

Marine Biological Laboratory  
LIBRARY

JUL 22 1974

Woods Hole, Mass.

PROCEEDINGS  
OF THE  
CALIFORNIA ACADEMY OF SCIENCES

FOURTH SERIES

Vol. XXXIX, No. 22, pp. 507-516; 3 figs.

June 27, 1974

**NEZUMIA (KURONEZUMIA) BUBONIS, A NEW  
SUBGENUS AND SPECIES OF GRENADIER  
(MACROURIDAE: PISCES) FROM HAWAII AND  
THE WESTERN NORTH ATLANTIC**

By

Tomio Iwamoto

*California Academy of Sciences  
San Francisco, California 94118*

INTRODUCTION

In the course of exploratory fishing by the R/V *Oregon* off the Caribbean coast of Colombia in the spring of 1964, a large black grenadier was captured by a trawl fished at a depth of 400 fathoms. The fish resembled *Nezumia atlantica* (Parr, 1946) in its general body shape and dentition, but it differed widely in several meristic and morphometric features and in having a velvetlike texture to its squamation and a peculiarly enlarged scaly swelling anterior to the vent. Additional specimens were subsequently collected both in the Caribbean Sea and in the Gulf of Mexico by the R/V *Pillsbury* and the R/V *Oregon II*. The surprising presence of this species off Hawaii was revealed upon examination of the fishes collected by Paul J. Struhsaker of the National Marine Fisheries Service. An undescribed, closely related species from the South China Sea was examined in June, 1970, in the collections of the Fisheries Research Station, Aberdeen, Hong Kong.

In squamation and in head shape the new species resembles certain species of *Malacocephalus*, and the swelling before the vent appears to be an exaggeration of the slight swelling before the vent in members of that genus; but the dentition, the strong serrations on the second spinous dorsal ray, and several other features are totally in disagreement. In such features as length of upper jaw and number of pyloric caeca, the species approaches certain species of *Ventrifossa*; but in other more important characters, such as the structure of the light

organ and the shape of the head, it differs widely from most members of that genus.

The difficulty of allocating the species to a genus has led to further, more extensive study of the generic problems concerning *Malacocephalus* Günther, 1862; *Ventrifossa* Gilbert and Hubbs, 1920; and *Nezumia* Jordan, 1904 (Iwamoto, MS). Publication of that study is being delayed because of the desire to incorporate much additional material. The description given here of the new species of *Nezumia* is being published at this time to make the name available to other workers. I have refrained from describing as new the species from the South China Sea because permanent disposition of the single representative has not been assured. The specimen now is at the Aberdeen Fisheries Research Station, Hong Kong. The new species and its closest congener from the South China Sea share certain characters (as indicated in the diagnosis below) so different from those in other members of the genus *Nezumia* that subgeneric status is designated.

#### METHODS

Methods for making counts and measurements generally follow procedures outlined by Hubbs and Lagler (1958) and further described for macrourids by Gilbert and Hubbs (1916) and Iwamoto (1970). The rounded snout of the species treated here and the lack of a prominent terminal scute make determination of the anterior tip of the nasal rostrum difficult. For this reason, measurements normally taken from the tip of the nasal rostrum (e.g., snout length, head length) are instead taken from whichever median point on the snout is more anterior. All rays of the pectoral fin are counted, including the short, usually thin, sliver-like uppermost ray and the 1 to 3 small lowermost rays. All gillrakers, including rudimentary ones, along the medial sides of the first and second gill arches are counted.

Institutional abbreviations are as follows: BPBM—Bernice P. Bishop Museum, Honolulu, Hawaii; CAS—California Academy of Sciences, San Francisco, California; FRSA—Fisheries Research Station, Aberdeen, Hong Kong; UMMI—University of Miami, Rosenstiel School of Marine and Atmospheric Sciences, Miami, Florida; USNM—Division of Fishes, United States National Museum of Natural History, Washington, D.C.

#### ACKNOWLEDGMENTS

I thank the persons listed below for their assistance during the preparation of this paper. The following made specimens available for examination: Harvey R. Bullis, National Marine Fisheries Service (NMFS), Miami, Florida; Edward F. Klima, NMFS, Pascagoula, Mississippi; Paul J. Struhsaker, NMFS, Honolulu, Hawaii; William Chan, Fisheries Research Station, Aberdeen, Hong Kong; C. Richard Robins, Rosenstiel School of Marine and Atmospheric Sciences, Miami, Florida. Lillian J. Dempster and William N. Eschmeyer critically reviewed the manuscript.

**Nezumia** Jordan *in* Jordan and Starks, 1904Subgenus **Kuronezumia** Iwamoto, new subgenus

**DIAGNOSIS.** Species of *Nezumia* with light organ peculiarly enlarged into a bulbous, scaly, wartlike structure anterior to anus and between pelvic fin bases (fig. 3); bulbous structure housing a large lens which partly encapsulates luminescent gland that fronts anterior wall of rectum. Light organ closely associated with pelvic girdle, the large lens essentially overriding part of girdle. Anterior dermal window of light organ at bottom of deep fossa and covered by bulbous lens-luminescent-gland mass. Snout almost entirely covered with small uniform scales; only thin margin above upper lips naked. Scales on suborbital region small, uniform, not forming a stout ridge. Body scales small, densely covered with extremely fine erect spinules. Color dark brown to black. Second spinous ray strongly serrated.

**REMARKS.** The bulbous structure housing the light organ in species of the subgenus *Kuronezumia* is apparently unique in the family, although the structure is vaguely approached by a swelling in the same region in members of *Malacocephalus*. (It appears to be an anteroventral swelling of the scaled area between the periproct and the anterior dermal window and a gross hypertrophy of the condition in *Malacocephalus*, where the area is slightly raised and the anterior dermal window sits in a relatively deep fossa, with the posterior wall of the depression steep, but not overlapping.) The species of the new subgenus have a darker overall coloration than almost every other member of *Nezumia* and resemble *Trachonurus* in that regard. Members of the subgenus are probably the largest of the genus, with *N. (Kuronezumia) bubonis* attaining a length of over 630 mm. The largest specimen of *N. atlantica* (another large species of *Nezumia*) I have measured is 450 mm. in total length.

**ETYMOLOGY.** The name is derived from the Japanese, *kuroi*, black or dark, and *nezumi*, rat, and is to be treated as feminine in gender.

**Nezumia bubonis** Iwamoto, new species.

(Figures 1-3.)

**COUNTS.** First dorsal rays II, 10-12; pectoral fin rays 23-26; pelvic fin rays 11-12 (one specimen with 9 in one fin, another specimen with 13 in one fin). Gillrakers on first arch 1-2 + 7-9 (usually 2 + 8); rakers on second arch 1-2 + 7-9. Scales below origin of first dorsal fin 14 to about 20, below origin of second dorsal fin 12-14; lateral line scales counted from the anteriormost scale posteriorly over distance equal to predorsal length 47-61. Abdominal vertebrae 13.

**MORPHOMETRY.** Head length of 10 specimens examined 30 to 125 mm.; total length 140 + to 630 mm. The following measurements are in percent of head length: snout length 26-32; ventral length of snout 13-18; orbit diameter 23-31; interorbital width 23-26; postorbital length 44-51; distance orbit to

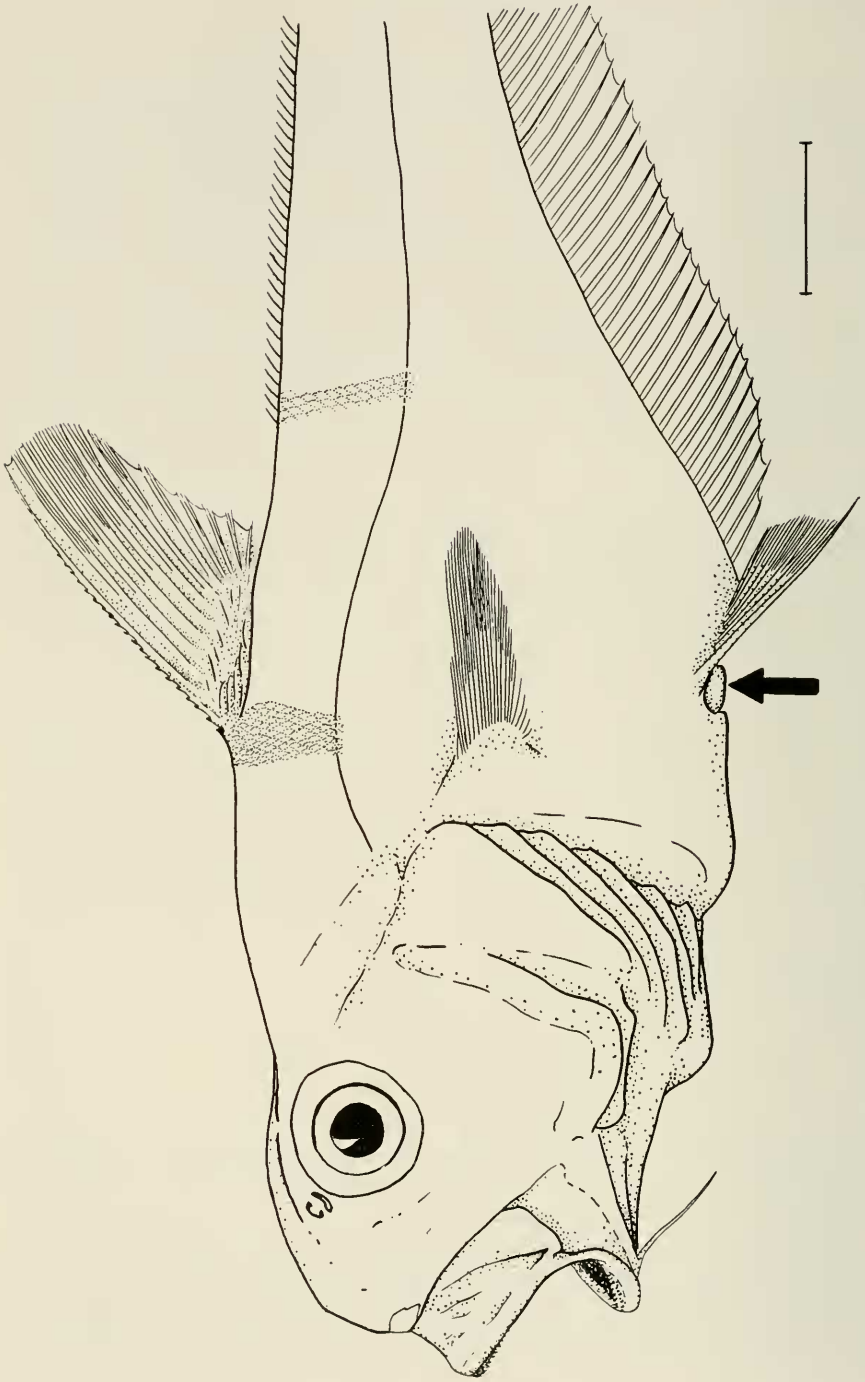


FIGURE 1. Holotype of *Nezamia* (*Kuronezamia*) *bubonis* Iwamoto, CAS no. 27872, 85.5 mm. head length, Gulf of Mexico, R/V *Oregon* station 4814. Arrow points to bulbous enlargement of light organ. Scale represents 25 mm.

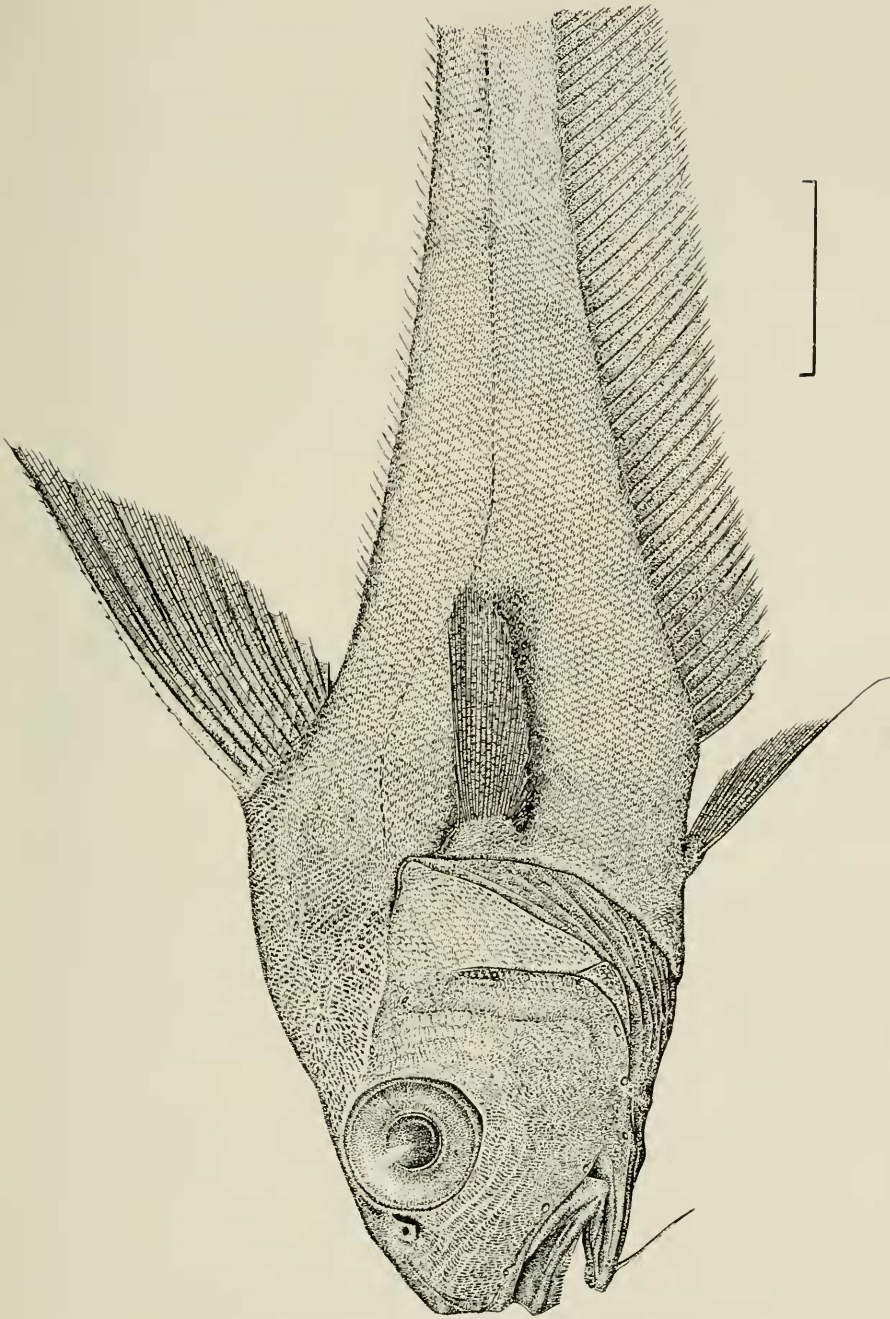


FIGURE 2. Paratype of *Nezumia bubonis*, BPBM uncatalogued, 59 mm. head length, from off Hawaii, R/V Townsend Cromwell cruise 40, station 87. Scale represents 25 mm.

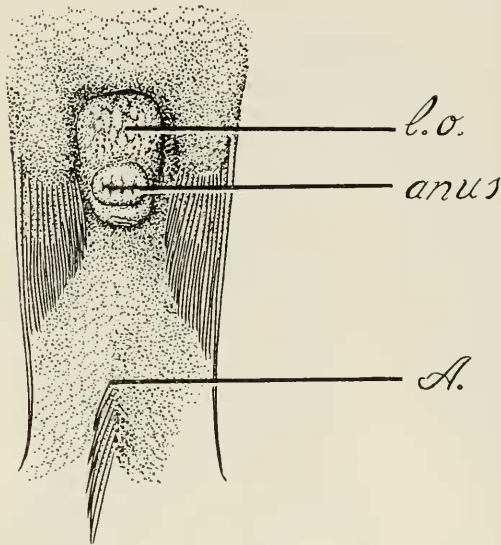


FIGURE 3. Ventral view of abdominal area of *Nezumia bubonis* showing position of bulbous swelling of light organ (l.o.) before anus. A.—origin of anal fin.

angle of preopercle 34–44; suborbital width 17–20; length upper jaw 35–44; greatest body depth 88–109; distance from base of outer pelvic fin to origin of anal fin 23–37 (usually 31–37); distance anus to anal origin 11–22; interspace between first and second dorsal fins 19–34; height first dorsal fin 89–92 (2 specimens); length pectoral fin 49–66; length outer pelvic ray 40–64; length barbel 20–29; length outer gill slit 16–21.

DESCRIPTION. Body deep, its greatest depth just anterior to first dorsal fin; trunk short, distance isthmus to anal origin about one-half length of head; body tapering rapidly behind trunk into long straplike tail. Head about one-fifth total length, laterally compressed, sides almost flat with no prominent projections or ridges; interorbital space slightly convex, proportionately widest in largest specimens; suborbital area broad, flat, evenly and completely scaled, without a coarsely scaled ridge. Mouth almost terminal; posterior end of maxillary lying under anterior half of orbits. Snout broadly rounded in profile, without a well-marked tip, generally not projecting beyond upper jaws. Orbits elliptic, proportionately largest in smallest specimens, usually longer in vertical than in horizontal diameter; upper margins not entering dorsal profile. Gill membranes united just behind vertical through posterior margin of orbits, attached to isthmus with a moderately narrow posterior free fold.

Fin positions best seen in illustration of 59-mm.-head-length paratype from Hawaii (fig. 2). Severe dorsal flexure distorts normal positions of fins of holotype. First dorsal fin complete in only two paratypes from Hawaii, measuring

89 and 92 percent of head length; spinous second ray strongly serrated along leading edge and slightly produced. Pelvic fins finely but densely scaled along exposed bases; outer ray slightly prolonged beyond other rays.

Head and body generally evenly and completely scaled. Exposed posterior and posteroventral margins of interoperculum scaled. Gular and branchiostegal membranes generally naked, although a few small patches of deeply embedded scales occasionally found at bases of branchiostegal rays; in one specimen, a few scales found at extreme tips of fourth and fifth branchiostegal rays. A narrow margin of scaleless skin along snout just above upper lip.

Scales on body and head very small and strongly adherent. Long, fine, slender spinules densely cover scales on body; spinules on nape scales almost erect, those on other parts of body reclined at about a 30-degree angle from vertical. Scales on head tend to have somewhat more stubby and conical spinules generally arranged in 3-7 radiating rows. No stout modified scales present on snout or suborbital region.

Pyloric caeca of two specimens moderately long (about 35 percent head length), unbranched, 35 and 39 in number. Gas glands of swim bladder two, kidney-shaped in outline although almost round in cross section; retia two, long and thin, about 16 mm. long in 113-mm.-head-length specimen.

Dentition consists of broad villiform bands of small teeth in both jaws with a slightly enlarged, evenly spaced outer series in upper jaw.

General color swarthy to dark brown with ventral surfaces of head, gill covers, and abdomen black to brownish black. Lips, gular and branchiostegal membranes, barbel, margins of orbits, periproct, and scaleless ventral margin of snout black. Buccal membranes light gray to dark gray. Gill cavity linings generally blackish towards outer and upper margins and paler ventrally and deeper within the cavity. Peritoneal membrane pallid with numerous black specks. All fins black.

COMPARISONS AND RELATIONSHIPS. The closest relative of *Nezumia bubonis* is an undescribed species from the South China Sea. Together they comprise the subgenus *Kuronezumia*. *Nezumia bubonis* differs from the undescribed species in having more pelvic fin rays (normally 11-12 compared with 8), slightly fewer scales below the second dorsal fin (12-14 versus 16) and a narrower interorbital space (23-26 percent of head length compared with 29 percent).

*Nezumia darus* (Gilbert and Hubbs, 1916) most closely approaches the members of subgenus *Kuronezumia* by its somewhat similar squamation and head physiognomy. The absence of ventral tubercular swellings, the more pronounced terminal snout scute, and the fewer scale rows below the second dorsal fin immediately separate *N. darus* from both *N. bubonis* and its South China Sea counterpart. *Nezumia burragei* (Gilbert, 1905), *N. hebetatus* (Gilbert, 1905), and *N. macronemus* (Smith and Radcliffe in Radcliffe, 1912)

all fall in a loose group near *N. darus* in their resemblance to the species of subgenus *Kuronezumia*. But, in addition to the subgeneric distinctions, *N. burragei* differs in having a well developed terminal snout scute and a sub-orbital ridge formed of two rows of stout scutelike scales, and most of the ventral surfaces of the snout and suborbital area naked; *N. hebetatus* differs in having a more pointed snout, extensive naked areas on both the upper and lower surfaces of the snout and on the ventral surface of the suborbital region, a narrow suborbital ridge formed of two rows of stout scales, and a posterior margin of the preoperculum that is inclined forward; and *N. macronemus* differs in having a more pointed snout and lanceolate scale spinules.

DISTRIBUTION. Off the Hawaiian Islands, in the Gulf of Mexico, and in the Caribbean Sea. Capture depths ranged from 732 to 1062 meters.

ETYMOLOGY. The name comes from the Greek, *bubonis*, a tumor, and is to be treated as a noun in apposition.

REMARKS. The peculiar distribution pattern of this species cannot be adequately explained because of the paucity of material and our present general lack of knowledge of dispersal means of macrourid fishes. Probably the species is much more widely distributed and the lack of more locality records is simply a reflection of sketchy collecting efforts.

SPECIMENS EXAMINED. Holotype: CAS no. 27872, 86 mm. head length, 480 mm. total length (including a small pseudocaudal), western Gulf of Mexico off Barra San Antonio, Mexico, ( $24^{\circ}49'N.$ ,  $96^{\circ}27'W.$ ), in 500 fathoms (914 meters), by 40-ft. otter trawl, R/V *Oregon* station 4814, 12 March 1964, bottom temperature  $41^{\circ}F$  ( $5^{\circ}C$ ).

Paratypes (9 specimens from 7 localities): USNM 210592 (2, 53–100 mm. head length, 284–500 mm. total length), off Colombia, R/V *Oregon* station 4902 ( $9^{\circ}02'N.$ ,  $76^{\circ}31.5'W.$ ), in 400 fathoms (732 meters), by 65-ft. otter trawl, 28 May 1964; UMML uncatalogued (1, 111 mm. H.L., 550 mm. T.L.), off Colombia, R/V *Pillsbury* station 388 ( $10^{\circ}16'N.$ ,  $76^{\circ}03'W.$ ), in 450–580 fathoms (823–1061 meters), by 40-ft. otter trawl, 15 July 1966; CAS no. 27873 (1, 125 mm. H.L., 630 mm. T.L.), Gulf of Mexico, R/V *Oregon II* station 10955 ( $21^{\circ}41'N.$ ,  $96^{\circ}55'W.$ ), in 490 fathoms (896 meters), by 150-ft. otter trawl, 3 June 1970; USNM 210593 (1, 113 mm. H.L., 560 mm. T.L.), Gulf of Mexico, R/V *Oregon II* station 11136 ( $24^{\circ}27'N.$ ,  $87^{\circ}38'W.$ ), in 500 fathoms (914 meters), by 71-ft. otter trawl, 9 August 1970; BPBM uncatalogued (1, 39.6 mm. H.L., 180 + mm. T.L.), Hawaiian Islands, R/V *Townsend Cromwell* cruise 35, station 24 ( $21^{\circ}06.5'N.$ ,  $156^{\circ}13.5'W.$ ), in 640–686 meters, by 41-ft. otter trawl, 5 April 1968; CAS no. 27874 (2, 30–56 mm. H.L., 140 + –246 mm. T.L.), Hawaiian Islands, R/V *Townsend Cromwell* cruise 40, station 86 ( $21^{\circ}06.8'N.$ ,  $156^{\circ}13.7'W.$ ), in 631–705 meters, by 41-ft. otter trawl, 23 November 1968; BPBM uncatalogued (1, 59 mm. H.L., 247 mm. T.L.), Hawaiian Islands, R/V



Townsend Cromwell cruise 40, station 87 ( $21^{\circ}04.6'N.$ ,  $156^{\circ}10.6'W.$ ), in 623–667 meters, by 41-ft. otter trawl, 23 November 1968.

### Nezumia species.

COUNTS. First dorsal fin rays II,10; pectoral fin rays 24; pelvic fin rays 8. Gillrakers on first arch 2 + 8; on second arch 2 + 7. Scales below origin of first dorsal fin 17–18; below origin of second dorsal fin 16; lateral line scales counted from the anteriormost scale for a distance equal to the predorsal length 50.

MORPHOMETRY. The following are in percent of head length: snout length 30; orbit diameter 25; interorbital width 29; postorbital length 48; distance orbit to angle of preopercle 41; suborbital width 18; length upper jaw 41; greatest body depth 100; interspace between first and second dorsal fins 21; height of first dorsal fin 93; length pectoral fin 63; length outer pelvic ray 55; length barbel 22; length outer gill slit 20.

DIAGNOSIS. A species of *Nezumia* of the subgenus *Kuronezumia* with 8 pelvic fin rays. Scales very small, finely spinulated, 16 rows below origin of second dorsal fin. Pectoral fin rays 24. Interorbital width 29 percent of head length.

REMARKS. The species agrees with the description previously given of *Nezumia bubonis* so closely that it would be redundant to repeat the same characters. A comparison of the differences between the two species of the subgenus is given in the description of *N. bubonis*.

DISTRIBUTION. South China Sea.

SPECIMEN EXAMINED. FRSA uncatalogued, (50 mm. H.L.), from the South China Sea.

### LITERATURE CITED

#### GILBERT, CHARLES H.

1905. The deep-sea fishes of the Hawaiian Islands. Pp. 576–713, pls. 66–101, figs. 230–276. In, David Starr Jordan and Barton Warren Evermann: The aquatic resources of the Hawaiian Islands. Bulletin of the United States Fish Commission, vol. 23, part 2.

#### GILBERT, CHARLES H., AND CARL L. HUBBS

1916. Report on the Japanese macrouroid fishes collected by the United States fisheries steamer "Albatross" in 1906, with a synopsis of the genera. Proceedings of the United States National Museum, vol. 51, no. 2149, pp. 135–214, pls. 8–11.
1920. Contributions to the biology of the Philippine Archipelago and adjacent region. The macrouroid fishes of the Philippine Islands and the East Indies. United States National Museum, Bulletin 100, vol. 1, part 7, pp. 369–588.

#### GÜNTHER, ALBERT

1862. Catalogue of the fishes in the British Museum, vol. 4, pp. 1–534.

#### HUBBS, CARL L., AND KARL F. LAGLER

1958. Fishes of the Great Lakes region. Revised edition. Cranbrook Institute of Science, bulletin 26, pp. 1–213.

## IWAMOTO, TOMIO

1970. The R V *Pillsbury* deep-sea biological expedition to the Gulf of Guinea, 1964-65.  
19. Macrourid fishes of the Gulf of Guinea. *Studies in Tropical Oceanography*, Miami, no. 4, part 2, pp. 316-431, figs. 1-27.

(MS). Macrourid fishes of the tribe Malacocephalini (Macrouridae: Gadiformes).  
Doctoral dissertation submitted to the University of Miami, June 1972.

## JORDAN, DAVID S., AND EDWIN C. STARKS

1904. List of fishes dredged by the steamer *Albatross* off the coast of Japan in the summer of 1900, with descriptions of new species and a review of the Japanese Macrouridae [by Jordan and Gilbert]. *Bulletin of the United States Fish Commission*, vol. 22 for 1902, pp. 577-630, pls. 1-8.

## PARR, ALBERT E.

1946. The Macrouridae of the western North Atlantic and Central American seas. *Bulletin of the Bingham Oceanographic Collections*, no. 10, part 1, pp. 1-99.

## RADCLIFFE, LEWIS

1912. Scientific results of the Philippine cruise of the fisheries steamer "Albatross," 1907-1910. No. 21. Descriptions of a new family, two new genera, and twenty-nine new species of anacanthine fishes from the Philippine Islands and contiguous waters. *Proceedings of the United States National Museum*, vol. 43, no. 1924, pp. 105-140, pls. 22-31, figs. 1-11.