



---

## AN OVERVIEW OF SRI LANKAN SEA SNAKES WITH AN ANNOTATED CHECKLIST AND A FIELD KEY

---

Submitted: 12 November 2008, Accepted: 15 January 2009

Ruchira Somaweera<sup>1</sup> and Nilusha Somaweera<sup>2</sup>

<sup>1</sup> Reptile Ecology Lab, School of Biological Sciences, The University of Sydney, Australia.

<sup>2</sup> University of Sydney Tropical Ecology Research Facility, Northern Territory, Australia.

<sup>1</sup> Corresponding author: ruchira.somaweera@gmail.com

### Abstract

Sea snakes of Sri Lanka has not received much attention and the last few decades did not see any unprecedented increase in interest in these largely ignored (in Sri Lanka) snakes, despite heavy attention has been made on certain other groups of herpetofauna. Hence, a new checklist and an overview in 'general literature' are much needed. This contribution provides an enumeration of the recorded species, together with an overview of the natural history of the group and a set of field keys for species found in Sri Lankan waters.

**Keywords:** sea snakes, sea kraits, natural history, distribution, identification key, Sri Lanka

### Introduction

**Sea snakes:** Snakes of at least five distinct lineages inhabit the marine environment. These comprise the file snakes (family Acrochordidae), the mud snakes (family Colubridae: subfamily Homalopsinae), the water snakes (family Colubridae: subfamily Natricinae), the sea kraits (family Laticaudidae) and the true sea snakes (family Hydrophiidae) (Heatwole, 1999), though the term 'sea snake' mainly refers to the sea kraits and the true sea snakes. Wall (1909) in the first monograph on sea

snakes identified 11 genera and followed Boulenger (1986)'s classification where all sea snakes were placed under subfamily Hydrophiinae in family Elapidae. Subsequently Smith (1926) in his monograph on sea snakes grouped all sea snakes under family Hydrophiidae which he further divided into two subfamilies: Hydrophiinae and Laticaudinae with *Laticauda* as the most primitive genus in the latter. All subsequent authors including Dowling (1959 & 1967), Underwood (1967 &

1979) and McDowell (1967 & 1974 etc.) followed Simth's classification with two subfamilies till Burger & Natsuno (1974) erected two separate families for the sea snakes, Laticaudidae (sea kraits) and Hydrophiidae (sea snakes) which was followed later by many other workers till to-date. However, some experts of today consider that the Laticaudids and Hydrophids evolved from different terrestrial representatives of the family Elapidae. Moreover, Rasmussen (1997) showed that the Hydrophids can be separated into two quite different groups, indicating that sea snakes may have evolved three times from terrestrial elapids and provided a phylogeny for the sea snakes. However, this paper follows the 'two separate families' classification and the word 'sea snake' has been used commonly to denote both Laticaudids and Hydrophids.

**History of investigations in Sri Lanka:** The first information about the species composition of sea snakes of Sri Lanka was published by Wall (1921) who considered the sea snake wealth to be 22 species belonging to 16 genera but he included all the species in the Indian Ocean around Sri Lanka, not necessarily the species found within Sri Lankan waters. Deraniyagala (1949) identified 19 species but subsequently revised the list to 12 species (Deraniyagala, 1955). Both de Silva (1980) and de Silva (1990) recognised 13 species. Due to the vast limit of the territorial waters of the island, de Silva (1994) suspected the occurrence of *Hydrophis fasciatus fasciatus*, *Hydrophis caerulescens*, *Hydrophis nigrocinctus* and earlier *Lapemis hardwicki* (now *L. curtus*) in Sri Lankan waters and listed them. Some of these species have been also mentioned in earlier works and Sri Lanka lies within the reported range of these species. Additionally they have been recorded from the adjacent Madras coasts (Murthy, 1977). However, since there were no confirmed records of these species in Sri Lankan waters, Das & de Silva (2005), de Silva (2006) and Somaweera (2006) did not list them in the checklists. Das & de Silva (2005) included *Laticauda colubrine* in the checklist to increase the total up to 14 species. Though Laticaudids have not been recorded from a coast in Sri Lanka, Wall (1921) also included Sri Lanka in its distribution. Somaweera (2006) further included *Hydrophis mamillaris* in the list, a species most previous author considered to be a synonym of *Hydrophis fasciatus* but probably represent a distinct species (Wall, 1921; Arne Redsted Rasmussen, pers. comm.; A. Lobo, pers. comm.).

**General Remarks on Natural History:** The sea kraits of family Laticaudidae inhabit the tropical waters of the western Pacific and northern Indian Oceans (Cogger, 2000) and currently eight species are recognised in the family (Cogger & Heatwole, 2006). Kharin & Czeblukov (2006) splitted the species into two genera, *Laticauda* and *Pseudolaticauda* but both Heatwole *et al.* (2005) and Cogger & Heatwole (2006), refused Kharin's and Czeblukov's proposal to make two genera in the family and both papers added all species to the genus *Laticauda*. The taxonomy of sea snakes belonging to family Hydrophiidae is still not fully resolved, but a total of 58 distinct species are cumulatively identified in literature (Uetz & Hallermann, 1995-2008). However, researchers have not reached consensus on the integrity of some taxa (Guinea, 2003). Sea snakes occur in the tropical and subtropical waters of the Indian and Pacific oceans from the east coast of Africa to the Gulf of Panama (Rasmussen, 2000), but were considered to be absent from the Atlantic Ocean (Cozzi, 1980) till Branch (1998) extended the distribution of *Pelamis platurus* into Atlantic. Sea snakes mostly inhabit shallow waters in the continental shelf but species like *Pelamis platurus* are pelagic. Contrastingly certain species are known to ascend into rivers and three species, *Hydrophis semperi* in Phillipines, *Hydrophis sibauensis* in Indonesia and *Laticauda crockeri* in Solomon's islands are found in freshwater rivers and lakes (Cogger *et al.*, 1987; Herre, 1942; Rasmussen *et al.*, 2001). *Hydrophis sibauensis* which is living more than 100 miles from the sea in a small river system has been never recorded in salt or brackish waters. Furthermore Ineich (1996) recorded the occurrence of "sea snakes" in the Great lake of Cambodia.

Sea snakes exhibit dramatic specialisations for their "fully" aquatic habits: a vertically flattened paddle-like tail for propulsion (absent in all other snakes, including other freshwater and brackishwater species); dorsally positioned nostrils each with a valve, salt regulating glands (including lacrimal glands that remove salt as tears), and a single lung that extends nearly the full length of the body (Dunson, 1975). *Aipysurus laevis* is reported to have a tail with cutaneous photoreceptive ability (light-sensitive) tail which is used to detect approach of predators (Zimmerman & Heatwole, 1990). The Sri Lankan species range in size from ~75 cm *Pelamis platurus* to the ~300cm *Hydrophis spiralis*, which is probably the longest sea snake in the world (Fichter, 1982). However *Astrotia stokesii* with a midbody girth of up to 26 cm at a length of 1.8 m is probably the largest or stoutest of all sea

snake (Green, 1997). All sea snakes are air-breathers and a single breath may last up to two hours in the case of *Pelamis platurus* but usually lasts as little as 30 minutes when the snakes are actively foraging (Heatwole, 1999). All Sri Lankan sea snakes are piscivorous predators that hunt during the day; at dawn or at night and few species eat fish eggs. The yellow-bellied sea snake, *Pelamis platurus*, is considered to persist the ability to catch fish in open water (Kropach, 1975). Guinea (2003) reported that all the other species corner their prey in crevices or burrows but he does not explain how species like *Enhydrina schistosa* which prey on Catfish (Voris *et al.*, 1978) and *Hydrophis ornatus* which is a generalist feeding on many different fish species not only living on the bottom (Rasmussen 1989) catch their prey. Behavioural studies indicate that *Pelamis platurus* are indeed even sensitive to water motions caused by swimming fish (Heatwole, 1999). To find their mobile prey in often turbid waters olfactory and visual cues may not be the best and only option and sea snakes may also use cutaneous mechanoreceptors and/or inner ear receptors to detect weak water motions such as those generated by prey objects (Westhoff *et al.*, 2005).

The genus *Laticauda* is oviparous thus comes ashore to lay eggs while all other sea snakes are viviparous and give birth to live young in the ocean. A considerable number of species move upstream in rivers to give birth (as mentioned by Porter *et al.*, 1997 etc.). Species like *Astrotia stokesii* are generally known to have relatively large brood sizes (Heatwole, 1997) and *Enhydrina schistosa* has large broods in Australian waters (Fry *et al.*, 2001) but there's only about 4-11 young in an average clutch in Asian waters (Voris & Jayne, 1979). Sea snakes are considered to be breeding annually and the reproductive seasonality varies amongst the sea snakes. A study by Rasmussen (1989) indicates the occurrence of synchronised annual reproductive cycles in *Hydrophis ornatus*. The gestation periods are lengthy and may vary between six and seven months (Heatwole, 1997). According to Voris & Jayne (1979) mortality amongst the young is high in sea snakes with an estimated 10 to 20% of young *Enhydrina schistosa* surviving the first year and only 6% of females of this species surviving to reproduce.

**Distribution:** The coastal and deep sea waters of Sri Lanka harbours lot of ideal habitats for sea snakes, including coral reefs, estuaries, bays, lagoons, mangrove forests, sea grass beds, large rivers, canal mouths etc. Fernando & Goonaratne (1983) stated

that sea snakes are common in Palk Bay and off Mullativu. However a vast majority of the sea snake records are from those entangle in nets of fishermen. Hence, most of the locality data coincide with the fishing beds and locations of fishing harbours. The region of marine resources exploitation is mainly confined to the narrow continental shelf, which rarely exceeds 40 km and averages around 22 km in width. The total area of the shelf is about 30000 km<sup>2</sup>, which is around 6% of the total area of the Exclusive Economic Zone (EEZ) of Sri Lanka (Haputhantri *et al.*, 2008). Hence the recorded species are principally from the continental shelf and deep sea pelagic species have been largely overlooked.

**Checklist:** By and large, we are following the list and systematic given by Somaweera (2006) from family level down. The systematic in this paper are simplified with only family, genus and species levels being considered. They are presented in purely alphabetical order of the family, genus and species names, respectively, though this order may not always reflect the real systematic relationships. The accounts first feature the currently valid scientific name in italics, the name(s) of the first describer(s) and the year of description. If there have been changes in the genus and species name in the past, the authority is given within parentheses (brackets). They are followed by a list of synonyms (without any sign in-between the scientific name and the authority) and chresonyms (with a hyphen in-between the scientific name and the authority) given according to alphabetic order of the genus name. Subsequently the type locality (if known) and the current location the type specimen is deposited is given. Junior synonyms of currently valid taxa are given even if they have not been applied in connection with Sri Lanka. The common English- E, Sinhala- S and Tamil- T name(s) are given depending on availability. However we are aware of several cases where misidentifications were made by using vernacular names when working with local inhabitants as many people are not aware of the specific Sinhala vernacular names and the common names in general use are referred to a group of animals rather than a specific species and also local names may change with the location. Notes are included where some comment is pertinent. Unless otherwise mentioned, synonyms, chrysonyms, range and type specimen data are based on Uetz & Hallermann (1995-2008), the latter which is in turn a compilation of reliable, published sources. Distribution around Sri Lanka is based on Somaweera (2006).

**Family Hydrophiidae Boie, 1827***Astrotia* Fischer, 1855**01. *Astrotia stokesii* (Gray, 1846)***Astrotia schizopholis* - Fischer 1856*Astrotia stokesi* - Wall, 1909; - Wall, 1921; - Smith 1943*Astrotia stokesii* - Cogger 1983; - Cogger 2000*Disteira stokesii* - McDowell 1972; - Boulenger 1896; - Rasmussen 1997; - Kharin 2005; - Grandison 1978*Hydrophis guttata* Murray 1887*Hydrophis schizopholis* Schmidt 1846; - Duméril & Bibron 1854*Hydrus annulatus* Gray 1849*Hydrus major* Shaw 1802 (part.)*Hydrus stokesii* Gray 1846

Global distribution: Australia, China, Gulf of Siam, India, Indonesia, New Guinea, Pakistan, Philippine Islands, Sri Lanka, Taiwan, Vietnam, West Malaysia.

Records from Sri Lanka: Shallow and deep waters in North, North-west, West and South Sri Lanka. Known from Colombo, Galle, Panadura, Peysalai, Pt. Pedro, Puttalam.

Type locality: Australian seas.

Holotype: BMNH 1946. 1. 17. 12.

*Enhydrina* Gray, 1849**02. *Enhydrina schistosa* (Daudin, 1803)***Disteira russelii* Fitzinger 1827*Disteira schistosa* - McDowell 1972; - Grandison 1978*Enhydrina schistosa* Stoliczka 1870; - Smith 1943; - Glaw & Vences 1994; - Cox *et al.*, 1998; - Murphy, Cox & Voris 1999; Cogger 2000*Enhydrina valakadien* - Boulenger 1890; Boulenger 1896; - Flower 1899*Enhydrina valakadyen* - Gray 1849; - Wall 1921*Enhydrina valakadyn* - Stejneger 1907*Enhydrina vikadien* - Boettger 1892*Hydrophis bengalensis* Gray 1842*Hydrophis fasciatus* - Jan 1872*Hydrophis schistosa* Schlegel 1837; - Fischer 1856*Hydrophis schistosus* Daudin 1803; - Duméril & Bibron 1854; - Jan 1872*Hydrophis subfasciata* Gray 1842*Hydrus valakadyn* Boie 1827*Polyodontes annulatus* Lesson 1834*Thalassophis weneri* Schmidt 1852

Global distribution: Australia, Bangladesh, Burma, India, Madagascar, Malaysia (incl. Sabah, Sarawak), New Guinea, Oman, Pakistan, Seychelles, Sri Lanka, Thailand, United Arab Emirates, Vietnam.

Records from Sri Lanka: Shallow and deep waters in North, North-west and West Sri Lanka. Known from Beruwala, Jaffna, Kalutara, Moratuwa, Negambo, Puttalam, Waskaduwa, Wilpattu.

Type locality: Tranquebar, India.

Holotype: BMNH 1946.1.10.7.

*Hydrophis* Latreille in Sonnini & Latreille, 1801**03. *Hydrophis bituberculatus* Peters, 1873***Aturia bituberculata* - Welch 1994*Chitulia bituberculata* - Kharin 2005*Distira bituberculatus* - Boulenger 1896*Hydrophis bituberculatus* Peters 1872; - Smith 1943; - Rasmussen 1992*Hydrophis cyanocinctus* Deraniyagala 1955 (part.)*Lioselasma bituberculatus* - Wall 1921

Global distribution: Sri Lanka, West coast of peninsular Thailand.

Records from Sri Lanka: Capt. Nietner collected the type specimen from Colombo in 1872 (Rasmussen, 1992). No confirmed, subsequent records are found in Sri Lanka though an unconfirmed record occurs from Puttalam lagoon (CEA/Euroconsult. 1995.). The species is reported to be common around Phuket in Thailand (Rasmussen, 1992).

Type locality: Colombo, Sri Lanka (as 'Ceylon').

Holotype: ZMB 4647 (female).

**04. *Hydrophis cyanocinctus* Daudin, 1803**

*Distira cyanocincta* - Boulenger 1896; - Stejneger 1907; - Kharin 2005

*Hydrophis aspera* Gray 1849

*Hydrophis chittal* Rafinesque 1817

*Hydrophis crassicollis* Anderson 1871

*Hydrophis cyanocincta* - Boulenger 1887

*Hydrophis cyanocinctus* Daudin 1803; - Smith 1943; - Murphy, Cox & Voris 1999

*Hydrophis phipsoni* Murray 1887

*Hydrophis striata* - Schlegel 1837; - Fischer 1856

*Hydrophis striatus* - Duméril & Bibron 1854

*Hydrophis subannulata* Gray 1849

*Hydrophis taprobanica* Haly 1887

*Hydrophis tenuicollis* Peters 1873

*Hydrophis trachyceps* Theobald 1870

*Hydrophis westermanni* Jan 1859

*Hydrophis westermanni* - Jan 1863

*Leioselasma* [sic] *cyanocincta* - Wall 1921

*Leioselasma cyanocincta* - Prater 1924; - Welch 1994

*Leioselasma cyanocinctus* - Kharin 1984; - Das 1996

*Leioselasma striata* Lacépède 1804

Global distribution: Bangladesh, Burma, China, India, Indonesia (Java, Aru Islands), Iran, Japan, Korea, Malaysia, New Guinea, Oman, Pakistan, Philippines, Solomon Islands, Sri Lanka, Thailand, United Arab Emirates, Vietnam.

Records from Sri Lanka: Apparently found all around Sri Lanka. Known from Beruwala, Chilaw, Colombo, Dehiwala, Gogawaya, Jaffna, Kalpitiya, Kaluthara, Kandakuliya, Kumana, Mannar, Moratuwa, Negambo, Puttalam, Rekawa, Rumassala, Ussangoda, Wadduwa, Waskaduwa, Wellawatte.

Type locality: "Coromandel". Probably referring to the south east coast of the Indian Peninsula named as the Coromandel coast, the English interpretation of Chola Mandalam- the land of the Cholas. A 'Coromandel Peninsula' exists in New Zealand, but considering the distribution of the species the earlier place may be more related.

**05. *Hydrophis gracilis* (Shaw, 1802)**

*Distira gracilis* - Fitzinger 1826; - Wall 1909

*Hydrophis guentheri* Murray 1884

*Hydrophis (Microcephalophis) gracilis* - Kharin 2004

*Hydrophis gracilis* - Duméril, Bibron & Duméril 1854; - Fischer 1856; - Günther 1864; - Boulenger 1896; - Bauer & Vindum 1990; - Welch 1994; - Cogger 2000; - Leviton *et al.*, 2003; - David *et al.*, 2004; - Greer 2006

*Hydrophis microcephala* - Fischer 1856

*Hydrophis microcephalus* - Duméril, Bibron & Duméril 1854

*Hydrophis rostralis* Smith 1917

*Hydrus gracilis* Shaw 1802

*Hydrus kadellnagam* Boie 1827

*Microcephalophis gracilis* - Lesson 1834; - Wall 1921; - Smith 1943; - Das 1996; - Grossmann & Tillack 2001

*Microcephalophis gracilis gracilis* Smith 1926

*Microcephalophis gracilis microcephalus* - Kharin 2005

*Thalassophis microcephala* Schmidt 1852

Global distribution: Australia, Bangladesh, Burma, China, Fuji, India, Indonesia, Iran, Melanesia, New Guinea, Oman, Pakistan, Peninsular Malaysia, Philippines, Sri Lanka, Thailand, United Arab Emirates, Vietnam.

Records from Sri Lanka: Beruwala, Chilaw, Potuwil, Pt. Pedro, Trincomalee, Ussangoda.

Type locality: not given (fide O'Shea 1996).

Holotype: BMNH 1946.1.3.89.

**06. *Hydrophis lapemoides* (Gray, 1849)**

*Aturia lapemoides* Gray 1849; - Welch 1994

*Chitulia lapemoides* - Kharin 2005

*Distira lapemoides* Wall 1909

*Hydrophis holdsworthii* Günther 1872

*Hydrophis lapemidoides* [sic] Kennedy 1937

*Hydrophis lapemoides* Günther 1864; Smith 1926; - Smith 1943; - Rasmussen 1993

*Hydrophis stewartii* Anderson 1872

*Lioselasma* [sic] *lapemidoides* [sic] - Wall 1921

Global distribution: India, Iran, Malaysia (Penang island), Oman, Pakistan, Singapore, Sri Lanka, Thailand, United Arab Emirates.

Records from Sri Lanka: Mainly known from shallow waters in West Sri Lanka. Known from Beruwala, Dehiwela, Jaffna, Kalutara, Kandakuliya, Moratuwa, Negambo, Waskaduwa.

**07. *Hydrophis mamillaris* (Daudin, 1803)**

*Anguis mamillaris* Daudin 1803

*Aturia mamillaris* - Welch 1994

*Chitulia mamillaris* - Kharin 2005

*Hydrophis mamillaris* - Smith 1943; - Das 1996

*Hydrophis mammillaris* [sic] - Khan 2002 (pers. comm.)

*Leioselasma mamillaris* - Smith 1926

*Lioselasma* [sic] *mamillaris* - Wall 1921

Global distribution: India, Pakistan, Sri Lanka.

Records from Sri Lanka: A specimen collected from Pt. Pedro is lodged at the National Museum in Sri Lanka (NMSL 2005.21.1).

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

*Aturia ornata* Gray 1842; - Welch 1994

*Chitulia ornate* - Kharin 2005

*Distira andamanica* Annandale 1905

*Distira mjobergi* Lönnberg & Andersson 1913

*Hydrophis ellioti* Günther 1864; - Boulenger 1887

*Hydrophis inornatus* - Smith 1926

*Hydrophis laevis* Lütken 1863

*Hydrophis ornata* - Günther 1864; - Smith 1943; - Murphy, Cox & Voris 1999; - Cogger 2000

*Hydrophis ornatus* - Tamiya *et al.*, 1983; - Rasmussen 1989

Global distribution: Australia, Guangxi, Hainan, Hong Kong, India, Indonesia, Iran, Japan (Ryukyu), Malaysia, New Guinea, Oman, Pakistan, Philippines, Shandong (China), Solomon Islands, Sri Lanka, Taiwan, Thailand, United Arab Emirates, Vietnam.

Records from Sri Lanka: Chilaw, Colombo, Galle, Hikkaduwa, Kalpitiya.

Type locality: not given

Holotype: BMNH 1946.1.23.72.

**09. *Hydrophis spiralis* (Shaw, 1802)**

*Hydrophis spiralis* Gray 1849; - Duméril & Bibron 1854; - Smith 1943; - Murphy, Cox & Voris 1999; - Bauer & Sadlier 2000; - David *et al.*, 2004

*Hydrus spiralis* Shaw 1802

*Leiocephalus spiralis* - Das 1996

*Leioselasma spiralis* - Prater 1924; - Kharin 1984; - Welch 1994; - Kharin 2005

*Lioselasma* [sic] *spiralis* - Wall 1921

Global distribution: China, India, Indonesia, Iran, Malaysia, New Caledonia/Loyalty Islands, New Guinea, Oman, Pakistan, Persian Gulf, Philippines, Sri Lanka, Thailand, United Arab Emirates.

Records from Sri Lanka: Apparently found all around Sri Lanka. Known from Beruwala, Bundala, Chilaw, Colombo, Godawaya, Hambanthota, Kalametiya, Kalpitiya, Kalutara, Kandakuliya, Kumana, Mannar, Moratuwa, Panadura, Puttalam, Rekawa, Rumassala, Ussangoda, Waskaduwa.

Type locality: Indian Ocean.

Holotype: BMNH 1946.1.6.94.

**10.** *Hydrophis stricticollis* Günther, 1864

*Aturia stricticollis* - Welch 1994

*Chitulia stricticollis* - Kharin 2005

*Hydrophis* cf. *stricticollis* - Baier 2005

*Hydrophis obscurus* Boulenger 1896

*Hydrophis stricticollis* Günther 1864; - Smith 1943; - Leviton *et al.*, 2003

Global distribution: Bangladesh, Burma, India, Sri Lanka.

Records from Sri Lanka: Kandakuliya, Mannar and Puttalam in North-west Sri Lanka.

Type locality: India.

Holotype: BMNH 1946.1.6.90.

*Kerilia* Gray, 1849

**11.** *Kerilia jerdonii* (Gray, 1849)

*Distira jerdonii* Boulenger 1896

*Kerilia jerdoni* - Rasmussen & Andersen 1990; - Murphy, Cox & Voris 1999

*Kerilia jerdonii* Gray 1849; - Wall 1921; - Smith 1943

Global distribution: Burma, China, Gulf of Siam, India, Indonesia (Borneo), Malaysia, Mergui Archipelago, Sri Lanka, Thailand.

Records from Sri Lanka: Colombo, Hambantota, Jaffna, Mannar.

Type locality: Madras, India.

Holotype: BMNH III.8.1.a.

*Lapemis* Gray, 1835

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

*Enhydris curtus* - Boulenger 1896

*Hydrophis (Pelamis) pelamidoides* - Fischer 1856

*Hydrophis (Pelamis) pelamidoides* var. *annulata* Fischer 1855; Fischer 1856

*Hydrophis abbreviatus* Jan 1863

*Hydrophis brevis* Jan 1863

*Hydrophis fayreriana* Anderson 1871

*Hydrophis hardwicki* - Boettger 1888

*Hydrophis hardwickii* Gritis & Voris 1990

*Hydrophis pelamidoides* Schlegel 1837; - Duméril & Bibron 1854

*Hydrophis pelamoides* Hilgendorf 1876

*Hydrophis propinquus* Jan 1859

*Hydrus curtus* Shaw 1802

*Lapemis curtus* - Gray 1842; - Rasmussen 1997; - Murphy, Cox & Voris 1999

*Lapemis loreatus* Gray 1843

Global distribution: Australia, Burma, China, Fiji, India, Indonesia, Iran, Japan, Malaysia (incl. Sabah, Sarawak), New Guinea, Oman, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, United Arab Emirates, Vietnam.

Records from Sri Lanka: A common species in the locations where they occur. Known from Bundala, Chilaw, Hambantota, Kalpitiya, Kumana, Panadura, Panama, Potuwil, Ussangoda.

Type locality: East India?

Holotype: BMNH 1946.1.17.59 (formerly BMNH III.2.1.a).

*Pelamis* Daudin, 1803

**13.** *Pelamis platurus* (Linnaeus, 1766)

*Anguis platura* Linnaeus 1766

*Hydrophis (Pelamis) bicolor* — Fischer 1856

*Hydrophis (Pelamis) bicolor* var. *alternans* Fischer 1855; Fischer 1856

*Hydrophis (Pelamis) bicolor* var. *sinuata* - Fischer 1855; - Fischer 1856

*Hydrophis pelamis* Schlegel 1837

*Hydrus bicolor* Schneider 1799

*Hydrus platurus* - Boulenger 1896; - Stejneger 1907

*Pelamis bicolor* - Schneider 1799; Daudin 1803; - Duméril, Bibron & Duméril 1854

*Pelamis bicolor* var. *sinuata* Duméril, Bibron & Duméril 1854

*Pelamis bicolor* var. *variegata* Duméril, Bibron & Duméril 1854

*Pelamis ornata* Gray 1842

*Pelamis platura* - Böhme 2003

*Pelamis platurus* [sic] Daudin 1803

*Pelamis platurus* - Smith 1943; - Peters & Orejas-Miranda 1970; - Stebbins 1985; - Liner 1994; - Glaw & Vences 1994; - Cox *et al.*, 1998; - Murphy, Cox & Voris 1999; - Cogger 2000; - Leviton *et al.*, 2003; - Sharma 2004

*Pelamis platyura* [sic] - Das & Yaakob 2007

*Pelamis schneideri* Rafinesque 1817

Global distribution: Probably the most widely distributed sea snake in the world. Known from Andaman Islands, Australia, China, Colombia, Costa Rica, Ecuador, El Salvador, Galapagos Islands, Guatemala, Honduras, India, Japan, Korea, Madagascar, Malaysia, Maldives, Mexico, New Caledonia, New Guinea, New Zealand, Nicaragua, Nicobar Islands, Oman, Pakistan, Panama, Peru, Philippines, Russia, Solomon Islands, Sri Lanka, Taiwan, Tanzania, Thailand, United Arab Emirates, Vietnam.

Records from Sri Lanka: Batticaloa, Beruwela, Bundala, Chilaw, Dehiwela, Kalutara, Moratuwa, Negambo, Panadura, Panama, Rekawa, Rumassala, Trincomalee, Ussangoda, Wadduwa, Waskaduwa.

*Praescutata* Wall, 1921

**14.** *Praescutata viperina* (Schmidt, 1852)

*Diseira praescutata* Duméril, Bibron & Duméril 1854

*Disteira viperina* - Stejneger 1907

*Distira viperina* - Boulenger 1896

*Hydrophis doliata* Fischer 1856

*Hydrophis jayakari* Boulenger 1887

*Hydrophis nigra* 1872

*Hydrophis plumbea* Murray 1887

*Hydrophis schistosus* Boulenger 1896

*Praescutata viperina* - Wall 1921; - Smith 1943; - David & Ineich 1999; - Van Der Kooij 2001; - Khan 2002; - Sharma 2004; - Kharin 2005

*Thalassophina viperina* - Smith 1926; - Golay *et al.*, 1993; - Welch 1994; - Rasmussen 1997; - Murphy, Cox & Voris 1999

*Thalassophis viperina* Schmidt 1852; - David *et al.*, 2004

*Thalassophis viperinus* - Grossmann & Tillack 2001

Global distribution: Burma, India, Indonesia (Java, Borneo, Sumatra), Malay Peninsula, Oman, Pakistan, Sri Lanka, Taiwan, Thailand, United Arab Emirates, Vietnam.

Records from Sri Lanka: Galkissa, Mannar, Pt. Pedro.

Type locality: Java.

Holotype: ZMH 404.



**Family : Laticaudidae Cope, 1879***Laticauda* Laurenti, 1768**15. *Laticauda colubrina*** (Schneider, 1799)*Anguis platura* Lacépède 1790 (fide Heatwole *et al.*, 2005)*Coluber laticaudatus* Linnaeus 1758 (part.)*Coluber platycaudatus* Oken 1836*Hydrophis colubrina* - Schlegel 1837*Hydrus colubrinus* Schneider 1799; - Begbie 1846*Laticauda colubrina* - Stejneger 1907; - Smith 1943; - Peters & Orejas-Miranda 1970; - Liner 1994; - Cox *et al.*, 1998; - Cogger 2000*Laticauda scutata* Cantor 1847 (not of Laurenti 1768)*Platurus colubrinus* - Wagler 1830; - Fischer 1884; - Fischer 1888; - Boulenger 1896*Platurus fasciatus* Latreille 1801*Platurus fasciatus* var. *colubrina* - Fischer 1856*Platurus laticaudatus* var. B. - Günther 1858 (part.)

Global distribution: Andaman Islands, Australia, Burma, China, Fiji, El Salvador, India, Indonesia (Borneo), Japan (Ryukyu Islands), Malaysia, Melanesia, Mexico, New Caledonia, New Guinea, New Zealand, Nicaragua, Nicobar Islands, Philippines, Polynesia, Solomon Islands, Sri Lanka, Taiwan, Thailand.

Records from Sri Lanka: There are no records of this species coming ashore in Sri Lanka.

Type locality: not given.

Holotype: ZMB 9078.

In addition to the aforementioned ‘sea snakes’, the Wart Snake or Cloth Snake (*Acrochordus granulatus*) of family Acrochordidae is sometimes found in shallow sea waters and the Dog-faced Water Snake (*Cerberus rynchops*) and the Glossy Marsh Snake (*Gerarda prevostiana*) of family Colubridae live in the intertidal zones of Sri Lankan waters.

**Key to the sea snakes of Sri Lanka**

Accurate identification of sea snakes to the species level is very difficult, especially if dealing with live animals. Most species (especially *Hydrophis* species) show wide interspecific variation which makes it difficult to exclusively use external characters for identification (Rasmussen, 2000). Hence, this key should be used in conjunction with the existing, more-detailed larger books and scientific papers available. We have omitted scale counts as much as possible and teeth counts and bone length ratios completely. However, these features are very important in confirming a species. We have illustrated most of the features, thus in addition to the herpetologists, this key should be usable by divers, Navy personnel and medical professionals to identify a sea snake and will be most useful for live or freshly killed specimens whose colour pattern is still visible. The key is based on Rasmussen (2000) and Somaweera (2006) and all sketches are reproduced from Cogger (2000) and Rasmussen (2000).

**Sea snake bites in Sri Lanka:** Sea snakes are among the most venomous snakes in Sri Lanka, and according to data from other countries, most species may be more toxic than the highly venomous land snakes in the island. Most sea snake species found around Sri Lanka are gentle and inoffensive and will only bite when provoked, but certain species like *Astrotia stokesii*, *Enhydrina schistose* and *Hydrophis ornatus* are known to be much more aggressive (Guinea, 1994; Heatwole & Cogger, 1994; Rasmussen, 2000; Toriba, 1994; Warrell, 1994). However sea snake bites are encountered very infrequently in Sri Lanka but among them those associated with non-envenoming (‘dry bites’) are frequent. Typical victims are fishermen who try to remove sea snakes entangled in gill nets. Reid (1961) wrote that sea snake bites are usually painless and envenoming does not cause local signs.

de Silva (1994) states that he could only find one reference to sea snake bite treatments among the ~150 traditional snake bite treatment literature, indicating that either the ancient physicians were unaware of their presence or that sea snake bites were never reported at that time. However, according to local beliefs, a person bitten by a sea snake should not come out of the sea and should drink sea water three times (de Silva, 1990). Thanabalasundram & Vidyasagara (1969) mentioned that sea snake bites were “not commonly seen” in Colombo. The following case reports are available with regard to Sri Lanka:

	Source	Species involved	Victim	Symptoms
1	Senanayake <i>et al.</i> , 2005	<i>Pelamis platurus</i> (70cm)	7-year-old boy	No local or systemic effects recorded other than a 2.5cm linear scratch mark. Hospitalised for one and a half days.
2	Senanayake <i>et al.</i> , 2005	<i>Enhydrina schistose</i> (110cm)	39-year-old male	Mild redness around two bite marks but no pain or local/ systemic effects. Only prescribed tetanus toxoid.
3	Amarasekera <i>et al.</i> , 1994	<i>Hydrophis spiralis</i>		Pain at the bite site, regional lymph node enlargement and absence of muscle pain and tenderness. *
4	Karunaratne & Panabokke, 1972	Unidentified (Whitaker & Captain, 2004) suspects it to be <i>Pelamis platurus</i>	Adult fisherman	Ptosis, difficulty in talking, swallowing but no heart or respiratory difficulties. Later developed severe pains, renal failure, hyperkaemia which lasted for 24 days, and the patient died. *
5	Jahubar <i>et al.</i> , 1984; Subramaniam & James, 1985	Reports three bites in fisherman at Mannar during a period of five months		

\* Polyvalent land-snake antivenom has been used in the management of these patients since specific antivenom against sea-snake envenoming is not available in Sri Lanka.

Rasmussen (2000) recommends the following first-aid procedures in case of a sea snake bite: if the bite is on an arm or leg, a broad crepe bandage (or material of similar type) should be wrapped immediately around the area of the bite. The bandage must be very tight and extended over the entire arm or leg. Then a splint should be used to immobilize the arm or leg and hospital treatment must be sought as quickly as possible. If the bite is on the body, firmly press the area of the bite and look for hospital treatment immediately.

**Threats and conservation:** Compared to terrestrial reptiles, sea snakes are not under any severe threats in Sri Lanka. Apart from direct threats like death due to entangling in fishing nets (dying from drowning or get killed by fishermen) and indirect threats including coral reef and mangrove destruction and oceanic pollution, sea snakes do not face any severe threats. They are not exploited for their skin, organs or meat in Sri Lanka, nor they are used as animal food (as in some South East Asian countries, where hundreds end up as croc food in crocodile farms). However, the latter threats persist in certain adjacent countries. Sea snakes are not listed as “protected” in the Fauna and Flora Protection Act (FFPA) of Sri Lanka and are also not protected by CITES.

### Acknowledgments

Our sincere thanks go to Arne Redsted Rasmussen, Aaron Lobo, John Rudge, Mohamed M. Bahir and anonymous reviewers for their valuable comments.

### Literature Cited

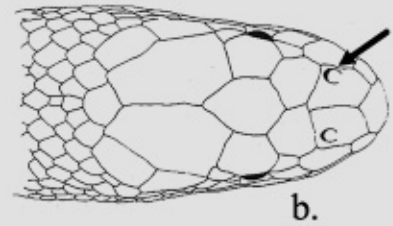
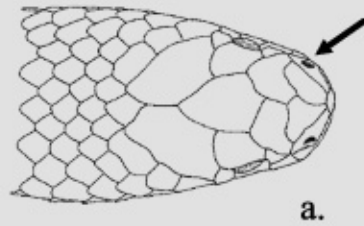
- Amarasekera, N., A. Jayawardena, A. Ariyaratnam, U. C. Hewage and A. de Silva, 1994. Bite of a sea snake (*Hydrophis spiralis*): a case report from Sri Lanka. *Journal of Tropical Medicine and Hygiene*, 97 (4): 195-198.
- Boulenger, G. A., 1896. *Catalogue of the snakes in the British Museum (Natural History). Vol. 3*, British Museum (Natural History), London: xiv+727.
- Branch, B. 1998. *Field Guide to Snakes and Other Reptiles of Southern Africa*. Third Revised Edition. Ralph Curtis Books Publishing, Sanibel Island, Florida.
- Burger, W. L. and T. Natsuno, 1974. A new genus for the Arafura smooth sea snake and redefinitions of other sea snake genera. *The Snake*, 6: 61-75.
- CEA/Euroconsult, 1995. *Wetland Site Report—Puttalam lagoon, Dutch Bay and Portugal Bay*. Book No. 34.
- Cogger, H. G. 2000. *Reptiles and Amphibians of Australia*. Reed New Holland, Sydney, Australia: 808
- Cogger, H., H. Heatwole, Y. Ishikawa, M. McCoy, N. Tamiya and T. Teruuchi, 1987. The status and natural history of the Rennell Island Sea Krait, *Laticauda crockeri* (Serpentes: Laticaudidae). *Journal of Herpetology*, 21 (4): 255-266.
- Cogger, H. G. & H. Heatwole, 2006. *Laticauda frontalis* (de Vis, 1905) and *Laticauda saintgironsi* n.

- sp. from Vanuatu and New Caledonia (Serpentes: Elapidae:Laticaudinae) - a new lineage of sea kraits? *Records of the Australian Museum*, 58: 245-256.
- Cozzi, C. A. 1980. The Absence of Sea Snakes in the Atlantic Ocean. *Bulletin Maryland Herpetological Society*, 16 (3): 113-118.
- Das, I. and A. de Silva, 2005. *A Photographic guide to snakes and other reptiles of Sri Lanka*. New Holland Publishers (UK) Ltd: 144.
- de Silva, A. 1990. *Color guide to the snakes of Sri Lanka*. R & A Publishing Limited, England: vi+130.
- de Silva, A. 1994. An Account of the Sea snakes (Serpentes: Hydrophiida) of Sri Lanka. 234-249. In: Gopalakrishnakone, P., (Ed.) *Sea Snake Toxinology*, Singapore University Press: 350.
- de Silva, A. 2006. Current status of the reptiles of Sri Lanka. In: Bambaradeniya, C.N.B. (Ed.). *Fauna of Sri Lanka: Status of taxonomy, research and conservation*. IUCN Sri Lanka: 34-163.
- de Silva, P. H. D. H. 1980. *Snake Fauna of Sri Lanka - with special reference to skull, dentition and venom in snakes*. National Museums of Sri Lanka: xi, 472.
- Deraniyagala, P. E. P. 1955. *A colored atlas of some vertebrates from Ceylon - Serpentine Reptilia*. Vol. 3, Ceylon National Museums, Colombo: 121.
- Dowling, H. G., 1959. Classification of the serpents: A critical review. *Copeia*, 1959: 38-52.
- Dowling, H. G., 1967. Hemipenes and other characters in colubrid classification. *Herpetologica*, 23: 138-142.
- Dunson, W. A. (Ed.). 1975. *The biology of the sea snakes*. London-Tokyo, University Park Press Baltimore: 530
- Fernando, M., W. Gooneratne, 1983. Sea snake envenoming. *Ceylon Medical Journal*, 28: 131-143.
- Fichter G. S. 1982. *Poisonous Snakes*. A First Book. Franklin Watts: 66.
- Fry, G. C., D. A. Milton, and T. J. Wassenberg, 2001. The reproductive biology and diet of sea snake bycatch of prawn trawling in northern Australia: characteristics important for assessing the impact on populations. *Pacific Conservation Biology*, 7 (1): 55-73.
- Green, H. W. 1997. *Snakes: the Evolution of Mystery in Nature*. University of California Press: 366.
- Guinea, M. L. 1994. Sea snakes of Fiji and Niue. 212-233. In: Gopalakrishnakone, P., (Ed.) *Sea Snake Toxinology*, Singapore University Press: 350.
- Guinea, M. L. 2003. *Ecology, Systematics and Biogeography of Sea Snakes*. Faculty of Education Health and Science, Northern Territory University, Darwin, Australia.
- Haputhantri, S. S. K., M. C. S. Villanueva and J. Moreau, 2008. Trophic interactions in the coastal ecosystem of Sri Lanka: An ECOPATH preliminary approach. *Estuarine, Coastal and Shelf Science*, 76 (2): 304-318.
- Heatwole, H., 1997. Marine snakes: are they a sustainable resource? *Wildlife Society Bulletin*, 25: 766-772.
- Heatwole, H., 1999. *Sea snakes*. UNSW Press, Sydney, Australia: 148.
- Heatwole, H. and H. Cogger, 1994. Sea snakes of Australia. 167-205. In: Gopalakrishnakone, P., (Ed.) *Sea Snake Toxinology*, Singapore University Press: 350.
- Heatwole, H., S. Busack & H. Cogger, 2005. Geographic variation in sea kraits of the *Laticauda colubrina* complex (Serpentes: Elapidae: Hydrophiinae: Laticaudini). *Herpetological Monographs*, 19: 1-136.
- Herre, A. W. C. T., 1942. Notes on Philippine sea-snakes. *Copeia*, 1942 (1): 7-9.
- Ineich, I., 1996. Geographic distribution- Serpentes. *Hydrophis torquatus diadema*. *Herpetological Review*, 27 (3): 154.
- Jahubar, M., A. Subramaniam and R. F. James, 1984. An analysis of snake bite in Base Hospital Mannar. 2<sup>nd</sup> Annual Sessions of the Jaffna Medical Association: 9.
- Karunaratne, K. E. de S. and R. G. Panabokke, 1972. Sea snake poisoning - Case report. *Journal of Tropical Medicine and Hygiene*, 75 (5): 91-94.
- Kropach, C. 1975. The yellow-bellied sea snake, *Pelamis*, in the eastern Pacific. 185-213 In: Dunson, W., (Ed) *The Biology of Sea Snakes*. Univ. Park Press, Baltimore: xi + 530.
- McDowell, S. B., 1967. *Aspidomorphus*, a genus of New Guinea snakes of the family Elapidae, with notes on related genera. *Journal of Zoology (London)*, 151: 497-543.

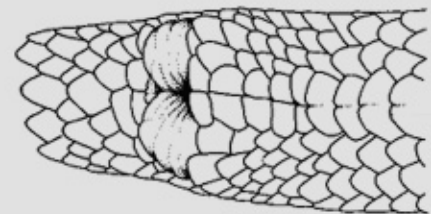
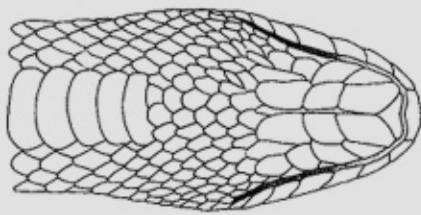
- McDowell, S. B., 1974. A catalogue of the snakes of New Guinea and the Solomons, with special reference to those on the Bernice Bishop Museum. Part I. Scolecophidae. *Journal of Herpetology*, 8: 1-57.
- Murthy, T. S. N., 1977. On sea snakes occurring in Madras waters. *Journal of the Marine Biological Association of India*, 19 (1): 68-72.
- Porter, R., Irwin, S., Irwin, T. and Rodrigues, K. 1997. Records of the marine snake species from the Hey-Embley and Mission Rivers, Far N Qld. *Herpetofauna*. 27 (2): 2-7.
- Rasmussen, A. R. 1989. An analysis of *Hydrophis ornatus* (Gray), *Hydrophis lamberti* (Smith) and *Hydrophis inornatus* (Gray) (Hydrophiidae, Serpentes) based on samples from various localities, with remarks on feeding and breeding biology of *Hydrophis ornatus*. *Amphibia-Reptilia*, 10: 397-417.
- Rasmussen, A. R., 1992. Rediscovery and redescription of *Hydrophis bituberculatus* Peters, 1872 (Serpentes: Hydrophiidae). *Herpetologica*, 48 (1): 85-97.
- Rasmussen, A. R. 1993. The status of the Persian Gulf Sea Snake *Hydrophis lapemoides* (Serpentes, Hydrophiidae). *Bulletin of the British Museum Natural History (Zoology)*, (59): 97-104.
- Rasmussen, A. R., 1997. Systematics of sea snakes: a critical review. *Symposium of the Zoological Society of London*, 70: 15-30.
- Rasmussen, A. R., 2000. *Sea snakes*. At Food and Agriculture Organization of the United Nations website. Accessed 20 September 2008: 3987-4008.
- Rasmussen, A. R., M. Auliya and W. Bohme, 2001. A new species of sea snake genus *Hydrophis* (Serpentes: Elapidae) from a river in West Kalimantan (Indonesia, Borneo). *Herpetologica*, 57 (1): 23-32.
- Reid, H. A., 1961. Diagnosis prognosis and treatment of sea-snake bite. *Lancet*, 2: 399-402.
- Senanayake, M. P., C. A. Ariaratnam, S. Abeywickrema and A. Belligaswatte, 2005. Two Sri Lankan cases of identified sea snake bites, without envenoming. *Toxicon*, 45: 861-863.
- Smith, M., 1926. *Monograph of the Sea-snakes (Hydrophiidae)*. London, British Museum (Natural History): 130.
- Somaweera, R., 2006. *Sri Lankawe Sarpayin ('The Snakes of Sri Lanka')*. Wildlife Heritage Trust of Sri Lanka: 297.
- Thanabalasundrum, R. S. and N. W. Vidyasagara, 1969. Snake bites and its treatment. *Ceylon Medical Journal*, 14 (4): 188-191.
- Toriba, M., 1994. Sea snakes of Japan. 206-211. In: Gopalakrishnakone, P. (Ed.) *Sea Snake Toxinology*, Singapore University Press: 350.
- Uetz, P. and J. Hallermann, 1995-2008. *The TIGR Reptile Database*. Retrieved on 20 April 2008, from <http://www.reptile-database.org/>.
- Underwood, G., 1967. *A contribution to the Classification of Snakes*. London: Trustee British Museum (Natural History).
- Underwood, G., 1979. Classification and distribution of venomous snakes in the world. In: Lee, C. Y. (Ed.). *Handbook of Experimental Pharmacology*. Vol. 52. *Snake Venoms*. Berlin: Springer-Verlag: 16-40.
- Voris, H. K., H. H. Voris, and L. B. Liat, 1978. The food and feeding behavior of a marine snake, *Enhydrina schistosa* (Hydrophiidae). *Copeia*. 1978: 134-146.
- Voris, H. K. and B. C. Jayne, 1979. Growth, reproduction and population structure of a marine snake, *Enhydrina schistose* (Hydrophiidae). *Copeia*. 1979 (2): 307-318.
- Wall, F., 1909. A monograph of the sea snakes (Hydrophinae). Asiatic Society, Calcutta. *Memoirs*, 2 (8): 169-251.
- Wall, F., 1921. *Ophidia Taprobanica or the Snakes of Ceylon*. Governmental Press, Ceylon: xxii+581.
- Warrel, D. A., 1994. Sea snake bites in the Asia-Pacific region. 1-36. In: Gopalakrishnakone, P. (Ed.). *Sea Snake Toxinology*, Singapore University Press: 350.
- Westhoff, G., B. G. Fry, H. Bleckmann, 2005. Sea snakes (*Lapemis curtus*) are sensitive to low-amplitude water motions. *Zoology*, 108: 195-200.
- Whitaker, R. and A. Captain, 2004. *Snakes of India*, Draco Books, India: 500.
- Zimmerman, K. and H. Heatwole, 1990. Cutaneous Photoreception: A New Sensory Mechanism for Reptiles. *Copeia*, 1990 (3): 860-862.

# PLATE 07

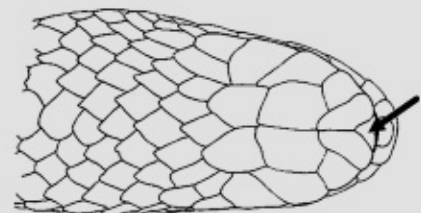
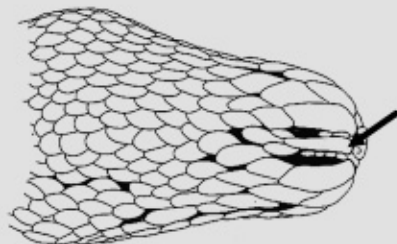
- 01 Nasals completely separated by internasals [a]; body clearly banded and more or less cylindrical ..... *Laticauda colubrina*  
 Nasals in contact [b]; body may be banded or not; more or less compressed (laterally flattened body) ..... 02



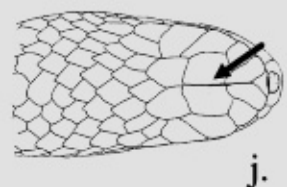
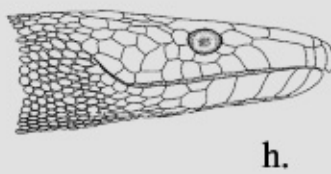
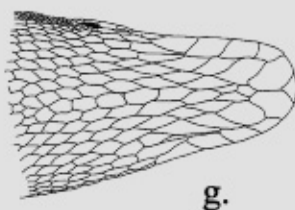
- 02 Ventral scales significantly broader at the anterior part of the body [c] and similar in size to coastrals towards the posterior of the body [d] ..... *Praescutata viperina*  
 No significant size difference in the ventrals along the body ..... 03



- 03 Mental scale narrow, splint or dagger shaped [e], several times longer than broad and partially hidden in the mental groove; rostral divided into 3 parts, and projects downward; head scales frequently with tubercles giving them a pebbled texture ..... *Enhydrina schistosus*  
 Mental scale triangular, normally broader than long [f] and not hidden in a the mental groove ..... 04

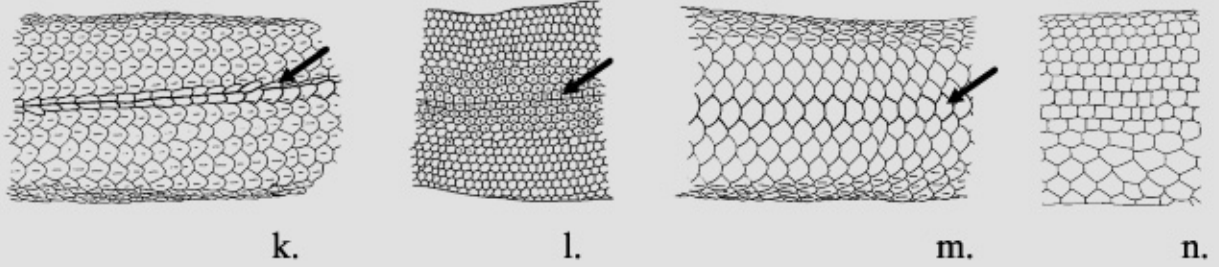


- 04 No distinct mental groove [g]; head elongate; snout bill-like and flattened [h]; gap of mouth very wide; normal colour pattern with yellow on ventral side and black on dorsal side [i]; body scales do not overlap ..... *Pelamis platurus*  
 A distinct mental groove [j]; colour pattern never with yellow on ventral side and black dorsal ..... 05



# PLATE 08

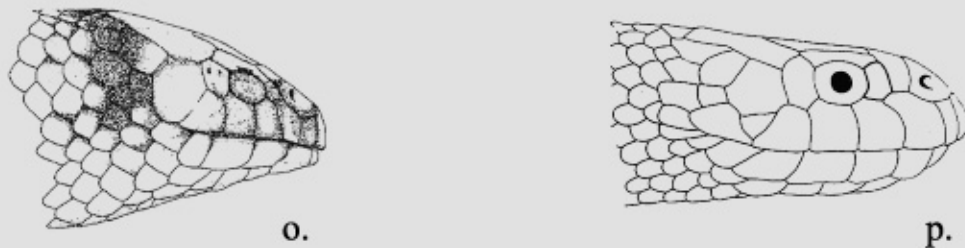
- 05 Ventrals (except on throat) divided into pairs of overlapping foliiform (leaf-shaped) scales which in most specimens form a mid-ventral keel [k & l] ..... 06
- Ventrals usually entire [m] or difficult to distinguish ..... 07



- 06 Body highly tapering towards the anterior and end with a very small head with no distinct head ..... *Hydrophis gracilis*
- Normal, stout body ..... *Astrotia stokesii*

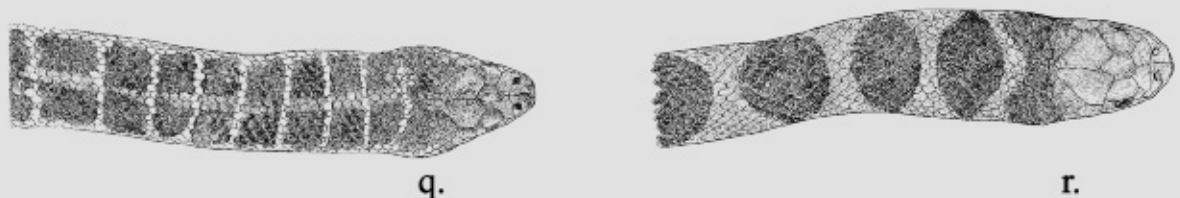
- 07 Ventrals very small and difficult to distinguish (especially towards the posterior part of body); scales in lowermost scale rows on flanks enlarged compared to dorsal scales [n] ..... *Lapemis curtus*
- Ventrals distinct throughout; lowermost scale rows on flanks not enlarged compared to dorsal scales ..... 08

- 08 Short snout [o]; less than 24 scale rows around body; dorsal pattern does not extend to belly; scales heavily keeled ..... *Kerilia jerdonii*
- Normal snout [p]; at least 24 scale rows around body ..... 09



- 09 Body either with board bands behind head parallel to each other [q] or with ocellus on sides; light colored bands on neck one scale length or less in width; tail with 6 to 11 grey bands and narrow whitish interspaces ..... 10

- Body unbanded or if banded, the bands on body not parallel behind head [r], and/or tail with less than 6 bands; light colored bands on neck usually more than one scale length in width ..... 11

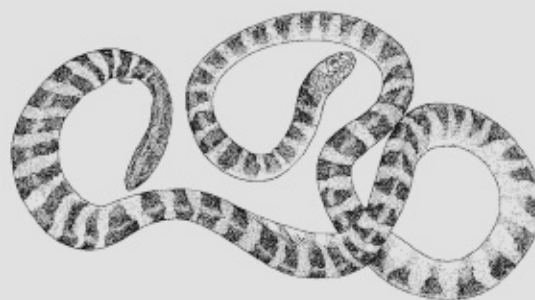


# PLATE 09

- 10 Dorsals and most coastals with a tubercle; 37-44 subcaudals ..... *Hydrophis ornatus*  
 Dorsals and most coastals with a two-crested median keel and sometimes also a tubercle; 41-52 subcaudals ..... *Hydrophis bituberculatus* (banded form)
- 11 Body significantly tapering towards the anterior and end with a small head ..... *Hydrophis stricticollis*  
 Normal body ..... 12
- 12 Body with blackish grey bands strongly dilated dorsally; tail with 3 to 5 weak bands, tip black, a horse-shoe shaped mark on head ..... *Hydrophis lapemoides*  
 Bands not strongly dilated dorsally, and/or bands on tail not weak; no clear markings on head ..... 13
- 13 Interspaces between bands 2 to 4 times broader than bands posteriorly [s], primarily yellow with black bands; smooth scales, or slight keels; eyes small, eye diameter less than eye-mouth distance ..... *Hydrophis spiralis*  
 Interspaces between bands are similar in size to the bands or narrower [t] ..... 14



s.



t.

- 14 Head olive; 27-36 body scales behind neck; some supralabials may be divided; bands on sides of the body greatly tapers towards the belly; body exceptionally long; eyes small, eye diameter three-fourth's of the eye-mouth distance ..... *Hydrophis cyanocinctus*  
 Head black; 25-29 body scales behind neck; supralabials normally not divided; bands on sides of the body slightly/slowly tapers towards the belly ..... 15
- 15 Larger head; less than 300 ventrals; 43-50 scales around mid body; dorsals and most coastals with a two-crested median keel and sometimes also a tubercle ..... *Hydrophis bituberculatus* (unbanded form\*)  
 Smaller head; more than 300 ventrals; 35-43 scales around mid body; coastals without a keel but sometimes with a tubercle ..... *Hydrophis mamillaris*

\* the type specimen (ZMB 4647) is unbanded.