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PENSOFT

A rare species of *Uropterygius* (Anguilliformes, Muraenidae) found in the stomach content of a Yellow-lipped Sea Krait from Japan

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Abstract
A single muraenid specimen (genus *Uropterygius*), recovered from the stomach of a live Yellow-lipped Sea Krait, *Laticauda colubrina* (Schneider, 1799), captured at Iriomote Island, Japan, was found to possess intermediate traits between 2 rare species, *Uropterygius xenodontus* McCosker & Smith, 1997 and *Uropterygius golanii* McCosker & Smith, 1997. The specimen is provisionally identified as *U. xenodontus* and is described below with its morphs, as an important addition to material of rare specimens of the genus in the western North Pacific.

Key words
Uropterygius xenodontus; *Uropterygius golanii*; moray eel; fish biodiversity; *Laticauda* spp.; western North Pacific.

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Introduction

Sea kraits (Squamata, Elapidae, *Laticauda* spp.) have a key role as predators of coastal fishes in tropical and subtropical regions. Some species specialize on feeding of anguilliform fishes, despite a large variety of co-existing fishes (McCosker 1975, Ineich et al. 2007, Tabata et al. 2017). When studying the stomach contents of *Laticauda* spp. at Iriomote and Ishigaki islands in Japan, 2 moray eel specimens of the genus *Uropterygius* Rüppell, 1838 (Muraenidae, Uropterygiinae) were recovered from *Laticauda colubrina* (Schneider, 1799). One was identified as *Uropterygius nagoensis* Hatooka, 1984, while the other remained unidentified (Tabata et al. 2017). We provisionally identify this specimen as *Uropterygius xenodontus* McCosker & Smith, 1997—a species known only from the type series collected from central and western South Pacific. The present report documents a significant range extension of this species, and is the first record from Japanese waters.

Methods

Details of specimen collection were given by Tabata et al. (2017). Counts and measurements generally follow McCosker and Smith (1997), measurements being made to the nearest 1 mm with a metal ruler for the total, trunk, preanal and tail lengths; and to 0.1 mm with digital calipers for other measurements. Vertebral counts were made from radiographs. Total and head lengths are abbreviated as TL and HL, respectively. Institutional abbreviations follow Sabaj (2016).

Figure 1. *Uropterygius xenodontus*, FAKU 141066, 516 mm TL, from stomach content of *Laticauda colubrina* captured at Iriomote Island, Ryukyu Islands, Japan.

Results

Family Muraenidae Rafinesque, 1810
Subfamily Uropterygiinae Fowler, 1925

Uropterygius xenodontus McCosker & Smith, 1997
(Figs 1, 2; Table 1)

English name: Black Snake Moray
New standard Japanese name: Iriomote-hebi-utsubo

Uropterygius xenodontus McCosker and Smith 1997: 1006, figs 1, 2 (type locality: Chesterfield Bank, 19°53.5′ S, 158°28.2′ E, southeastern side of lagoon, Coral Sea, 6–9 m depth).

New records. Nakano Beach (24°25.5′ N, 123°47.2′ E), northern coast of Iriomote Island, Ryukyu Islands, Okinawa Prefecture, Japan, western North Pacific, collected by Runa Tabata and Hideaki Nishizawa, 7 July 2013, FAKU 141066 (516 mm TL), 1 specimen.

Description. Selected morphological characters, generally reported for members of the family Muraenidae, are summarized in Table 1 and as follows. Body elongate, laterally compressed; head moderate; snout obtuse, short; anus situated about midway along body. Dorsal and anal-fins inconspicuous, origins situated near tail tip. Gill opening small, oval. 1 + 2 supraorbital, 4 infraorbital and 6 mandibular pores; a single branchial pore. Teeth on vomer and intermaxillary conical, needlelike; jaw teeth wedge-shaped (Fig. 2). Jaw and vomerine teeth arranged uniserially. Body uniformly dark brownish with indistinct darker mottling; head coloration unknown due to partial digestion of skin (Fig. 1).

Distribution. *Uropterygius xenodontus* is widely distributed in shallow tropical and subtropical waters of the central to western North Pacific (Fig. 3). However, specimen records are limited to only the Coral Sea, American Samoa, the Marshall Islands, Johnston Island, and Iriomote Island (McCosker and Smith 1997, this study).

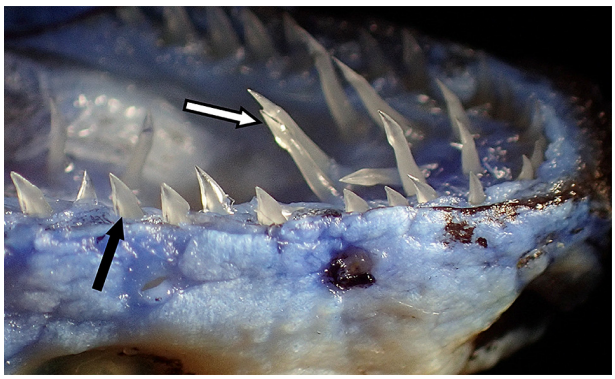

Figure 2. Close-up of upper jaw (ventral view) showing wedge-shaped (closed arrow) and needlelike (open arrow) teeth of *Uropterygius xenodontus*, FAKU 141066.

Discussion

Böhlke et al. (1989) recognized 4 genera, *Anarchias* Jordan & Starks, 1906, *Channomuraena* Richardson, 1848, *Scuticaria* Jordan & Snyder, 1901, and *Uropterygius*, within the subfamily Uropterygiinae. Morphological features of this specimen correspond to the genus *Uropterygius* that comprises 21 valid species (Böhlke et al. 1989, Smith 2012). Vertebral numbers and wedge-shaped jaw teeth of our specimen were most similar to *U. xenodontus*, found in the western and central Pacific (Fig. 3), and *Uropterygius golanii* McCosker & Smith, 1997, which is endemic to the Red Sea (Fig. 3). *Uropterygius xenodontus* and *U. golanii* are recognized as representing a sister species relationship (McCosker and Smith 1997, DiBattista et al. 2016), and are distinguished only by differences in vertebral numbers, that is, 143–146 before dorsal fin, 144–149 before anal fin, and 154–157 in total in the former vs 134–138, 136–141, and 145–148 in the latter. Vertebral counts in our specimen are 139, 141 and 152 respectively, and represent an intermediate condition between *U. xenodontus* and *U. golanii*. We provisionally

Table 1. Counts and proportional measurements of *Uropterygius xenodontus* and *U. golanii*.

	U. xenodontus		*U. golanii*
	FAKU 141066	**Type series† (*N* = 4)**	**Type series† (*N* = 4)**
Total length (mm)	516	304–530	291–453
Counts			
Total vertebrae	152	154–157	145–148
Vertebrae before mid-anus	67	66–69	60–68
Vertebrae before dorsal fin	139	143–146	134–138
Vertebrae before anal fin	141	144–149	136–141
Proportions as % TL			
Head length	8.4	7.1–7.9	7.6–8.9
Preanal length	50.2	48.0–50.2	48.6–49.3
Tail length	49.8	49.8–52.0	50.7–51.4
Trunk length	42.1	No data	No data
Body depth at gill opening	3.9	3.3–3.8	4.0–4.8
Body depth at mid-anus	3.1	No data	No data
Body width at mid-anus	2.3	2.1–2.5	2.3–3.1
Proportions as % HL			
Snout length	18.4	18.8–20.4	20.4–22.2
Upper jaw length	40.8	32.9–47.4	42.7–46.4
Eye diameter	7.1	7.9–10.0	8.0–9.2
Interorbital length	15.0	14.6–19.3	16.1–17.5

† Data from McCosker and Smith (1997).

identify the Iriomote specimen as *U. xenodontus* based on its collection locality (= Iriomote Island), located in the southern part of the western North Pacific. This specimen is also the first record from Japanese waters and well distant from the previously known distribution of the species (Fig. 3).

Exhaustive specimen collection efforts, primarily by net fishing and hook and line, were conducted from the early 20th century for the purpose of understanding fish biodiversity in Japanese waters. However, uncertainties remain in coral reef and rocky fish assemblages when compared to other coastal habitats, mainly due to the difficulty in capturing specimens. In addition to *U. xenodontus* reported here, other poorly known fish species have been found in recent investigations of sea krait stomach contents (Tabata et al. 2017). As evident here and also suggested by Ineich et al. (2007) and Séret et al. (2008), examination of the stomach contents of sea kraits provides an additional useful tool for investigating the diversity of tropical and subtropical fishes.

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Authors' Contributions

FT examined and identified the specimen, made the distributional map, took the photos, wrote the text and table, and RT, HN and HM conducted the survey and captured the specimen.

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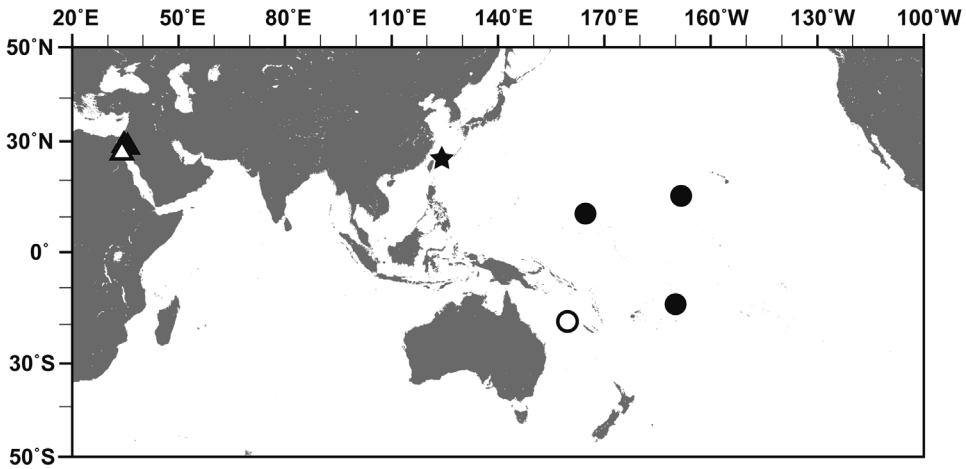

Figure 3. Map showing specimen records of *Uropterygius xenodontus* (star, FAKU 141066; open circle, holotype; closed circles, paratypes) and *U. golanii* (open triangle, holotype; closed triangles, paratypes).

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