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DESCRIPTION OF THREE NEW SPECIES OF CARANGOID FISHES FROM FORMOSA.

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The Carnegie Museum has lately bought from Dr. Hans Sauter a fine collection of fishes, obtained by Dr. Sauter from the port of Takao in Formosa. This collection has been placed in the hands of the present writers by Dr. Holland, the Director of the Carnegie Museum, for study and identification.

Among the new species are three, all of the *Citula* group of *Caranx*, which seem to be new. One of these constitutes a distinct genus, *Ulua*. The description of these species constitutes the present paper.

Caranx rastrosus Jordan & Snyder, sp. nov.

(Plate LI.)

Head $3\frac{2}{3}$ in length to base of caudal fin; depth $2\frac{1}{7}$; depth caudal peduncle $5\frac{1}{2}$ in head; eye 4; snout 3; interorbital space $3\frac{1}{2}$; dorsal VII–20; anal III–18; pores in lateral lines about 115.

Anterior profile rising abruptly to occiput from where the slope to base of dorsal is very gradual; interorbital area high, the sharp median ridge about an eye's diameter above orbit; jaws about equal, the lower projecting slightly; maxillary extending to a vertical through anterior edge of pupil; width of posterior edge of maxillary contained $1\frac{1}{8}$ times in suborbital. Minute bristle-like teeth on the jaws, vomer, and palatines. Gill-rakers rather long for *Caranx*, 10–22, those on lower limb of arch short anteriorly, the longest contained 6 times in head. Edges of opercles and preopercles membranous.

Body with very small scales; the throat, breast, a considerable area including base and axil of pectoral, and a narrow space extending back from occiput to base of dorsal naked; minute scales on upper edge of opercle and preopercle and also on cheek immediately below eye. Lateral line with a long curve above pectoral, the curved portion equal to half the length of lateral line; 14 or 15 small plates on tail, each with a low keel and a posterior spine. Base of caudal with 5 pronounced lateral keels, the pair on each of the median one oblique and convergent posteriorly.

First dorsal with 7 spines, the posterior two separate and very small; highest spine $2\frac{1}{6}$ in head. Anterior part of soft dorsal filamentous, the tip when depressed extending beyond base of caudal; median rays also filamentous, the filamentous extending above edge of fin a little over half their length. Anterior rays of anal closely united to form a filament which extends to base of caudal when depressed, the succeeding rays low. Both soft dorsal and anal with a high sheath of very small, thin scales. Ventrals $2\frac{1}{5}$ in head. Pectorals falcate, $2\frac{7}{8}$ in the length. Caudal lobes equal, $3\frac{1}{10}$ in the length.

Color in spirits silvery; median dorsal region dusky, opercle dusky above, axil of pectoral black; filaments of dorsal and anal black, caudal dusky on edges and on posterior border, ventrals tipped with blackish.

One specimen, the type, from Takao, Formosa, in the Carnegie Museum, measures $13\frac{1}{2}$ inches in length. There is also a specimen from Cavite, in the Philippines in the Museum of Stanford University.

This species closely resembles *Caranx plumbeus* (Quoy and Gaimard) from which it differs in having a greater number of gill-rakers (14 on lower limb of first arch in *Caranx plumbeus*) and a black anal.

Caranx formosanus Jordan & Snyder, sp. nov.

(Plate LII.)

Head $3\frac{1}{5}$ in length to base of caudal; depth 2; depth caudal peduncle 6 in head; eye $4\frac{1}{2}$; snout $2\frac{1}{2}$; width interorbital space $3\frac{1}{3}$; dorsal VII–23; anal II–19; pores in lateral line about 127.

Dorsal contour of body almost evenly rounded from tip of snout to insertion of dorsal, there being but a slight elevation at occiput; and a small depression anterior to nostrils; interorbital area slightly higher than diameter of eye, the crest sharp. Jaws equal; maxillary extending to a vertical through anterior edge of orbit, the width of its posterior edge contained $1\frac{1}{4}$ times in the suborbital. Broad bands of fine teeth on jaws, vomer, and palatines. Gill-rakers short and strong,

4–16 on the first arch, those on anterior part of lower limb very short, the longest (near angle of arch) contained $7\frac{1}{2}$ times in head.

Scales very small; base and axil of pectoral, breast, and throat naked; a small isolated patch of minute, partly embedded scales anterior to base of pectoral; cheek and upper parts of preopercle and opercle with small scales; head otherwise naked, the unscaled area extending backward to base of spinous dorsal. Lateral line broadly curved above pectoral, the curved part including considerably more than half of the lateral line; straight part of the lateral line with small, weak plates, those on caudal peduncle scarcely keeled and without spines.

Dorsal with 7 spines, the posterior 2 being small and detached; highest spine $2\frac{1}{3}$ in head. Anterior part of soft dorsal elevated but not filamentous, the height 2 in head; other rays $4\frac{1}{2}$ in head. Anal similar in shape to dorsal; height of first rays $1\frac{3}{4}$ in head, following rays 4 in head. Caudal lobes equal, $3\frac{1}{10}$ in the length. Pectoral falcate, $2\frac{7}{8}$ in the length. Ventrals $2\frac{1}{2}$ in the length.

Color silvery; a small dusky spot at upper edge of opercle; axil black; dorsals, anal, and caudal edged with dusky; ventral and pectoral immaculate.

Described from the type, an example $11\frac{1}{2}$ inches long from Takao, Formosa, in the Carnegie Museum, collected by Dr. Hans Sauter. A similar specimen, differing in no particular from the type, was recorded from Formosa as *Carangus armatus* "with opercular spot present; lobes of dorsal and anal very low" (Jordan & Evermann, Proc. U. S. Nat. Mus., XXV, p. 338).

The gill-rakers, few in number and very short, especially on anterior part of lower limb, are characteristic of the species.

ULUA Jordan and Snyder, gen. nov.

(Type *Ulua richardsoni* Jordan and Snyder.)

This genus resembles the subgenus *Citula* in *Caranx*, differing in the larger, oblique mouth, and especially in the very long gill-rakers, which cause the mouth to appear, when opened, as if full of feathers. The name *Ulua* is Polynesian, being applied to the finest food-fish of Hawaii and Samoa, belonging to this group. *Caranx forsteri* Cuv. and Val.

Ulua richardsoni Jordan & Snyder, new species.

(Plate LIII.).

Head $3\frac{1}{2}$ in length to base of caudal; depth $2\frac{1}{3}$; depth caudal peduncle $6\frac{1}{2}$ in head; eye $4\frac{9}{10}$; snout 3; width interorbital space $3\frac{1}{3}$; dorsal VII–21; anal III–16; pores in lateral line about 90.

Dorsal contour steep from snout to occiput, then rising more gently to base of dorsal; interorbital region high and sharp anteriorly, its edge an eye's diameter from orbit. Mouth very large, the maxillary extending to a vertical through center of pupil, $2\frac{1}{10}$ in head, the width of its posterior edge contained $1\frac{1}{2}$ times in suborbital area; lower jaw projecting prominently beyond the upper; no teeth; gill-rakers numerous, 24 + 54, and extremely long, the anterior ones projecting upward and forward along sides of mouth and base of tongue, small lateral setæ giving them a distinctly feather-like appearance; length of longest ones contained $3\frac{1}{2}$ times in head. Edges of opercles and preopercles membranous.

Scales very small, those on lower half of body minute and partly embedded; head, except a small area on upper part of opercle and preopercle, naked; throat and breast naked, the unscaled area extending upward and including base and axil of pectoral; a narrow naked area extending from occiput to base of spinous dorsal; a low sheath of scales along bases of soft dorsal and anal. Lateral line with a gentle upward curve on anterior half; a conspicuous dorsal branch extending upward to occiput and then backward to near origin of spinous dorsal; posterior part of lateral line with about 20 plates which are heaviest on caudal peduncle where a slight keel and a blunt spine are developed. Base of caudal with an indistinct keel on each side of the median row of plates.

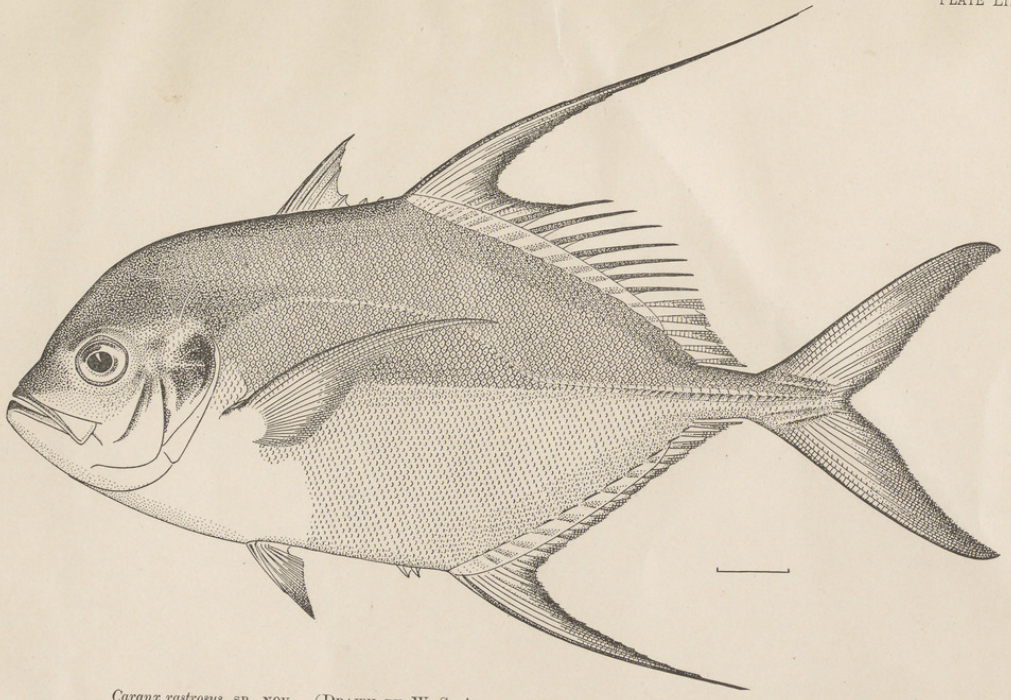
Height of longest dorsal spine contained $3\frac{1}{2}$ times in head, not reaching origin of soft dorsal when depressed, the fin followed by 2 very low free spines; first 5 or 6 rays of soft dorsal elongate, giving the anterior part of fin a somewhat falcate appearance; the following rays about equal in height to diameter of eye. Anal similar in shape to soft dorsal. Caudal very deeply cleft, the lobes equal, their length contained $3\frac{1}{4}$ times in length. Pectoral falcate, $2\frac{2}{3}$ in the length. Ventrals $2\frac{2}{3}$ in head.

Color in spirits bright silvery, somewhat dusky above; axil of pectoral black; median dorsal area from snout backwards dusky; dorsals narrowly edged with dusky; caudal with a dusky margin.

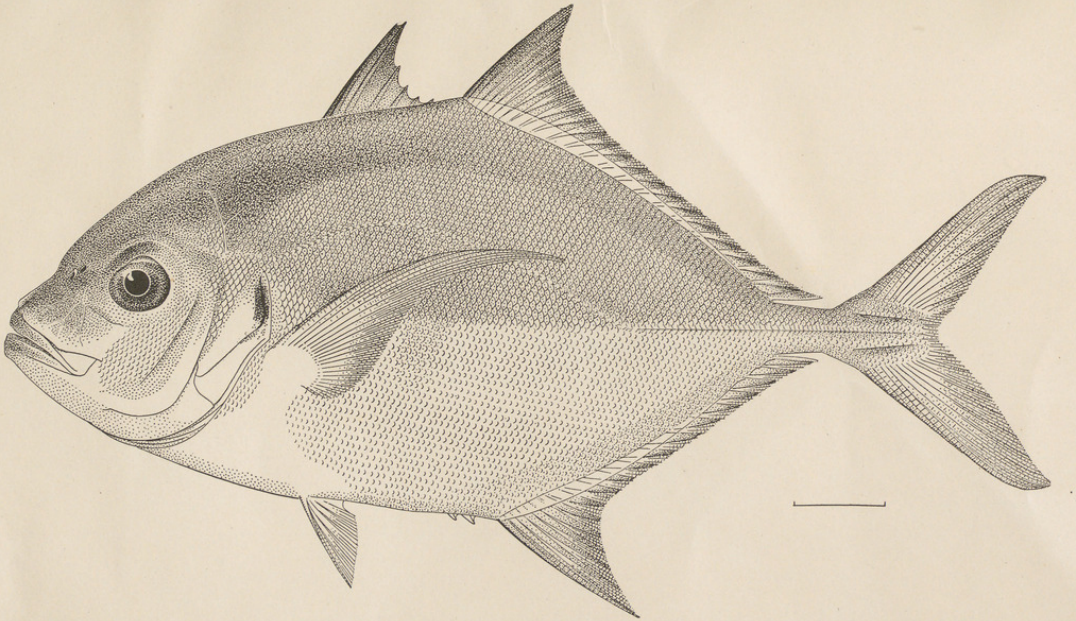
The above description is taken from the type, a specimen 18 inches long from Takao, Formosa, in the Carnegie Museum.

A cotype measuring 9 inches, from the same locality, has the interorbital area slightly lower, the soft dorsal decidedly filamentous, the tip extending backward to middle of caudal fin, and the pectoral more curved and falcate. Other specimens from Cavite, P. I., recorded as *Caranx plumbeus* (Jordan and Seale, Bull. Bureau Fisheries, XXVI, p. 14) do not appear to differ from the Formosan examples.

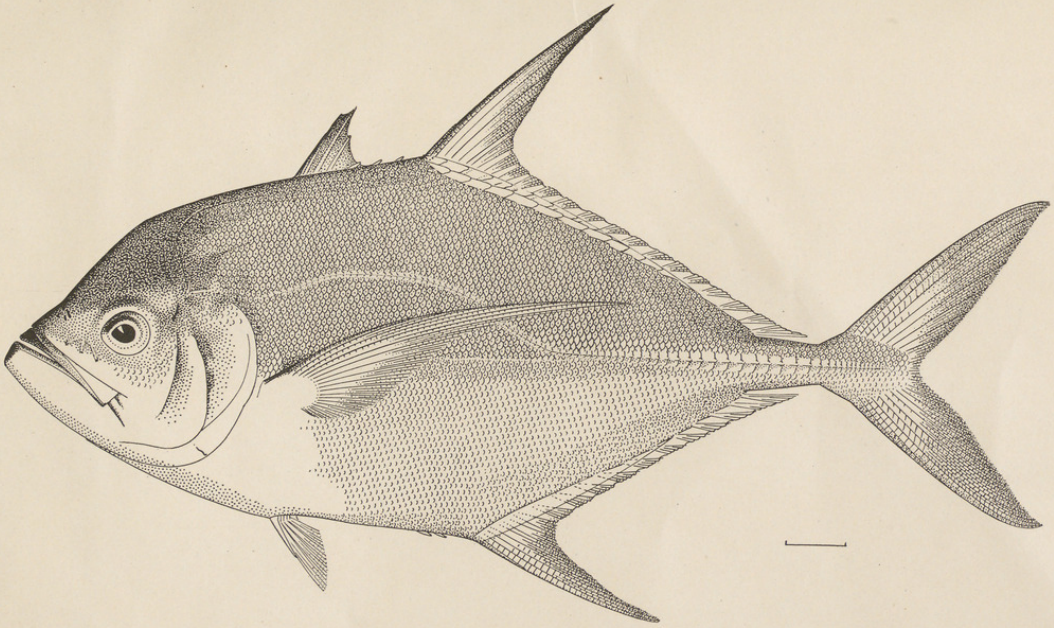
The species is named for Mr. Robert Earl Richardson, who first recognized the distinctness of the genus.



Caranx rastrosus, SP. NOV. (DRAWN BY W. S. ATKINSON FROM THE TYPE, TAKEN AT TAKAO, FORMOSA.)



Caranx formosanus, SP. NOV. (DRAWN BY W. S. ATKINSON FROM THE TYPE, TAKEN AT TAKAO, FORMOSA.)



Ulua richardsoni, SP. NOV. (DRAWN BY W. S. ATKINSON FROM THE TYPE, TAKEN AT TAKAO, FORMOSA.)