Vol. 58, pp. 77-82 June 30, 1945

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON



# NOTES ON FISHES IN THE ZOOLOGICAL MUSEUM OF STANFORD UNIVERSITY. XIX.—TWO NEW PHILIPPINE GOBIES, WITH KEY TO THE GENERA OF GOBIES WITH VOMERINE TEETH.

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While in charge of fishery investigations in the Philippines, I was compelled to take up the study of gobies because of the great economic importance of certain species at the mouths of streams in northern Luzon. The study soon spread to gobies in general, and during the subsequent years the collection, observation in the field, and critical examination of gobies has continued. The gobioid fishes present problems of great interest and intriguing possibilities to the field naturalist who will pursue them on the coral reefs, in the mangrove swamps, and along the streams and lakes of the oriental tropics especially. Those interested in geographical distribution, variation, adaptation, physiological phenomena, and evolution in general, could find no better vertebrate organisms to work with than some of the gobies (*sensu lato*). Such studies should be carried on chiefly with living material, the investigator working with them in their native habitat.

Some of the gobies present very singular or bizarre variations, often tangential to the ordinary goby structure. One of the remarkable variations, and one which has been forced upon my attention, is that presented by the gobies with teeth on the vomer. These teeth may vary from those rather small in size, and more or less concealed, to those which are relatively of gigantic size. The vomerine teeth of gobies hitherto known are all set transversely on the vomer; they may be widely spaced, but more often their inner edges touch. In those species with the largest and best developed teeth they are firmly united to form a single large chisel-like organ. In one of the new species here presented the arrangement of the

teeth is quite different; the vomerine teeth are small and set one behind the other on the median line of the vomer.

Two new genera and two new species of gobies with vomerine teeth are here presented, together with a key to the genera thus far known of this peculiar section of gobies. Nine genera and 14 species of gobies with vomerine teeth are now known, all but one of which have been discovered by me. Ten of the species are thus far known only from the Philippines; two are known from reefs at Singapore, one from the Pelew Islands, and one from Apia, Samoa. Such a distribution indicates that not only the East Indies but also the whole vast Indo-Pacific tropical area must contain many more gobies with vomerine teeth. The number now known is probably less than half of those actually living on the coral reefs of the tropical Indo-Pacific.

### Key to the Genera of Gobies With Vomerine Teeth.

A. Vomerine teeth set one behind the other on the median line; 3 flaps on inner edge of shoulder girdle; opercle with numerous small scales; a pair of post-symphysial canines in lower jaw..... *Calamiana*

One species from Busuanga Island, P. I.

AA. Vomerine teeth set side by side, across the vomer; no flaps on shoulder girdle, opercle not as above; no post-symphysial canines in lower jaw, as far as known.

B. Scales ctenoid, 40 or less.

C. No predorsal scales; lateral series about 24....*Coronogobius*

One species from Busuanga, Is., P. I.

CC. Predorsal scales present.

D. Predorsal scales 6; lateral series about 26.

E. Head and body scaled; no ridges or rows of sensory papillae on head....*Macrodontogobius*

One species from Gorror, Pelew Islands.

EE. Head naked with many ridges and sensory papillae; median lateral scales with vertical rows of papillae.....*Intonsagobius*

One species from Jolo, Sulu Islands, P. I.

DD. Predorsal scales 14–16; lateral series 38–40; head naked; mouth little inclined; sensory papillae scarcely evident; lateral recurved canines in lower jaw.....*Mindorogobius*

One species from southwestern Mindoro, P. I.

BB. Scales 40 or more, cycloid or ctenoid.

F. Scales more or less ctenoid, at least posteriorly.

G. Scales 40–50, more or less cycloid on anterior half, posterior scales enlarged, mouth nearly vertical, chin prominent; no conspicuous lines of papillae on cheeks..... *Mangarinus*

One species from Mangarin, Mindoro, P. I.

GG. Scales 60–65, all ctenoid, or only on posterior half; mouth moderately oblique; head with many conspicuous lines of sensory papillae.... *Mars*

One species from Samoa and two from the Philippines.

FF. Scales all cycloid, 60 or more.

H. Lower jaw projecting, maxillary extended back on preopercle, scales about 60; predorsal area, a strip back to second dorsal, and area below a diagonal from pectoral axil to anus all naked.... *Myersina*

One species from Culion, P. I.

HH. Maxillary not extended backward, jaws equal; scales 70 to 85; no scales before line from first dorsal to ventral base; upper lip lined with dense papillate fringe..... *Smilogobius*

2 species from the Philippines and 2 from Singapore.

**Calamiana** Herre, new genus.

Two small incisor-like teeth on the median line of the vomer, one in front of the velum and the other behind it, the teeth well separated. The teeth in the jaws are small to minute, those of the upper jaw in two rows at the front, with a third row of larger teeth some distance behind; lower jaw with two or three rows of teeth, and a pair of symphysial canines behind them. The tongue has a broad, free, lunate tip. There are 3 small fleshy flaps on the inner margin of the shoulder girdle.

The form is wedge-shaped, the trunk laterally compressed, the head large, broad, with blunt rounded snout and large oblique mouth, the maxillary reaching beyond the eye; physiognomy peculiar, a wide deep groove separating the maxillary from the overlapping snout flap and

suborbital; anterior nostril in a projecting tubule which hangs down over the maxillary; eyes small, in the anterior half of the head. The fins are small to medium, the dorsals well separated, the second dorsal and anal not reaching the caudal base when depressed; the caudal is bluntly rounded. The gill openings are a little wider than the pectoral base, the isthmus broad.

Dorsal VI–I–7; anal I–6; scales in lateral series 86 to 40, in transverse series 12; predorsal scales 12 to 15; head naked, except opercles which are covered with small scales; all scales before a perpendicular from the first dorsal cycloid, the rest ctenoid; abdomen and preventral region scaled.

Type of the genus *Calamiana magnoris* Herre, new species. *Calamiana*, from the Calamianes, a group of Philippine Islands. Busuanga, and Culion, with their adjacent islets, are called collectively the Calamianes.

**Calamiana magnoris** Herre, new species.

Dorsal VI–7; anal I–6; scales in lateral series 38, transverse 12; predorsal scales 14, the anterior one largest and projecting into the interorbital space; opercular scales about 18; pectoral base covered with very small scales.

The form is as given in the generic description, the depth 5.35, the head 3.2, the caudal 3.75, the pectoral 4.28 times in the length. The head is broad, with bulging cheeks, its width 1.5 in its own length; the eye is 5.16, the snout 4.2, the maxillary, which extends almost to the posterior angle of the preopercle, 1.6 times in the head; the postorbital is more than half of the head length; the interorbital is 1.8 times in the eye. The third and fourth spines of the first dorsal are longest, 3.1 in the head or 10 times in the length; the second dorsal and anal are of equal height, their posterior rays longest, 1.86 in the head or 6 in the length; the short wide ventral is 6.66 in the length. The female genital papilla is thin, with lunate tip. Other characters are given in the generic diagnosis.

The color in alcohol is very pale tan, each scale stippled with minute brown dots; a brown stripe runs from the lower margin of the eye across the preopercle and opercle; the dorsals have a few dark spots basally, then a white longitudinal bar, the balance reddish brown; the other fins are all more or less reddish brown.

Described from the type and sole specimen, a female 30 mm. long, collected by me at Coron, Busuanga, July 1, 1940. This is a unique species; its combination of vomerine teeth one behind the other, symphysial canines in the lower jaw, fleshy flaps on the inner edge of the shoulder girdle, and numerous small opercular scales, set it apart from all other gobies. *Magnoris*, big mouth, from *magna*, large, and *oris*, mouth.

**Coronogobius** Herre, new genus.

Dorsal VI–I–8 or 9; anal I–7 or 8; scales in longitudinal series 22 to 26, in transverse series 7 to 9; head naked except for a strip of small cycloid scales above the opercle and preopercle, without sensory papillae; all other scales ctenoid except the preventral ones, which are very small and cycloid.

Body laterally compressed, fins low, the ventrals fragile and their frenum very delicate. The eyes are very high up and close together; the chin is prominent, the mouth strongly oblique, the teeth small; the upper jaw has an outer row of enlarged teeth with 2 or 3 rows of minute teeth behind it; in the lower jaw the outer row has larger teeth than in the upper jaw, with a small posterior canine, and three inner rows of minute teeth; on the vomer is a pair of enlarged incisor-like teeth which are not fused or united; the tongue is small, free, its tip rounded. The gill openings are wide, the isthmus broad; no free silky rays on the pectoral.

Type of the genus *Coronogobius striatus* Herre, new species.

Named for the little town of Coron, Busuanga Island, Philippine Islands, where the specimen was obtained.

**Coronogobius striatus** Herre, new species.

Dorsal VI–I–8; anal I–7; 24 scales in a longitudinal series, plus 1 on the caudal base, and 8 in a transverse series; no predorsal scales, but small scales extend forward on the side above the opercle nearly to the eye.

The body is laterally compressed, the dorsal profile gently arched, the ventral profile a little more arched, the depth almost 4 times (3.96) in the length; the round-pointed caudal equals the compressed head, 3.5 in the length; the large eye is 3 times in the head, dorso-lateral in position, projecting above the dorsal profile, the interorbital very narrow, 7.66 times in the eye; the short broad snout is 2.3 times in the eye; the chin is prominent, the mouth strongly oblique, the angle of the maxillary beneath the anterior fourth of the eye; the first dorsal spines have filiform tips, the longest about 5 times in the length, reaching to the base of the second ray of the second dorsal when depressed; the posterior second dorsal rays are longest, 6 times in the length, the posterior anal rays a very little shorter, both anal and second dorsal falling far short of the caudal when depressed; the pectoral and ventral are equal, 3.88 in the length; the frenum of the ventrals is very thin and delicate, and the ventrals have been torn apart, the whole ventral structure being fragile.

The color in alcohol is pale tan, each scale stippled with minute darker dots; faint traces of darker cross bars on the caudal, and of duskiness on the second dorsal and anal; the head is marked with longitudinal pale stripes as follows: One from the tip of the snout over the rim of the eye to the predorsal region; two from the eye to below the first dorsal origin; a broader one from the snout across the lower margin of the eye to the opercle and upon the pectoral base; a still broader one from the tip of the chin and across the angle of the mouth to the hind margin of the opercle, where it connects by a broad arm with the stripe above, and on back across the pectoral base; a sixth stripe runs from the chin back along the under side of the head as far as the ventral origin.

Here described from the type and only specimen, 21 mm. long, standard length, which I secured among the coral heads of the little dock at Coron, Busuanga Island, Philippine Islands. This is a unique goby, unlike any previously known to me.

(*Striatus*, striped.)