

Central Pacific Eels of the Genus *Uropterygius*, with Descriptions of Two New Species¹

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IN THE CENTRAL PACIFIC, at least, *Uropterygius* is, after the related *Gymnothorax*, the largest and most difficult genus of eels. Inadequate knowledge precludes any final revision at the present time either of the genus as a whole or of the species in the region under consideration. The individuals are, for the most part, among the smallest and most inconspicuous of morays, and some species doubtless remain undescribed. Nomenclatorially, the final allocation of the older names to the various forms must await examination of the types or of topotypical material. Where the specimens available do not aid in the solution of nomenclatorial problems, I have followed Schultz (1953: 140-159); to do otherwise would only be substituting one dubious name for another.³

The basic classification of the genus was laid down by Schultz (1943: 23-33; 1953: 140-159). The present paper could not have been written without this groundwork. It is, indeed, something of an addendum to Schultz's treatments of the genus, and full descriptions and synonymies have been omitted here. Its purpose is to clarify further the distinctions and relationships between Central Pacific species of *Uropterygius*, and to describe two new ones.

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³ I believe that the same nomenclatorial policy could advantageously be followed for other Central Pacific fishes. That the scientific names applied to most of the fishes from this area can only be provisional may as well be admitted. It is merely a question of what provisional set of names to accept. The nomenclature of Schultz *et al.* should be altered, of course, as the various groups become revised on a world-wide basis. However, the adoption of such a policy should not be construed as a deterrent to further work on the zoological entities represented within the Central Pacific, or to the adoption of the nomenclatorial changes necessitated by such work.

The genus, as here recognized, has the limits drawn for it by Schultz (1953: 99), i.e., *Scuticaria* is considered a synonym but *Anarchias* is excluded as a separate valid genus. Within the area under consideration *Uropterygius* may be sufficiently defined as containing those muraenid eels with no lateral-line pore near the posterior nostril, with sharp teeth in the jaws, and with the fins restricted to the tail region. (An alizarin-stained specimen of *U. knighti* shows that in this species, at least, the rayed portions of the dorsal and anal fins commence about one head length ahead of the tip of the tail.) The investigated members of the genus, except *U. xanthopterus*, seem to be differentiated from other muraenids in having a single open lateral-line pore above and before the gill opening. Other morays examined (*Muraena pardalis*, *Echidna polyzona*, *E. nebulosa*, various species of *Gymnothorax*, *Rabula fuscomaculata*, *Anarchias allardicei*, *A. cantonensis*, and *A. leucurus*) have two pores, one in front of the other, in this area (as does *Uropterygius xanthopterus*). The one exception is *Echidna zebra*, which does not have any pore.

The type of *Uropterygius* is *U. concolor* Rüppell from the Red Sea.

KEY TO THE CENTRAL PACIFIC SPECIES OF *Uropterygius*

1. Anus in front of or approximately under the middle of the length..... 3
Anus at least two-thirds of the way back along the length. Species reaching at least 3 feet in length..... 2
2. Posterior nostril over front border of orbit; color plain brown..... *U. sealei*
Posterior nostril over eye; color light with prominent round or oval dark blotches..... *U. tigrinus*

3. Anus somewhat in front of middle of length; body without large, round or oval dark blotches.....5
Anus under or slightly behind middle of length; body with large, round or oval dark blotches.....4
4. Vomerine teeth continuous with those on the premaxillary (Fig. 1*b*) and of approximately the same form; posterior nostril in a tube in specimens over 10 inches long; head without lengthwise bands.....*U. polyspilus*
Vomerine teeth well separated from the premaxillary series, relatively small, conical; posterior nostril without a tube; head with lengthwise bands. *U. fijiensis*
5. Gill opening on middle or lower third of sides.....7
Gill opening high, on upper third of sides. Teeth multiserial on the sides of jaws (Fig. 1*c*, *d*); eye in front of middle of wide gape.....6
6. Teeth in a broad band all along the sides of the upper jaw (Fig. 1*c*); head and chin spotted; maximum known length, 17 inches.....*U. supraforatus*
Teeth in 3 or 4 rows along middle of the upper jaw, tending to become biserial posteriorly (Fig. 1*d*); head and chin plain; maximum known size, 10 inches.....*U. fuscoguttatus*
7. Teeth on the sides of the jaws in one or two rows; vomerine teeth uniserial or absent; maximum size about 10 inches.8
Teeth on the sides of the jaws in three rows; vomerine teeth in two or three rows in front; maximum size 3 feet....*U. marmoratus*
8. Teeth on the sides of the jaws in two rows; vomerine teeth present.....9
Teeth on the sides of the jaws in a single row; no vomerine teeth (Fig. 1*e*). Color uniform brown.....*U. inornatus*
9. Markings of some sort always present. 10
Color uniform brown. Inner row of teeth on the lower jaw extending only about two-thirds of the way back along the outer row.....*U. concolor*
10. A single open lateral-line pore in front of and above the gill opening (for the approximate position of this pore, see Fig. 2); no scattered light punctulations on the head and body.....11
Two open lateral-line pores in front of and above the gill opening, one before the other; numerous scattered light punctulations on head and body.....*U. xanthopterus*
11. Posterior nostril over or behind the middle of the eye, which lies over or behind the middle of the gape.....12
Posterior nostril over the front of eye, which lies ahead of the middle of the gape.....*U. micropterus*
12. Tail more or less pointed, the terminal rays about two eye diameters in length; gape short, contained more than 3 times in the head length (to gill opening)....*U. makatei*
Tail bluntly rounded, the rays at its tip short, less than an eye diameter in length; gape relatively wide, contained fewer than 3 times in the head length.....*U. knighti*

Uropterygius sealei Whitley

Table 1

TYPE LOCALITY: Society Islands. This species was originally described as *Scuticaria unicolor* by Seale; the specific name is said to be preoccupied.

MATERIAL EXAMINED: One specimen from the Honolulu aquarium.

The posterior position of the anus and the plain brown color together are said to be distinctive. The other two plain brown species of *Uropterygius* do not seem to reach more than a foot in length whereas our specimen of *U. sealei* is 3 feet long. The dentition of the available specimen is somewhat mangled. Apparently unknown outside of the Society and the Hawaiian Islands.

Uropterygius tigrinus (Lesson)

Table 1, Fig. 1a

TYPE LOCALITY: Society Islands. Several specimens examined from Johnston Island and the Hawaiian chain, 27 to 34 inches in length.

The posterior position of the anus, together with the round black markings on the sides, is distinctive. The great similarity between *U. tigrinus* and *U. polyspilus* will be discussed under the latter species. In tooth pattern, *U. tigrinus* and *U. sealei* are very similar and differ from all other members of the genus. The teeth of the inner maxillary row, those on the vomer, and the larger premaxillary teeth are all subequal in size. The inner maxillary and premaxillary teeth are distinctly separated by

a gap which is not much smaller than that separating the vomerine teeth from those on the premaxillary. The mandibular teeth are biserial but the inner row stops short of the front of the eye.

Uropterygius polyspilus (Regan)

Table 1, Fig. 1b

TYPE LOCALITY: Tahiti. Two small specimens available from Johnston Island and one 17-inch individual from Honolulu, Hawaii.

The young of this species, up to at least 8 inches in length, may be recognized immediately by the abruptly light snout (yellow in life). However, the 17-inch specimen, which agrees with small specimens in other respects, lacks the light snout; its color pattern is an almost exact duplicate of that of *U. tigrinus*. Indeed the specimen was identified as *U. tigrinus* until the relatively forward position of the anus was noted. (Because of this similarity of color pattern the original description of *U. tigrinus* was checked to see that it did not really represent this species. Fortunately the description states that the anus is two-thirds of the way back along the body, which eliminates this possibility.) However, the dentition

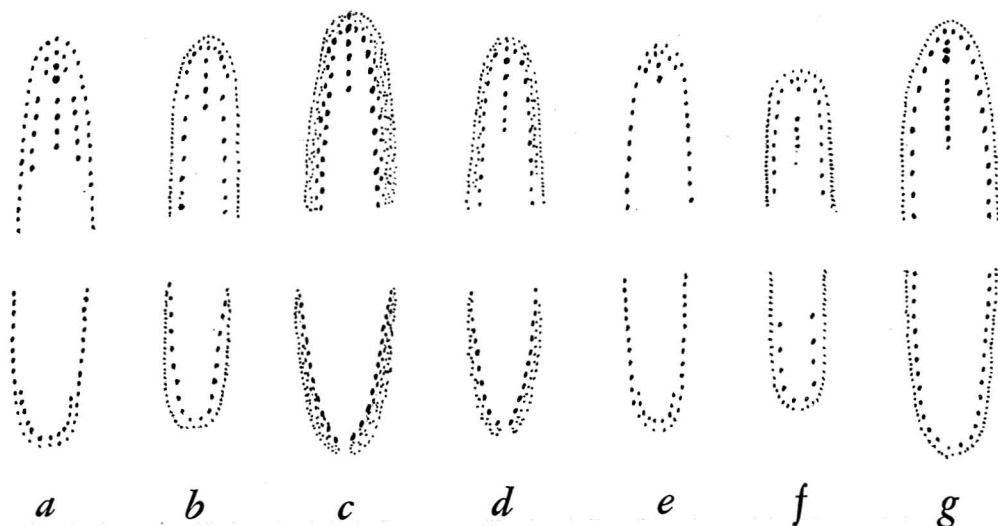


FIG. 1. Diagrammatic representation of dentition of a, *Uropterygius tigrinus*; b, *U. polyspilus*; c, *U. supraforatus*; d, *U. fuscoguttatus*; e, *U. inornatus*; f, *U. makatei*; g, *U. knighti*. Each dot represents a tooth; upper jaw above, lower jaw below.

TABLE 1
TOOTH COUNTS IN CERTAIN SPECIES OF *Uropterygius*

SPECIES	LOCALITY	LENGTH OF SPECIMEN IN INCHES	TEETH ON ONE SIDE			
			On outer row above ¹	On inner row above ¹	On outer row below	On inner row below
<i>U. sealei</i>	Oahu	36	10	10	15	5
<i>U. tigrinus</i>	Johnston	27	18	8	17	6
<i>U. polyspilus</i>	Oahu	17	35	7	30	8
<i>U. xanthopterus</i>	Line Is.	9.5	29	10	23	6
<i>U. micropterus</i>	Gilberts	9.5	43	15	40	11
<i>U. knighti</i>	Tuamotus	7	29	12	38	8

¹ These counts include both premaxillary and maxillary teeth within the rows indicated.

of the two species is entirely different. In the lower jaw of *U. polyspilus* the inner row of teeth extends about as far back as the outer, and the inner rows on both jaws as well as some of the teeth on the premaxillary and vomer are definitely enlarged and fanglike.

Uropterygius fijiensis Fowler and Bean

TYPE LOCALITY: Fiji. The type and only known specimen has been briefly redescribed by Schultz (1943: 24, 26, fig. 3f).

Judging from the descriptions the salient features of this species are: anus slightly behind middle of length; eye forward of middle of the moderate gape; rear nostril over front border of pupil; color pattern of five or six irregular rows of brown spots, more or less joined, and about eight or nine somewhat broken lengthwise bands on the sides of the head. The bands on the head would appear to be unique among Central Pacific species of *Uropterygius*.

The color pattern is somewhat reminiscent of *U. polyspilus* and *U. tigrinus* but the tooth pattern would seem to place it in an entirely different portion of the genus.

Uropterygius supraforatus (Regan)

Fig. 1c

TYPE LOCALITY: Savaii, Western Samoa.

SYNONYM: *U. dentatus* Schultz, with Johnston Island as type locality. Four specimens, 7 to 16 inches long, examined from the Gilberts, Johnston Island, and Honolulu.

The similarity between *U. supraforatus*, *U. dentatus*, and *U. fuscoguttatus* has been previously noted (Gosline, 1955: 155). There, in the absence of adequate comparative material, *U. supraforatus* and *U. dentatus* were both provisionally recognized. Subsequent examination of two Gilbertese specimens failed to show any basis for separating the two, which are herewith synonymized.

Schultz (1953) allocates specimens to both *U. supraforatus* and *U. dentatus*. His differentiation of the two species is based on color differences and on a gap between the vomerine and premaxillary teeth in *U. dentatus*. As to this gap, I find it no greater in our Johnston Island specimen topotypic for *U. dentatus* than for the Gilbertese specimens that appear to be typical of *U. supraforatus*. In color, the most significant difference between the Johnston and Hawaiian specimens at hand and those from the Gilberts is the heavier spotting on the former; but these specimens are also larger, and other species of *Uropterygius* also become more heavily pigmented with increasing size.

Uropterygius fuscoguttatus Schultz

Fig. 1d

TYPE LOCALITY: Bikini.

MATERIAL EXAMINED: Numerous specimens from Hawaii and Johnston Island.

About the only differences between this species and *U. supraforatus* seem to be those mentioned in the key. In the presence of

needlelike vomerine teeth far forward, though not in other characters, these two species somewhat resemble *U. sealei*, *U. tigrinus*, and *U. polyspilus*.

In the Hawaiian Islands this species occurs commonly in about 25 to 75 feet of water, but it was taken at a much shallower depth at Johnston Island, probably because of the very different reef conditions there.

Uropterygius marmoratus (Lacepède)

TYPE LOCALITY: New Britain.

SYNONYM?: *Ichthyophis pantherinus* Lesson. No specimens seen.

Lacepède's original description, based on Commerson, is of a marbled brown and white *Uropterygius*, a meter in length, with needlelike teeth. Lacepède's name has been applied to various members of the genus. Here, it is identified with the species called *Gymnomuraena marmorata* by Weber and de Beaufort (1916: 397, figs. 193, 194) and presumably represented by the larger specimens listed under *Uropterygius marmoratus* by Schultz (1943: 33; 1953: 155). The following combination of characters would seem to be distinctive for this species: large size, anus in front of middle of length, many rowed teeth, and gill openings about halfway up the sides. It would appear to be most similar to *U. supraforatus*.

In recent years Schultz (1943, 1953) has apparently confused two species in his accounts of *U. marmoratus* under the impression (mistaken, I believe) that the teeth and tooth rows increase with age. I can find no support for this supposition in available material of any species of *Uropterygius*.

Uropterygius inornatus new species

Table 2, Figs. 1e, 2a

HOLOTYPE: U.S.N.M. 175007, 187 mm. total length, off Waikiki reef, Oahu, in 25–35 ft. of water, Dec. 31, 1952, Gosline, Brock, Randall, *et al.*

PARATYPES: University of Hawaii No. 1686, 2 specimens, 108 and 129 mm., with the same data as the holotype; U.H. No. 1788, 1 speci-

men, 107 mm., cove 1 mi. north of Kailua, Hawaii, in 12–30 ft. of water, June 19, 1953, Brock, Gosline, *et al.*; U.H. No. 2362, 2 specimens, 117 and 189 mm., ½ mi. off Hawaiian Village, Waikiki, in 25–30 ft. of water, Sept. 7, 1951, Herald, Harry, Brock, Gosline, *et al.*

A very slender eel, heaviest just behind the head, and distinctly smaller near the tail (see Table 2). Caudal fin rays extending at least one eye diameter beyond the tip of the last vertebra.

The posterior nostril has no raised rim and opens above the middle of the eye; there is no lateral-line pore near it. The eye lies nearer the corner of the mouth than to the tip of snout, but the gape extends at least an eye diameter behind the eye. The usual lateral-line pores are present on the head, but on the jaws there are only 5 (sometimes 4 or 3) pores on each side instead of the usual 6. A single open lateral-line pore is present in front of and above the gill opening, as is normal for *Uropterygius*. The gill opening lies slightly above the midline of the sides.

The teeth are uniserial on the sides of the mouth. The only needlelike teeth are a few at the front of each jaw. There are no vomerine teeth in any of the six specimens.

The color is a plain, uniform brown though the tip of the tail and the chin are a lighter brown.

The uniserial teeth on the sides of the jaws and the absence of vomerine teeth in this species seem to be unique for *Uropterygius*. The closest relative of *U. inornatus* appears to be *U. concolor* Rüppell. (Certain counts and measurements of the only available specimen of the latter species, from Onotoa in the Gilbert Islands, are given in Table 2 for comparison.) *U. concolor* exactly duplicates *U. inornatus* in color, but appears to be a stockier, longer-headed eel with vomerine teeth and with a second, inner row of larger teeth running at least two-thirds of the way back in each jaw.

The name is derived from the Latin word *inornatus*, meaning undecorated.

Uropterygius concolor Rüppell

Table 2

TYPE LOCALITY: Red Sea. One specimen from the Gilberts examined, slightly less than 5 inches long.

This is one of three plain brown species of *Uropterygius* known from the Central Pacific. From *U. sealei* it differs in the more anterior position of the anus and in having the small, conical, vomerine teeth widely separated from the fanglike teeth of the premaxillary. *U. inornatus* does not have any vomerine teeth at all. Dental pattern in *U. concolor* is about as in Figure 1*f*; tooth counts and measurements for the available specimen are given in Table 2.

Uropterygius xanthopterus Bleeker

Table 1

TYPE LOCALITY: East Indies. Numerous specimens available from the Line, Tuamotu, and Marshall Islands.

Uropterygius xanthopterus is unique among

available forms of the genus in having the usual two muraenid, but not *Uropterygius*, lateral-line pores above and ahead of the gill opening. The light speckling on a dark ground is equally distinctive. The tooth pattern is about as in Figure 1*f*.

Uropterygius micropterus (Bleeker)

Table 1

TYPE LOCALITY: East Indies. Schultz (1953: 156) considers *U. tinkhami* Fowler, type locality, Carolines, as a synonym of this species.

MATERIAL EXAMINED: One specimen, 9 inches long, from the Gilberts.

Judging from the specimen available, the forward position of the nostril and eye noted in the key are better distinguishing characters for this species than the color pattern; the vomerine teeth are biserial in front as shown in Schultz's figures and not uniserial as stated in his description (1953: 156). Except for the biserial vomerine teeth, the dentition is about as in Figure 1*g*.

TABLE 2
CERTAIN COUNTS AND MEASUREMENTS IN THREE SPECIES OF *Uropterygius*
Measurements, aside from total length and height of gill opening, expressed as thousandths of the total length

	<i>U. inornatus</i>		<i>U. concolor</i>	<i>U. makatei</i> (Holotype)
	Holotype	Five paratypes		
Total length (mm.)	187	107-189	123	230
Greatest depth	46	33-38	53	63
Depth at anus	34	30-37	47	50
Depth one head length before tail	24	20-28	35	40
Distance from tip of snout to anus	448	428-463	448	438
Head length, measured to gill opening	88	77-88	119	147
Tip of snout to corner of mouth	33	28-33	42	37
Snout length	20	16-22	20	19
Eye diameter	7	5-7	11	7
Distance from eye to corner of mouth	13	7-14	13	20
Length of middle caudal rays	9	6-9	7	13
Height of gill openings, in per cent distance up sides	50	58-67	58	20
Tooth counts				
Outer row above, on one side ¹	12	16-19	27	23
Inner row above, on one side ¹	2	0-4	8	9
Outer row below, on one side	13	14-20	28	25
Inner row below, on one side	3	2-5	4	5
Median teeth on premaxillary	3	2-3	3	3
Median teeth on vomer	0	0	7	4

¹These counts include both premaxillary and maxillary teeth within the rows indicated.

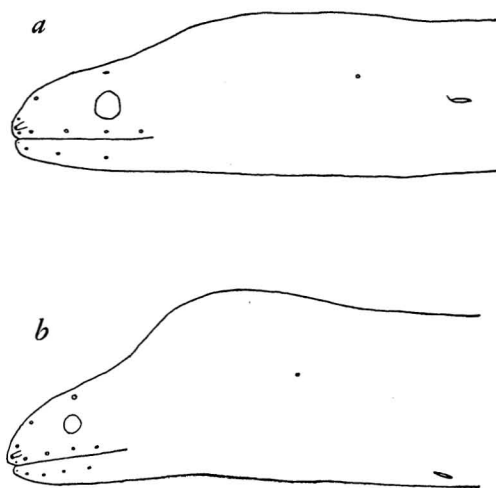


FIG. 2. Heads of holotypes: *a*, *Uropterygius inornatus*; *b*, *Uropterygius makatei*.

Uropterygius makatei new species

Table 2, Figs. 1*f*, 2*b*

HOLOTYPE: (Only known specimen.) U.S. N.M. 175008, 230 mm. in total length, taken just west of the phosphate dock, Makatea, northern Tuamotus, over reef flat and in surge channel, Mar. 15, 1956, by John E. Randall.

A short-jawed, heavy-headed, stocky *Uropterygius*. The tail is bluntly pointed with the terminal rays well developed for the genus.

The posterior nostril has a rudimentary rim and opens above the middle of the eye; there is no lateral-line pore near it. The small eye lies over the middle of the gape which is very short, contained almost four times in the head length. The usual lateral-line pores of the genus are present. The gill opening is very low, almost ventrally directed.

The teeth in the inner maxillary, premaxillary, and mandibular rows are moderately enlarged and fanglike. The vomerine teeth are smaller and essentially similar in size to those on the outer rows of the jaws.

The ground color is light with brown reticulations darkest on the snout and back, present on the mandible and lower surface of the body

posteriorly, and almost completely lacking on the belly, which is plain gray. The anterior nostril and the head pores are of the same color as the surrounding areas, but the posterior nostril has a rather narrow white rim.

Uropterygius makatei seems to have shorter jaws in relation to the head length than any of the others taken up here. It also has the gill openings lower on the sides. This latter character places it with *U. knighti* in the key, but it has more of the look and coloration of *U. micropterus*. This last species has far longer jaws and more numerous teeth than *U. makatei*, however. In tooth pattern, the new species belongs with *U. concolor* and *U. xanthopterus*.

Named *makatei* for the island at which it was taken.

Uropterygius knighti (Jordan and Starks)

Table 1, Fig. 1*g*

TYPE LOCALITY: Samoa.

SYNONYM: *Uropterygius reidi* Schultz with type locality, Tau Island, Samoan group. Two specimens from the Tuamotus and one from Wake Island seem typical of the species; innumerable specimens from Hawaii, the Tuamotus, and Wake are provisionally identified with it.

The last section of Schultz's key (1953: 143, section 22*b*) seems to require comment. It leads to two species: *U. necturus* (Jordan and Gilbert) from the Gulf of California, and *U. knighti* (Jordan and Starks). Now according to Jordan and Evermann (1896: 404) *U. necturus* has "a pore situated just above the posterior nostril." If this is so, *U. necturus* is not a *Uropterygius* at all but an *Anarchias*. As for *U. knighti*, it is keyed by Schultz as having the "lower jaw notably barred or reticulated with brown"; however, Jordan and Starks' figure (in Jordan and Seale, 1906: 205, fig. 10) shows the whole lower jaw unpigmented and their description states that the mandible is white below. If this is true, there is little left to dis-

tinguish *U. knighti* from *U. reidi*, and I believe the two are synonyms.

At present I am also allocating to *U. knighti* a whole series of more or less dark-chinned specimens. It is presumably this type of fish that Jordan and Evermann (1905: 111) and innumerable others have been calling *U. marmoratus* and which is probably represented by the small specimens in Schultz's (1943: 33; 1953: 155) accounts of the same species. The reasons for provisionally combining the dark-chinned and light-chinned forms (cf. Schultz, 1953: 159) are: (1) that I can find no valid morphological differences between them, (2) that available collections (from Makatea, Wake) that contain the light variety also contain the dark one, and (3) that many individuals are partially intermediate between the two.

That the dark form is not the young of *U. marmoratus* can be more convincingly demonstrated: of the hundreds of Hawaiian specimens many are ripe adults but the largest is just over 13 inches long; in specimens from 3 to 13 inches there is no evidence for additional tooth rows with increasing size.

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