

## Short Note

# Redescription and New Records of a Rare Moray Eel, *Echidna xanthospilos* (Bleeker, 1859) (Anguilliformes: Muraenidae)

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(Accepted July 15, 1996)

**Hong-Ming Chen and Eugenia B. Böhlke (1996)** Redescription and new records of a rare moray eel, *Echidna xanthospilos* (Bleeker, 1859) (Anguilliformes: Muraenidae). *Zoological Studies* 35(4): 300-304. Bleeker described 2 specimens of a beautiful moray eel, *Muraena xanthospilos*, in 1859. The species has subsequently been reported only 3 times (once as *Poecilophis ornata* Kaup, a junior synonym) until now. In this study, we redescribe the species based on Bleeker's syntypes, one of the previously recorded specimens, and 3 additional recently collected specimens. A lectotype is designated; the variations of spots, the dentition and the body length formulas of different growing stages are described; and photographs of a fresh specimen are provided for the first time. *Echidna xanthospilos* differs from other species of *Echidna* in its shorter tail, smaller number of vertebrae, and distinctive coloration.

**Key words:** *Echidna xanthospilos*, Moray eel, Anguilliformes, Muraenidae, Fish taxonomy.

Bleeker's description of *Muraena xanthospilos* in 1859 was based on 2 small specimens from Karangbollang, Java. Kaup described and illustrated a 750-mm moray from the East Indies as *Poecilophis ornata* in his paper on eels in the Hamburg Museum collection; the paper is in a journal dated 1859, but actually published in 1860. Bleeker repeated the description and illustrated his species as *Echidna xanthospilus* [sic] in his Atlas (1865: 79, pl. 167 (fig. 1)). He suggested that *Poecilophis ornata* might be the same species, with the rows of spots present in the small specimen of *E. xanthospilos* changing to the overall spotted pattern depicted for the much larger *P. ornata*, and he noted that such ontogenetic variation had been observed in many other species of fish.

Since publication of those descriptions and illustrations, *Echidna xanthospilos* has very seldom been recorded. Steindachner (1906: 1423) listed a specimen from Upolu, Samoa in the Vienna Museum, and Günther (1910: 423) listed the above plus an additional specimen in the British Museum and one illustrated by Andrew Garrett, both also from Samoa. Recently, 2 large specimens taken off Taiwan were identified as this species by H.-M. Chen and K.-T. Shao, and a 3rd specimen from Sri Lanka was identified by J. E. Randall. Coincidentally, the 2 syntypes, as well as Günther's Samoa specimen, had recently been examined by E. B. Böhlke. It was decided to collaborate in redescribing this very distinctive and colorful species and to publish the new records.

**Materials and Methods**—Methods and terminology are as defined in Böhlke et al. (1989). Proportions are expressed in terms of total length (TL) (measured from snout tip to the tip of the tail), or head length (HL) (snout tip to the posterodorsal margin of the gill opening), for comparisons with the historical descriptions of morays. Preanal length is measured to mid-anus; body depth is measured at the gill openings (usually the greatest depth) and at the anus and does not include the fins; snout length is measured from snout tip to the anterior margin of the eye; upper jaw length is from snout tip to the external inner angle of the mouth, lower jaw length from tip of the lower jaw to mouth angle. Counts for the vertebral formula, as explained in Böhlke (1982), are obtained from radiographs; the mean vertebral formula (MVF) gives the mean values for predorsal — preanal — total vertebrae counts. Tooth counts are approximate and include sockets of missing teeth.

The specimens for this study are deposited at the Nationaal Natuurhistorisch Museum, Leiden (RMNH); the Natural History Museum, London (BMNH); the Museum of the Institute of Zoology, Academia Sinica, Taiwan (ASIZP); the Museum of the Taitung Branch of the Taiwan Fisheries Research Institute (TFRI-TT); and the Bishop Museum, Honolulu (BPBM).

**Materials examined:** RMNH 7210, 222 mm TL (lectotype of *Muraena xanthospilos*) and BMNH 1867.11.28.229, ca. 300 mm TL (paralectotype of *M. xanthospilos*), Karangbollang, Java, P. Bleeker; BMNH 1871.9.13.86, (1, 285 mm TL), Samoa

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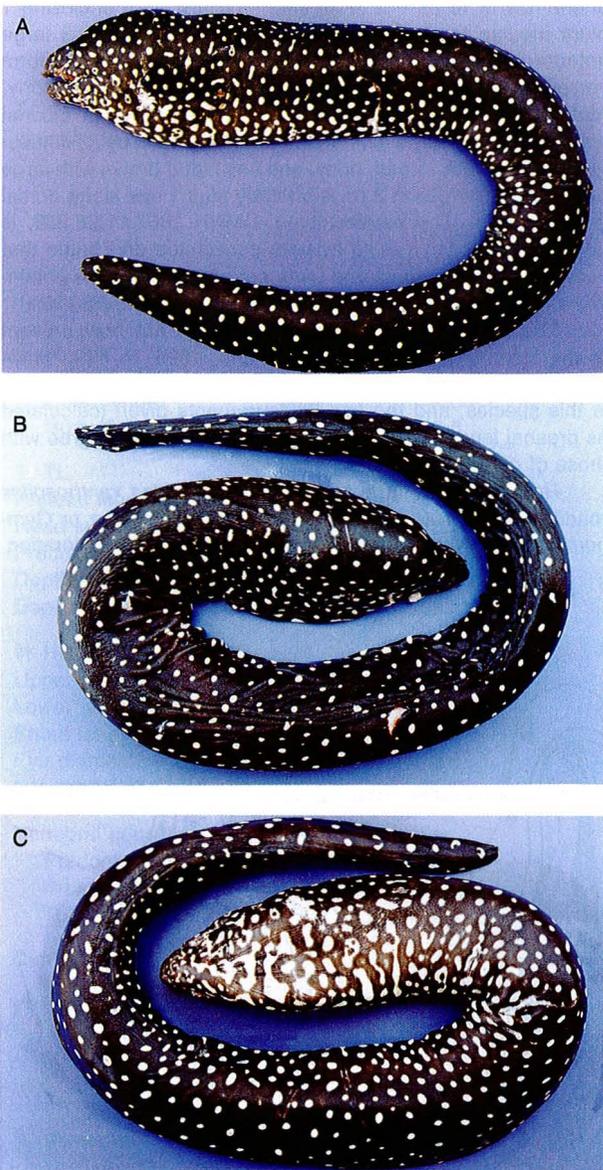
Islands, Mr. Schmeltz Jr.; ASIZP 057628, (1, 835+ mm TL), Chengkung, Taiwan, longline at a depth of 20-30 m, Miss Yueh-Er Tsou, 10 September 1992; TFRI-TT 685, (1, 905 mm TL), Chengkung, Taiwan, dive spearing at a depth of 8 m, Mr. Chiou-Cherng Doong and Jeng-Nan Tsai, 16 July 1995; and BPBM 35743, (1, 525 mm TL), Sri Lanka, commercial aquarium, J.K.L. Mee and John E. Randall, May 1993.

One specimen (250 mm TL) which appears in a photograph of our collection of this species is used for Fig. 2A.

#### Results and Discussion—

##### *Echidna xanthospilus* (Bleeker, 1859)

(Figures 1-3; Table 1)



**Fig. 1.** The newly recorded specimen TFRI-TT685 (905 mm TL, Chengkung, Taiwan) of *Echidna xanthospilus*. A, lateral view; B, dorsal view; C, ventral view, showing the coloration and spot pattern of a larger *Echidna xanthospilus*.

*Muraena xanthospilus* Bleeker, 1859: 348 (original description; Lectotype RMNH 7210, 222 mm TL; type locality Karangbollang, Java).

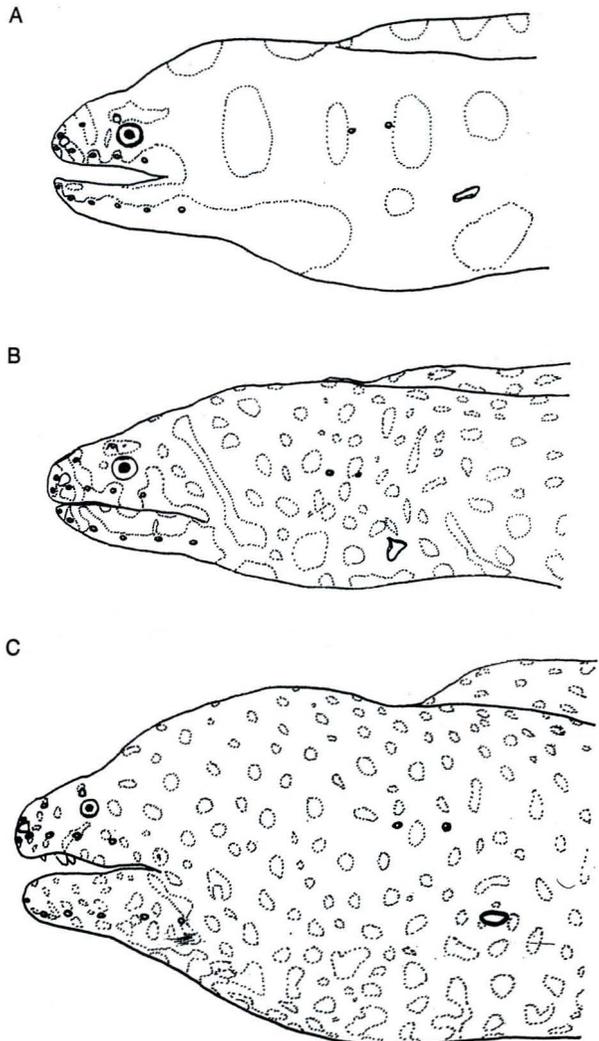
*Poecilophis ornata* Kaup, 1860: 28, pl. 5 (original description; Holotype ZMH, 750 mm; type locality East Indies).

*Echidna xanthospilus* Bleeker, 1865: 79, pl. 167 (fig. 1).

*Echidna xanthospila*: Steindachner, 1906: 1423; Günther, 1910: 423, pl. 163 (fig. B).

**Diagnosis:** A moderately stout, dark moray with distinctive white to yellow spots and polygons on head, body, and fins; anus behind mid-body, PA 1.75-1.91 in TL; head 6.46-8.04 in TL, and depth 10.2-16.1 in TL; teeth blunt and molariform, uniserial on upper jaw, triserial to biserial on lower jaw, and with elongate patch of triserial to uniserial teeth on vomer; MVF 5-55-115.

**Description:** (See Table 1) Body moderate and stout, tail tapering little until tail tip; tail short, anus behind mid-body. Head moderate, snout short and blunt, jaw short; eye moderate but smaller in larger specimens, above mid-gape. Anterior



**Fig. 2.** Head diagrams, showing the head pores and spot pattern changes of 3 different-sized specimens of *Echidna xanthospilus*. Body TL: A, 250 mm; B, 525 mm; C, 905 mm.

nostril in short tube at tip of snout, posterior nostril with elevated margin or rim. Head pores conspicuous, as depicted in Fig. 2; 2 branchial pores above and before gill opening; 1 ethmoid pore on tip of snout plus 2 supraorbital pores, the 1st just before anterior nostril, the 2nd between 1st pore and posterior nostril; 4 pores along upper jaw, the 1st just behind anterior nostril and the last below posterior margin of eye; 6 mandibular pores, the 1st smaller and at tip of lower jaw, the last below and slightly behind the mouth angle. Dorsal-fin origin well before gill opening, above the 1st branchial pore; anal fin beginning just posterior to anus. Gill opening round or oval, at or below mid-side.

Teeth blunt and molariform, increasing in number with size. Intermaxillary teeth 11-14 in peripheral row enclosing 1-3 teeth on mid-line, the teeth large and about the same size and covering the premaxillo-ethmoid area in large specimens. Maxillary teeth 7-13, a few teeth sometimes appearing as an anterior inner row (present in the lectotype). Vomerine teeth numerous, 14-33, biserial or triserial anteriorly and medially, uniserial far posteriorly, extending farther back than the maxillary tooth row. Dentary teeth about 21-56, very large and in 2 irregular rows anteriorly, becoming smaller and triserial laterally, the row extending about as far as the vomerine patch.

Head, body, and fins uniform dark brown to black, with numerous white to yellow spots varying in size, from 1/2 to 3 times eye diameter, appearing as 2 rows along the body plus a row along each fin in small (to 300 mm TL) specimens, the spots becoming more numerous, irregular, and not in distinct rows in large specimens (see Figure 2); some spots connecting ventrally before anus in all sizes. Posterior nostril pale, with a brown to black rim, jaw pores in conspicuous white spots in specimens below 525 mm TL.

The largest specimen taken to date is a 905-mm male.

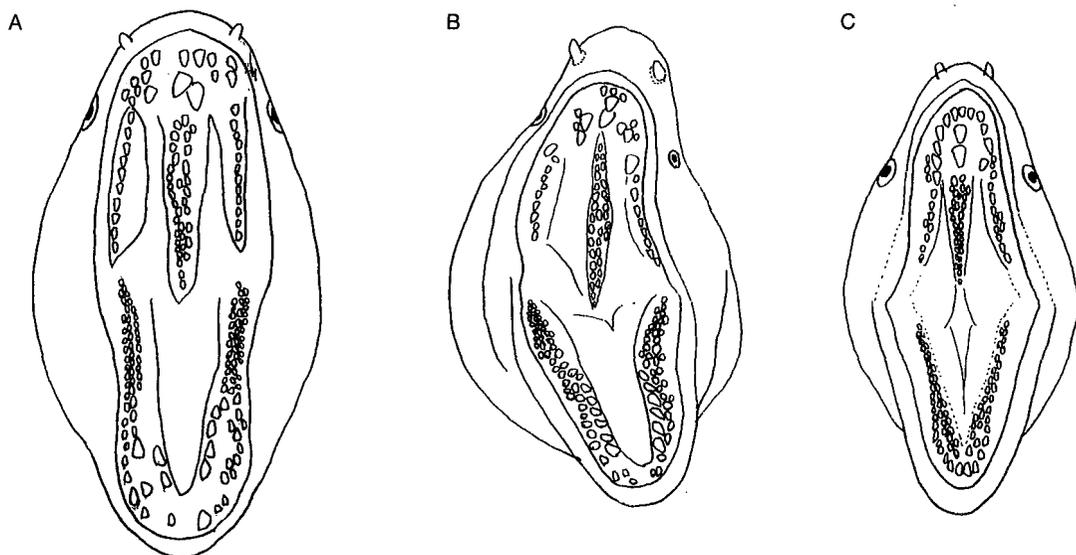
**Distribution:** Taken off Taiwan, Samoa, Java, and Sri Lanka; recent specimens were taken by spear at 8 m and by longline at 20-30 m depth.

**Types:** Bleeker described *Muraena xanthospilos* from 2

specimens measuring 225-334 mm TL. One of these was exchanged with the British Museum in 1867, the other remains in the collection in Leiden. RMNH 7210 is a small faded specimen with dissected fins; large isolated pale spots are visible in 2 irregular rows along the brown body plus 1 row on dorsal fin; the anus is behind mid-body. The 2nd syntype, BMNH 1867.11.28.229, is slightly larger, is faded and shows a similar spotted pattern, but is dried, shriveled, and unmeasurable. RMNH 7210 is therefore here designated the lectotype. It currently measures 222 mm TL, with preanal length 1.91 in TL, head length 8.04 in TL, and depth at gill opening 16.1 in TL; head pores are typical for the species; VF 5-54-115. The skin of the dorsal and anal fins is dissected exposing the rays, the condition typical for morays used by Bleeker for fin-ray counts (he reported 290 dorsal-fin rays, 186 anal-fin rays and 10 caudal-fin rays). Teeth blunt and molariform; outer peripheral row of 13 (6 + 1 + 6) intermaxillary teeth enclosing 1 blunt median tooth; maxillary teeth partially biserial, 3 large anterior inner and 11-13 outer teeth; about 24 molariform vomerine teeth, triserial anteriorly to uniserial posteriorly, headed by 1 very large conical tooth; dentary teeth biserial anteriorly, 3 very large inner molar teeth enclosed by 23 smaller granuliform teeth. Head, body, and fins faded brown with large pale spots arranged in 2 rows on body plus 1 row along dorsal and anal fins. The paralectotype, BMNH 1867.11.28.229, is about 300 mm TL; it is so twisted, convoluted and brittle that accurate measurements and tooth counts could not be obtained; a radiograph provided a vertebral formula of 5-56-116.

The holotype of *Poecilophis ornata* is not now present in the Hamburg collection (H. Wilkens, 1996, in litt.). However, the description and illustration leave little doubt that it is this species, and the few measurements given (calculated as preanal length 1.78 and head length 6.52 in TL) agree with those of our larger specimens.

**Remarks:** The large molar teeth of *Echidna xanthospilos* readily identify it as a species of the genus *Echidna* or *Gymnomuraena*. While some of the characters (bold coloration,



**Fig. 3.** Dentition diagrams of the 3 newly recorded specimens. A, ASIZP 057628, 835+ mm TL; B, TFRI-TT 685, 905 mm TL; C, BPBM 35743, 525 mm TL.

multiserial dentition, and short tail) might seem related to *Gymnomuraena*, it does not possess the extremely short tail (30 percent of total length) that characterizes *Gymnomuraena*, and we retain the species in the genus *Echidna*. *Echidna xanthospilos* differs from other species of *Echidna* by its shorter tail, smaller number of vertebrae, and its very distinctive coloration, which was well described and illustrated by Bleeker who called it a "belle espèce" in smaller specimens; it is readily identified by color pattern alone, and could hardly be confused with any other species. The few specimens in collections indicate that it is a rare species, although its scarcity may possibly be due to limited collecting in suitable habitat.

**Acknowledgements**—We are very grateful to Dr. Kwang-Tsao Shao of the Institute of Zoology, Academia Sinica and Dr. Che-Tsung Chen of the Institute of Fishery Science, National Taiwan Ocean University for their guidance and help; Dr.

John E. Randall of the Bishop Museum, Honolulu (BPBM), for providing information and the loan of a specimen. We thank Dr. Marinus Boeseman and Dr. M.J.P. van Oijen of the Nationaal Natuurhistorisch Museum, Leiden (RMNH); and Mr. Oliver Crimmen, Dr. Anthony Gill, Patrick Campbell, and Sean Davidson of the Natural History Museum, London (BMNH) for providing information and assistance in examining and x-raying specimens while visiting their institutions [EBB]. We also wish to thank Dr. Wen-Yie Chen, the Director of the Taitung Branch of the Taiwan Fisheries Research Institute; Dr. Shih-Chieh Shen of the Department of Zoology, National Taiwan University; and Dr. Sin-Che Lee of the Institute of Zoology, Academia Sinica, for their expert opinions and support throughout the study; Miss Yueh-Er Tsou, Mr. Chiou-Cherng Doong, and Jeng-Nan Tsai for their offering the Taiwanese specimens of this species. This study was originally supported by a National Science Council grant (NSC-77-0211-B-001-26) to KT Shao.

**Table 1.** Measurements, proportions, vertebral and dental counts of the lectotype, paralectotype, additional and newly recorded specimens of *Echidna xanthospilos*

	Lectotype	Additional	Paralectotype	Newly recorded specimens			Range
	RMNH 7210	BMNH 1871.9.13	BMNH 1867.11.28	ASIZP 057628	TFRI-TT 685	BPBM 35743	
Total length (mm)	222	285	300	835 + (ca.919 <sup>a</sup> )	905	525	222-905
In TL							
Preanal length	1.91	1.88	—	1.75 <sup>a</sup>	1.75	1.84	1.75-1.91
Head length	8.04	7.58	—	6.47 <sup>a</sup>	6.46	6.81	6.46-8.04
Body depth	16.1	13.6	—	11.2 <sup>a</sup>	10.2	15.0	10.2-16.1
% TL							
Preanal length	53.2	53.3	—	57.1 <sup>a</sup>	57.1	54.4	53.2-57.1
Head length	12.6	13.2	—	15.5 <sup>a</sup>	15.5	14.7	12.6-15.5
Predorsal length	10.3	10.3	—	12.7 <sup>a</sup>	13.2	10.5	10.3-13.2
Depth at GO	6.3	7.4	—	8.92 <sup>a</sup>	9.8	6.7	6.3-9.8
Depth at anus	5.5	6.3	—	6.42 <sup>a</sup>	6.6	5.5	5.5-6.6
% HL							
Upper jaw length	35.7	31.9	—	31.7	31.4	32.5	31.4-35.7
Lower jaw length	31.4	30.3	—	30.3	29.3	31.2	29.3-31.4
Snout length	17.5	18.1	—	15.5	16.4	16.9	15.5-18.1
Eye diameter	8.9	8.5	—	4.1	3.6	6.0	3.6-8.9
Interorbital width	13.2	14.1	—	18.3	15.0	14.3	13.2-18.3
Vertebral counts							
Predorsal	5	5	5	5	5	5	5
Preanal	54	54	56	54	55	54	54-56
Total	115	114	116	102 +	116	115	114-116
Dental counts							
Intermaxillary	6-1-6	6-6	6-1-6	6-8	5-6	6-6	11-14
Median	1	3	2	2	2	2	1-3
Maxillary							
Inner	3-3	—	—	—	0-1	2-4	0-4
Outer	11-13	10-10	7	10-12	8-10	7-11	7-13
Vomerine	24	14	—	33	31	29	14-33
Dentary							
Inner	3	—	—	30-33	14-19	14-20	0-33
Outer	21-23	21	—	19-25	23-24	16-20	16-25

<sup>a</sup>Actual length 835 + mm; calculations based on estimated total length of 919 mm (missing tail tip).

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## 一種罕見的鯙類，黃斑蝮鯙(鰻形目；鯙科)之重新描述及新記錄

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Bleeker 氏於 1859 年依據二尾採自印尼爪哇的標本，描述了一種美麗的鯙類—黃斑蝮鯙 *Muraena xanthospilos*。這種鯙類隨後僅僅被記錄過三次(其中一次是以 *Poecilophis ornata*, Kaup 這個無效的次異名被記載)，直到現在。本研究依據 Bleeker 氏的二尾標本，一尾先前另外記錄過的標本，及三尾最近採集並新增記錄到的較大型標本，重新描述了本種鯙類；設定其新的選模；描述其不同成長階段的斑點、齒式和體型變異；且在此首度提供其新鮮標本的照片記錄。黃斑蝮鯙和其他蝮鯙屬鯙類主要的區別在於：其尾部較短，脊椎骨數較少，及體色斑紋形式明顯不同。

關鍵詞：黃斑蝮鯙，鯙類，鰻形目，鯙科，魚類分類。

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