

AUSTRALIAN MUSEUM SCIENTIFIC PUBLICATIONS

Hoese, Douglass F., 1975. A revision of the gobiid fish genus *Kelloggella*.
Records of the Australian Museum 29(17): 473–484. [6 June 1975].

doi:10.3853/j.0067-1975.29.1975.214

ISSN 0067-1975

Published by the Australian Museum, Sydney

nature culture **discover**

Australian Museum science is freely accessible online at
www.australianmuseum.net.au/publications/
6 College Street, Sydney NSW 2010, Australia



A REVISION OF THE GOBIID FISH GENUS *KELLOGGELLA*

BY DOUGLASS F. HOESE

Plates 1-3, Figures 1-3.

Manuscript received, 14th March, 1974.
Manuscript revised, 20th June, 1974.

SUMMARY

The genus *Kelloggella* is diagnosed on the basis of the four known species. The nominal genera *Itbaya*, *Atuona*, and *Agunia* are placed in the synonymy of *Kelloggella*. The four species are compared and *K. centralis* is described as new.

INTRODUCTION

The four goby species of the genus *Kelloggella* are among the smallest fishes known. The largest specimen recorded is 26 mm standard length. Because of the small size of the species, many of the features characterizing the genus and those separating the species have been overlooked or incorrectly reported. This situation has led to the description of five species placed in five different genera. The discovery of a new species from Eniwetok and Rarotonga led to the present revision.

Jenkins (1903) described the first known species, an Hawaiian species, in the New World genus *Enypnias*, as *E. oligolepis*. The generic placement was based on the alleged occurrence of scales on the posterior part of the body. Examination of recently collected material and the original material has failed to reveal any scales or scale pockets. Jordan and Seale (1906) described *Kelloggella cardinalis* from Samoa as the type species of *Kelloggella*. They also allocated *E. oligolepis* to *Kelloggella*. The genus was characterized as having a naked body and an elongate head and body, but no mention was made of the tricuspid teeth characteristic of the genus. Bean and Weed (1912) later reported the tricuspid teeth in *Kelloggella*. Herre (1927) redescribed *K. cardinalis* from the Philippines, as a new species and genus, *Itbaya nuda*. The genus *Itbaya* was diagnosed as having tricuspid teeth in the lower jaw only and a naked body. The genus was also characterized as having an interorbital crest, which is developed only in large individuals and is accentuated by dehydration upon preservation. Herre (1935) subsequently described *Atuona tricuspidata* from the Marquesas with tricuspid teeth in both jaws and the naked body. He compared the genus with *Itbaya* separating the two on the basis of the dentition. Fowler (1946) described the fourth genus *Agunia*, with *A. quindecimfasciata* as the type species, virtually identical with *K. oligolepis*. Fowler incorrectly reported four dorsal spines, rather than six. He separated *Agunia* from *Itbaya* on the basis of the deeper body, longer pectoral fins, and barred coloration of *Agunia*. He noted the tricuspid teeth, but made no comparison with *K. oligolepis*. Undoubtedly much of the confusion arose due to the lack of comparative material and technical difficulties in studying teeth in 2 mm jaws.

Specimens of *Kelloggella* are rare in collections. The species are known from few areas, only oceanic islands of the tropical western and central Pacific Ocean. Although the species are known from very shallow water, their small size has probably contributed to their apparent rarity. Little is known of the habits of the species, although these are under study by Helen Larson at Guam. While separable on fin ray counts, the species can be most easily separated by colouration.

METHODS

The following abbreviations are used in reference to material examined: AMNH, American Museum of Natural History, New York; AMS, Australian Museum, Sydney; ANSP, Academy of Natural Sciences, Philadelphia; BC, University of British Columbia; BPBM, Bernice P. Bishop Museum, Honolulu; CAS, California Academy of Sciences, San Francisco; LACM, Los Angeles County Museum of Natural History; SU, Stanford University (specimens now in CAS); UG, University of Guam; USNM, National Natural History Museum, Washington, DC.

All fish lengths given are standard length. All measurements were taken with the aid of an ocular micrometer.

The first ray of the anal and second dorsal is always a spine (= simple ray) in the species studied. The remaining rays are all segmented. The last ray of the dorsal and anal fins consists of two elements, in contact, though distinct through the extreme base. Ray counts in Table 1 are total ray counts. Vertebrae were counted from radiographs and counts include the urostyle. The osteology was studied from trypsin-prepared cleared-and-stained specimens.

Kelloggella Jordan and Seale

Kelloggella Jordan and Seale 1905 (in Jordan and Evermann): 488. (Type species *Enypnias oligolepis* Jenkins, by monotypy.)

Kelloggella Jordan and Seale, 1906: 409. (Type species *Kelloggella cardinalis* Jordan and Seale, by original designation.)

Itbaya Herre, 1927: 288. (Type species, *Itbaya nuda* Herre, by original designation.)

Atuona Herre, 1935: 428–429. (Type species, *Atuona tricuspidata* Herre, by original designation.)

Agunia Fowler, 1946: 207. (Type species, *Agunia quindecimfasciata* Fowler, by original designation.)

All species of *Kelloggella* examined share the following characters: Teeth of jaws tricuspid, outer row enlarged. Body elongate and compressed (depth into standard length 5 to 7). Head strongly compressed, interorbital region elevated above laterally placed eyes. Branchiostegal rays 5. Scales absent. Head pores absent. First dorsal fin with 6 spines. Second dorsal rays 11 to 13. Anal rays 8 or 9. Gut elongate. First dorsal fin low, spines equal to or slightly longer than rays of second dorsal. Snout evenly rounded in lateral view. Anal spine under third or fourth ray of second dorsal. Vertebrae 11 + 15 = 26. Only one inter-

hemal before first hemal spine. Pectoral rays few, 12 to 15, all but two branched. Gill opening narrow (lower attachment of membrane just below pectoral base). Mouth slightly oblique, ending approximately under middle of eye, anterior margin of jaws directly under anterior tip of snout. Pelvic disc short, reaching about one-third to one-half of distance to anus; pelvics I, 5, fused into a cup-shaped disc. Papillae of lateralis system poorly developed; a few widely spaced papillae around dorsal, posterior, and ventral margin of eye; one line of widely spaced papillae from posterior margin of eye to just above upper and posterior margin of operculum. Each nostril with a raised rim, that of anterior nostril longer, sometimes tubular.

The osteology of three cleared specimens of *K. oligolepis* from Easter Island was studied. This species shows considerable reduction in the extent of ossification of several bones. The supraoccipital crest and the lower fork of the posttemporal are absent. The pectoral radials are poorly ossified. The frontal is incomplete. There is a gap between the frontal and the surrounding bones. Gosline (1955) also discussed the osteology of this species.

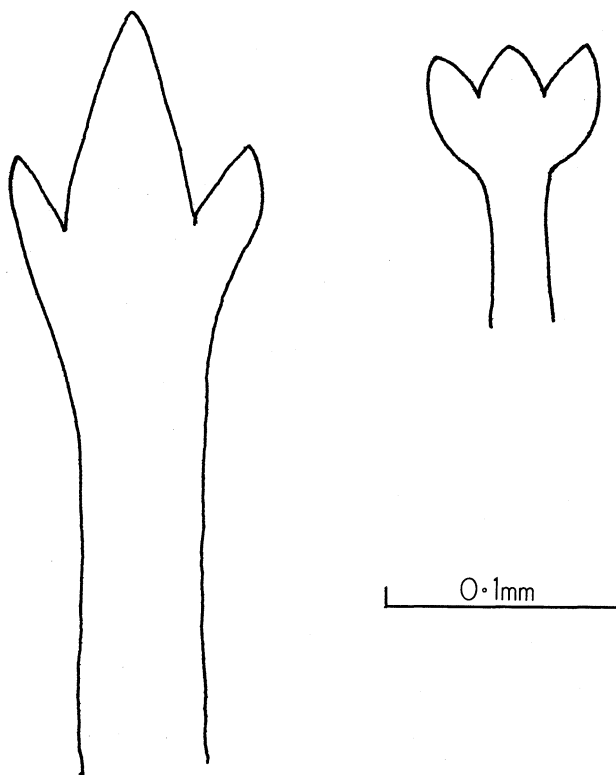


Figure 1.—Enlarged tricuspid tooth in the outer row of the upper jaw of *Kelloggella* (left) and tooth from an inner row. Scale 0.1 mm.

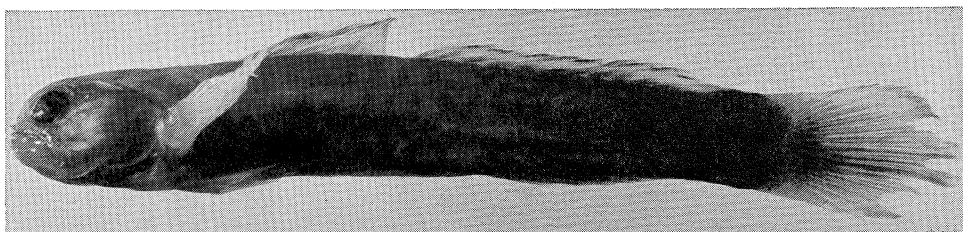
The mouth shape, elongate compressed body, lack of scales, elongate gut, short pelvic fins, and dentition separate this genus from other gobiids. The relationship of the genus to other gobiids is unknown. In all species of the genus examined the teeth of the outer row in each jaw are enlarged, and the median cusp of each tooth is the longest (Fig. 1). In all species, one or both lateral cusps may be lacking on some teeth in the outer row of the upper jaw in a given individual. Large males have one to four pairs of enlarged curved conical teeth, laterally in the inner row of the lower jaw. The anterior teeth in this row are smaller, simple (in both sexes), and conical. In each jaw there are three to seven rows of smaller tricuspid teeth, with equal-sized cusps. Posteriorly these rows converge into one or two rows.

Since the species differ in few characters only diagnostic characters are given in the species descriptions.

The species of *Kelloggella* are separable on colouration, dentition, and fin ray counts. There is some overlap between species in fin ray counts. Based on specimens studied the following percentage of misidentifications can result from the counts: second dorsal rays 11 per cent; anal rays 5 per cent; pectoral rays 9 per cent; and segmented caudal rays 7 per cent.

Key to the species of *Kelloggella*

1. Body without transverse bands or distinctive marks.
(Four or five inner rows of small tricuspid teeth in jaws. Second dorsal I, 12. Anal, I, 8. Pectoral rays modally 14. Segmented caudal rays modally 16). Samoa, Tonga, and Guam *K. cardinalis* (Jordan & Seale)
1. Body with transverse bands or a series of transverse blotches, appearing as interrupted bands 2
2. Body with seven dark bands from the origin of the first dorsal fin to the base of the caudal; interspaces broad in adults, about equal to band width or broader. Caudal fin with dark bands dorsally. Six or seven inner rows of small tricuspid teeth in each jaw. Second dorsal modally I, 12. Anal modally I, 8. Pectoral modally 14. (Segmented caudal rays 16). Marquesas *K. tricuspidata* (Herre)
2. Body with eight to 13 dark bands, which may be interrupted by a series of spots along the midside; interspaces equal to or much narrower than dark bands. Caudal fin dusky or clear, without distinct bands or spots. Three or four inner rows of small tricuspid teeth in each jaw. Second dorsal usually I, 10-11. Anal modally I, 7. Pectoral usually 12 or 13 3
3. Body with eight to 11 dark bands; interspaces between band narrow in adults, about one-fifth band width. Segmented caudal rays typically 15. Second dorsal usually I, 10-11. Pectoral modally 13. Ryu Kyu Islands, Hawaii, and Easter Island *K. oligolepis* (Jenkins)
3. Body with about 11 to 13 spots along midline in females above and below this line a series of spots along bases of median fins or with 11 to 13 dark bands in males. Segmented caudal rays modally 16. Second dorsal modally I, 10. Pectoral modally 12. Raratonga and Eniwetok *K. centralis*, new species.

Kelloggella cardinalis (Jordan and Seale)

First Plate.—*Kelloggella cardinalis*, Tonga, BPBM 14662. 25 mm SL. Photo by Charles Turner.

Kelloggella cardinalis Jordan and Seale, 1906: 409, pl. 53, fig. 1 (type locality Samoa). Schultz, 1943 (listed after Jordan and Seale).

Itbaya nuda Herre, 1927: 288–289, pl. 23, fig. 2 (type locality Itbayat, Philippines). Herre, 1935: 429 (comparison with *Atuona tricuspida*). Fowler, 1946: 207 (comparison with *Agunia quindecimfasciata*).

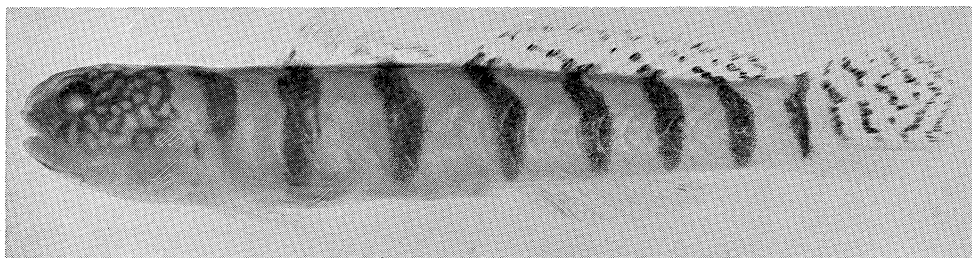
Fin ray counts are given in Tables 1 and 2. Inner row of teeth in lower jaw with two to four pairs of enlarged conical teeth, larger in males. Adults with slight fleshy crest extending from behind eyes to before eyes.

Coloration in alcohol—Body uniformly brown or black, covered with evenly spaced minute dark spots. A few small spots below eye, sometimes forming two irregular vertical bands. Bases of dorsal fins dusky, central part lighter; a faint black longitudinal stripe near distal margin of fins. Anal, caudal, pectoral, and pelvic fins clear to dusky, without spots or bands.

Colouration of fresh material—Body grass-green to greenish-black. Dorsal and anal fins bright cherry-red to bright orange edged with black. Caudal fin bright cherry-red to grey. Pectoral and pelvic fins green to golden-green (after Jordan and Seale, 1906).

Herre (1927) characterized *Itbaya nuda* as lacking canines in the lower jaw, having simple teeth in the outer row of the upper jaw, having a prominent fleshy interorbital crest, and in having a uniformly colored body. He did not indicate whether the inner rows of teeth were tricuspid. The interorbital crest was found to result from dehydration of the prominent compressed, fleshy, interorbital and snout regions in large specimens. The outer row of teeth in the upper jaw has small lateral cusps, with the outer cusp often absent. The specimens from Guam do differ from those from more eastern areas in usually having shorter canines, but some specimens from Guam have prominent curved teeth. The specimens from Guam also have fewer spots under the eye. These differences are minor, and it is very likely that Herre incorrectly reported simple teeth in the upper jaw. It is apparent that *Itbaya nuda* is a species of *Kelloggella* and is regarded here as a synonym of *K. cardinalis*. Herre reported four branchiostegal rays in *Itbaya* rather than five as always found in gobiids.

Samoa: Holotype and paratype, 2 (23–25) USNM 51785. One paratype, SU 8699. New Hebrides: ANSP 71395 1 (23); ANSP 91354 9 (9–21). Tonga: BPBM 14662 4 (21–25). Guam: USNM 124063 1 (22); UG (uncatalogued, 15 May 1972, H. Larson) 5 (14–21).

Kelloggella tricuspidata (Herre)

Second Plate.—*Kelloggella tricuspidata*, Marquesas Islands, BPBM 10872. 26 mm SL. Photo by Gregory Millen.

Atuona tricuspidata Herre, 1935: 429–430 (type locality Atuona, Hiva Oa Island, Marquesas Islands). Herre, 1936: 383–384, fig. 32 (redescription).

Fin ray counts are given in Tables 1 and 2. Inner row of teeth in lower jaw with two to four pairs of enlarged conical teeth, more prominent in males. Males without distinct fleshy interorbital crest, but with interorbital region elevated above eyes.

Coloration in alcohol—Body light brown or tan, with eight dark brown transverse bands (seven bands from first dorsal origin to caudal peduncle). Head light below and darker above; darker area of head with several small white spots. Caudal fin with four or five dark brown transverse bands covering upper two-thirds of fin. Dorsal fins with dark oblique bands extending upward and forward from dark body bands in young; fins becoming darker in large specimens with numerous white spots. Pectoral, pelvic and anal fins clear in females, dusky in males.

Coloration of fresh material—Body deep dull green with eight broad blackish-brown bands. Interspaces greenish, but abruptly white dorsally. Top and sides of head black, spotted with green. First dorsal black with two or three transverse rows of pale green spots, or most of first dorsal red, and upper margin of second dorsal broadly red. Anal and ventrals dusky or black, pectorals clear. (After Herre, 1935 and field notes of J. Randall.)

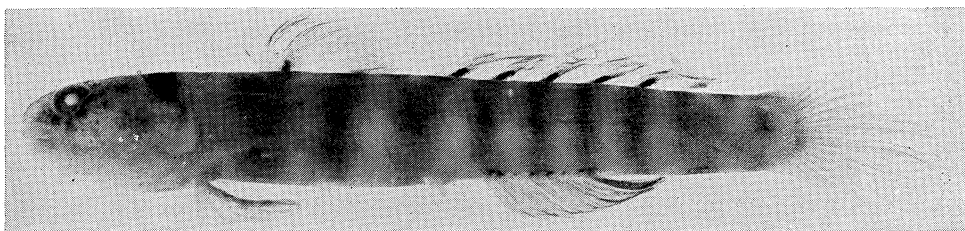
The holotype is in the Field Museum of Natural History, Chicago.

This species is known only from tidepools of the Marquesas Islands.

Herre (1935) reported the following counts for the holotype: D. VI, I, 11. A. I., 8.

MATERIAL EXAMINED

Marquesas Islands, Hiva Oa Island: seven paratypes, SU 24424; 1 (15), USNM 177359 USNH 117325 1(15). Nuku Hiva, Marquesas Islands: BPBM 10872 17 (10–26). Marquesas Islands: ANSP 83048, five specimens.

Kelloggella oligolepis (Jenkins)

Third Plate.—*Kelloggella oligolepis*, Easter Island, BPBM 6742, 22 mm SL. Photo by Gregory Millen.

Enypnias oligolepis Jenkins, 1903: 504–505, fig. 45 (type locality Honolulu, Hawaii).

Enypnias desquamatus Brigham, 1904:21 (type locality Honolulu, Hawaii, name only, a nomen nudum).

Kelloggella oligolepis.—Jordan and Seale, 1906: 409 (placement in *Kelloggella*). Kendall, and Radcliffe, 1912: 147 (Easter Island). Fowler, 1928: 408 (description and synonymy). de Buen 1963: 62 (Easter Island).

Agunia quindecimfasciata Fowler 1946: 207–208, fig. 68 (type locality, Ryu Kyu Islands).

Fin ray counts are given in Tables 1 and 2. Inner row of teeth in lower jaw with two to four pairs of enlarged conical teeth, more prominent in males. Males without a fleshy interorbital crest or prominently elevated interorbital region.

Coloration in alcohol—Body brown or light tan, with nine to 11 dark brown or black transverse bands. In adults, bands as broad or much broader than light interspaces. Dark brown or black spot on side of head above operculum. Series of dark brown or black spots, sometimes forming bands radiating downward from posterior and lower margin of eye. Base of first dorsal dusky. Black spot at base of first dorsal between fifth and sixth dorsal spines, and similar and fainter spot at base between third and fourth spines. Second dorsal light with bands formed by extension of body bands, paralleling fin rays. Caudal, pectoral, pelvic, and anal fins dusky to blackish being darker in males.

Coloration of fresh material from Easter Island—Similar to preserved coloration. Head light brown. Body bands dark brown to black. Interspaces between dark bands white on body and fins. First dorsal fin white interrupted by dusky semicircular bands connecting two dark spots at base of fin. (Based on colour photo by J. Randall.)

Jenkins (1903) reported that this species is scaled on the caudal peduncle, but I am unable to find scales or scale pockets in any of the material examined. Also, the figure given by Jenkins shows faint bands on the caudal fin, which I do not find (but most of the Hawaiian material is faded).

I am unable to find differences between Hawaiian and Easter Island material, except that the bands are on the average slightly narrower in Easter Island material. In young individuals (less than 16 mm in standard length) from Easter Island the interspaces are about as wide as the dark bands. In larger specimens the bands become narrower in relation to the interspaces. In 20 mm specimens the interspaces are about one-third as wide as the bands. In Hawaiian material the interspaces become very narrow in specimens 16 mm and larger. Since the interspace width changes with growth it is unlikely that the minor differences between the Hawaiian and Easter Island material are significant.

The holotype of *Agunia quindecimfasciata*, 18 mm in standard length, agrees in colour pattern and in dentition with Easter Island and Hawaiian material of *K. oligolepis*. The dorsal and pectoral ray counts are low for *K. oligolepis*, but within the range of that species. Consequently, *Agunia quindecimfasciata* is regarded here as a synonym of *K. oligolepis*.

MATERIAL EXAMINED

Ryu Kyu Islands: holotype of *Agunia quindecimfasciata*, ANSP 71079 1 (18). Hawaiian Islands: BPBM 5497 10 (13-24); BPBM 5498 17 (12-19); SU 7844, six specimens; USNM 126574 2 (13-16); holotype of *E. oligolepis*, USNM 50715, 1 (16). Easter Island: AMNH 12990 1 (19); BPBM 6741 2 (18-21); BPBM 6742 2 (20-22); BC 65-422 31 (14-20); USNM 65549 5 (20-26).

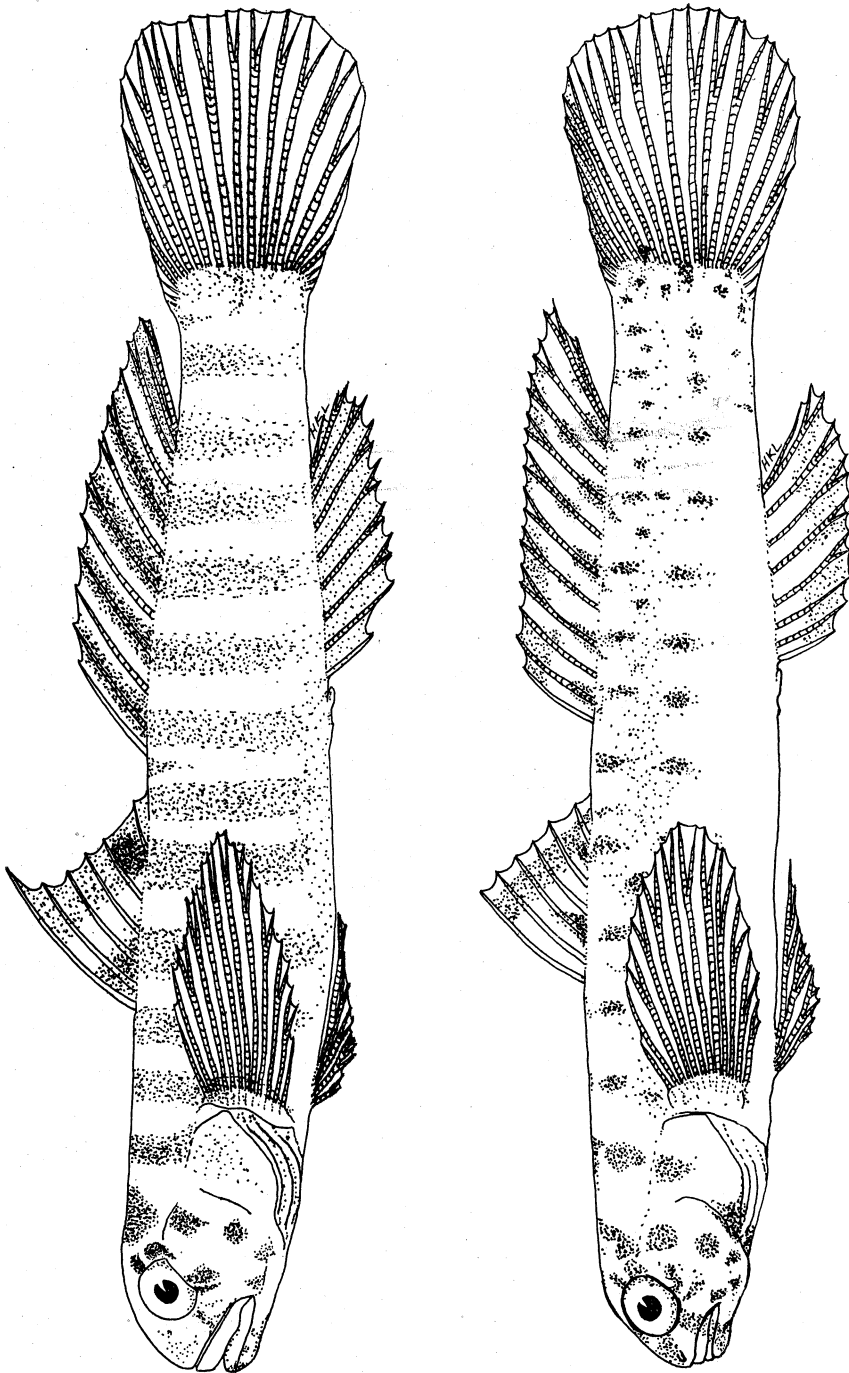


Figure 2.—Holotype of *Kelloggella centralis*, Raratonga BPBM 14660, male, 20.4 mm SL 1, left. Drawing by Helen K. Larson.

Figure 3.—Female paratype of *Kelloggella centralis*, BPBM 14661, 20 mm SL 1, left. Drawing by Helen K. Larson.

Kelloggella centralis new species

Fin ray counts are given in Tables 1 and 2. Measurements of holotype in millimetres: standard length 20.4, head length 4.9, head width 2.9, head depth 3.1, body depth at anal origin 3.0, least caudal peduncle depth 2.5, caudal peduncle length 4.8, eye 1.1, upper jaw 1.7, snout 1.3, pectoral length 4.5, pelvic length 3.2, caudal length 4.4, base of second dorsal 3.8, base of anal 3.4. Inner row of teeth in lower jaw with two to four pairs of enlarged curved teeth, more prominent in males. Outer row of teeth in jaws enlarged and tricuspid. Three or four inner rows of small tricuspid teeth in each jaw. Males without a distinct fleshy interorbital crest, or elevated interorbital region.

Coloration in alcohol—Male. Body light brown with 11 to 13 dark brown transverse bands, these narrower than interspaces; bands not reaching ventral profile; posterior bands faint and often indistinct. Top of head with transverse brown bands, broken up into spots on sides of head. Body bands extending upward onto dorsal fins as oblique bars. Prominent black spot on membrane of first dorsal fin between fifth and sixth dorsal spines. Anal fin clear basally and with dusky longitudinal band near tip. Pectoral, pelvic and caudal fins clear to faintly dusky. Female. Body light brown with two rows of dark spots; upper row directly below dorsal fins, and lower row along midside; spots in lower row directly under and paired with upper spots. Below spots on midside a row of subcutaneous spots along base of anal fin. Head with dark brown spots. Base of dorsal fins with vertical brown bars; dorsal fins with irregular dusky margins. No prominent spot on first dorsal fin between fifth and sixth spines. Caudal fin sometimes with rows of faint spots. Anal with a dusky bar near tip. Pectoral and pelvic fins clear.

Kelloggella centralis is most closely related to *K. oligolepis*, being similar in dentition, head shape, and anal ray counts. It differs from *K. oligolepis* in pectoral, dorsal, and segmented caudal ray counts (Tables 1 and 2), and in the marked sexual dichromatism.

Name—*centralis*, L. central, referring to the central distribution in the Pacific Ocean in relation to its nearest relative.

MATERIAL EXAMINED

Holotype, BPBM 14660, a male 20.4 mm SL. Nikau, Rarotonga. Coll. J. Powell and R. H. Snider, 15 January, 1965.

Paratypes: AMS I. 17021-001 4 (16-20), taken with holotype; BPBM 14661 19 (11-22), taken with holotype. Eniwetok: LACM 6671-21, two specimens. USNM 213478 2 (15-17), taken with holotype. CAS 31018 2 (17-18), taken with holotype.

RELATIONSHIPS OF SPECIES OF KELLOGGELLA

In dentition, general head shape and fin ray counts of the four species fall into two groups. *K. cardinalis* and *K. tricuspidata* have four to seven inner rows of tricuspid teeth in the upper jaw, elevation of the interorbital region and higher dorsal, anal and pectoral ray counts. *K. oligolepis* and *K. centralis* have three to four inner rows of tricuspid teeth in the upper jaw, no elevation of the interorbital region and lower fin ray counts.

DISTRIBUTION OF SPECIES OF *KELLOGGELLA*

Few collections of *Kelloggella* have been made and currently all species are known only from insular areas of the Pacific Ocean. *K. cardinalis* is apparently widely distributed, known from Guam, the Philippine Islands, the New Hebrides, Tonga and Samoa. Its nearest relative *K. tricuspидata* is known only from the Marquesas Islands to the east. *K. oligolepis* is known from peripheral areas; Ryu Kyu Islands, the Hawaiian Islands in the north Pacific and Easter Island in the southeastern Pacific. Its nearest relative, *K. centralis*, is known from the central Pacific areas of the Cook Islands and Eniwetok Atoll in the Marshall Islands.

ACKNOWLEDGMENTS

I would like to thank Drs John E. Randall, I. Efford, R. J. Lavenborg, E. Lachner, and W. Eschmeyer for supplying material for this study. Dr Randall supplied a colour photo of the Easter Island *Kelloggella oligolepis*. I would also like to thank Dr J. R. Paxton for reviewing this manuscript, Mrs H. K. Larson kindly drew figures 2 and 3.

LITERATURE CITED

- Bean, B. A. and A. C. Weed. 1912. Notes on a collection of fishes from Java, made by Owen Bryant and William Palmer in 1909, with description of a new species. *Proc. U.S. natn. Mus.* 42: 587-611.
- Brigham, W. T. 1904. Director's Report for 1903. *Occ. pap. of Bernice P. Bishop Mus.* 2 (2): 1-51.
- Buen, F. de. 1963. Los Peces de la Isla da Pascua. *Boln. Soc. Biol. Concepcion.* 35-36: (1960-61): 3-80.
- Fowler, H. W. 1928. The fishes of Oceania. *Mem. Bernice P. Bishop Mus.* 10: 1-539.
 ——— 1946. A collection of fishes obtained in the Riu Kiu Islands by Ernest R. Tinkham, *A.U.S. Proc. Acad. nat. Sci. Philad.* 96: 123-218.
- Gosline, W. A. 1955. The osteology and relationships of certain gobiid fishes, with particular reference to the genera *Kraemaria* and *Microdesmus*. *Pac. Sci.* 9: 158-170.
- Herre, A. W. 1927. Gobies of the Philippines and the China Sea. *Monogr. Philipp. Bur. Sci.* 23: 352 pp.
 ——— 1935. New fishes obtained by the Crane Pacific Expedition. *Field Mus. natn Hist. Zool. Ser.* 18 (12): 383-438.
 ——— 1936. Fishes of the Crane Pacific Expedition, *Ibid.*, 21: 1-472.
- Jenkins, O. P. 1903. Report on collections of fishes made in the Hawaiian Islands, with descriptions of new species. *Bull. U.S. Fish Commn.*: 417-511.
- Jordan, D. S. and B. W. Evermann, 1905. The aquatic resources of the Hawaiian Islands. Part I. The shore fishes. *Bull. Bur. Fish., Wash.* 23: 1-574.
- Jordan, D. S. and A. Seale. 1906. The fishes of Samoa. *Bull. Bur. Fish., Wash.* 25: 173-455.
- Kendall, W. C. and L. Radcliffe. 1912. Reports on the scientific results of the expedition to the eastern tropical Pacific, in charge of Alexander Agassiz, by the U.S. Fish Commission Steamer *Albatross*, from October, 1904, to March, 1905, Lt-Commander L. M. Garrett, U.S.N., Commanding. *Mem. Mus. comp. Zool. Harv.* 35: 77-171.
- Schultz, L. P. 1943. Fishes of the Phoenix and Samoan Islands collected in 1939 during the expedition of the U.S.S. *Bushnell*. *Bull. U.S. Natn Mus.* 180: 1-316.

Table 1
Dorsal and anal counts for various populations of species of *Kelloggella*

An asterisk indicates holotype

Species	D1 Simple Rays		Second Dorsal Rays				Annal Rays					
	6	7	10	11	12	13	6	7	8	9	10	
<i>K. cardinalis</i>												
Samoa	1	..	..	..	1	2*	..	..	..	3*	..	..
Tonga	3	..	..	..	1	3	..	..	1	3	..	..
New Hebrides	5	..	..	..	1	9	..	..	1	9	..	..
Guam	5	..	..	..	..	6	..	..	1	5	..	..
Totals	13	..	..	..	3	20	..	..	3	20	..	..
<i>K. tricuspidata</i>	10	..	..	..	..	26	..	..	1	24	1	..
<i>K. oligolepis</i>												
Hawaii	8*	..	..	5	25*	..	1	1	27*	1	..	..
¹ Ryu Kyu Islands	1*	..	..	1*	..	..	..	..	1*	..	..	..
Easter Island	4	..	..	2	20	2	..	..	24	..	..	..
Totals	13	..	..	8	45	2	1	1	52	1	..	..
<i>K. centralis</i>	28*	1	1	27*	2	..	..	..	27*	2	..	..

¹Holotype of *Agunia quindecimfasciata*

Table 2
Segmented caudal and pectoral ray counts for various populations of species of *Kelloggella*

An asterisk indicates holotype

Species	Segmented caudal rays				Pectoral rays			
	13	14	15	16	12	13	14	15
<i>K. cardinalis</i> —								
Samoa .. ..	..	..	..	..	..	..	..	..
Tonga .. ..	..	..	..	4	..	..	3	1
New Hebrides .. ..	..	..	..	..	..	1	7	1
Guam .. ..	..	..	1	5	..	1	5	..
Totals .. ..	..	..	1	9	..	2	16	2
<i>K. tricuspidata</i> .. ..	..	..	1	15	..	1	20	4
<i>K. oligolepis</i> —								
Hawaii	1	1	24	..	1	26	3	..
¹ Ryu Kyu Islands .. ..	..	..	1*	..	1*	..	..	..
Easter Island .. ..	..	..	4	1	1	17	6	..
Totals	1	1	28	2	3	43	9	..
<i>K. centralis</i> .. ..	..	..	2	26*	25*	4	..	..

Holotype of *Agunia quindecimfasciata*