

琉球大学学術リポジトリ

琉球列島で得られた日本初記録のカワウミヘビ *Lamnostoma mindorum* (条鰭綱: ウナギ目: ウミヘビ科)

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First Japanese record of the Mindoro snake eel *Lamnostoma mindorum* (Actinopterygii: Anguilliformes: Ophichthidae) from the Ryukyu Islands

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Abstract. A single specimen (626 mm in total length) of *Lamnostoma mindorum* (Jordan & Richardson, 1908) was collected from the freshwater area in Okinawa Island, Ryukyu Islands, Japan. The specimen represents the first record of *L. mindorum* from Japan and the northernmost record of this species.

Introduction

The Mindoro snake eel *Lamnostoma mindorum* (Jordan & Richardson, 1908) is a rare species of the West Pacific. Specimens have been reported only from five rivers located in Mindoro Island (Jordan & Richardson 1908; Herre 1923) and Luzon Island (Herre 1953) in the Philippines; in New Guinea (Weber & de Beaufort 1916), and from two rivers (Hatooka & Yoshino 1998; Chang & Tsai 2003, 2004) in eastern Taiwan.

In June 2017, an unfamiliar ophichthid fish was caught in the freshwater area of Genka River, Okinawa, southern Japan. We identified the specimen as *L. mindorum* based on morphological observation and DNA analysis. This is the northernmost record of the species and the first record of it in Japanese waters. In the present study, we describe the morphological characters and other biological aspects.

The scientific name often used for this species is *L. mindora* (McCosker 1977; Kottelat et al. 1993). However, Hatooka & Yoshino (1998) corrected *L. mindora* to *L. mindorum*, because the generic name is neuter. In this paper, the scientific name *L. mindorum* has been used.

Materials and Methods

The fish was caught using a hand net by tourists at a freshwater area (approximately 1.8 km from the mouth) of the Genka River, Okinawa Island,

Japan, on June 24, 2017. This fish was kept in a 100 L freshwater tank and fed small living freshwater shrimps (1–2 cm length). The fish died due to an unknown cause on October 31, 2017. There was no apparent change in morphology during captivity. After taking photographs and removing tissue for genetic analysis, the specimen was fixed in 10% formalin.

Counts and measurements follow Hatooka & Yoshino (1998). Vertebral counts were based on CT scanned images using a Somatom Definition AS CT scanner (Siemens Medical, Iselin, NJ, USA). This specimen is deposited in the Okinawa Churashima Foundation (OCF), Okinawa, Japan (Specimen number: OCF-P03836).

A region of the mitochondrial cytochrome oxidase subunit I (COI) and the hypervariable region of the 12S ribosomal gene (Miya et al 2015) were amplified from the muscle tissue by polymerase chain reaction (PCR) using KOD FX Neo (Toyobo Inc.). The two sequences obtained were submitted to the GenBank nucleotide sequence database under the accession numbers LC349013 (COI) and LC349014 (hypervariable region).

Lamnostoma mindorum (Jordan & Richardson, 1908)

[New Japanese name: Kawa-umihebi]
(Fig. 1)

Diagnosis. Preanal length half of total length. Gill opening lateral. Dorsal fin arising slightly behind the level of the posterior edge of the gill opening. This specimen was identified as *Lamnostoma mindorum*, because the morphological features agreed well with the original description and that of Hatooka & Yoshino (1998).

Description. Total length (TL) 626 mm; preanal length 2.1 in TL (48.6% of TL), head length (HL) 8.3 (12.1), predorsal length 6.7 (15.0), body depth

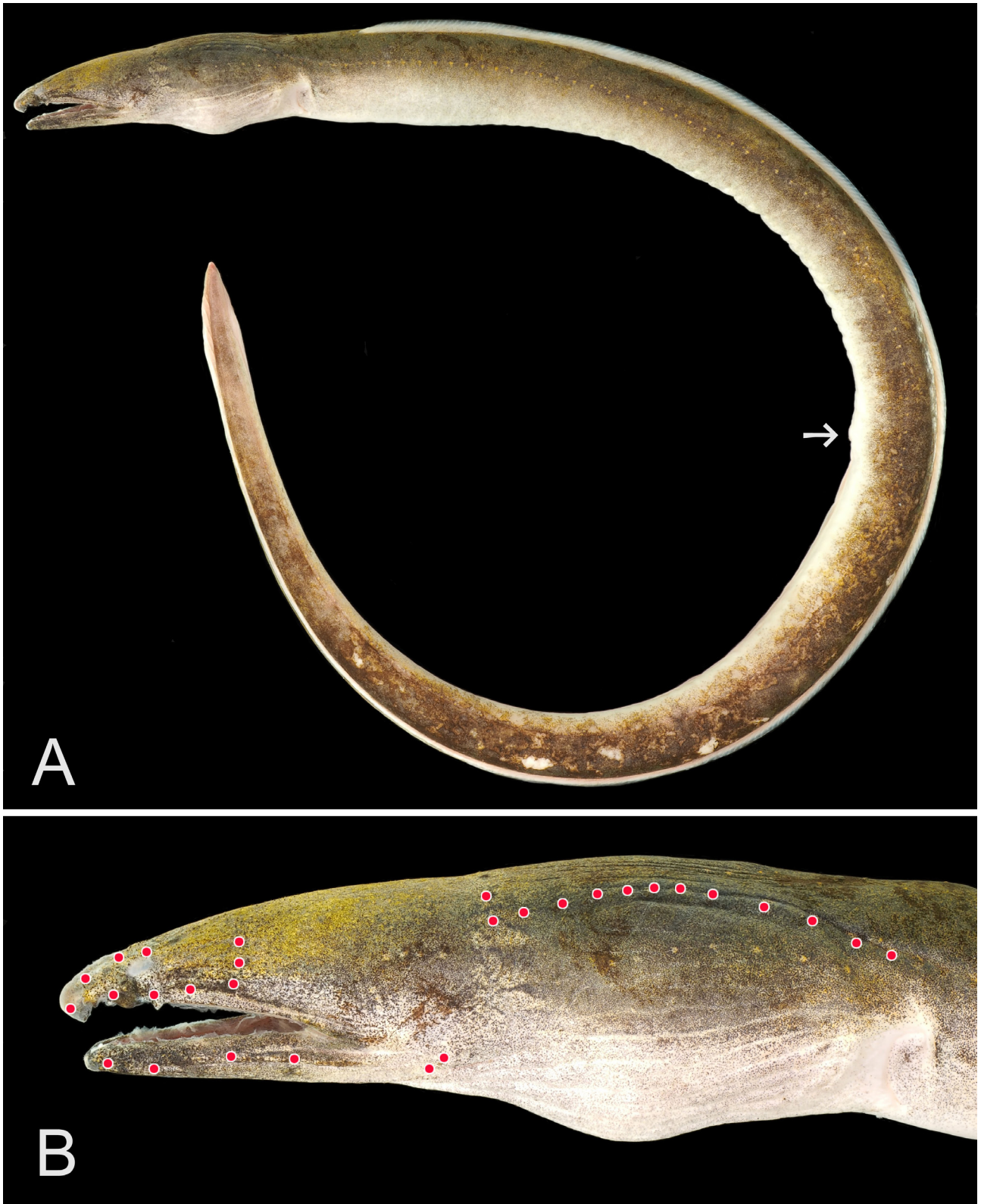


Fig. 1. *Lamnostoma mindorum*, OCF-P03836, 626 mm TL, from Genka River, Okinawa Island, Japan. A: photograph of the body (arrow: position of the anus), B: photograph of the head showing sensory pores (red spots).

図1. カワウミヘビ (OCF-P03836, 全長 626 mm), 沖縄島源河川で採集. A: 全身写真. B: 感覚孔を強調 (赤点) した頭部拡大写真.

at anus 29.3 (3.4). Upper jaw 2.7 in HL (37.6% of HL), snout length 9.0 (11.1), eye diameter 24.4 (4.1), interorbital width 14.3 (7.0), gill opening 7.3 (13.6). Body width 1.1 in body depth at anus (89% of body depth). Total vertebrae 142, preanal vertebrae 60, predorsal vertebrae 14.

Body elongate, nearly cylindrical or slightly compressed. Anus located in front of mid-body. Dorsal and anal fins low, their height obscure owing to their depressed condition. Dorsal fin arising slightly behind the gill opening and ending close to the caudal tip; anal fin origin just behind the anus. Tip of tail fleshy, pointed, without fins. Paired fins absent.

Snout sharp and pointed. Mouth large; anterior part of premaxillary tooth row exposed. Anterior nostril located at one-third of snout from tip of snout with a short rim; posterior nostril located in upper tip, in front of the eye, opening between two pendulous papillae of the upper lip. Posterior papilla of upper lip very short; eye small, located slightly ahead of the middle part of the upper lip. Gill opening lateral, a large slit-like cleft; isthmus fairly wide, approximately of the same size as that of the gill slit. Eye small, embedded under the skin.

Lateral-line pores small, 12 before the gill opening, 58 before the anus. Upper body brown and lower yellowish: brown color on trunk extending onto middle of the lower half, these colors separated on the tail region.

Cephalic sensory pores minute. Supraorbital canal with 4 pores, infraorbital canal with 6 pores, mandibular canal with 4 pores, preopercular canal with 2 pores, supratemporal canal with 3 pores; lateral-line canal with 12 pores before the gill opening (Fig. 1B).

Teeth slender, small, canine. A semicircle of intermaxillary teeth with some missing. Nine teeth on prevomer. Maxillary and mandibular teeth uniserial, small and close-set. The exact number of teeth could not be counted because some teeth were buried and missing. Mandibular teeth larger anteriorly.

Remarks. The morphological features of the present specimen agreed well with the other descriptions of *Lamnostoma mindorum* (Jordan & Richardson; Weber & de Beaufort 1916; Herre 1923, 1953; Hatooka & Yoshino 1998; Chang & Tsai 2003, 2004). Dr. John E. McCosker kindly informed us of the vertebral counts of the holotype of this species as follows: predorsal 16, preanal 60, total 143 (John E. McCosker, personal communication). The vertebral

counts of the present specimens almost completely matched with those of the holotype.

The present report is the northernmost record of this species and the sixth locality from which specimens have been recorded. Moreover, it is the largest known specimen (Chang & Tsai 2004).

This species has been collected from brackish and freshwater areas. Chang & Tsai (2004) speculated that this species is a peripheral freshwater fish, which occasionally enters rivers. The present specimen was collected in the lower part of the Genka River, close to a brackish water area. Our specimen weakened and nearly died after capture, but recovered immediately after adding sodium (0.9% in salinity) to its holding tank. This result suggests that this species may need brackish or normal seawater to maintain its physiology.

Chang & Tsai (2004) found a small goby and shrimp in the stomach of the specimen that they collected from the wild. Moreover, we confirmed that our captive fish ate small living shrimps at night. Thus, it appears that this species might nocturnally feed mainly on small benthic animals.

Nowadays, increases in the number of invasive fish originating from fish kept in aquaria is causing serious problems for the conservation of native freshwater fish in Okinawa (Ishikawa & Tachihara 2014). However, it is unlikely that the existence of *L. mindorum* in Japan is due to artificial release as this species is not traded as an aquarium fish. Because all anguilliforms undergo the leptocephalus stage during their early stage in the ocean, we assume that *L. mindorum* is distributed around the Kuroshio Current region and the present specimen might have been brought from a southern area by this current.

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琉球列島で得られた日本初記録のカワウミヘビ
Lamnostoma mindorum (条鰭綱: ウナギ目:
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要旨 . 沖縄島の淡水域においてカワウミヘビ (新称) *Lamnostoma mindorum* (Jordan & Richardson, 1908) 1 個体 (全長 626 mm) を捕獲した . 本確認は本種の日本初記録であるとともに北限記録である .

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