

## SEA-SNAKES OF THE INDIAN OCEAN IN THE COLLECTIONS OF THE ZOOLOGICAL SURVEY OF INDIA TOGETHER WITH REMARKS ON THE GEOGRAPHICAL DISTRIBUTION OF ALL INDIAN OCEAN SPECIES†

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### ABSTRACT

A detailed study of the Sea snakes (Family: Hydrophiidae) occurring in the Indian Ocean has revealed the presence of thirtynine species included in twelve genera. In this paper the systematics, ecology and distribution of nineteen species embraced in eight genera, which are present in the collections of the Zoological Survey of India, are given. The distribution pattern of all the valid species known to occur in the Indian Ocean are also included from a detailed study of the literature.

### INTRODUCTION

THE Sea-snakes are a well defined group of highly specialised forms and constitute a small but very distinctive family the Hydrophiidae, including nearly fifty species in the World Oceans. After Smith's publication on the monograph of the Sea-snakes in 1926 and the Fauna of Reptilia and Amphibia in 1943 in the fauna of India series there has been no study on the taxonomy, ecology and distribution of sea snakes that inhabit the Indian Ocean.

Therefore a study of the sea-snakes of the Indian Ocean based on the collections of the Zoological Survey of India (ZSI) was made. This paper deals with the Systematics, ecology and distribution of nineteen species included in eight genera which are present in the ZSI collections. The distribution pattern of the twentynine valid species that have been reported from the Indian Ocean are also presented based on the study of the present material and from literature.

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### CLASSIFIED LIST OF SPECIES REPORTED FROM THE INDIAN OCEAN

#### Family HYDROPHIIDAE

Genus *Laticauda* Laurenti, 1768

\*1 *Laticauda colubrina* (Schneider)

\*2 *Laticauda laticaudata* (Linn.)

Genus *Aepyurus* (Lacépède, 1804)

\*3 *Aepyurus eydouxi* (Gray)

Genus *Kerilla* Gray, 1849

\*4 *Kerilla jerdoni* Gray

Genus *Praescutata* Wall, 1921

\*5 *Praescutata viperina* (Schmidt)

Genus *Enhydrina* Gray, 1849

\*6 *Enhydrina schistosa* (Daudin)

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Genus <i>Hydrophis</i> Latreille, 1802	21 <i>Hydrophis brookei</i> Günther
*7 <i>Hydrophis nigrocinctus</i> Daudin	Genus <i>Thalassophis</i> Schmidt, 1852
*8 <i>Hydrophis spiralis</i> (Shaw)	22 <i>Thalassophis anomalus</i> (Schmidt)
*9 <i>Hydrophis cyanocinctus</i> Daudin	Genus <i>Kolpophis</i> Smith, 1926
*10 <i>Hydrophis obscurus</i> (Daudin)	23 <i>Kolpophis annandalei</i> (Laidlaw)
11 <i>Hydrophis klossi</i> Boulenger	Genus <i>Lapemis</i> Gray, 1835
12 <i>Hydrophis bituberculatus</i> Peters	*24 <i>Lapemis hardwickii</i> Gray
13 <i>Hydrophis stricticollis</i> Günther	*25 <i>Lapemis curtus</i> (Shaw)
14 <i>Hydrophis torquatus diadema</i> (Günther)	Genus <i>Astrotia</i> Fischer, 1856
*15 <i>Hydrophis ornatus ornatus</i> (Gary)	26 <i>Astrotia stokesi</i> (Gray)
*16 <i>Hydrophis lapemoides</i> (Gray)	Genus <i>Microcephalophis</i> Lesson, 1834
*17 <i>Hydrophis mamillaris</i> (Daudin)	*27 <i>Microcephalophis gracilis</i> (Shaw)
*18 <i>Hydrophis caeruleus</i> (Shaw)	*28 <i>Microcephalophis cantoris</i> Günther
*19 <i>Hydrophis fasciatus</i> (Schneider)	Genus <i>Pelamis</i> Daudin, 1803
20 <i>Hydrophis parviceps</i> Smith	*29 <i>Pelamis platurus</i> (Linn.)

\*Represented in the collections of the Zoological Survey of India.

#### SYSTEMATICS, ECOLOGY AND DISTRIBUTION OF SPECIES PRESENT IN Z.S.I. COLLECTIONS

##### Genus *Laticauda* Laurenti, 1768

*Laticauda*, Laurenti, 1768, p. 109 (Type *Scutata*); 1926, P. 3.

*Platurus*, Latreille, 1802, p. 183 (Type *Fasciata*).

This genus includes two valid species both of which are present in the collections of the ZSI, Calcutta.

##### *Laticauda colubrina* (Schneider, 1799)

*Hydrus colubrinus* Schneider, 1799, p. 238.

For synonymy see Smith, 1943, p. 443.

In the ZSI collections, Material from Ramri Island (off the Coast of Arakan, Calcutta; Camorta Island, Nankauri Harbour (Nicobar), and Port Blair are present.

This species is distinguished by the presence of scales in 21-25 rows and by the presence of an azygous prefrontal shield. In the living condition the specimens are light or dark bluish-grey above, yellowish below, with black bands of more or less uniform width throughout, or narrowing across the belly; some or all of them may be interrupted below.

This species is distributed in tropical regions of Indian and Pacific Oceans. This is also known to enter tidal rivers upto 80 or 100 miles inland. It is rarely found in Indian Ocean and recorded mainly in the Andaman group of Islands.

##### *Laticauda laticaudata* (Linn., 1758)

*Coluber laticaudatus* Linn. 1758, p. 222.

For synonymy see Smith, 1943, pp. 442-43.

In the ZSI collections, material from Penang, Tolly'snullah, Calcutta and Aberdeen jetty, S. Andaman are present.

This species is distinguished by the presence of scales in 19 rows and by the absence of azygous prefrontal shield. In living condition they have the same colour pattern as *L. colubrina* or are dark.

Unlike the previous species it is found only near river mouths and have never been recorded in the rivers. This species occurs in the Bay of Bengal in the Indian Ocean, and that too very rarely.

#### Genus *Kerilia* Gray, 1849

*Kerilia* Gray, 1849, P. 57 (Type *Jerdoni*).  
*Distira* Boulenger, 1890, P. 408.

This genus includes only one valid species which is present in the ZSI collections.

#### *Kerilia jerdoni* Gray, 1849

*Kerilia jerdoni siamensis* Smith, 1926, P. 32.  
For synonymy see Smith, 1943, pp. 446-47.

In the ZSI collections, material from Mergui expedition, Patani Bay, Siamese Malay State; Singgora, Siam and Karaikkal are present. The bulk of the collections is from the Mergui expedition.

The species is olive above, yellowish or white beneath, with black dorsal spots of rhombs which extend round the body to form complete bands in the smaller (younger) specimens.

In the Indian ocean it occurs in the Bay of Bengal along the east coast of India and Sri Lanka in the Mergui Archipelago and straits of Malacca. The form occurring in the Bay of Bengal has 19 or 21 scales at mid body and the dorsal bars number from 30-38.

#### Genus *Praescutata* Wall, 1921

*Praescutata* Wall, 1921, P. 390 (Type *Viperina*).  
*Thalassophina* Smith, 1926, P. 33 (Type *Viperina*).  
*Distira* Boulenger, 1890, p. 407.

This genus includes a single valid species which is present in the ZSI collections.

#### *Praescutata viperina* (Schmidt, 1852)

*Praescutata viperina* Wall, 1921, P. 391.  
*Thalassophina viperina* Smith, 1926, P. 33.  
For synonymy see Smith, 1943, P. 448.

In the ZSI collections, materials from Puri, Ganjam Coast and Karwar on the West Coast of India are present.

In all the specimens examined the head is short, depressed and distinct from neck. The nasal shields are subtriangular and the frontals are twice as broad

as the supraocular. In the specimens examined there are 27-32 scale rows on the neck and 37-48 on the body. The hemipenis is forked near the tip and spinose throughout except at the proximal end. This species is distributed widely in the Indian Ocean. It has been reported from Malay archipelago and extends upto South China in the Pacific.

Genus **Enhydrina** Gray, 1849

*Enhydrina* Gray, 1849, P. 47 (Type *Valakadyen*).

This genus includes one valid species which is present in the ZSI collections.

**Enhydrina schistosa** (Daudin, 1803)

*Hydrophis schistosus* Daudin, 1803, P. 386.

*Enhydrina valakadien* Boulenger, 1890, P. 406.

For synonymy see Smith 1943, P. 144-45.

In the ZSI collections, material from Siam (Singgora) Burma Coasts (Mergui Archipelago, Rangoon), East Coast of India (Sand heads, Sagar Is., Spibpur, Puri, Karaikkal); West Coast of India (Bombay) and Persian Gulf are present.

This species is distinguished by their high rostrals, prefrontals being much narrowed anteriorly and imbricated or subimbricated scales with a short central keel. In the specimens examined, there are 40-50 scale rows in the neck of the females, 42-50 in females, 49-60 on the body of males and 51-60 on the body of the females. In the specimens examined, the hemipenis is forked for about half its length and the tip is furnished with coarse, flattened, papilla-like structures arranged in longitudinal series. This species is very common along the east and west coasts of India. According to Smith (1952) this species extends from the Persian Gulf to the coast of Cochin, China and the North coast of Australia.

Genus **Hydrophis** Latreille, 1802

*Hydrophis* Latreille, 1802, P. 193 (Type *fasciatus*).

*Distira* Boulenger, 1890, P. 407 (in part).

This genus includes 15 species in the Indian Ocean of which nine species are present in the ZSI collection.

**Hydrophis nigrocinctus** Daudin, 1803

*Hydrophis nigrocinctus* Daudin, 1803, P. 380.

This species is distinguished by the small temporals, scarcely differentiated from ordinary scales and with yellow markings on the head.

In the ZSI collections, material from the Sunderbans is present. There are 27-33 scale rows on the neck, 39-45 on the body, the scales imbricate throughout and strongly keeled. The hemipenis is forked near the tip and spinose throughout.

This species is known from the Bay of Bengal and the Burmese Coast.

**Hydrophis spiralis** (Shaw, 1802)

*Hydrus spiralis* Shaw, 1802, p. 564.

*Leioselasma spiralis* Prater, 1924, P. 174.

In the ZSI collections, materials from Mergui, Puri and Cape Comorin are present.

This species is distinguished by the presence of 25-31 scale rows on the neck, 33-38 on the thickest part of the body, the scales feebly imbricate throughout, with a small central keel. The head is yellowish in colour and the body has narrow black bands.

This species has been recorded from the Persian Gulf, Penang and Borneo.

**Hydrophis cyanocinctus** Daudin, 1803

*Hydrophis cyanocinctus* Daudin, 1803, P. 383.

*Leioselasma cyanocincta*, Prater, 1924, P. 173.

In the ZSI collections, material from Morrison Bay, Poknam, Singgora, Siam State; and Sunderbans near Calcutta, Hooghly River, West Bengal are present.

In the species there are two anterior temporals. The specimens examined have 27-35 scale-rows on the neck, 37-47 on the thickest part of the body, the scales imbricate throughout; usually with a central keel, which is broken into a series of two tubercles.

This species is very common on the west coast of India and Sri Lanka. It has been recorded very rarely from the east coast of India. In the Indian Ocean it has been recorded mostly from north of the Equator and has been recorded rarely from regions south of the Equator.

**Hydrophis obscurus** (Daudin, 1803)

*Hydrophis obscura* Daudin, 1803, P. 375.

*Dolichodira diadema* Prater, 1924, P. 173.

For synonymy see Smith 1943, P. 457.

In the ZSI collections, material from Mergui Archipelago, Chilka Lake, Orissa State; Barkuda Island, Sunderbans, near Calcutta; and Hooghly River are present.

In this species there are 19-23 Scale-rows on the neck and 29-37 on the body. There are 6-7 supralabials, the second in contact with the prefrontal, the third and fourth touching the eye. The hemipenis is forked near the tip and spinose throughout.

This species is very common on the east coast of India. It is a very common species at the mouths of the river Hooghly. This species tolerates wide range in salinity since it has been recorded from the open sea under typical marine conditions and under low salinity conditions at the mouth of the river Hooghly and Chilka Lake.

**Hydrophis ornatus ornatus** (Gray, 1842)

*Aturia ornata* Gray, 1842, P. 61.  
For synonymy see Smith 1943, P. 460.

In the ZSI collections, material from Arrakan coast, Colombo, Sri Lanka are present.

In the specimens examined, there are 28-37 scale rows on the neck in males, 31-45 in females. There are two anterior temporals. The body has dorsal bars or rhomboidal spots and the head is grey in colour. The species is distributed from the Persian Gulf to Burma Coast in the Indian Ocean.

**Hydrophis lapemoides** (Gray, 1849)

*Aturia lapemoides* Gray, 1849, P. 46.  
for synonymy see Smith 1943, P. 461.

In the ZSI collections, materials from Persian Gulf are present.

In the specimen examined there are 29-35 scale rows on the neck, 43-51 on the body. In the young specimens the head has a curved yellow mark which is not present in the bigger (older) specimens.

This species has been recorded very rarely. It has been recorded from the Persian Gulf, and along the east and west coasts of India and Sri Lanka.

**Hydrophis mamillaris** (Daudin, 1803)

*Anguis mamillaris* Daudin, 1803, P. 340.  
*Leiostelasma mamillaris*, Prater, 1924, P. 173.

In the ZSI collections, material from Gulf of Cambay is present.

The specimens in the ZSI possess 8 to 10 maxillary teeth behind the poison fangs. There are 25-29 scale rows on the neck, and 35-43 on the body. The head is black.

This is a very rare species having been recorded from the north west coast of India and Vizagapatnam on the east coast.

**Hydrophis caerulecens** (Shaw, 1802)

*Hydrus caerulecens* Shaw, 1802, P. 561.  
*Polyodontophis caerulecens*, Prater, 1924, P. 174.

In the ZSI collections, materials from Morrison Bay, Malay Archipelago, Mergui Archipelago and Sand heads, Bay of Bengal are preserved. Most of the collections are from Mergui Archipelago.

In the specimens examined there are two anterior temporals with 31-43 scale rows on the neck and 38-54 on the body. The hemipenis is forked close to the tip and is furnished with coarse, flattened, papilla-like structures arranged in longitudinal series. They are bluish grey above, yellowish-white below with 40-60

broad bands. It has been recorded at several localities on the west coast between Bombay and Karwar and on the east coast between Madras and Calcutta. This species has also been recorded in estuarine conditions.

**Hydrophis fasciatus** (Schneider, 1799)

*Hydrus fasciatus* Schneider, 1799, P. 240.

*Micromastophis fasciatus*, Prater, 1924, P. 173.

In the ZSI collections, material from Akyale, Burma Coast, Puri, Balasore, Orissa Coast; and Tranqueber, Madras Coast are present. Majority of the collected materials is from Puri Coast.

In the specimens examined there are 25-33 scale rows on the neck, and 39-58 on the body. The hemipenis is forked near the tip; it is spinose throughout.

This species includes two races. The race *fasciatus* is very common on the east coast of India from Madras to Sunderbans and has been rarely recorded on the west coast at Malabar and Karachi.

**Genus *Lapemis*** Gray, 1835

*Lapemis* Gray, 1835. Col. Pl. 137, fig. 2 (Type *curtus*).

*Enhydris* Boulenger, 1890, P. 396.

This genus includes two valid species both of which are present in the ZSI collections.

***Lapemis hardwickii*** Gray, 1835

*Lapemis hardwickii* Gray, 1835, Pl. 87, fig. 2.

In the ZSI collections, material from Mergui Archipelago; Puri and Ganjam Coast are present. Majority of the collections is from the Mergui Archipelago.

This species is distinguished by the parietals being normally entire; the ventral being very small or absent in the posterior three quarters of the body. The species examined have the dorsal scales juxtaposed the lower most 3 or 4 rows larger than the others. There are 23-31 scale rows on the neck in males, 27-35 in females: 25-27 on the body in males, 33-41 in females. The scales are hexagonal or squarish. This species is very common in the Mergui Archipelago, the strait of Malacca and the Gulf of Siam.

***Lapemis curtus*** (Shaw, 1802)

*Hydrus curtus* Shaw, 1802, P. 562.

For synonymy see Smith, 1943, P. 470.

In the ZSI collections, material from Colva Beach, Canakona Sea bridge, Goa are present.

This species is very easily distinguished from *L. hardwickii* by the broken parietals and ventral being distinct throughout. In this species there are 28-31 scale rows

on the neck in the males, 31-35 in females; 33-39 on the body in males, 36-43 in females. The tip of the hemipenis is not forked. This species is common in the west coast of India and Sri Lanka. It is common in the Arabian Sea. There is no authentic record of this species from the Bay of Bengal.

Genus *Microcephalophis* Lesson, 1834, P. 320 (Type *gracilis*)

*Hydrophis* Boulenger, 1890, P. 398.

This genus includes two valid species of which the following species are present in the ZSI collections.

***Microcephalophis gracilis* (Shaw, 1802)**

*Hydrus gracilis* Shaw, 1802, P. 560 (Type locality unknown, London).  
For synonymy see Smith 1943, P. 472.

In the ZSI collections, materials from Mergui Archipelago; Hooghly River; Puri Coast; Karikkal, Madras; Tranquebar Coast, Beluchistan and Karachi are present.

In the specimens examined the ventrals are divided by a longitudinal fissure and the scales are juxtaposed, the prefrontal do not touch the third supralabial and there are 220 to 350 ventrals. This species occurs commonly on the east coast of India. It occur rarely on the south west coast of India. In the Indian Ocean it has been recorded from the Persian Gulf and Arabian Sea region.

***Microcephalophis contoris* (Gunther, 1864)**

*Hydrophis cantoris* Gunther, 1864, P. 374.

In the ZSI collections, material from sand heads, Bay of Bengal; Hooghly River, Puri Coast; Sand Bay; and Bombay Coast, Arabian Sea are present.

In this species the prefrontals touch the third supralabial and there are 404-468 ventrals. There are 23 to 25 scale rows on the neck and 41-48 on the body. This species occurs commonly on the east and west coasts of India.

Genus *Pelamis* (in part) Daudin, 1803, P. 361 (Type *Platurus*)

*Hydrus* Boulenger, 1890, P. 397.

This genus includes one valid species and is present in the ZSI collections.

***Pelamis platurus* (Linn., 1766, No Type Locality)**

*Anguis platurus* Linn. 1766, P. 391.  
For synonymy see Smith 1943, P. 476.

In the ZSI collection, material from Puri Coast; South Travancore, Bay of Bengal; Sri Lanka and Gwadar, Persian Gulf are present.

This species is distinguished by a longitudinal fissure on the ventrals; and the dorsal scales being juxtaposed and subquadrangular in shape.



## DISTRIBUTION OF SPECIES NOT PRESENT IN THE ZSI COLLECTIONS BUT REPORTED FROM THE INDIAN OCEAN

*Aepyurus eydoxi* (Gray): coasts of Siam, Cochin, China and Southern Annam (Phan-thiet); the Indo-Australian Archipelago; Queensland.

*Hydrophis klossi* Boulenger: Straits of Malacca (coasts of Perak and Selanagor) and the eastern coast of Penin Sularsiam and as far south as Patani Bay.

*H. bituberculatus* Peters: Colombo.

*H. stricticollis* Günther: east coast of India, coast of Burma as far south as the Gulf of Martaban.

*H. torquatus diadema* (Günther): The range of its distribution is from the Gulf of Siam north of lat. 12; Canton, very common in the Bight of Bangkok at the mouths of the Mekong and Chantabun rivers.

*H. perviceps* Smith: Not definitely known.

*H. brookei* Günther: Straits of Malacca as far north as Trang, the Gulf of Siam, the coast of Viet Nam and southern Annam, and the north coasts of Borneo and Java.

*Thalassophis anomalus* (Schmidt): Common in the Gulf of Siam, Cambodia, the w. coast of Viet Nam the Malay Archipelago.

*Kolpophis annadalei* (Laidlaw): Malay Peninsula (Patani Bay); Siam (Singgora); S. Annam (Phan-thiet); Java.

*Astrotia stokesi* Gray: Mekran Coast, W. Pakistan; Colombo; Bay of Patani on the east coast of the Malay Peninsula; Singapore.

The Sea snakes are distributed in the tropical region of the Indian and Pacific Oceans. Of the twenty-nine species of the family Hydrophiidae known from the Indian Ocean, all excepting one species occur in the shallow water near the coast sometime extending up the rivers. *Pelamis platurus* has a wider range of distribution in the coastal and oceanic regions.

## REFERENCES

\*SMITH, M. 1926. Monograph of the Sea Snakes (Hydrophiidae). Trustees of the British Museum (London), pp. 1-130.

\*SMITH, M. A. 1943. The fauna of British India, Ceylon and Burma. Reptilia and Amphibia. Vol. III. - Serpentes, pp. 1-568.

\*These two References contain all other References given in the text.