

The Rare Moray Eel *Gymnothorax pikei* Bliss Recorded from Papua New Guinea¹

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ABSTRACT: The eel *Gymnothorax pikei* Bliss, type locality Mauritius, is recorded from Papua New Guinea. This, the second known specimen, agrees closely with the type in color pattern, dentition, and body proportions. It is described and compared with the species *Gymnothorax berndti* Snyder, *G. rueppelliae* (McClelland), and *G. rupelli* auct. *G. berndti* is recorded here from Réunion and Mauritius.

SINCE THE PUBLICATION of *The Fishes of New Guinea* (Munro 1967), many additional species of fish have been collected in the waters of this region. One of the more interesting is a specimen of *Gymnothorax pikei* Bliss 1883, which was speared in coral near Daugo Island (9°32' S, 147°03' E), southwest of Port Moresby, in November 1968.

The holotype of *Gymnothorax pikei* was collected from deep water in Mauritius in 1871 by Nicholas Pike, named *pikei* by Steindachner, and described by Bliss in 1883. Until recently, this was apparently the only specimen known of the species (Smith 1962). The purpose of this paper is to describe the Papua New Guinea (PNG) specimen and to give reasons for identifying it as *Gymnothorax pikei*. The specimen (registration number F01997) is presently located in the fish collection of the Department of Agriculture, Stock and Fisheries (D.A.S.F.) in Port Moresby.

Specimens of three different species of moray eel were collected at the same time and vicinity as *G. pikei*. These were: *Gymnothorax undulatus* (Lacépède 1803), *G. flavimarginatus* (Rüppell 1828), and *G. favagineus* Bloch & Schneider 1801.

DESCRIPTION

Total length (TL) 807 mm. Total number of vertebrae 145; vertebrae before anal fin origin 54.

Body slender, elongate; tail compressed. Depth behind gill openings 14.4 in total length, 2.2 in head length. Head 6.6 in total length, 2.2 in trunk. Tail 1.1 longer than remainder of body. Snout to dorsal fin origin 1.4 in head length, 9.2 in total length.

Head narrow and moderately pointed. Dorsal profile curved abruptly upward behind eyes. Upper jaw slightly longer than lower jaw; mouth shuts completely. Anterior nostril an unbranched tube, 2.1 in eye diameter. Open pore of posterior nostril above front border of eye. Eye 11.7 in head and 2.3 in snout, nearer rictus than snout tip. Snout 5.1 in head; 1.8 times interorbital space. Snout to rictus 2.5 in head. Row of six pores on each side of both jaws.

Length of horizontal gill opening 11.1 in head. Dorsal fin origin one-third distance from gill opening to rictus. Fins low. Dorsal fin height behind gill openings 6.4 in body depth. Dorsal fin deeply notched about 135 mm from tail tip (probably a healed wound, not a species character). Dorsal fin height anterior to notch 4 in body depth behind gill opening. Anal fin height at middle of tail 7.3 in body depth. (See Table 1 for body measurements as thousandths of total length).

Teeth (Figure 1) slender, conical, and pointed, uniserial in jaws, larger anteriorly. Peripheral series of 14 teeth on intermaxillary and a median series of three long depressible canines. Maxillaries with 14 teeth on right side, 13 on left. Ten small uniserial teeth on vomer. Lower jaw with 18 teeth on right side, 19 on left.

Color in 45-percent isopropyl alcohol (speci-

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TABLE 1
MEASUREMENTS OF THE PNG SPECIMEN OF
Gymnothorax pikei

CHARACTER	MEASUREMENTS AS THOUSANDTHS OF TOTAL LENGTH
Total Length in Millimeters	807
Eye	13
Snout	29
Anterior Nostril	6
Snout to Rictus	60
Interorbital	16
Head	151
Depth	69
Snout to Dorsal Fin Origin	109
Snout to Anus	475
Trunk	329
Tail	527
Gill Opening	14

men originally fixed in formalin): background light brown, paler ventrally on trunk, with 25 to 27 irregular dark brown bands crossing body and fins (Figures 2, 3). Some bands with white edges. Bands narrow ventrally; some terminate midlaterally. Vertical offshoots from dark band running along ventral surface of trunk unite with crossbands or extend into interspaces. Occasional dark brown spots on sides of body. Bands on fins irregular but distinct, although some merge near tail tip to form dark border. Interspaces wider than dark bands. Bands not extending far onto head, which is uniform, darker brown than rest of body. First crossband on nape, not reaching ventral surface. Narrow dark streaks in skin creases on sides of head. Gill opening situated in middle of second crossband.

DISCUSSION

The dentition and overall color of the PNG specimen agree with those of the type of *G. pikei* (in the Museum of Comparative Zoology, Cambridge, MCZ 6145, total length 905 mm). Other species with similar coloration are *Gymnothorax berndti* Snyder 1904, *G. rueppelliae* (McClelland 1845) (*G. petelli* auct.), and *G. rupelli* auct. (considered by Randall [1973] to be *G. reticularis* Bleeker but which is preoccupied by *G. reticularis* Bloch. *G. rupelli* auct. is without

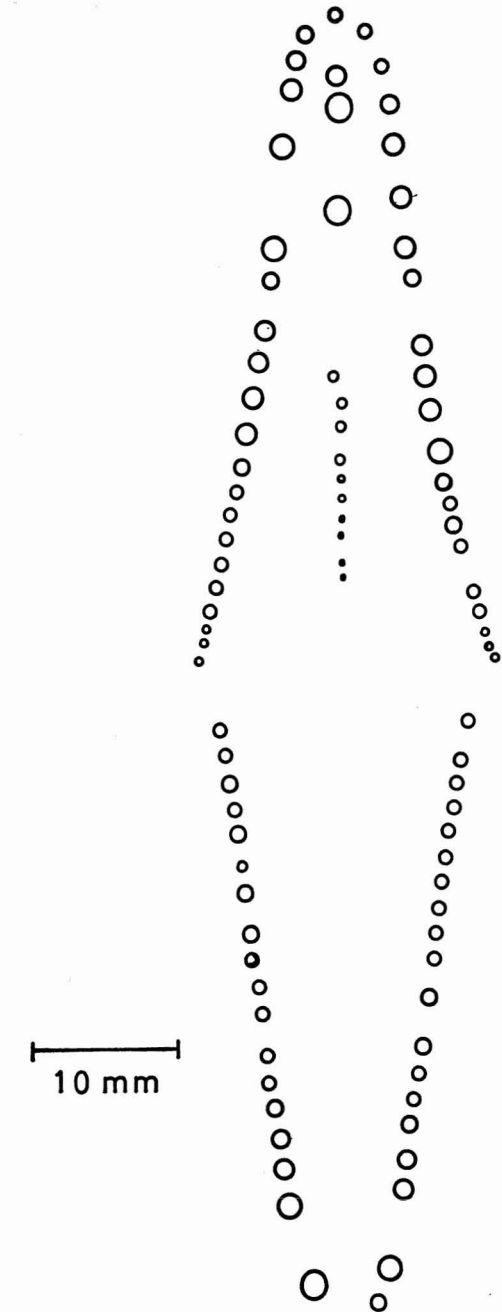


FIGURE 1. Tooth pattern of *Gymnothorax pikei* (registration number FO1997).

a name [McCosker, personal communication]. *G. rueppelliae* and *G. rupelli* auct. are wide-ranging Indo-Pacific species (Fowler 1928).



FIGURE 2. The PNG specimen of *Gymnothorax pikei*, registration number FO1997. Total length is 807 mm. Registration tag is attached.



FIGURE 3. Head of PNG specimen of *Gymnothorax pikei*, registration number FO1997. Mouth has been propped open.

G. berndti is now known to extend westward from Hawaii as far as Japan (Kuroda 1954), Taiwan (Chen and Weng 1967), Réunion (Fourmanoir, personal communication), and Mauritius (based on the two specimens noted herein). Following is a description by which

these three species can be distinguished from *G. pikei*.

The coloration of the PNG specimen is distinctive enough to separate it from both *G. rueppelliae* (the correct spelling has been pointed out by McCosker, personal communication),

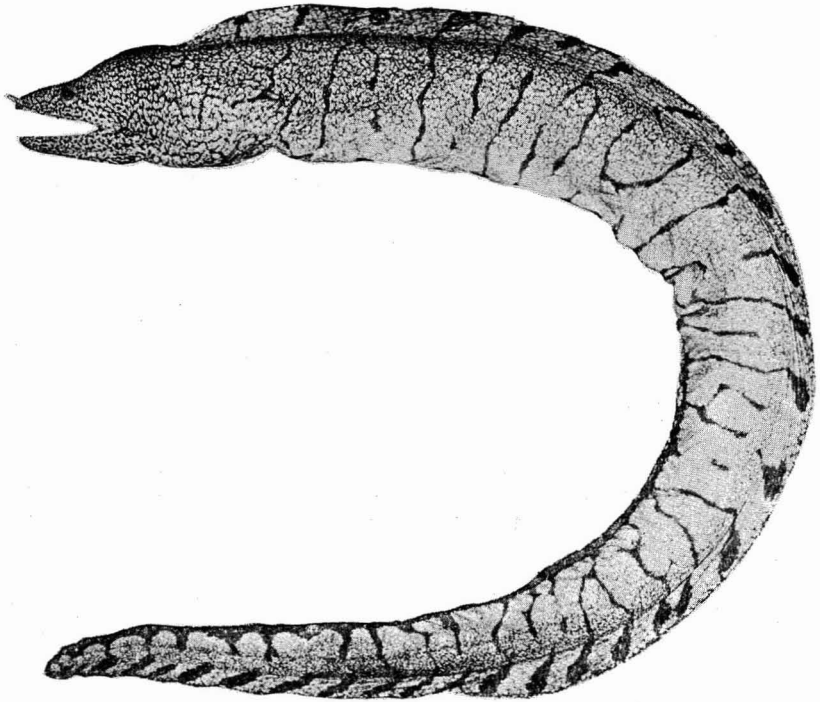


FIGURE 4. *Gymnothorax berndti* Snyder. Bernice P. Bishop Museum number 9077. Specimen was taken off Oahu, Hawaii, in 100 fathoms on 28–29 October 1969. Total length is 805 mm. Collector, Thomas A. Clarke. Photograph, John E. Randall.

and *G. rupelli* auct., in which the bands are regular and continuous around the body and extend onto the head as far as the snout. *G. berndti* (Figure 4) is covered with a fine brown meshwork, which breaks up into “elongate, crooked spots on jaws” (Snyder 1904: 519). Broader dark bands cross the body and expand on the dorsal fin.

The dark bands on one paratype are “about equal to width of pupil” (Snyder 1904: 519). In the PNG specimen of *G. pikei*, the bands are broader, less numerous, and rarely narrower than the eye diameter. The bands continue across both the dorsal and anal fins. In *G. berndti* the anal fin is black with a broad white border. Fowler (1928: 58) considered *G. berndti* to be a synonym of *Gymnothorax richardsoni* (Bleeker 1852), an action disregarded by subsequent authors (e.g., Chen and Weng 1967).

The two specimens of *Lycodontis pikei* recorded by Fourmanoir and Nhu-Nhung (1965) are from Réunion and are actually *G. berndti* (Fourmanoir, personal communication).

These specimens are described as “gris clair avec de larges mailles gris-brun formant un réseau lâche...” (Fourmanoir and Nhu-Nhung 1965). The smaller specimen illustrated by Fourmanoir (Fourmanoir and Nhu-Nhung, 1965, plate IIIB) is remarkably similar to that figured by Chen and Weng (1967) and identified as *G. berndti*, and to that in Figure 4 in this paper. The body of the smaller specimen is densely covered with a fine meshwork, which is quite distinct on the head. The dark narrow overlying bands number about 35 and unite to form a loose latticework. The anal fin is not visible on the figures of both specimens.

Gymnothorax rueppelliae, *G. rupelli* auct., and *G. berndti* have fewer (two to seven) vomerine teeth than does *G. pikei* (nine in type, 10 in PNG specimen). The number of median intermaxillary canines of *G. berndti* varies from zero (Snyder 1904: 519) to three (Chen and Weng 1967). There are two in the type of *G. pikei* (Seale 1917).

Radiographs show 58 vertebrae before the

TABLE 2

COMPARISONS OF BODY PROPORTIONS OF FOUR SPECIES OF *Gymnothorax* WITH THE SPECIMEN FROM PAPUA NEW GUINEA

CHARACTER	PAPUA NEW GUINEA SPECIMEN				
	<i>G. pikei</i> *	<i>G. berndti</i> †	<i>G. rueppelliae</i> (<i>G. petelli</i> auct.)‡	<i>G. rupelli</i> auct.§	
Depth	14.4	13.3	14.6	12.1–20.0	14.2–23.0
Depth in Head	2.2	1.8	1.8	1.8–2.2	1.9–2.6
Head	6.6	7.4	6.6–6.7	7.1–9.6	7.0–9.0
Eye in Head	11.7	15.2	13.8	—	7.0–10.0
Eye in Snout	2.3	3.4	2.7	1.3–4.0	1.2–2.0
Snout in Head	5.1	4.5	4.2–5.6	5.0–5.4	4.8–7.0
Mouth-Gape in Head	2.5	2.1	2.0–2.6	2.2–2.5	2.5–3.0
Head in Trunk	2.2	2.4	—	2.6–2.9	2.3–2.8

* Based on the holotype, MCZ 6145. Proportions calculated from data supplied by M. M. Dick (personal communications) and from Seale (1917).

† Data from Snyder (1904), Jordan and Evermann (1905), Chen and Weng (1967), and M. M. Dick (personal communication).

‡ Data from Smith (1962), Fowler (1928), Munro (1957), Jordan and Evermann (1905), Schultz (1953), and Weber and de Beaufort (1916).

§ Data from Smith (1962), Fowler (1959), Schultz (1953), and Weber and de Beaufort (1916).

anal fin origin and a total of 149 vertebrae in the type of *G. pikei*, which compare favorably with the vertebral count in the PNG specimen. A paratype of *G. berndti* (California Academy of Sciences, SU.12791, TL 78 cm) has 53 vertebrae before the anal fin origin, and a total of 136. Two specimens of *G. berndti* from Mauritius, approximately 614 and 595 mm TL, have 131 and 134 total vertebrae respectively. These specimens have one to two teeth on the vomer, a distinctly mottled head, and a broad white border to the anal fin. (The 614 mm TL specimen is held in the D.A.S.F. fish collection, registration number F03912, and the 595 mm specimen is held in the Bernice P. Bishop Museum, Honolulu).

There is little difference in body proportions between the four species of eel considered and the PNG specimen (Table 2). (Differences in body proportions are often inconclusive for species of *Gymnothorax* [McCosker, personal communication]).

In only two respects does the PNG specimen differ slightly from the type of *G. pikei*: color of the gill opening, and relative eye size. In the PNG specimen the gill opening is in the second dark crossband and the eye is 2.3 in the snout. The gill opening of the type of *G. pikei* is in a black spot (Bliss 1883), and the eye is 3.4 in the snout (Dick, personal communication).

The PNG specimen was identified as *Gymnothorax pikei* after all the available information was considered. Differences between the two specimens of *G. pikei* may be ascribed to geographical and individual variation. Future collections from intermediate localities should further define the limits of variability of this rare species.

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made a radiograph of the paratype of *G. berndti*. P. Fourmanoir (Centre O.R.S.T.O.M., Noumea) kindly gave information on specimens of *G. berndti* from Réunion, and J. Baissac (Mauritius) lent two specimens of *G. berndti*. Photographs of *G. pikei* were taken by the Department of Information and Extension Services, Port Moresby. Radiographs of the PNG specimens and the Mauritius *berndti* specimens were made by Mr. Udu Sisia of the General Hospital in Port Moresby.

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