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Current Status of Marine Snakes from Jaffna Peninsula, Sri Lanka with Description of Hitherto Unrecorded *Hydrophis fasciatus fasciatus* (Schneider, 1799)

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Abstract: As ouly a few study reported on sea snakes of Sri Lanka, a study was undertaken from June 2003 to November 2004 in the coast of Jaffna Peninsula which lies in the Northern part of Sri Lanka. Out of the 121 specimens examined, 9 species under 5 genera in two families were documented in the coastal waters of both Valvettiturai to Point Pedro and the Jaffna lagoon waters. This includes *Hydrophis fasciatus fasciatus* which is no longer known in Sri Lanka increased the number of Hydrophis species to 8, thus the total number of sea snakes inhabiting the coastal waters of Sri Lanka become 14 in Hydrophiidae. Of the sea snakes collected, *Lapemis curtus* (33.88%) and *Praescutata viperina* (23.97%) were the commonly recorded species. Least recorded species were *H. lapemoides*, *H. fasciatus fasciatus*, *Kerilia jerdonii jerdonii* and *Acrochordus granulatus* (0.83, 0.83, 2.47 and 2.47%, respectively).

Key words: Sea snakes, *Hydrophis* species, Monotypic genera, Hydrophiidae, Jaffna Peninsula

INTRODUCTION

The classification of sea snakes is far from settled (Mao and Chen, 1980). This is true for sea snakes of Sri Lanka as studies on marine snakes are scanty (De Silva, 1990). Ferguson (1877) listed 24 species of marine snakes in 4 genera in his ''Reptile fauna of Ceylon'' which is the first comprehensive work on herpetofauna of Sri Lanka. Later Wall (1921) recorded 22 species belonging to 16 genera where he has given detail description of species in the book titled *Ophidia taprobanica* or Snakes of Ceylon. Deraniyagala (1946) recorded 19 species within 8 genera and subsequently he (Deraniyagala, 1955) recorded only 12 species within 8 genera in his "A coloured atlas of some vertebrates from Ceylon". Even though Welch (1988) added another 6 species to Sri Lankan waters, it is well followed by De Silva (1980) that the authentic records are only in respect to 13 species.

Recently Das (2001) reported 16 species under 7 genera in which 10 species in the genera *Hydrophis* and 6 other monotypic genera namely *Astrotia*, *Enhydrina*, *Kerilia*, *Lapemis*, *Pelamis* and *Praescutata*. However, Wickramasinghe and Rodrigo (2004) argued that because of the lack of data on the three species of *Hydrophis* (*H. mamillaris*, *H. nigrocinctus*, *H. obscura*) mentioned by Das (2001), Sri Lanka has ouly 13 species of sea snakes at present. Although De Silva (1990) listed 13 species of marine snakes in his "Colour Guide to the Snakes of Sri Lanka" he wrote that, it is possible some of the species that have been collected from the coast of Madras (Murthy, 1977) such as *H. caerulescens* (Shaw) and *H. fasciatus fasciatus* (Schneider) could easily come to the coasts in the North of Sri Lanka. The statement has became true as one of the species *H. fasciatus fasciatus* has been collected in one of the landing centers of the Point Pedro coast increases the total number of species to fourteen in the

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family Hydrophiidae. Thus the present study considers the total number of species of true marine snakes inhabiting the coastal waters of Sri Lanka as fourteen. So far only three species out of 14 are reported from Jaffna waters. They are *Astrotia stokesii*, *Kerilia jerdonii jerdonii* and *Enhydrina schistosa* (pers.com.).

This study considers any snakes with paddle shaped tail as marine snakes. The species *Acrochordus granulatus* of the family Acrochordidae has also been collected in the Jaffna waters. It is one of the two species in the genera *Acrochordus* restricted to marine envirourment. Thus even though *A. granulatus* is not a true marine snake, the presence of dorso ventrally oriented tail justifies the definition.

MATERIALS AND METHODS

The study area in the present investigation is situated from Valvettiturai to Point Pedro (80° 09' 06"-80° 14' 08" E, 9° 49' 34" - 9° 49' 42" N) in the Vadamarachchi division and at the landing centres (80° 01' 06" -80° 10' 09" E, 9° 39' 11" -9° 51' 19"N) of the Jaffna lagoon in the Jaffna division of the Jaffna Peninsula which are the Northern part of Sri Lanka (Fig. 1). The sea snakes were collected once a month as the by-catch of fisheries, from June 2003 to November 2004 in 8 landing centers in Vadamarachchi division and one landing centre in Jaffna division.

Detailed morphological features and measurements were made at the time of collection of each specimen along with photographic recordings. The species were identified by using the standard keys and descriptions of Wall (1921), Smith (1943), Deraniyagala (1955), De Silva (1980), Bussarawit *et al*. (1989), Minton (1966), Murphy *et al*. (1999) and Rasmussen (2001) and were further confirmed by Dr. Harold De Voris and Dr. Rasmussen. The nomenclature in this study has followed Rasmussen (2001) and Das (2001). The description of each species is based on a combination of the characters found in the sea snakes collected and previous description found in the literature. All collected sea snakes were caught by different types of gill nets. Up to 05 to 06 specimens were taken for preservation and rest of them were released to the envirourment after taking the data. Samples of each species were deposited at the museum of Zoology Department, University of Jaffna and Natural History Museum of Colombo.

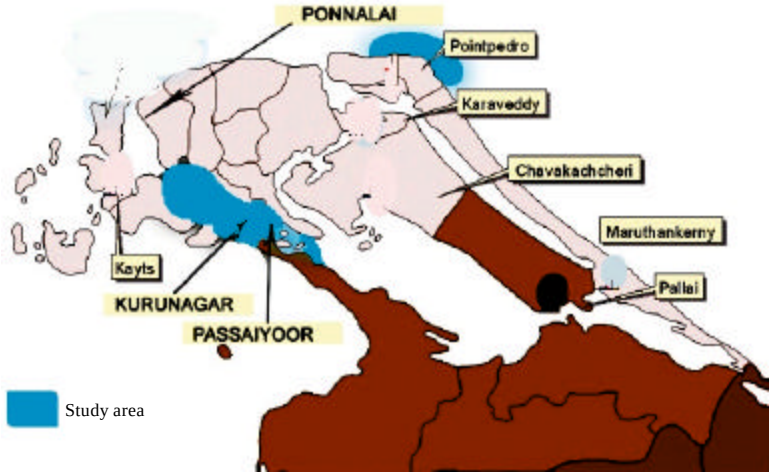

Fig. 1: Map showing the study area

RESULTS

Family: Acrochordidae

Genus: *Acrochordus* Hornstedt

Neck not defined, no cephalic shields, scales are small, juxataposed or subimbricate and tri carinate, no ventral scutes, body is stout and covered by loose skin (Deraniyagala, 1955; Smith, 1943).

***Acrochordus granulatus* (Schneider, 1799) (Fig. 2a)**

Three specimens were collected of which two were males and one was female from the Jaffna lagoon. It is a rare snake (Deraniyagala, 1955; De Silva, 2001). This is not earlier reported from Jaffna Peninsula.

Description: Based on 3 specimens (from 349-656 mm SVL). In percentage of Snout-Vent length: head length 2.637-3.065; snout to post labial 1.631-1.891; snout to eye 0.838-1.088; Inter orbit 0.868-1.060; total length to tail length ratio 8.58-9.75.

Head and body: All scales on head and body are granulated and tricarinated; white rings encircling the body; scales broader than long; no cephalic scutes but series of supra and infra labial scales present.

Scale rows: 80 -86, 101-115, 80-104.

The line of Ventrals and Sub caudals can be differentiated by a skin fold and represented by 3-4 rows of small spinuous scales projecting irregularly which are occasionally intersected by minute flat scales.

Colour: Alternate rings of brown or olive brown above and paler below; coastal with a median spine which is the longest. In the young bands are contrasted and conspicuous, giving a zebra like appearance. The dark grey or black with white cross bars become indistinct in adults (De Silva, 1980; Smith, 1943; Wall, 1921; Murthy, 1974).

Collection locality: Landing centre from Jaffna lagoon.

Family: Hydrophiidae

Genus: *Hydrophis* Latreille

Ventrals small distinct throughout and normally entire, ***Hydrophis*** is the largest genus in the family Hydrophiidae with approximately 30 species (Aunonymous, 2007).

***Hydrophis cyanocinctus* (Daudin, 1803) (Fig. 2b)**

This is one of the largest sea snakes known (Bussarawit *et al*., 1989) and not reported from Jaffna previously.

Description: Based on 09 specimens (from 783-1087 mm SVL). In percentage of Snout-Vent length: head length 2.066-2.522; snout to post labial 1.421-1.772; snout to eye 0.607-0.818; inter orbit 0.616-0.840; total length to tail length ratio 8.78-11.23.

Head and body: Head somewhat smaller in size, snout elongate, projecting slightly; neck not distinct, the extreme depth of the body 2-2½ times that of the anterior part. 7-8 supra labials of which 3,4 or 3,4,5 entering the orbit; 1 pre and 2 post oculars; 5-8 infralabials and 5-8 maxillary teeth behind poisonous fangs.

Scale rows: 27-35 on neck, 37-47 on mid body, 34-37 on hind body.

Ventrals: (238) 290-390; Subcaudals: 41-54.

Colour: Head black or yellow with black markings. Body with 50-64 black rhombic bars which dilate dorsally. These bars can be encircling the body or appear ouly on the dorsal side, the dorsal bars are wider than the interspace; yellowish white ventrally, tail black on the tip (Bussarawit *et al*., 1989).

Collection locality: Landing centres from Vadamarachchi coastline.

***Hydrophis fasciatus fasciatus* (Schneider, 1799) (Fig. 2c, d)**

Although, Wall (1921) included this snake among the sea snakes of Sri Lanka, later he added that the

Fig. 2: Marine snakes collected in the Jaffna Peninsula
- a: *Acrochordus garnulatus* (Family: Acrochodidae);
- b: *Hydrophis cyanocinctus* (Family: Hydrophiidae);
- c: Dorsal view of *Hydrophis fasciatus fasciatus* (Family: Hydrophiidae);
- d: Ventral view of *Hydrophis fasciatus fasciatus* (Family: Hydrophiidae);
- e: *Hydrophis gracilis* (Family: Hydrophiidae);
- f: *Hydrophis lapemoides* (Family: Hydrophiidae);

species labeled as *fasciatus* was a different one. Hence to date this species is no longer known in Sri Lankan waters. The specimen was collected in June 2003 and deposited at the National Museum, Colombo (Reg. No: 2005-21-1).

Description: Based on a single male specimen (870 mm SVL, 106 mm tail length). In percentage of Snout-Vent length: head length 1.655; snout to post labial 1.045; snout to eye 0.574; inter orbital 0.551 and total length to tail length ratio 9.21.

Head and body: Head elongate with snout projecting forward; slender body anteriorly, becomes 4 times as deep as neck posteriorly; 1 pre and 2 post oculars; 5 supralabials followed by greatly reduced 6th and 7th of which 3rd and 4th entering eye, 2nd touches the preocular; (1+1) temporals; a series of

two rows of small scales placed below the temporals; infralabials 04, of which 4th largest, all of which touch the chin shields; a cunate scale present between 3rd and 4th infralabials; chin shield 2 pairs nearly equal in size; 5 maxillary teeth behind fangs; coastals longer than broad, imbricate in the slender anterior region and more or less equal in dimension and juxtaposed in the compressed part with small central short keel; ventrals bicarinate.

Scale rows: 29, 47, 41.

Ventrals: 434; Sub caudals: 63.

Colour: (As per the collected specimen) head jet black with 65 black bands encircling the body of which 7 are in the tail; black bands wider in the dorsal aspect narrowing down laterally again broadening ventrally so as to confluent with one another; the confluency is such intense that the slender anterior part becomes jet black; prominent anterior bands, blurred posteriorly but well defined and retained their definition; bands are greater than 2 times that of the interspace at the midcosta and greater than 4-5 times in the tail; interspaces white in colour dorsally, to dirty yellowish laterally; sub caudals black (Minton, 1966; Murthy, 1992).

Collection locality: Collected from Inparuti - one of the landing centers from Vadamarachchi coastline during June 2003.

***Hydrophis gracilis* (Shaw, 1802) (Fig. 2e)**

Fifteen specimens were collected and reported for the first time from Jaffna waters. A gravid female was collected with four brood during February, 2004.

Description: Based on 15 specimens (from 623-1058 mm SVL). In percentage of Snout-Vent length: head length 1.370-1.605; snout to post labial 1.001-1.381; snout to eye 0.540-0.592; Inter orbit 0.359-0.526; total length to tail length ratio 8.78-13.44.

Head and body: Very small headed snake with slender anterior body; snout projecting beyond the jaws; 1 pre 1-2 post oculars; 6 rarely 5 or 7 supra labials with 3, 4 entering eye; 5-6 maxillary teeth behind fangs.

Scale rows: 16-21 on neck, 28-47 on mid body, 28-35 on hind body.

Ventrals: 223-374; Subcaudals: 32-40.

Colour: Head greenish black to grayish; bands are distinguishable on the slender anterior part, while bands on the body dark or feeble become confluent to form a blackish or greenish gray dorsal side; whitish below; each scale in the lateral and ventral region is clearly defined by green edge.

Collection locality: Landing centres from Vadamarachchi coastline.

***Hydrophis lapemoides* (Gray, 1849) (Fig. 2f)**

An adult male was collected from Point Pedro coast during February 2004 and reported for the first time from Jaffna Peninsula. The specimen was brought to the University and was reared at the Fisheries Centre. It shed skin 3 times and died in June from unknown reason. (acknowledged the then director for providing prawns as food for the snake). A rare snake species known from a few examples (Deraniyagala, 1955) (Fig. 2f).

Description: Based on a single specimen (738 mm SVL). In percentage of Snout-Vent length: head length 2.750; snout to post labial 2.181; snout to eye 0.907; Inter orbit 0.907; total length to tail length ratio 10.23.

Head and body: Head small to moderate, body deepening posteriorly 2-3 times the depth of the neck; 1 pre and 2-3 post oculars; 8 supralabials 3,4 entering eye; 2 anterior temporals and 1 or 2 or 3 posterior temporals; 4 infralabilas touching genials; coastals smooth in young, feeble carination in females and spinous in males; ventrals distinct, bicarinate more than twice as broader than the adjacent dorsal scales; anterior ventrals are a little broader than the posterior ventrals; 8 maxillary teeth behind fangs.

Fig. 3: Marine snakes collected in the Jaffna Peninsula
- a: *Hydrophis spiralis* (Family: Hydrophiidae);
- b: *Lapemis curtus* (Family: Hydrophiidae), Juvenile;
- c: *Lapemis curtus* (Family: Hydrophiidae), Adult;
- d: *Kerilia jerdonii jerdonii* (Family: Hydrophiidae);
- e: *Praescutata viperina* (Family: Hydrophiidae), Juvenile;
- f: *Praescutata viperina* (Family: Hydrophiidae), Adult;

Scale rows: 29-35 (32) on neck, 41-54 (43) on mid body, 41 on hind body.
Ventrals: (290) 290-404; Sub caudals: (46) 45-47.
Colour: As per the specimen collected, head olive green; dorsally greenish gray with 43 dark rings (35-43) enlarged into tapered blotches dorsally, broader than the interspace, broadest vertebrally; ventral yellowish (Rasmussen, 1987; Murthy, 1992).
Collection locality: Landing centre from Vadamarachchi coastline.

***Hydrophis spiralis* (Shaw, 1802) (Fig. 3a)**

Nineteen individuals have been examined and reported for the first time from Jaffna waters. A gravid female contained 07 young ones collected during June 2003. Wickramasinghe and Rodrigo (2004) reported this species from Kandakuliya to Kumana as common. One of the longest sea snakes known and the maximum attainable length is 2 m (Frith, 1977; Bussarawit et al., 1989; Rasmussen, 2001). The longest specimen examined was a female with 1856 mm total length and 200 mm the tail.

Description: Based on 19 specimens (from 762-1756 mm SVL). In percentage of Snout-Vent length: head length 1.767-2.286; snout to post labial 0.787-1.537; snout to eye 0.660-1.464; inter orbit 0.540-0.827; total length to tail length ratio 10.06-14.07.
Head and body: Head is large and distinct heavy, body not slender anteriorly, 1 pre and post oculars; supralabials 7 of which 3rd and 4th entering eye; 6th supralabial becomes the 1st temporal; temporals 1+1 rarely 1+2; 7 or 8 infralabials touching genials; coastals longer than wide; imbricate anteriorly and sub imbricate posteriorly each with centrally placed umbo.
Scale rows: 26-32 on neck, 31-38 on mid body, 29-34 on hind body.
Ventrals: 318-383; Sub caudals: 40-55.
Colour: In young stages the head is black with a inverted U shaped yellow mark upon vertex and extending to prefrontals, body yellowish with 40-60 black complete bands encircling body, the bands are much narrower than the interspace at least on the posterior part of the body, tail black (Bussarawit *et al*., 1989; Deraniyagala, 1955; Rasmussen, 2001).
Collection locality: Landing centres from Vadamarachchi division.

Genus: *Kerilia* Gray

Snout acute and arched in profile; scales on body strongly keeled and in regular rows.

***Kerilia jerdonii jerdonii* (Gray, 1849) (Fig. 3d)**

Three specimens were collected at the Point Pedro landing centre and reported for the first time from Jaffna Peninsula. It has been reported from Vaduga bank, Colombo and Mullaitivu (Deraniyagala, 1955) and recently from Kandakuliya to Kumana (Wickramasinghe and Rodrigo, 2004).
Description: Based on 03 specimens (from 644-872 mm SVL). In percentage of Snout-Vent length: head length 1.975-2.748; snout to post labial 1.307-2.003; snout to eye 0.665-0.900; inter orbital 0.642-0.869; total length to tail length ratio 8.14-8.92.
Head and body: Short head, arched snout, anterior body depth half that of the posterior body depth. 1 pre and post oculars; no loreals; 6 supralabials of which 3rd and 4th entering the orbit; temporals 1+1, the 6th supralabila becomes the 1st temporal shield; 5-7 infralabilas; coastals strongly keeled, imbricated, the carina occupy 3/4 length of the coastal; ventrals ouly slightly larger than coastals, each ventral consists of a medial pleat that separates the two laterally placed carina; 7 to 8 maxillary teeth behind fangs.
Scale rows: 17 on neck, 19-21 on mid body, 19-20 on hind body.
Ventrals: 200-256 (210-248 as on the collected specimens); Subcaudals: 35-40
Colour: 30-40 complete bands around body, 1st band more or less interrupted by parietals; blackish grey above, pale yellow on sides, between bands grey or dull yellow colour and ventrally pale white; the black cross bars are smaller than the interspaces, tail tip black (Smith, 1943; Bussarawit *et al*., 1989; Deraniyagala, 1955; Rasmussen, 2001).
Collection locality: Landing centres from Vadamarachchi coastline.

Genus: *Lapemis* Gray

Head Large, body stout; the lowermost scale rows enlarged; ventrals small distinct anteriorly vestigial posteriorly (Murphy *et al*., 1999).

***Lapemis curtus* (Gray, 1849) (Fig. 3b, c)**

Forty one specimens examined and reported for the first time from Jaffna Peninsula. One of the common sea snakes of waters of Jaffna Peninsula and it is common along the North-West coasts of Sri Lanka (Deraniyagala, 1955). Collection revealed that it can grow up to 1100 mm.
Description: Based on 41 specimens (from 351-970 mm SVL). In percentage of Snout-Vent length: head length 2.606-4.923; snout to post labial 2.181-3.530; snout to eye 0.907- 2.452; Inter orbit 0.907-2.132; total length to tail length ratio 7.28-11.10.

Head and body: Body bulky in proportion to its length. Ventral spines are more prominent in males than females; 1 pre and post oculars; 07 supralabials the 7th is the smallest; parietals broken, mostly follow f pattern (Gritis and Voris, 1990) anal divided into 4 or 6; three or 5 maxillary teeth behind the fangs.
Scale rows: 23-35 neck, 33-40 on mid body, 30-37 on hind body.
Ventrals: 146-194; Sub caudals: 33-46.
Colour: Head black in juveniles, adult has pale black body with 50-65 dorsal black bars prominent in young ones, the bars are often fused in the adults; sides are yellow becoming pale as progresses; whitish below; bands taper to a point on flanks; about half of the tail is black (Smith, 1943; Deraniyagala, 1955; Bussarawit *et al*., 1989; Murphy *et al*.,1999).
Collection locality: Landing centres from Vadamarachchi coastline.

Genus: *Praescutata* Smith

Head broad, short and distinct from the neck. Ventrals very broad anteriorly become one third to one fifth times narrower posteriorly (Bussarawit *et al*., 1989; Deraniyagala, 1955; Smith, 1943).

***Praescutata viperina* (Schmidt, 1852) (Fig. 3e, f)**

Twenty nine specimens were examined. It is reported for the first time from Jaffna waters and a common species landed in the Vadamarachchi coast.
Description: Based on 29 specimens (from 478-770 mm SVL). In percentage of Snout-Vent length: head length 2.376-4.314; snout to post labial 2.012-2.895; snout to eye 0.783-1.170; Inter orbit 1.140-1.381; total length to tail length ratio 7.2-10.8.
Head and body: Head short broadly rounded; body subcylindrical with the greatest diameter in the posterior part of the body; 1 pre and 2 or occasionally 1 post oculars; 7-8 supralabials of which 3.4 or 4 or 4.5 entering the eye; temporals variable usually 1 or 2 , sometimes 3 anterior temporals; anal divided into 4 or 6; each coastal with a median keel; 4 or 5 maxillary teeth behind fangs (Smith, 1943; Deraniyagala, 1955; Bussarawit *et al*., 1989).
Scale rows: 27-34 on neck, 37-50 on mid body, 33-40 on hind body.
Ventrals: 232-274; Subcaudals: 39-56.
Colour: Rhombic bars feeble or confluent to form a uniform olive grey to grayish green dorsally, yellowish laterally and pale greenish to white ventrally.
Collection locality: Landing centres from Vadamarachchi coastline.

DISCUSSION

Sea snakes collections from by-catch fisheries is a common phenomenon (Ward, 2000, 2001; Tonks *et al*., 2008). Out of the 121 specimens examined 9 species under 5 genera were documented in the coastal waters of both Valvettiturai to Point Pedro and in the Jaffna lagoon areas, of which eight from the family Hydrophiidae and one from the family Acrochordidae (Table 1, 2). This study records *A. granulatus* from Jaffna lagoon ouly as it is known to inhabit fresh water, marine waters estuaries as well as terrestrial (Lillywhite, 1996; Shine and Lamberk, 1985) while *Lapemis curtus* was collected from sea (No. 15) and lagoon (No. 16). Out of the nine species of sea snakes five were from the genus *Hydrophis* (Table 1).

Eight of the nine species *Hydrophis cyanocinctus*, *H. fasciatus fasciatus*, *H. gracilis*, *H. lapemoides*, *H. spiralis*, *Lapemis curtus*, *Praescutata viperina* and *Acrochordus granulatus* were first time documented from Jaffna Peninsula. The species *Enhydrina schistosa* and *Astrotia stokesii* (Gray, 1846) earlier reported from Jaffna were not collected during the survey. The record of

Table 1: Summary of variations of Jaffna Peninsular specimens of the Genus *Hydrophis*

Species	No.	Scales at fore body	Scales at mid body	Scales at hind body	Ventrals	Sub caudals	Anterior temporal	Dark bands	MTL ex. (mm)
H. spiralis	19	26-32	31-38	29-34	318-383	40-55	1	42-57	1625
H. cyanocinctus	9	27-35	37-47	34-37	290-390	41-54	1 or 2	50-61	1294
H. gracilis	15	16-21	28-47	28-35	223-374	32-40	1	51-55	1143
H. lapemoides	1	32	41-54	41	290	47	2	43	878
H. fasciatus fasciatus	1	29	47	36	374	57	1	65	976

No = Number; Ant.tem. = Anterior temporals; Mtl ex. = Maximum total length examined

Table 2: Summary of variations of Jaffna Peninsular specimens of the monotypic genus

Species	No.	Scales at fore body	Scales at mid body	Scales at hind body	Ventrals	Sub caudals	Anterior temporal	Dark bands	MTL ex (mm)
Lapemis curtus	41	23-35	33-40	30-37	146 -194	33-46	2 or 3	39-62	1100
Præscutata viperina	29	27 -14	37-50	33-40	232-274	39- 56	1 or 2	31-35	873
Kerilia jerdonii jerdonii	3	17	19-21	19-20	210-248	34-40	1	34-41	982
Acrochordus granulatus	3	80-86	101-115	80-104	-	-	-	70-84	731

No. = Number; Ant. tem. = Anterior temporals; Mtl ex. = Maximum total length examined

H. fasciatus fasciatus from Jaffna Peninsula increases the *Hydrophis* species to 8, thus a total of 14 species of sea snakes are found in the coastal waters of Sri Lanka in the family Hydrophiidae.

Of the total 121 specimens of sea snakes, *Lapemis curtus* (33.88%) and *Praescutata viperina* (23.97%) were the commouly recorded species. *P. viperina* sporadically recorded in the western coast (Wall, 1921) and not observed in the Western to North Western coast (Wickramasinghe and Rodrigo, 2004) was found to be a common species in the Northern region. Least recorded species were *H. lapemoides* (0.83%), *H. fasciatus fasciatus* (0.83%) *Kerilia jerdonii jerdonii* (2.47%) and *Acrochordus granulatus* (2.47%). Six species [*H. bituberculatus* Peters, 1873; *H. ornuatus ornatus* (Gray, 1842); *H. stricticollis* Günther, 1864; *Pelamis platurus* (Linnaeus, 1766); *Enhydrina schistosa* (Daudin, 1803) and *Astrotia stokesii* (Gray, 1846)] were not recorded in the field sampling of this study.

Dynamite fishing is not practiced in any part of the Jaffna Peninsula along with the poor development of tourism industry have no part in reducing the sea snake population. Shark predation (Masunaga *et al*., 2007) and mortality due to trawlers are also less because of the restricted trawler fishing in this part of the country though trawler mortality can be the single most factor in reducing sea snake population in many parts of the world (Lobo *et al*., 2005; Agardy, 2000). But entanglements into the gill nets along with accidental and deliberate killing by fishermen are the major threats to the sea snakes of this part. All the by-catch species occur in areas that are not subjected to trawling that it is apparent that there is no correlation between the type of fishing and the entanglement. Ward (2000) suggested that no data support these activities seriously threaten any population of sea snakes; it is advisable for a formal assessment of the status of populations.

However it has been reported that sea snake venom has low toxicity (Mariam and Tu, 2002), this survey documented one fisherman lost his eye site from the bite of a sea snake when he was trying to release it from the net at the Vadamarachchi coast. The venomous sea snakebites have also been documented in other parts of the Indian ocean as well (Kuch, 2007). The absence of *Enhydrina schistosa* which was earlier reported in the northern region (Deraniyagala, 1955) may be due to the fact that most of the by catches examined were from the sea and *E. schistosa* appears to be a sea snake of shallow, muddy coastal waters and river mouths (Lim, 1982). Though Jaffna Peninsula is devoid of rivers other than a non perennial river known as Valukki aru, it may be possible *E. schistosa* could be collected from lagoons as Jaffna Peninsula is intersected by several lagoons. Future investigations will probably reveal more species.

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APPENDIX

Catalogue numbers of specimens deposited to the National Museum of Colombo and museum of Department of Zoology, University of Jaffna are as follows,

H. cyanocinctus: MSPC 0008, 0009, 0016, 0021, 0027 and 0051
H. fasciatus fasciatus: 2005-21-1
H. gracilis: 2005-19-1; Jaffna MSPC 0032, 0052, 0058
H. lapemoides: 2005-16-1
H. spiralis: MSPC 0001, 0003, 0006, 0023-0025
Kerilia jerdonii jerdonii: MSPC 0015, 0020, 0055
Lapemis curtus: MSPC 0004, 0011-0014, 0038
Thalassophina viperina: 2005-20-1; MSPC

REFERENCES

Agardy, T., 2000. Effects of fisheries on marine ecosystems. A conservationist's perspective. J. Mar. Sci., 57: 761-765.

Annonymous, 2007. The Reptile database. http://www.reptile-database.org.

Bussarawit, S., A.R. Rasmussen and M. Anderson, 1989. A preliminary study on sea snakes (Hydrophidae) from Phuket harbour, Phuket Island, Thailand. Nat. Hist. Bull. Siam. Soc., 37: 209-225.

Das, I., 2001. Biodiversity and Biogeography of the Herpetofauna of Southern Asia. In: An Overview of the Threatened Herpetofauna of South Asia, Bambaradeniya, C.N.B. and V.N. Samaraseekra (Eds.). IUCN Sri Lanka and Asia Regional Biodiversity Programme, Colombo, Sri Lanka, ISBN 955-8177-11-3, pp: 1-38.

De Silva, P.H.D.H., 1980. Snake fauna of Sri Lanka with special reference to skull, dentition and venom in snakes. Publ. Sri Lanka Natl. Mus., pp: 1-472.

De Silva, A., 1990. Colour guide to the snakes of Sri Lanka. R and A Publishing Limited, England, pp: vi + 130.

De Silva, A., 2001. The herpetofauna of Sri Lanka-historical over view, current status with check lists. 4th World Congress of Herpetology, (WCH'2001), Colombo, Sri Lanka, pp: 91-91.

Deraniyagala, P.E.P., 1955. A coloured atlas of some vertebrates from ceylon serpentoid reptilia, 3, Publ. Sri Lanka Natl. Mus., Colombo, pp: vii + 121.

Frith, C.B., 1977. The sea snake *Hydrophis spiralis* (Shaw); a new species of the faunna of Thailand. Nat. Hist. Bull. Siam Soc. (Bangkok), 26: 339-341.

Gritis, P. and H.K. Voris, 1990. Variability and siguificance of parietal and ventral scales in the Genus *Lapemis* (Serpentes: Hydrophiidae), with comments on the occurrence of spiny scales in the genus. Fieldiana. Publ., 1411: 1-13.

Kuch, U., 2007. Snake Bite Envenoming in Bangladesh and the Challenge of Biodiversity. In: Hundred Years of Tropical Medicine, Bangladesh Association of Advancement of Tropical Medicine and The Royal Society of Tropical Medicine and Hygiene, Joint Meeting 2007, Yunus, E.B. (Ed.), Bangladesh Association of Advancement of Tropical Medicine, Chittagong, pp: 23-28, 50.

Lillywhite, H.B., 1996. Husbandry of the little file snake, *Acrochordus granulatus*. Zoo. Biol., 15: 315-327.

Lim, B.L., 1982. Poisonous Snakes of Peninsular Malaysia. 1st Edn., Malayan Nature Society, Kuala Lumpur .

Lobo, A.S., K. Vasudevan and B. Pandav, 2005. Trophic ecology of *Lapemis curtus* (Hydrophiinae) along the Western Coast of India. Copeia, 2005: 636-640.

Mao, S.H. and B.Y. Chen, 1980. Seasnakes of Taiwan. A natural history of seasnakes. NSC Special Publication No. 4. The National Science Council, Taiwan, pp: 64.

Mariam, K. and A.T. Tu, 2002. Extremely low nerve growth factor (NGF) activity of sea snake (Hydrophiidae) venoms. J. Nat. Toxins, 11: 393-398.

Masunaga, G.T. Kosuge, N. Asai and H. Ota, 2007. Shark predation of sea snakes (Reptilia: Elapidae) in the shallow waters around the Yaeyama Islands of the Southern Ryukyus, Japan. JMBA2-Biodiversity Records Published on-Line.

Minton, S.A. Jr., 1966. A contribution to the herpetology of West Pakistan. Bull. Am. Mus. Nat. Hist., 132: 27-184.

Murphy, J.C., M.J. Cox and H.K. Voris, 1999. A key to the sea snakes in the gulf of Thailand. Nat. Hist. Bull. Siam. Soc., 47: 95-108.

Murthy, T.S.N., 1974. On the record of the rare Indian wart snake, *Chersydrus granulatus* (Schneider) (Serpentes: Acrochordidae) from Tamil Nadu coast. J. Mar. Biol. Ass. India, 16: 834-835.

Murthy, T.S.N., 1977. On sea snakes occurring in madras waters. J. Biol. Ass. India, 19: 68-72.

Murthy, T.S.N., 1992. Marine reptiles of India. A Overview Contribution in Herpetology, pp: 35-38.

Rasmussen, A.R., 1987. Persian gulf sea snake *Hydrophis lapemoides* (Gray): New records from phuket island, andaman sea and the southern part of the strait of malacca. Nat. Hist. Bull. Siam Soc., 35: 57-58.

Rasmussen, A.R., 2001. Sea Snakes. In: FAO Species Identification Guide For Fishery Purposes, Carpenter, K.E. and V.H. Niem (Eds.). The Living Marine Resources of the Western Central Pacific, Rome, pp: 3988-4008.

Shine, R. and R. Lambeck, 1985. A radiotelemetric study of movements, thermoregulation and habitat utilization of arafura filesnakes (Serpentes: Acrochordidae). Herpetol., 41: 351-361.

Smith, M.A., 1943. The Fauna of British India Ceylon and Burma Including the Whole of the Indo-Chinese Sub Region. Reptilia and Amphibia Vol. 3, Serpents. Reprinted Edition 1981, Today and Tomorrow's Printers, New Delhi, India, pp: 583.

Tonks, M.L., S.P. Griffiths, D.S. Heales, D.T. Brewer and Q. Dell, 2008. Species composition and temporal variation of prawn trawl bycatch in the joseph bonaparte gulf, Northwestern Australia. Fish. Res., 89: 276-293.

Wall, F., 1921. Ophidia tabrobanica or the snakes of ceylon. Govt. Printer, Colombo, pp: 581.

Ward, T.M., 2000. Factors affecting the catch rates and relative abundance of sea snakes in the by-catch of trawlers targeting tiger and endeavour prawns on the northern Australian continental shelf. Mar. Freshwater Res., 51: 155-164.

Ward, T.M., 2001. Age structures and reproductive patterns of two species of sea snake, *Lapemis hardwickii* (Grey, 1836) and *Hydrophis elegans* (Grey 1842), incidentally captured by prawn trawlers in northern Australia. Mar. Freshwater Res., 52: 193-203.

Welch, K.R.G., 1988. Snakes of the Orient: A Checklist. 1st Edn., Snakes of the Orient: A Checklist. Malabar, Florida, ISBN: 0894642030.

Wickramasinghe, L.J.M. and R.K. Rodrigo, 2004. Taxonomy and current status of marine snake fauna of Sri Lanka. Presented in the National Workshop on Current Status of Marine Fauna in Sri Lanka on 17th August, 2004.