) in fleshy interorbital width. Snout and eye together 1.5 (1.2 to 1.3) in cheek, 2.3 (1.9 to 2.1) in postorbital length of head. Upper jaw, 2.0 (2.3) in head. Highest dorsal spine a little less, highest soft ray a little more, than one-third length of head; anal a little lower than soft dorsal; length of caudal, 1.9 (1.8 to 2.1) in head; pectoral, 1.8 (1.8 to 2.0); pelvic, 1.45 (1.6 to 1.7); median length of basal membrane nearly one-third length of pelvic fin. Anus a little nearer tip of snout than end of caudal rays (the abdomen much less elongate than in *Typhlogobius californiensis*).

(*Connectens*: connecting the blind goby with other members of the family.)

PLATE I

Heads of *Typhlogobius californiensis* and of *Lethops connectens*.

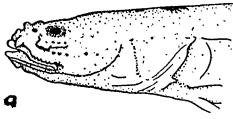
All of the figures are drawn to the same scale, indicated at the top of the plate.

FIG. *a*. Young specimen of the blind goby, *Typhlogobius californiensis*, showing the degree of development of the eye.

FIG. *b*. Adult specimen of *Typhlogobius californiensis*. This specimen and the young both collected near Point Fermin, California.

FIG. *c*. Half-grown specimen, paratype of *Lethops connectens*.

FIG. *d*. Adult specimen of *Lethops connectens*: the holotype, from Carmel, California.



1mm

