

# Redescription of *Yirrkala gjellerupi*, a Poorly Known Freshwater Indo-Pacific Snake Eel (Anguilliformes: Ophichthidae)<sup>1</sup>

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**Abstract:** *Yirrkala gjellerupi* (Weber & de Beaufort, 1916), unknown since the brief and unfigured original description of the holotype from New Guinea, is herein diagnosed, described, and illustrated, based on specimens recently captured in a Fijian freshwater stream. Other eels collected there and nearby include *Anguilla megastoma*, *A. obscura*, *Lamnostoma kampeni*, and an unidentified moringuid. Living far from the sea is very atypical for an adult ophichthid.

*SPHAGEBRANCHUS GJELLERUPI* was described by Weber and de Beaufort (1916) on the basis of a 153-mm specimen captured at "Dutch North New Guinea, Tanah Merah in a brook near shore." This species has not been recorded since its brief and unfigured original description. Tanah Merah (06° 140' S, 140° 30' E) is located on the Digoel River, approximately 200 km from the sea (and a much farther distance by the winding river). Such a habitat is rare for an adult ophichthid eel species, the majority of which live in marine habitats and all of which, as leptocephali, enter the ocean. An extensive ichthyological survey of freshwaters in Fiji by D.B. and A.J. resulted in the capture of four specimens of this rare snake eel, and we herein take the opportunity to provide an expanded description and illustration of this species, as well as information about its habitat.

## MATERIALS AND METHODS

Measurements are straight line (point-to-point) and made with dial calipers and re-

corded to the nearest 0.1 mm. Body length comprises head and trunk lengths; head length is measured from the snout tip to the posterodorsal margin of the gill opening; trunk length is taken from the end of the head to midanus; maximum body depth does not include the median fins. Head pore terminology follows that of McCosker et al. (1989:257). Vertebral counts (which include the hypural) are taken from radiographs. Preanal vertebrae are counted until midanus. The specimens are located in: the California Academy of Sciences (CAS), San Francisco; the University of the South Pacific (USP), Suva, Fiji; and the Zoological Museum of Amsterdam (ZMA), Amsterdam.

## TAXONOMY

*Yirrkala gjellerupi* (Weber & de Beaufort, 1916)

*Sphagebranchus gjellerupi*: Weber & de Beaufort, 1916:326.

*Yirrkala gjellerupi*: McCosker, 1977:69.

## Figures 1–3

**MATERIAL EXAMINED:** Holotype, ZMA 104.146, 153 mm (originally described as 152 mm), "Dutch North New Guinea, Tanah Merah" (06° 140' S, 140° 30' E) "in a brook near shore; collected by Dr. K. Gjellerup," August 1910. USP 5225, 160 mm, Fiji, Viti Levu, Savura River (18° 05' S, 178° 26' E), sampling site no. 13, collected by David Boseto and Sidney Malo, 28 January 2003. CAS 217642, 3 (166–276 mm), collected 10 m upstream from USP 5225, site no. 14, on 28 January 2003.

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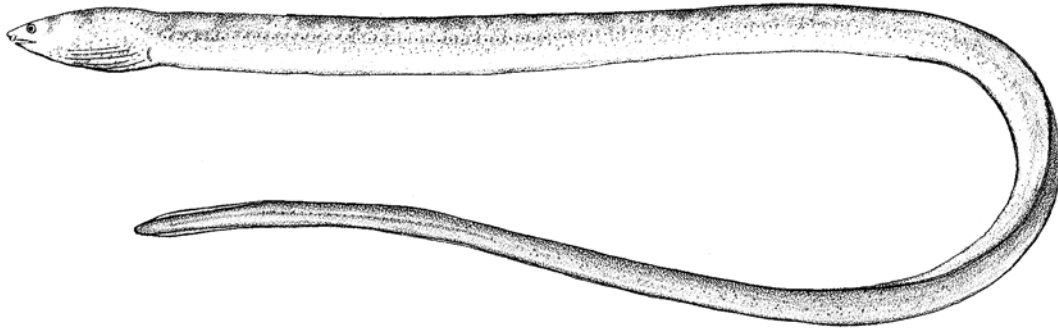


FIGURE 1. Left lateral view of *Yirrkala gjellerupi*, CAS 217642, 229 mm SL.

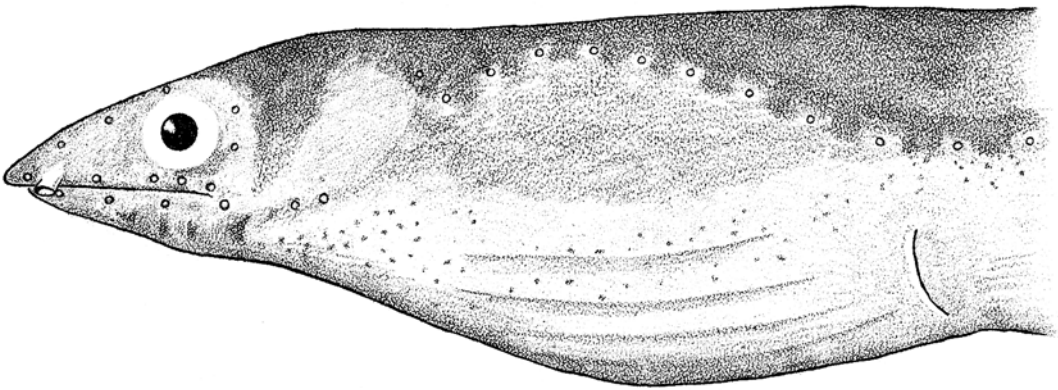


FIGURE 2. Cephalic pores of *Yirrkala gjellerupi*, CAS 217642, 229 mm SL.

**DIAGNOSIS:** An elongate species of *Yirrkala* with unique combination of characters: head 6.9–8.6% of total length (TL); tail 56–58% of TL; dorsal-fin origin in anterior trunk region; rictus of jaw before posterior margin of eye; teeth conical, minute, uniserial on jaws and vomer and absent on intermaxillary; coloration pale, overlain with fine brown punctations above midline; and mean vertebral formula 16-64-154.

**DESCRIPTION:** Body elongate, its depth at gill openings 36–45 times in TL, tapering posteriorly to an acute, finless point (Figure 1). Body and tail nearly cylindrical throughout, becoming laterally compressed behind midtrunk region. Head and trunk 2.2–2.4 times and head 11.6–14.5 times in TL. Snout acute at tip, conical from above, rounded on underside and split medially. Lower jaw in-

cluded, its tip reaching slightly behind the anterior nostril edge. Anterior nostril within a tube that extends beyond upper lip, at an angle of approx. 45°; posterior nostril within upper lip, its opening beneath center of eye, not visible when mouth is closed. Eye developed, its posterior margin slightly in advance of rictus.

Median fins low but obvious. Dorsal-fin origin about 0.6 head lengths behind gill opening, ending just before tail tip. Gill openings low lateral, their major axis nearly vertical, without an anterior lateral membrane or duplication. Isthmus narrow, slightly wider than gill-opening length.

Cephalic pores (Figure 2) small but discernible, mostly covered with a waxy exudate. Four mandibular, 2 preopercular, 1 ethmoidal + 3 supraorbital, 4 + 2 infraorbital,

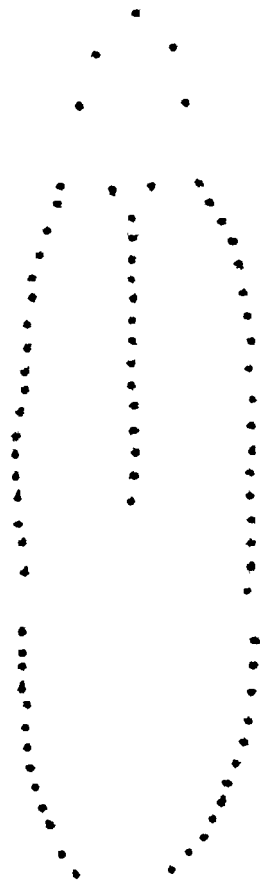


FIGURE 3. Schematic diagram of dentition of *Yirrkala gjellerupi*, CAS 217642, 276 mm SL.

and single interorbital and supratemporal pores. Lateral-line pores difficult to discern. Largest Fijian specimen has 9 before gill opening, 61 before anal opening, and 133 before ending 22 mm before tail tip.

Teeth (Figure 3) minute, conical, close set, and uniserial. A rosette of 5 anterior intermaxillary teeth, followed by a short gap, then a pair followed by 12–14 uniserial vomerine teeth. Jaw teeth uniserial, approximately 12–18 in upper jaw and 10–15 in lower.

Body coloration in ethanol pale yellow, with many fine brown punctations, becoming denser above the lateral midline. Ventral surface without spots, except before tail tip. A

TABLE 1

Counts and Proportions (in Thousandths) of *Yirrkala gjellerupi*, Based on the Holotype and Four Additional CAS and USP Specimens

Parameter	Mean	Range
TL (mm)	—	153–276
HL/TL	77	69–86
Head and trunk/TL	426	419–446
Tail/TL	574	564–581
Depth at gill opening/TL	26	22–28
Dorsal fin origin/TL	122	114–127
Upper jaw/HL	235	192–272
Snout/HL	150	142–171
Eye/HL	84	63–130
Predorsal vertebrae	16	15–18
Preanal vertebrae	64	63–66
Total vertebrae	154	152–158

TL, total length; HL, head length.

few brown spots on throat, chin, and snout, forming a thin band between eyes and a broad dark patch across nape. Median fins yellow, unspotted. Cephalic and lateral-line pores unpigmented. Peritoneum pale yellow ventrally, heavily spotted on dorsal surface. Inside of mouth pale.

See Table 1 for counts and proportions of characters of *Y. gjellerupi*.

#### REMARKS

This species is remarkable because it ascends freshwater rivers far inland. The holotype was more than 250 river kilometers from the sea, and the Fijian specimens were 10 km from the sea. Water temperature at the Fijian sites was 25.7°C, dissolved oxygen was 8.1 mg/liter, water clarity was about 50%, the current speed was 0.4–1.2 m/sec, and the stream was 0.74 m deep and 14.2 m wide. The substrate comprised rubble and sand, and the vegetation was primarily moss and paragrass. The sites were 9 and 10 m above sea level.

All three of the CAS Fijian specimens appear to be females. The smallest (166 mm standard length [SL]) has minute, undeveloped eggs in each ovary. The larger specimens (229 mm and 276 mm SL) have what appear to be massive, irregularly separated white tissue masses containing either spent

or undeveloped ova. (The condition of the tissue disallowed precise microscopic examination, such that their reproductive status could not be discerned conclusively.) The largest specimen appears to have an abnormally enlarged orbit, perhaps associated with breeding condition.

Fijian eels collected along with *Y. gjellerupi* were the ophichthid *Lamnostoma kampeni* (Weber & de Beaufort), the anguillids *Anguilla megastoma* Kaup and *A. obscura* Günther, and an as-yet undetermined species of moringuid. The *Yirrkala* is by far the smallest of those eels, and that it could venture that far upstream seems remarkable.

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