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CONSERVATION AND NATURAL HISTORY

A Dwarf Seasnake, *Hydrophis caerulescens* (Shaw 1802), Dog-faced Watersnake, *Cerberus rynchops* (Schneider 1799), and Little Filesnake, *Acrochordus granulatus* (Schneider 1799) from the Surat District, Gujarat, India

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Photographs by the author.

Colleagues and I recently recorded one marine and two estuarine snakes, all with extensive coastal distributions in India (Fig. 1), along the coast of Gujarat, India. The venomous Dwarf Seasnake (*Hydrophis caerulescens*) in the family Elapidae has been recorded between Mumbai and Karwar on the western coast of India (states of Maharashtra, Goa, and Karnataka) and from Chennai northward to the mouth of the Ganges on the eastern coast (Tamil Nadu, Andhra Pradesh, Odisha, West Bengal) (Whitaker and Captain 2008). The Dog-faced Watersnake (*Cerberus rynchops*) is a mildly venomous estuarine snake in the family Homalopsidae. This species occurs along the entire Indian coast, including the Andaman and Nicobar Islands (Daniel 1983, 2002; Whitaker and Captain 2008). The Little Filesnake (*Acrochordus granulatus*) is a non-venomous estuarine snake in the family Acrochordidae. It also occurs along coastlines and in river estuaries throughout India, including Andaman and Nicobar Islands (Whitaker and Captain 2008).

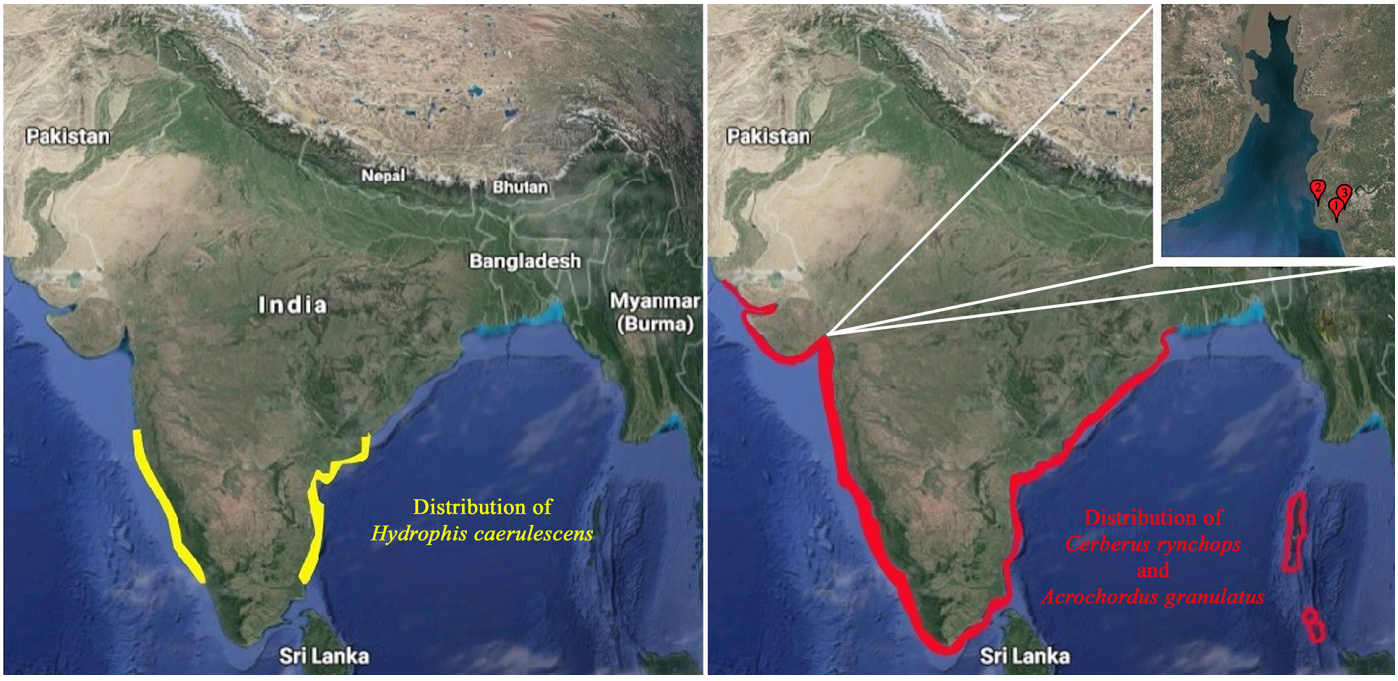

Fig. 1. Distributions in India of (1) the Dwarf Seasnake (*Hydrophis caerulescens*), (2) Dog-faced Watersnake (*Cerberus rynchops*), and (3) Little Filesnake (*Acrochordus granulatus*). The insert shows the locality records in Surat, Gujarat, India.

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Fig. 2. A Dwarf Seasnake (*Hydrophis caerulescens*) washed ashore on Hazira Beach near Magdalla Village in the Surat District, Gujarat, India. The insert shows the extensive dentition responsible for the alternative name Many-toothed Seasnake.

Dwarf Seasnake (*Hydrophis caerulescens*).—At 1034 h on 23 January 2019, we found an adult Dwarf Seasnake (SVL 772 mm; Fig. 2) washed ashore on a subtidal sandy-mud beach in Hazira (21.0840°N, 72.6462°E) during a boat race held in Magdalla Village of the Surat District. Also known as the Many-toothed Seasnake, this species usually has 14–18 maxillary teeth (rarely 13) behind the fangs (Whitaker and Captain 2004, 2008). The snake from Gujarat had four rows of teeth in the upper jaw, each with 13 teeth, including the maxillary teeth counted behind the fangs (Fig. 2 insert). Two rows of 17 and 19 mandibular teeth, the first three enlarged and the second largest, were present. These snakes are generally inoffensive but will bite if provoked (Whitaker and Captain 2008). This species has a neurotoxic venom and fatal bites have been reported (Whitaker and Captain 2004, 2008).

Kapadia (1951) listed the Dwarf Seasnake from Maha Gujarat, but Gujarat did not become an independent state until 1960. Subsequent reports of the species in Gujarat (e.g., Vyas 1993, 2000, 2007; Desai 2017; Patel and Vyas 2019) almost certainly were referring to specimens from Mumbai, Maharashtra. For example, Desai (2017) noted that this species was uncommon in Gujarat but provided no locality data — and the photograph in that book illustrated a specimen from Mumbai. Whitaker and Captain (2004, 2008) indicated that any record of the species from Gujarat needed confirmation. Consequently, I believe that the snake reported herein is the first documented record from Gujarat.

Dog-faced Watersnake (*Cerberus rynchops*).—This species is thought to be common, but despite frequent coastal surveys in the Surat District of Gujarat, it is herein reported for only the second time in this area. The first report was in 2012 in Magdalla Village. Six years later, at 1530 h on 16 January 2019, we found a dead male (SVL 428 mm; Fig. 3) while responding to a snake rescue call from the ABG Shipyard, at the port of Magdalla (21.1395°N, 72.7707°E). Although Whitaker and Captain (2008) stated that this species has three hemipenes, and an illustration in De Souza (2017) depicted one on the right side and two on the left, all three of which were spiky and rounded, our specimen had only two smooth hemipenes (4.5 x 3.0 mm; Fig. 3 insert) with distinct sulci spermatici (grooves that help conduct sperm into the female during copulation).

Murphy (2010) presented morphological and molecular evidence suggesting possible grounds for dividing this species into a south Asian species with a range extending from India to Phuket, a southeast Asian species from Phuket to the Philippines and Indonesia, and a third species on Palau.

Fig. 3. A Dog-faced Watersnake (*Cerberus rynchops*) encountered in response to a snake rescue call in the ABG Shipyard in the Surat District, Gujarat, India. The insert shows the smooth, pink hemipenes with distinct sulci spermatici.

However, since the population trends are unknown (Murphy 2010), further study of this species and other potential subspecies are certainly warranted.

Little Filesnake (*Acrochordus granulatus*).—This species has an extensive southeast Asian distribution (Smith 1941; Chandi 2006; Whitaker and Captain 2008; de Silva et al. 2010). *Acrochordus granulatus* shares marine habitat and fish resources with true seasnakes in waters to 20 m in depth (Voris and Glodek 1980), although it usually occurs at depths of 0–10 m (Guinea 2007). At 1134 h on 6 February 2019, we found an adult male (SVL 740 mm) burrowed in subtidal sandy mud (Fig. 4) at Suvali Beach, Hazira (21.1639° N, 72.6192° E). When we picked up the snake and placed it on the surface of the mudflats, it immediately buried itself again. This behavior presumably provides camouflage, protecting it from predators, and helps maintain a suitable body temperature. These stout-bodied snakes with baggy skin (Fig.

Fig. 4. A Little Filesnake (*Acrochordus granulatus*) burrowed in mudflats at Suvali Beach, Hazira, Surat District, Gujarat, India.

5) are usually inoffensive (Whitaker and Captain 2008) but this individual attempted to bite several times.

The pink hemipenes (7.0 x 3.9 mm) were smooth and tubular and had distinct sulci spermatici (Fig. 5 insert). When held by its tail, the snake everted its right hemipenis and then withdrew it again, repeating this eversion and withdrawal three times in 30 sec. Never having witnessed any comparable behavior, I came to the conclusion that it might be an

Fig. 5. A Little Filesnake (*Acrochordus granulatus*) from Suvali Beach, Hazira, Surat District, Gujarat, India. The insert shows the snake everting a pink, smooth, tubular hemipenis in an apparent response to being handled.

Fig. 6. When initially caught, this Little Filesnake (*Acrochordus granulatus*) ejected a sperm-like, milky-white liquid.

Fig. 7. A shark at a fish market at Dumas Beach, Surat District, Gujarat, India. The seller indicated that sharks are rarely encountered because industrial waste, oil spills, and chemical pollution have forced them to migrate far from the usual fishing grounds.

unusual defense technique. When we initially caught the snake, it immediately released a white sperm-like liquid likely intended to extricate itself from captivity (Fig. 6). When this proved ineffective, the snake began everting and withdrawing its hemipenes. When the tail portion of the individual was returned to the ground, the hemipenes were completely retracted. The entire performance was repeated again when the snake was handled.

Whitaker and Captain (2008) indicated that these snakes are nocturnal; however, we found this individual active by day and found additional records of daytime activity in the coastal regions of Gujarat. Consequently, we suggest that this species is active by both day and night.

Conservation.—All three of these species are listed as being of least concern on the IUCN Red List (Murphy 2010; Rasmussen et al. 2010; Sanders et al. 2010), conclusions based on extensive ranges and a lack of major threats. However, fishing and trawling are threats to these species (e.g., Stuebing and Voris 1990; Sanders et al. 2010). Marine life along the coast of the Surat District is rapidly vanishing, largely due to pollution generated by major coastal industries (e.g., Parmar 2018, 2019). During surveys, we visit a fish market at Dumas Beach, Surat in search of seasnakes. On one recent occasion, we found a few small fish and prawns, but surprisingly also a small male shark (Fig. 7). The seller indicated that sharks are rarely encountered because industrial waste, oil spills, and chemical pollution have forced them to migrate far from the usual fishing grounds, where once they were caught in abundance.

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