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On the occurrence of Persian Gulf Sea Snake, *Hydrophis lapemoides* (Gray, 1849) (Reptilia, Squamata, Elapidae, Hydrophiinae), along the coast of Bangladesh

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Abstract

We provide the first evidence of the presence of the Persian Gulf Sea Snake, *Hydrophis lapemoides* (Gray, 1849), along the coast of Bangladesh. This species was assumed to exist in there, but neither specimens nor confirmed observations exist until now. We document here the first confirmed record of *H. lapemoides* based on a freshly collected and taxonomically verified specimen from coastal Bangladesh. The Bangladeshi specimen had the following diagnostic characters: 55 black bands, a dorsal scale composition of 35:51:43, 342 ventrals, one pre-ocular, two post-oculars, 2+3 temporals, 8 supralabials (II largest and contact prefrontals; III–IV contact orbit) and 8 infralabials (I–IV contact genials).

Keywords

Distribution, extent of occurrence, geographic range, morphology, new country record

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Introduction

Sea snakes are secondarily adapted marine reptiles occurring in the shallow, coastal waters throughout tropical and subtropical regions (De Silva 1994; Rasmussen 1997; Heatwole 1999; Sanders et al. 2008). There are 3,889 species of snakes in the world (Uetz and Hallermann 2021), of which only 72 species are adapted to the marine life (Murphy 2012; Ukuwela et al. 2012; Nankivell et al. 2020). Bangladesh is a South Asian country in

the delta of the Bay of Bengal, where 102 snake species have been reported until now (Husain 1977; Montaquim et al. 1980; Khan 1982, 1987, 1992, 2015, 2018; Sarker and Sarker 1985, 1988; Ahsan 1998; Asmat and Hannan 2007; Mahony and Reza 2008; Kabir et al. 2009; Mahony et al. 2009; Ahsan et al. 2015; IUCN Bangladesh 2015; Haidar et al. 2020; Romon et al. in press). So far, 16 species of sea snakes from Bangladesh have been included in the Red List of the International Union for Conservation of Nature (IUCN Bangladesh 2015). Among these species, the occurrence of 11 are substantiated in the scientific literature (Khan 1982, 1987, 1992, 2008, 2015, 2018; Sarker and Sarker 1988; Kabir et al. 2009; Hasan et al. 2014; Sarker et al. 2017). However, presence of five species—*Hydrophis lapemoides* (Gray, 1849), *H. obscurus* Daudin, 1803, *H. stokesii* (Gray, 1846), *Laticauda colubrina* (Stejneger, 1907), and *L. laticaudata* (Linnaeus, 1758)—is yet to be confirmed.

Among these five species, *H. lapemoides* was reported from Bay of Bengal at Puri (Odisha, India), and two of its subjective junior synonyms, *Hydrophis stewartii* Anderson, 1872 and *Hydrophis dayanus* Stoliczka, 1872, have their type localities on the coast of Odisha (India) and Myanmar, respectively (Smith 1943; Ganesh et al. 2019). *Hydrophis lapemoides* is known to be distributed along the coasts of Oman, United Arab Emirates, Qatar, Bahrain, Saudi Arabia, Kuwait, Iraq, Iran, Pakistan, India, Sri Lanka, Myanmar, Thailand, Malaysia, and Singapore (Fig. 1; Ahamed 1975; Rasmussen 1987; Somaweera and Somaweera 2009; Rasmussen et al. 2010; Wallach et al. 2014; Buzás et al. 2018), which implies that it should be present in Bangladesh as well. However, specific records of *H. lapemoides* from Bangladesh coast were lacking. Here, we report the first confirmed presence of this species in Bangladesh based on morphological and morphometric study of a recently collected specimen.

Methods

The snake specimen was procured from a local fish market of Chittagong University campus on 2 January 2021 as a routine snake rescue by the Venom Research Centre, Bangladesh. The snake was caught as by-catch during fishing and unintentionally handed over to fish seller. The individual was still alive but weak and showing passive behavior during collection and died within 4 hours of procurement. The dead specimen was tagged and preserved in 70% ethanol following the Dead Snake Preservation Protocol v. 2.1 of the Venom Research Centre. We resurveyed the fishing area (Foillatoli, Chattogram) along the coast of Bay of Bengal with help of fishermen to obtain plausible GPS coordinates for the catch.

To identify the snake, morphological and meristic data were taken and compared with the standard literature (Volsøe 1939; Smith 1943; Ahamed 1975; Rasmussen 1987, 1993; Das 2010; Rezaie-Atagholipour et al. 2016; Ganesh et al. 2019). A lamp with simple microscope (5×), standard measuring tape, a Vernier scale (to the nearest 0.1 cm), a digital weighing balance (to the nearest 0.01 g), and a sexing probe were used to obtain morphological and meristic data. The specimen was photographed using a Canon 600D camera.

The specimens is deposited in the collection of Venom Research Centre, Bangladesh (BAP-Hl-001).

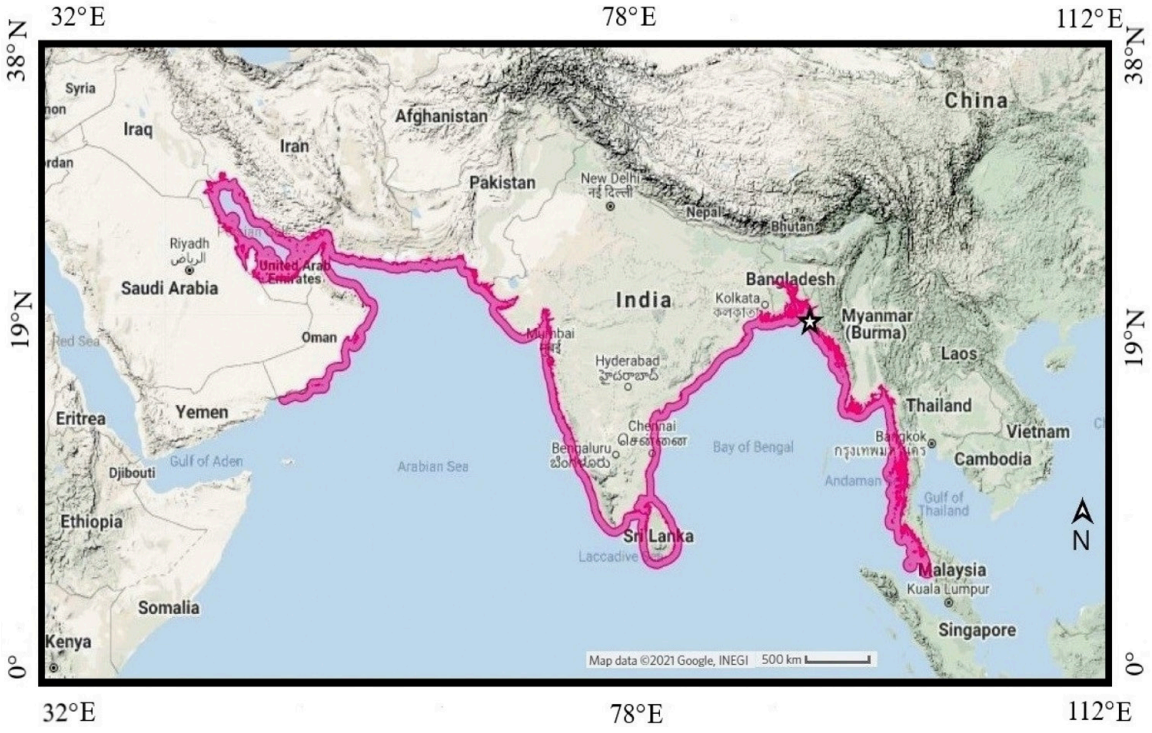

Figure 1. Distribution range of *Hydrophis lapemoides* from the Persian Gulf to the Malacca Straits. Black star icon depicts the location of current record from Chattogram of Bangladesh (map source: ©2021 Google, INEGI).

Results

Class Reptilia
Order Squamata
Family Elapidae
Genus *Hydrophis* Latreille, 1801

***Hydrophis lapemoides* (Gray, 1849)**
Figures 1, 2

New record. Bangladesh – Chattogram • Foillatoli; 22°19′41″N, 091°45′14″E; 0 m alt.; 02.I.2021; Mohammad Abdul Wahed Chowdhury, Harij Uddin & Najmul Hasan leg.; shore of the Bay of Bengal; 1♀, SVL 36.3 cm, TL 4.3 cm, weight 32.3 gm, BAP-Hl-001.

Description. The specimen is characterized by 35:51:43 rows of dorsal scales. It has 342 small, rectangular ventral scales, and the preanal plate is shielded with four small scales (Fig. 2D). The dorsal side of the head shows a large hexagonal frontal, a single pre-ocular, a pair of post-oculars, and 2+3 temporals (Fig. 2C). The snake also has eight supralabials; 2nd supralabial largest and touching pre-frontal, 3rd and 4th touching eye; the suboc-ular scale absent. The lower jaw is characterized with two pairs of chin shields and eight infralabials; 1st to 4th touching chin shields and 1st separates chin shields from mental. The snake has a robust body, a grey dorsum with black bands, a small indistinct head, dorsally positioned nasals, small round eyes with black pupil, and a later-ally flattened tail (Fig. 2A). The small, indistinct head is dark, with curved white marks from forehead to back of the head along the eyes (Fig. 2B). There are 49 black bands along the body narrowing towards flanks and ab-sent on ventral side. The tail possesses six dark bands,

Figure 2. *Hydrophis lapemoides* (BAP-Hl-001, SVL 36.3 cm, TL 4.3 cm). **A.** Photograph of the preserved specimen. **B.** Dorsal view of head. **C.** Lateral view of head. **D.** Anal aperture (photographs: Ibrahim K.A. Haidar).

wider near the dorsum, narrower along the lateral side, becoming much broader at the subcaudal region touching each other while the last band covers entire tail tip.

Our evaluation of meristic characteristics verified the specimen as *H. lapemoides* (Table 1).

The morphological characters of the collected specimen were compared with other elapid sea snakes of the Indian Ocean, including the Andaman Sea, Bay of Bengal, Laccadive Sea, and Gulf of Thailand. Presence of much reduced ventral scales and dorsally positioned nostrils in the specimen excludes the genus *Laticauda* (vs. large ventrals and laterally positioned nostrils). The composition of dorsal scale rows (n = 51) along midbody of our specimen distinguish it from *Aipysurus eydouxii* (vs. 17), *H. aagaardi* (vs. 39–47), *H. anomalus* (vs. 33), *H. atriceps* (vs. 39–49), *H. belcheri* (vs. 32–36), *H. brookii* (vs. 37–45), *H. cantoris* (vs. 41–48), *H. curtus* (vs. 25–43), *H. cyanocinctus* (vs. 37–47), *H. gracilis* (vs. 29–43), *H. inornatus* (vs. 43–44), *H. jerdoni* (vs. 19–21), *H. klossi* (vs. 31–39), *H. mamillaris* (vs. 35–43), *H. melanosoma* (vs. 35–45), *H. nigrocinctus* (vs. 39–45), *H. obscurus* (vs. 29–37), *H. pachycercos* (vs. 39–45), *H. peronii* (vs. 23–31), *H. perviceps* (vs. 19), *H. sibauensis* (vs. 35–37), *H. spiralis* (vs. 33–38), *H. torquatus* (vs. 35–42), and *Kolpophis annandalei* (vs. 70–100). The specimen possesses small rectangular ventrals (n = 342), which are less than the counts of *H. fasciatus* (vs. 410–445) and *H. stricticollis* (vs. 374–452), and more than the counts of *H. bituberculatus* (vs. 247–290), *H. lamberti* (vs. 258–306), *H. ornatus* (vs. 209–312), *H. schistosus* (vs. 239–322), *H. stokesii* (vs. 226–286), and *H. viperinus* (vs. 226–274). The presence of a complete preanal in our specimen differentiates it from *H. caerulescens* (vs. divided preanal). Apparently a black dorsum and yellow ventrum is a distinct body coloration of *H. platurus*. Additionally, *H. lapemoides* is distinguished from its close congener *H. cyanocinctus* by the number of dorsal scales at midbody (51 vs. 37–47), contact of the supralabials with eye (III–IV vs III–V), scale patterns on the thickest part of body (feebly imbricate vs. imbticate), and shape of frontal scale (hexagonal vs. longer than broad).

Discussion

The range of *Hydrophis lapemoides* extends from the Persian Gulf to the Strait of Malacca along the coast of the Arabian Sea, Laccadive Sea, Bay of Bengal, Andaman Sea, and Gulf of Thailand (Smith 1943; Das 2010). Although, Bangladesh lies within the geographic range of *H. lapemoides*, the presence of the species in Bangladesh waters was doubtful due to the absence of any specimens. Our new record, therefore, is the first evidence of *H. lapemoides* in Bangladesh waters.

This species was assessed as Data Deficient in Bangladesh (IUCN Bangladesh 2015), and an earlier assessment by Rasmussen et al. (2010) considered this species to be Least Concern globally. Like other sea snakes, *H. lapemoides* is facing threats such as capture in by-catch and intentional killing by fishermen, habitat degradation, exploitation as food, and movement of heavy trawls suffocating habitat (Ward 2000; Wassenberg et al. 2001; Milton et al. 2009; Rasmussen et al. 2010; Das 2012; Sarker 2013; Ganesh et al. 2019). With this in mind, additional information on its habitat, ecology, and threats to aid in the conservation of *H. lapemoides.*

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Authors' Contributions

Conceptualization: MAWC, IKAH. Formal analysis: MAWC, MRI, AA, IKAH. Data curation: MRI, NH, HU, IKAH. Visualization: IKAH.

Table 1. Comparative accounts on the meristic characteristics of the present specimen and previous descriptions of *Hydrophis lapemoides*.

Characteristics	This study	Previous studies*
Number of bands	55 (49 on body, 6 on tail)	29–64
Dorsal scales on the neck	35	29–35
Dorsal scales on the mid-body	51	40–57
Ventrals	342	288–404
Pre-ocular	1	1
Post-oculars	2	2/3
Temporals	2+3	2+3/3+3
Supralabials	8 (II largest and contact prefrontal; III–IV contact orbit)	8 (II contact prefrontal; III–IV/III–V contact orbit)
Infralabials	8 (I–IV contact genials)	8 (I-II/I–IV contact genials)
Preanal	Shielded with four small scales	Shielded with four small scales
Scales on thickest part of body	Feebly imbricate and quadrangular	Juxtaposed or feebly imbricate and hexagonal or quadrangular

*Data compiled from Volsøe 1939; Smith 1943; Ahamed 1975; Rasmussen 1987, 1993; Das 2010; Rezaie-Atagholipour et al. 2016; Ganesh et al. 2019.

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