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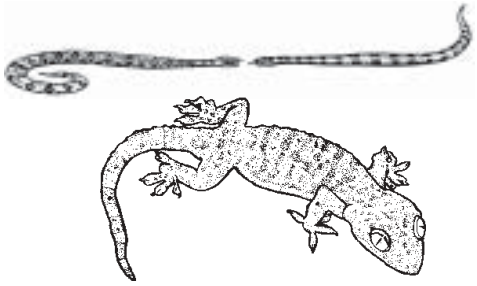

The continued existence of *Melanochelys trijuga coronata* in Kerala, southern India

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The Indian Pond Turtle *Melanochelys trijuga* is one of the most abundant and widely distributed chelonians in the Indian subcontinent. Its distribution ranges from Sri Lanka (Deraniyagala, 1939), most of southern peninsular India, north-eastern India and Burma (Smith, 1931; Wayne & Russell, 1997) and also extends into the western part of Thailand (Wirot, 1979), and presently 7 subspecies have been reorganized although the exact distribution of each of these subspecies still remain obscure (Smith, 1931; Das, 1985). The distinguishing character among these subspecies is the coloration of the head and to a lesser extent that of the shell, while there is also a difference in size. In captive facilities, with more than one subspecies in an enclosure, intergrades (interbreeding between subspecies) have been documented, especially for the Indian subspecies, leading to the general belief that such interbreeding is a possibility in natural condition. Recently, though there has been concern raised over the survival of true subspecies in natural conditions given the present rate of forests loss and habitat degradation, which has been largely contributed by the fact that there has been no recent field records of the true Indian subspecies. The continued survival of true subspecies is a serious conservation problem especially when it has been argued that the ability of *M. trijuga trijuga* to exist in areas far away from water source (Das & Pritchard, 1990) could and has led to greater incidence of such intergrades in natural conditions.

Of the three subspecies of *Melanochelys trijuga* reported from India, *M. trijuga coronata* is probably the most distinct, with a striking head pattern, a broad black diamond shaped marking on the crown of the head, with bright yellow or white coloured temporal region, the other head regions being olivaceous in colour, the shell as a whole is uniformly balck (Smith, 1931; Das, 1985; Das & Pritchard, 1990). In contrast, the head pattern in the other subspecies consists of mainly small, yellow to pink spots that disappear with age and the plastron is lighter in colour (Das & Pritchard, 1990). The distribution of *M. trijuga coronata* is also interesting in that it is the only subspecies among *M. trijuga* that is restricted to a single state in India, namely Kerala, in southern Western Ghats, hence the common name Cochin Black Turtle.

A recent survey of reptiles in the Arippa area (Thenmala Forest Division) in southern Kerala revealed the presence of the true *M. trijuga coronata* subspecies in a small pond (*Amai Kullam*), near the town of Kuluthuphuza. A juvenile (length: 8.5cm; width: 7cm) was recorded at this pond on 27 May 2001. Locals in this area collect this subspecies and the endemic and rare travancore tortoise (*Indotestudo forstenii*) for use in pet trade and also as a source of protein. According to the locals this is a very common and widely occurring turtle in this area.

Although efforts to capture more individuals from this area for measurements was unsuccessful, as the species is very agile and adapted for a fast-track life in water when disturbed, observations were made on a few adult individuals and many more juveniles. All the adults that were observed retained their distinct head colouration.

The habitat of these turtles are ponds and rivers (Das, 1985) in the low elevation tropical evergreen forests of Kerala. This habitat has been under tremendous anthropogenic pressure and most of these forests have been either completely lost or highly fragmented. A majority of these forests are presently surrounded by cash crop plantations mainly cardamon and rubber. This has also lead to an increase in the population densities in these areas. The continued survival of this true subspecies would solely rest on the continued protection of these highly fragmented and vulnerable areas, protection from hunting for use in pet trade and as food by local tribals and also limiting the run-off of pesticides into these ponds and streams.

Acknowledgements

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References

Deraniyagala, P.E.P. 1939. *The Tetrapod Reptiles of Ceylon.* Colombo Museum, Colombo, 412pp.

Wirot, N. 1979. *The Turtles of Tailand.* Mitbhadung Press, Bangkok.

Smith, M.A. 1931. *The Fauna of British India, including Ceylon and Burma. Reptilia and Amphibia. Vol. 1 Loricata, Testudines.* Taylor and Francis, London, 185pp.

Das, I. 1985. *Indian Turtles: A Field Guide.* World Wildlife Fund India, Eastern Region, Calcutta, 119pp.

Das, I. & P.C.H. Pritchard. 1990. Intergradition between *Melanochelys trijuga trijuga* and *M. t. coronata* (Testudines: Emydidae: Batagurinae). *Asiatic Herpetological Research* 3: 52-53.

King, F.W. & R.L. Burke (Editors.). 1997. Crocodilian, Tuatara, and Turtle Species of the World: An Online Taxonomic and Geographic Reference. Association of Systematics Collections, Washington, D.C. 294 pages.
[http://www.flmnh.ufl.edu/natsci/herpetology/turtcroclist/]

Reptiles of Kawal Wildlife Sanctuary, Andhra Pradesh

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Between 1998 and 1999, documentation of faunal resources in Kawal Wildlife Sanctuary was undertaken. The Kawal Wildlife Sanctuary (19°05'-19°20'N and 78°32'-79°12'E) covering an area of 893 sq. km., is located in Adilabad district of Andhra Pradesh in the Godavari river belt. The vegetation is of southern tropical dry deciduous type. Kawal Wildlife Sanctuary is home to a great variety of fauna (Srinivasulu, *et al.* 2001; Srinivasulu *in press*).

A total of 34 species (Order Testudines: 4 species, Order Sauria: 14 species; and Order Serpentes: 17 species) of reptiles were recorded (Table 1). Among the testudines were 3 terrapins and 1 tortoise. All these species seemed to be uncommon in occurrence within the Sanctuary. Among the lizards (5 species), the Termite Hill Gecko *Hemidactylus triedrus* was the rarest. Among the agamids (4 species), the Fan-throated Lizard *Sitana ponticeriana* and the Peninsular Rock Agama *Psammophilus dorsalis* were uncommon. Off the three species of skinks recorded Bronze Grass Skink *Mabuya macularia* was uncommon. Indian chameleon *Chamaeleo zeylanicus* and the Indian monitor lizard *Varanus bengalensis* were common.

Three species of boids, 9 species of colubrids, 2 species of elapids and 3 species of viperids constitute the snake diversity of Kawal Wildlife Sanctuary. All these species are widely distributed within the Sanctuary excepting the Buff Keelback *Amphiesma stolata* that was only once recorded. Thick bamboo growth, rocky outcrops and healthy prey base account for good numbers of snakes within the Sanctuary.

Sanyal *et al.* (1993) reported the occurrence of Giant Tree Gecko *Hemidactylus giganteus* (collected from Itikyal), a species that we failed to record. There might be a few more species that could have been overlooked or missed. Future herpetological expeditions will certainly yield many species hitherto unrecorded here.

On the whole, the present study resulted in documentation of a total of 34 species of reptiles from Kawal Wildlife Sanctuary, Andhra Pradesh. Of the diversity listed, 30 species (marked '+') are being reported for the first time from Adilabad district, Andhra Pradesh.

Table 1: Checklist of Reptiles of Kawal Wildlife Sanctuary, Andhra Pradesh

Order Testudines

Family Bataguridae

1. Deccan Sawback Terrapin *Kachuga tentoria* (Gray, 1834)+
2. Indian Pond Terrapin *Melanochelys trijuga* (Schweigger, 1812)+

Family Testudinidae

3. Starred Tortoise *Geochelone elegans* (Schoepff, 1795)+

Family Trionychidae

4. Indian Mud Turtle *Lissemys punctata* (Lacepede, 1788)+

Order Sauria

Family Gekkonidae

5. Brook's Gecko *Hemidactylus brookii* (Gray, 1845)*
6. Northern House Gecko *Hemidactylus flavivirdis* Ruppell, 1840+
7. Bark Gecko *Hemidactylus leschnaulti* Ruppell, 1840+
8. Rock Gecko *Hemidactylus maculatus* Dumeril & Bibron, 1836+
9. Termite Hill Gecko *Hemidactylus triedrus* (Daudin, 1802)+ Rare

Family Agamidae

10. Forest Calotes *Calotes rouxii* Dumeril & Bibron, 1837+
11. Common Garden Lizard *Calotes versicolor* (Daudin, 1802)*
12. Peninsular Rock Agama *Psammophilus dorsalis* (Gray, 1831)+
13. Fan-throated Lizard *Sitana ponticeriana* (Cuvier, 1844)*

Family Chamaeleonidae

14. Indian Chameleon *Chamaeleo zeylanicus* Laurenti, 1768+

Family Scincidae

15. Common Skink *Mabuya carinata* (Schneider, 1802)*
16. Snake Skink *Lygosoma punctatus* (Gmelin, 1799)+

Family Varanidae

17. Indian Monitor Lizard *Varanus bengalensis* (Daudin, 1802)+

Order Serpentes

Family Boidae

18. Rusell's Earth Boa *Eryx conicus* (Schneider, 1801)+
19. John's Earth Boa *Eryx johnii* (Russell, 1801)+
20. Indian Python *Python molurus* (Linnaeus, 1758)+

Family Colubridae

21. Common Green Whip Snake *Ahaetulla nasutus* (Lacepede, 1789)+
22. Buff Keelback *Amphiesma stolata* (Linnaeus, 1759)+ Rare
23. Cat Snake *Boiga trigonatus* (Schneider, 1802)+
24. Common rat Snake *Coluber mucosus* (Linnaeus, 1758)+
25. Common Indian Bronzeback *Dendrelaphis tristis* (Daudin, 1803)+
26. Trinket Snake *Elaphe helena* (Daudin, 1803)+
27. Common Wolf Snake *Lycodon aulicus* (Linnaeus, 1758)+
28. Shaw's Wolf Snake *Lycodon striatus* (Shaw, 1802)+
29. Checkered Keelback *Xenochropis piscator* (Schneider, 1799)+

Family Elapidae

30. Common Indian Krait *Bungarus caeruleus* (Schneider, 1799)+
31. Indian Cobra *Naja naja* (Linnaeus, 1758)+

Family Viperidae

32. Russell's Viper *Daboia russelii* (Shaw & Nodder, 1797)+
33. Saw-scaled Viper *Echis carinata* (Schneider, 1801)+
34. Bamboo Pit Viper *Trimeresurus gramineus* (Shaw, 1802)+ Commoner in bamboo thickets

\+ – First report from Kawal and Adilabad district.
* – Reported earlier by Sanyal *et al.* (1993).

References

Sanyal, D.P., B. Datta Gupta & N.C. Gayen. 1993. Reptilia, pp. 1 – 63. *In:* Ghosh, A.K. (Ed.) *Fauna of Andhra Pradesh. Part I (Reptilia, Amphibia, Fishes).* Zoological Survey of India, Calcutta, 334pp.

Srinivasulu, C., V.V. Rao, G. Ravinder & V. Nagulu. 2001. New site record of the Indian Great Black Woodpecker *Dryocopus javensis* (Horsfield) from Andhra Pradesh. *J. Bombay nat. Hist. Soc.* 98(2): 280-281.

Srinivasulu, C. (*in press*). Birds of Kawal Wildlife Sanctuary, Andhra Pradesh, India. *J. Bombay nat. Hist. Soc.*

Tracking Olive Ridleys on the east coast of India

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The study of sea turtles has largely been confined to the brief period in their life cycle when they come ashore to nest. In recent times, new tools have played a major role in answering questions of biological and ecological interest in marine turtles. While field-based tagging studies of several thousand turtles over thirty years merely provided clues of natal homing behaviour in turtles (i.e. the return of nesting adult females to the beach where they hatched), studies using genetic markers were able prove the theory conclusively in green turtles and other species. Molecular genetic markers have been widely used in studying global population structure of sea turtles, in tracing the source of turtles caught in deep sea and other fisheries. In addition, satellite telemetry has been used to precisely trace the long distance migratory routes of these species.

Olive Ridleys are circumglobal in distribution, and are particularly well known for the phenomenon of mass nesting. The Orissa coast has three major mass nesting sites, of which Gahirmatha is the largest with over 100,000 turtles nesting each year. In the past five years, there has been serious cause for concern due to marine fisheries related mortality on the Orissa coast. Since 1994, more than 85,000 turtles have been counted dead on the Orissa coast and actual number dead is certain to be much higher.

In collaboration with Centre for Cellular and Molecular Biology (CCMB), Hyderabad, we studied the population genetic structure of olive ridleys on the east coast with a view to evolving conservation strategies for these turtles. The mitochondrial DNA sequencing analysis revealed that the Indian ridley population is most closely related to the Kemps ridley, the endangered cousin of the olive ridley, found only in the Mexico. The haplotypes found on the east coast of India are the most ancient lineage in olive ridleys, suggesting that olive ridley population on the east coast of India could be the source for contemporary global populations of ridleys. They may have recolonised the Pacific and Atlantic basins after unstable climatic conditions lead to the periodic extirpation of those populations. This certainly increases the conservation importance of this population.

In collaboration with the Orissa Forest Department and the Smithsonian Institution, we also attached satellite transmitters to 4 olive ridley turtles in Devi mouth in April, 2001. The transmitters were attached after the turtles had completed nesting and were expected to begin their post nesting migration. Anecdotal evidence and tag returns had suggested that ridleys nesting in Orissa migrated along the coast to Sri Lanka (and perhaps beyond) to forage during the non-breeding season. Contrary to expectations, 3 of the 4 turtles remained in the offshore waters of Orissa and Andhra Pradesh for 2–3 months, moving in large circles (with a diametre of 100–200 km) and appeared to be tracking oceanic gyres. The fourth turtle however, did, begin her southward migration in May, swimming to Sri Lanka, after which she ceased transmissions as well. Though there could be many reasons for the cessation of transmissions, fishery related mortality seems the likely cause, as there was no evidence of any other technical problem.

Different methods such as tagging, satellite telemetry and molecular genetics have their respective costs and benefits. Tagging, using metal tags, requires a very large effort (tens of thousands of animals need to be tagged) in order to get fruitful results. Satellite telemetry, though prohibitively expensive (each transmitter costs US $ 2000 and the data about as much), gives precise migration data. However, due to the cost, sample sizes must remain small. The resolution of molecular genetic data for migration studies depends on the number of potential sampling sites, but it is useful for the variety of evolutionary and ecological questions that it can address. Ideally, a combination of methods yields the best results.

It is also important to consider the conservation benefits accruing from these 'scientific projects'. Satellite telemetry and molecular genetics are 'sexy' new techniques which can create a lot of publicity for sea turtles and conservation issues. Currently, the WII and CCMB are carrying out an extensive project on the molecular genetics of four species of marine turtles on the mainland coast and islands of India.

Check-list of snakes of Kerala with their Malayalam vernacular names

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With a world figure of about 2744 species of snakes, India has a representation of 244 species (Murthy & Ravichandran, 1998). Of these, 104 species of snakes have so far been reported from Kerala (Smith,1935 &1943; Adiyodi, 1965; Das, 1991; Radhakrishnan, 1997; Joseph & Easa, 1997). Adiyodi (1965), Daniel (1983) and Radhakrishnan (1997) recorded some of the commonly used Malayalam vernacular names of the snakes pertaining to Kerala. In the present communication we have attempted to list the snakes of Kerala with their all known local vernacular names, collected from villagers and local snake charmers. It is interesting to note that often the local names reflect the people's observations on the physical features, habits and behaviour of the species concerned as well as the habitats in which they occur. The list is provided in Table 1 along with their word meanings wherever possible.

Acknowledgements
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References

Adiyodi, K.G. 1965. *Keralathile Vishapampukal*. (in Malayalam). The Mathrubhumi Printing & Publishing Co., Ltd. Kozhikode.
Daniel, J.C. 1983. ***The Book of Indian Reptiles***. Bombay Natural History Society. Bombay.
Das, I. 1991. A new species of *Eryx* (Boidae: Serpentes: Squamata) from south-western India. *Journal of the Bombay Natural History Soci-*

Scientific Name	Common English Name	Vernacular Name	Word Meaning
Typhlopidae			
Ramphotyphlops braminus	Common Blind Snake	*Kurudan pampu, Enna kurudi, Koli pampu, Brahmana Kurudi, Kurudi pampu*	*Kurudan* = Blind, *pampu* = Snake, *Enna* = Oily, *Kurudi* = Blind
Typhlops porrectus	Slender Blind Snake	*Kurutippampu*	*Kurudi* = Blind
T. thurstoni	Thurston's Blind Snake	*Amminjikutiyanpampu*	*Amminjikutiyan* = Breast feeding
T. beddomei	Beddome's Blind Snake	*Vellamookkan Kurutipampu*	*Vella-mookkan* = White-nosed
T. tindalli	Malabar Blind Snake	*Thindal kurudipampu*	*Thindal* = unclean
T. acutus	Beaked Blind Snake	*Kokkuruttipampu*	*Kockurutti* = Beaked
Uropeltidae			
Melanophidium punctatum	Pied-belly Uropelt	*Melivalan pampu*	*Melivalan* = Thin-tailed
M. bilineatum	Yellow-striped Uropelt		
M. wynaudense	Wynad Uropelt	*Kadan Melivalan Pampu*	*Kadan* = Wild
Platyplecturus trilineatus	Three-lined Uropelt	*Varayan Melivalan Pampu*	*Varayan* = Striped
P. madurensis	Madurai Uropelt	*Thavittu Melivalan Pampu*	*Thavittu* = Brown
Teretrurus sanguineus		*Chemmelivalan Pampu*	*Chem* = Reddish
Plectrurus guentheri		*Panadan Mulluvalan Pampu*	*Pandan* = Whitish
P. perroteti	Nilgiris Uropelt	*Mulluvalan Pampu*	*Mulluvalan* = Spine-tailed
P. aureus	Canara Uropelt	*Chambrakkunnan Pampu*	
Brachophidium rhodogaster	Red-bellied Uropelt		
Uropeltis nitidus	Cochin Uropelt	*Kariruthalayan Pampu*	Kariruthalayan = Black two headed
U. ocellatus	Anaimalai Uropelt	*Iruthalayan Pampu*	Iruthalayan = Two headed
U. woodmasoni	Black-bellied Uropelt	*Karatiyiruthalayan Pampu*	Karati = Bear
U. ceylanicus		*Lankiruthalyan Pampu*	Lank = Sri Lankan
U. arcticeps	Thirunelveli Uropelt	*Kunniruthalayan Pampu*	Kunni = Small
U. phipsoni			
U. rubrolineatus	Red-striped Uropelt	*Kunkumavarayan Pampu*	*Kunkumavarayan* = Saffron striped
U. myhendrae		*Manjavalayan Pampu*	*Manjavalayan* = Yellow ringed
U. rubromaculatus	Red-spotted Uropelt	*Kunkumapottan Pampu*	*Kunkumapottan* = Saffron spotted
U. maculatus	Orange-spotted Uropelt	*Chorakuttan Pampu*	*Chorakuttan* = Blood spotted
U. pulneyensis	Palni Uropelt	*Pazhanipampu*	*Pazhani* = Palni
U. elliotti	Elliot's Uropelt	*Chemvalayan Pampu*	*Chemvalayan* = Red ringed
U. beddomei	Beddome's Uropelt	*Manjeruthalayan Pampu*	*Man* = Earth, *Cheruthalayan* = Small headed
U. macrorhynchus		*Oriruthalayan Pampu*	
Rhinophis sanguineus	Red-bellied Uropelt	*Adichoppan Munpampu*	*Munpampu* = Earth Snake
R. fergusonianus	Cardamom Uropelt	*Munpampu*	
R. travancoricus	Travancore Uropelt	*Thekkan Munpampu*	*Thekkan* = Southern
Boidae			
Python molurus	Indian Rock Python	*Perumpampu, Malampampu, Ayackoora*	*Perum* = Large, *Mala* = Hill,
Eryx conicus	Common Sand Boa	*Mannuilipampu, Mannunnipampu, Mandalipampu, Payyanipampu, Mannutheenipampu, Kurdan pampu*	*Mannuli* = Burrowing, *Mannutheeni* = Soil-eating, *Payyani* = A Plant
E. johni	Red Sand Boa	*Erattathalayan, Eruthalayan, Mandalipampu, Enna pampu*	*Erattathalyan* = Two headed *Enna* = Oily
E. whitakeri			
Acrochordidae			
Acrochordus granulatus	Indian Wart Snake, Elephant Trunk Snake	*Kayal Pampu*	*Kayal* = Backwater
Colubridae			
Elaphe helena	Common Trinket Snake	*Kattu pampu, Velipampu*	*Kattu* = Forest, *Veli* = Fence
Coluber mucosus	Rat Snake	*Chera (Manna Chera, Karimchera)*	*Manna* =Yellow, *Karim* = Black
Argyrogena fasciolatus	Banded Racer	*Valli Chera, Valayan Chera, Kannichera*	*Valli* = Climber
Liopeltis calamaria	Faintly-striped Neck Snake	*Chennivarayan Pampu*	*Chenni* =Nape
Oligodon venustus	Black-spotted Kukri Snake	*Orachurutta*	*Ora* = Path
O. travancoricus	Travancore Kukri Snake	*Thekkanchuruttaa*	*Churutta* = Curled
O. arnensis	Common Kukri Snake	*Muvarayan Churutta*	*Muvarayan* = Three striped
O. taeniolatus	Russell's Kukri Snake	-	-
O. affinis	-	*Malanchurutta*	*Malan* = Hill
O. brevicauda	Striped Kukri Snake	*Kuttivalan Churutta*	*Kuttivalan* = Dwarf- tailed
Dendrelaphis tristis	Common Indian Bronze-back	*Villoonni, Billoonni, Komberipampu, Komberi Moorkan*	*Komberi* = Arboreal *Villoonni/Billoonni* = Bow shaped
D. grandoculis	Large-eyed Bronze-back	*Malankomberipampu*	-

Scientific Name	Common English Name	Vernacular Name	Word Meaning
D. bifrenalis	Black-striped Bronze-back	*Kattukomberipampu*	*Kattu* = Forest
D. ahaetulla	Painted Bronze-back	*Komberipamb, Villoonni*	
D. caudolineolata	Striped-tailed Bronze-back	*Nalvarayan Komberipambu*	*Nalvarayan* = Four striped
Chrysopelia ornata	Ornate Flying Snake	*Nagathan pampu, Alankara pampu*	*Nagathan* = Snake God *Alankara* = Ornamental
Lycodon aulicus	Common Wolf Snake	*Vellivarayan pampu, Chuvar pampu, Chennay Thalayan*	Vellivarayan = Silverlined, *Chuva* = Wall, *Chennaythalayan* = Wolf headed
L. travancoricus	Travancore Wolf Snake	-	-
Dryocalamus nympha	Common Bridal Snake	*Vellethalayan Pampu, Churutta*	*Vellethalayan* = White headed
D. gracilis	Gunther's Bridal Snake	*Venkattazhakan Pampu*	*Venkattazhakan* = Nupital
Sibynophis subpunctatus	Dumeril's Black-headed Snake	*Ezhuthanichurutta*	*Ezhuthani* = A tool used for writing on palm leaf
Xenochrophis piscator	Checkered Keel-back (Common Water Snake)	*Neerkoli, Thannipampu,Kulamandali Thanneer pampu, Neerpampu, Olla Pulavan, Neer Mandali*	*Neer/Thanni/Thanneeer* = Water *Koli* = Stick, *Pulavan* = Wriggling
Amphiesma stolata	Stripped Keel-back Snake	*Theyyan Pampu, Padakooti Daivathankutti, Tharliyan Pampu*	*Theyyan* = A ritual art, *Daivathankutti* = Sacred
A. beddomei	Beddome's Keel-back	*Kattuneerkoli*	*Kattu* = Forest
A. monticola	Yellow-collared Forest Keel-back	*Malaneerkoli*	*Mala* = Hill
Macropisthodon plumbicolor	Green Keel-back	*Pacchanagam*	*Pacchanagam* = Green snake
Atretium schistosum	Olivaceous Keel-back	*Neerkoli, Kulamandali, Pacha Neerkoli, Paccha Neermandali*	*Kula* = Pond, *Paccha* =Green
Rhabdops olivaceus	Olive Forest Snake	*Monthayunthi Pampu*	*Monthayunthi* = Hump-nosed
Xylophis perroteti	Spotted Small-headed Snake	*Parotti Pampu*	*Parotti* = Colloquial pronunciation of Peroteti.
X. stenorhynchus	Striped Small-headed Snake	*Orakkullanpampu*	*Ora* = Path, *Kullan* = Dwarf
Boiga trigonata	Common Cat Snake, (Indian Gamma)	*Poocha Kannan pampu, Panarathal Valli Churutta*	*Poocha Kannan* = Cat-eyed *Pana* = Palm, *Valli* = Climber
B. forsteni	Forsten's Cat Snake	*Karikkuriyan pampu*	*Kari* = Black, *Kuriyan* = Samll
B. ceylonensis	Ceylon Cat Snake	*Kattuvalayan pampu*	*Kattuvalayan* = Forest ringed
B. dightoni	Travancore Cat Snake	*Peeramedan pampu*	*Peermedu* = A place
Ahaetulla nasuta	Common Green Whip or Vine Snake	*Pachila pampu, Pacha pampu, Kankothipampu,Pacholapampu*	*Pachila/Pachola* = Green Leaf *Kankothi* = Eye-attacking
A. dispar	Gunther's Whip Snake	*Malambacholanppampu*	*Malambachola* = Hill Leaf
A. perroteti	-	-	-
A. pulverulenta	Brown Whip Snake	*Thavittolapampu*	*Thavittola* = Brown Leaf
Enhydris sieboldi	Siebold's Smooth Water Snake	*Venthatichipottanpampu*	*Ven* = White, *Thadichi* = Fat, *Pottan* = Idiot
E. dussumieri	Dussumieril's Smooth Water Snake		*Thatichipottanpampu*
Cerberus rhynchops	Dog-faced Water Snake	*Attuvay pampu, Kaipampu, Cher - Mandali, Chettumandali*	*Attuvay* = Estuarine, *Cher/Kai/ Chettu* = Mud
Gerardia prevestiana		*Pachattuvaypampu*	*Pacha* = Green
Elapidae			
Bungarus caeruleus	Common Krait	*Vellikettan, Valavazhappan, Kattu-viriyan, Valla pampu, Yettadiveeran, Shanguvarayan, Valayarappan, Mothiravalayan, Kettuvalayan, Valakazhappan, Valayippan, Valapampu, Karivela*	*Vellkettan* = Silver-ringed, *Shanguvarayan* = Shell -striped *Mothiravalayan* = Ringed *Kettuvalayan* = Ringed
Callophis melanurus	Slender Coral Snake	*Ezhuthanimoorkhan, Pavizhapampu*	*Pavizha* = Coral
C. nigriscens	Striped Coral Snake	*Ettatimoorkhan*	*Ettadi* = eight feet, *Moorkhan* = Cobra
C. bibroni	Bibron's Coral Snake	*Ezhuthanivalyan*	*Valayan* = Ringed
Naja naja naja	Common Cobra, Indian Cobra, Binocellate or Spectacled Cobra	*Moorkhan, Pullani, Vembala, Karimoorkhan, Nalla Nagam, Sarppam, Pathikkaran, Nagam, Nallapampu, Nallon Pampu*	*Kari* = Black, *Pathikkaran* = Hooded, *Nagam* = Divine Snake, *Nallon/ Nalla* = Sacred Snake, *Pullani* = A Climber
Ophiophagus hannah	King Cobra, Hamadryad	*Rajavembala, Karingoli,Karimkali, Karimchathi, Krishnasarpam, Kari-nagam, Karinatan,Karinadon, Raja-nagam, Karumchati, Karunagam, Malanagam, Ettativeeran, Karividala, Shangumala, Kalinga sarppam*	*Raja* = King, *Kari* = Black, *Mala* = Hill, *Ettadi* = eight feet long, *Shangumala* = Shell Necklace, *Malanagam* = Hill Serpent
Hydrophiidae			
Hydrophis fasciatus	Banded Sea Snake		
H. spiralis	Yellow Sea Snake	*Valayankotali*	*Valayan* = Ringed, *Kodali* = Axe
H. ornatus	Cochin Banded Sea Snake	*Chittulipampu*	

Scientific Name	Common English Name	Vernacular Name	Word Meaning
H. cyanocinctus	Annulated Sea Snake	*Katalorakkotali*	*Katalora* = Sea Shore
H. (Microcephalophis) gracilis	Common Narrow-headed Sea Snake	*Mulakukutian,Cheruthalayan Katal-pampu*	*Mulakukutian* = Corner loving, *Cheruthalayan* = Small headed
H. (M) cantoris	Cantor's Narrow-headed Sea Snake	*Cheruthalayan Katalpampu*	*Cheruthalayan* = Small headed
Enhydrina schistosa	Common Sea Snake	*Valakadiyan pampu,Thunipampu, Kadalpampu, Kodalipampu*	*Valakadiyan* = Net-biting, *Kadal* = Sea
Lapemis curtus	Malabar Sea Snake	*Arabipampu*	*Arabi* = Arabian Sea
Kerilia jerdoni	Jerdon's Sea Snake	*Kerilipampu*	
Praescutata viperina	Viperine Sea Snake	*Katalmandali*	*Mandali* = Viper like
Astrotia stokesi	Large headed Sea Snake	*Katalthadiyanpampu*	*Thadiyan* = Big
Viperidae			
Vipera russelli	Russell's Viper	*Anali, Manchatti, Payyana Mandali, Chenathandan, Mandali, Payyani, Rakthamandali, Rudiramandali, Rakthaanali, Kannadiviriyan, Manchatti, Vattackura, Pullan, Kuthirakulamban*	*Manchatti* = Earthern pot, *Chenathandan* = Yam shoot, *Raktha/Rudira* = Blood, *Kuthirakulamban* = Horse-shoe shaped marks, *Pullan* = Grass dwelling, *Kannadi* = Mirror marks
Echis carinatus	Saw-scaled Viper	*Churuttamandali, Shofamandali, Churutta*	*Shofa* = Blood, *Churutta* = Curled
Hypnale hypnale	Hump-nosed Pit Viper	*Marayanali*	*Marayanali* =Tree Viper
Trimeresurus malabaricus	Malabar Rock Pit Viper	*Kattumandali, Cholamandali*	*Kattu/Chola* = Forest
T. gramineus	Green/Bamboo Pit Viper	*Mulamandali*	*Mula* = Bamboo
T. macrolepis	Large scaled Pit Viper	*Chattithalayanpampu, Kuzhimandali, Paramandali*	*Chatithalayan* = Flat-headed, *Para* = Rock
T. strigatus	Horse-shoe Pit Viper	*Latamandali*	*Lata* = Climber

ety 88(1): 92-97.
Joseph, T. & P.S. Easa. 1997. Additions to the Reptilian fauna of Silent Valley. *Cobra* 27: 31-33.
Murthy, T.S.N. & M.S. Ravichandran. 1998. Reptilia. In: *Faunal Diversity in India.* Alfred *et al.* (Eds.), ENVIS Centre, Zoological Survey of India, Calcutta.
Radhakrishnan, C. 1997. Reptiles, Pp: 507-517. In: Thampi, K.B., C.M. Nayar and C.S. Nair. (Eds.). *The Natural Resources of Kerala.* W.W.F. India. Kerala Office, Thiruvananthapuram.
Smith, M.A. 1943. *The Fauna of British India, Ceylon and Burma, including the whole of the Indo-Chinese Sub-region*. R*eptilia and Amphibia. Vol.III. Sauria.* Taylor and Francis, London.

South Asian Herpetofauna

After little over one and half months of preparation, we are finally launching the email discussion group. Please read the rest of the mail carefully and if you have questions, please direct it to <moderator_hisasia@yahoo.com>

1. We have chosen the name of the discussion group as <HISASIA@yahoogroups.com> ("Herpetology In South Asia").
Please follow the directions below to subscribe to the discussion group. If you have problem please write to us at <moderator_hisasia@yahoo.com>

To subscribe to the group just send a blank email to the address: <HISASIA-subscribe@yahoogroups.com>
You will receive a mail asking you to confirm your membership

If you have a yahoo address and want to use that for posting and receiving mails from discussion group use the first option i.e. "Join the group", otherwise for subscribing through any non yahoo address choose the second option that is "Join the mailing list". You will then receive a Welcome message from the moderators of the group. And that's it!

You can post messages to the group by sending mails to: <HISASIA@yahoogroups.com> and you can unsubscribe at any time by sending a blank email to: <HISASIA-unsubscribe@yahoogroups.com>

Please remember that you can only post messages to the group from the email id you have used to subscribe to the group.
In any RARE case if you are unable to post a massage send that to the moderators at <moderator_hisasia@yahoo.com> and moderators will post it in turn.

2. We list the following as potential resources, which we think could be shared among group members: references, reprints, information on natural history, ecology, taxonomy, status, distribution of herps, photographs, call files, contacts/addresses, information regarding meetings, workshops, conferences, information regarding research/collection permits, logistics, equipments,

What's happening in the Northeast?

Samraat Pawar

Northeastern India, an important part of the Indo-Myanmar biodiversity hotspot, supports some of the biologically richest areas in the world, which affords it recognition as an area of global importance. Today, the forest cover in this region is merely one third of its geographical area, and the rate of habitat loss here is of serious concern. The low- to mid-elevation moist forests of this region are particularly important, as they not only support most of its biological diversity, but are also more vulnerable to human exploitation and settlement due their relatively easier access. Despite its importance, this region has remained poorly explored, and all evidence suggests much of the region's diversity is being lost without even being recorded. A serious problem that hinders effective prioritisation and evaluation for site-specific conservation attention is the lack of baseline biological data.

We undertook a survey of amphibians, reptiles, and birds in low- to mid-elevation sites along the montane tracts of northeastern India. Nine sites were covered over a period of eight months, with a special focus on inventorying forest species. The survey yielded a number of range records in the three faunal groups, and in the case of amphibians and reptiles, species new to science as well. *Excluding* records that are new for northeastern India, species seen during this survey comprise about 54%, 53% and 32% of all the frog, reptile, and bird species, respectively, known from the region. In general, the survey gave a good indication of the extent to which biological information is lacking in the region, and highlighted areas and issues that need urgent scientific and conservation attention. Amphibians, reptiles and birds comprise a significant proportion of the region's vertebrate diversity, and along with basic inventorying, we also investigated the role that they can play in evaluation and prioritisation for conservation attention. We compared patterns in diversity and distribution of forest frogs, lizards and birds across surveyed areas, and explored anthropogenic (e.g. habitat fragmentation) and natural environmental correlates of these patterns. These analyses showed disparate patterns for the three faunal groups. In general, tests for congruence showed poor agreement between groups, not just in terms of species richness, but in patterns of turnover as well.

This is not surprising, considering the fact that they have divergent biological properties and evolutionary history. From a conservation evaluation / prioritisation perspective, this implies that any one of these groups may not necessarily be a good indicator of richness patterns of the other two. Moreover, of the total species known from the region, an updated list for these nineareas *alone* now accounts for a sizable 87%, 56% and 60% respectively, for amphibians, reptiles, and birds. After comparing turnover between groups, and taking the inequality of survey effort between these groups, we estimate that in the montane tracts of this region, a greater proportion of frog and lizard species are likely to be present *outside* the protected area network in comparison to birds. This suggests that there may be a greater loss of forest species diversity of amphibians and reptiles from non-protected areas than of birds, given the present extent of habitat loss in the region. This strongly suggests that patterns in more biotic groups (including invertebrates and plants) need to be closely examined and compared for more effective prioritisation of areas for conservation attention. The existing initiatives for conservation prioritisation and evaluation in the region need to be reviewed with this perspective. Indeed, if the chief objective of a protected area network is to *minimise* the loss of biodiversity at the regional scale, a prioritisation policy with focus on more faunal groups will have much better success in attaining this goal in northeastern India.

E-mail Discussion Group Launched

museum resources, funding sources, papers and project proposals for review, and so forth!
Now a few points regarding the functioning of the group,

3. We won't be moderating mails coming to the group, and each mail sent to the group would reach all the individuals who are subscribed to the group at that point of time. In everybody's best interest please post only herpetology related mails. Only if irrelevant mails start appearing on the group, we will consider moderating emails.

Certain kinds of mails are an absolute NO; these include Personal mails, Abusive language, Commercial Advertisements. However, information regarding field or experimental instruments potentially usable in herpetological studies are welcome. We also realize that many individuals may have very specific interests, so we request to include a clear subject line and with name of the taxon, like snakes frogs, etc and perhaps a few words indicating the content (e.g., "Amphibians – Clutch size in *Hyla annectans*") so that other members can have the option of ignoring mails they are not interested in. Mails not related to any taxa, should also include a clear subject line.

We encourage you to spread the word about this email group to herpetologically oriented people in the region. They can in turn write to us for information or directly subscribe on their own.

Please Note: This is not an organization of any sorts, but only an open forum for discussing issues related to herpetology of South Asia. Individuals can unsubscribe from the group at any point of time they desire. Responding to this email @ moderator_hisasia@yahoo.com does not automatically subscribe individuals to the discussion email list. Also individuals not complying with ethical use of this common resource would be cautioned regarding their misuse, and if continued would lead to removal of their email address from the discussion list.

With Best Wishes, Firoz Ahmed, Samraat Pawar and Sayantan Biswas.

POSTER PRESENTATIONS & ABSTRACTS FROM THE 4TH WORLD HERPETOLOGICAL CONGRESS

Little known snakes of the Andaman and Nicobar Islands, India.

Harry V. Andrews & Sameer Ghodke

The Andaman and Nicobar Archipelago is situated in the Bay of Bengal, 6^0 45' and 13 ^{0} 41' N and between 92 ^{0} 12' E and 93 ^{0} 57' E, with a land area of 6,283 km^2 and a coastline of 1,952 km. These two islands groups have been known for their species diversity and high levels of endemicity. Of the 36 species known from the Andaman and Nicobar islands, only six occur on both island groups, seven are endemic to the Nicobar group and five to the Andaman islands.

The three-mega species of elapidae include the kind cobra *(Ophiophagus hannah), the,* Andaman krait *(Bungarus andamanensis*) endemic to the Andaman islands and the endemic Andaman cobra *(Naja sagittifera),* the latter was designated as a separate species only in 1995. Of the known three pit vipers, *Trimerasurus labialis* and *Trimerasurus cantorii* are endemic to the Nicobars. *Trimerasurus andersoni* is an endemic and is fond commonly through out the Andaman Islands. The sun beam snake, *Xenopeltis unicolor* Reinwardt, 1827, was first recorded from the Great Nicobar islands in 1991 and *Python reticulata* is found only in the Nicobar group.

Among the 20 colubrid species, two are endemic to the Andaman islands, *Lycodon tiwarii* and *Boiga andamansis.* The four Nicobar endemics are *Amphiesma nicobriense, Oligodon woodmasoni, Gongylosoma nicobarenense* and Das described a new species, *Boiga wallachi,* from Little and Great Nicobar islands. Das and Chanda reported *Boiga cyaneum* from Great Nicobar Island in 1994. *Cantoria violacea* Giard, 1857 was first reported by Wall (1914) and 86 years later, examples from North and Middle Andaman islands are currently being reported (Ghodke & Andrews in prep.).

There are five marine species that occur around the Andaman and Nicobar Islands, *Pelamis platurus* and *Laticauda laticaudatus* are the only species reported for both island groups. *Laticauda colubrinus* is a very common species and can be found by the hundreds between July and November, on small isolated Andaman Islands and Das and Chandra first reported *Micocephalophis cantoris* in 1994. *Acrochordus granulatus* has been observed along the East Cost of South Andaman Island. Of the 3, *Typhlops, Typhlops oatesi* and *Typhlops andamanensis* are restricted to the Andaman Islands.

Marine turtles around the Anadaman and Nicobar archipelago

Harry V. Andrews & Shreyas Krishnan

The Andaman and Nicobar archipelago consists of over 345 islands, islets and rocky outcrops, with land area extending up to 8,249 sq. km and a coastline stretch of 1,962 km., the Andaman Islands constitute 6408 sq. km and the Nicobars 1841 sq. km. The Andaman Islands are the extension of the submerged Arakan Yoma Mountain range of Myanmar. These two island groups situated in the Bay of Bengal, span latitude 6 45' N to 13 41' N (extent 740 km) and longitudes 9212'E to 93 57'E (extent 190 km). The nearest land mass to Great Nicobar Island is Sumatra, 145 km away and the Myanmar coast is roughly 280 km north of Landfall Island, the northern most island in the Andaman group.

Due to their long isolation, these islands have evolved significant diversity of flora and fauna with a high level of endemism; including Andaman affinities to Indo- China and Nicobar affinities to the Indo-Malayan. Of the 2000 known flora 221 species are endemic, the 62 species of mammals include 32 endemic species. Currently 12 amphibians and 45 reptiles reported for the Andamans include seven amphibians and 16 reptiles as endemic. The Nicobars have 11 amphibians and 43 reptile species, of these two amphibians and 15 reptile are know to be endemic (Das, 1999).

Of the 306 islands in the Andamans and Nicobars, 94 are designated as Sanctuaries, including 6 areas as National Parks; two of which are Marine National Parks and five as Tribal Reserves in the Andamans. The land area of 6408 sq. km in the Andamans constitutes 90% as Reserves and Protected Areas of which 36% is Tribal Reserves. The entire Nicobar group is a Tribal Reserve and has four Sanctuaries, three of which are islands. An area 885 sq. km. in the Great Nicobar Island has been designated as the Great Nicobar Biosphere Reserve and two other areas as national parks. The status, flora, fauna and profiles of these Protected Areas for both island groups has been discussed in detail by Pande, *et al.* (1991).

The four species of marine turtles that occur in the Andaman and Nicobar Islands are; the leatherback sea turtle (*Dermochelys coriacea*); the hawksbill turtle (*Eretmochelys imbricata*); the green sea turtle (*Chelonia mydas*) and the olive ridley turtle (*Lepidochelys olivacea*). Blyth in 1863, in Mount's account, first reported only three species, the *C. mydas, L. olivacea* and *E. imbricata* in the Andaman Islands. During the 1970's and even up to early 1990's, authors have reported Caretta caretta to occur around the islands (Khan, 1983; Chandrasekhara Rao & Khan, 1989; Pande *et al*. 1991), probably confusing it with *L. olivacea* or *C. mydas*. However surveys conducted since 1978 clearly confirms that there is absolutely no evidence of *C. caretta* occurring around the Andaman and Nicobar Islands.

Status survey and studies conducted in the Andaman and Nicobars have recorded India's best nesting beaches for three species, *D. Coriacea, E. imbricata* and *C. mydas*. The presence of *C. mydas* and *E. imbricata* feeding grounds have been confirmed (Bhaskar, 1993; Das, 1996; Andrews, 2000 b & c). The *E. imbricata* and *D. coriacea* populations in the Andamans and Nicobars are the largest for India and most important for the Northern Indian Ocean region (Bhaskar, 1993; Pernetta, 1993; Andrews, 2000) and *C. mydas* is the most common and wide spread species through out both island groups.

Currently 10 *D. coriacea* nesting beaches in the Nicobars and 6 beaches in the Andamans are known. The estimated population for this species is 100 nesting females for the Andamans and over 500 for the Nicobar group. Over 11 *E. imbricata* nesting beaches in the Nicobars and 32 in the Andaman group of islands have so far been identified. The *E. imbricata* nesting population is estimated as over 250 for both island groups. *C. mydas* the most wide spread species nests on over 35 beaches in the Andamans and on 14 beaches in the Nicobar group of islands and the estimated population for this species is over 600 females for Andamans and the Nicobars. There are 17 known *L. olivacea* nesting beaches in the Andamans and five for the Nicobar group of islands and the nesting population for this species is estimated as over 500 (Andrews & Krishnan, 2001).

A lot of work still remains to be conducted in the Andaman and Nicobar Islands, the current estimates and nesting beaches identifies are from limited work. Several areas and islands require intensive surveys and monitoring to derive at accurate estimates on nesting populations and information on nesting beaches and sites.

Sri Lankan skinks: molecular phylogenetic relationships of the endemic genus *Lankascincus*

Christopher C. Austin

The island of Sri Lanka, off the tip of the Indian subcontinent, has an amazingly diverse and highly endemic herpetofaunal assemblage despite its close proximity to the mainland. *Lankascincus,* a scincid genus endemic to the island of Sri Lanka, is one of the most common skinks found on the island, yet aspects of its biology and systematics are poorly understood. *Lankascincus* is a lygosomine scincid but it has an uncertain phylogenetic affinities within this major lineage. It is unclear if *Lankascincus* belongs within

the *Sphenomorphus* or *Eugongylus* major groups of lygosomines. In addition the intrageneric relationships are unknown. We take a molecular DNA sequence approach to resolve the placement of *Lankascincus* as well as resolve intrageneric phylogenetic relationships.

Habitat fragmentation and conservation of herpetofauna symposium -- introduction

Teresa C.S. Avila-Pires

One of the fundamental questions of our time is about how much of the world biodiversity we will be able to conserve with the continuously growing human populations and consequent continuously decreasing "natural", or at least less-disturbed, environments. Related questions are "How do populations respond to habitat fragmentation?", "What are the most important factors that influence survivorship in fragmented areas?", "What are the most efficient landscape designs in terms of conservation of their biota?", and many others. Such questions have been the subject of many studies, especially in the past 2-3 decades, in response to the growing perception of the profound consequences of human activity on Earth. At the same time that we learned how rich and complex ecosystems were, we realised how much we were destroying, without knowing the consequences of our actions. Among animals, studies have focused predominantly on mammals, birds and insects, while studies on reptiles and amphibians have been less numerous. However, while some common aspects related to the response to habitat fragmentation by different organisms are expected, there are certainly, also, many particularities. A basic feature for reptiles and amphibians, for instance, in contrast to birds and mammals, is that they are ectotermic. For most amphibians, moreover, their dependence on both aquatic and terrestrial habitats is also of great importance. With this symposium, we hope to stimulate the discussion on the subject; the exchange of information between different groups, with different approaches, working on it; and, ultimately, to some degree, however small, to help understanding a bit more of this complex problem, that will only grow in the future.

Our aim while organising the symposium was to have speakers working in a number of different ecosystems, different continents, different scales, and with different approaches. We have a common problem and we focus on two groups of animals, but otherwise circumstances differ in many respects. Biological, historical, cultural, economic aspects all are important to the questions related to habitat fragmentation and what can be done to minimise its effects. Each presentation in this symposium shows a unique situation, with differences in all aspects mentioned. Even though, I hope that we can find common aspects in these studies, that eventually can lead us to better understand what are the consequences of habitat fragmentation for reptiles and amphibians; what do we need to know, to know better (which factors should we look at?); which methodologies are most effective; and how can we try to minimise the negative effects of habitat fragmentation.

Urgent measures for the conservation of *Caretta caretta*: experimental evaluation of by-catch reduction devices.

Balletto Emilio, Affronte Marco, Barone Bernardo, Dell'anna Luigi, Di marco Stegano, Dominici Alberto, Giacoma Cristina, Mari Franco, Miglietta Franco, Nannarelli Stefano, Nicolini Giusi, Piovano Susanna, Pozzi Ludovico, Solinas Micaela, Zannetti Alvise

One of the main goals of the EU-Life Project Urgent conservation measures of *Caretta caretta* in the Pelagie islands (LIFE99NAT/IT/006271) consists in evaluating the impact of local fisheries on the Loggerhead Turtle's mortality rates in the waters surrounding the island of Linosa (35^0 5 I'N 12^0 51'E, Pelagie Islands, South of Sicily). Reports of by-catches of *Caretta caretta* collected since 1994, in fact, suggest that long-line fishing has a strong impact on the local population. To develop suitable conservation measures in this respect, we created a network of local fishermen willing to co-operate in order to: 1) take turtles to the rescue centre, in order to de-hook and treat them medically before release (during summer 2000 a total of 158 turtles were treated, measured and marked at the Linosa rescue centre; only 4 of them died), and 2) to develop an experimental fishing procedure, suitable for reducing bycatches. To the last purpose, we first made a survey of local fishing procedures. In order to try and reduce captures of turtles, but selectively not of swordfish (*Xiphias gladius*), we investigated the possibility (1) to reduce bait attractiveness, (2) to decrease the overall attractiveness of the fishing device and (3) to utilise acoustic deterrents. Experiments were initially run in a round tank having a 10 m diameter at the Cattolica Aquarium. The bait's (Scomber scomber) smell and colour were tested to see whether the yellow, red or blue colour make baits less attractive and/or more difficult for the turtles to detect. The bait's smell demonstrated to be an important component for its detection by turtles. Smell-less artificial baits, in fact, are generally unattractive for turtles. The effect of the bait's colour is doubtful, since individual turtles may show a colour preference, but different colours attract different turtles. No attractive effect of lights set on the line floaters was evident. Finally, we played back sounds (both pure tones and noises) to elicit a possible avoidance response and we found that turtles react to low frequency sounds (0-300 Hz). Later on, thanks to the co-operation of local fishermen, artificial baits will be tested in the Sicilian Sea, during fishing trips.

Herpetofaunal mortality in highways: a case study from Sri Lanka

C.N.B. Bambaradeniya, L.J. Mendis Wickramasinghe, V.A.P. Samarawickrama & L.D.C.B. Kekulandala

Urbanisation and infra-structure development has contributed to an increase in highways that improves accessibility. Highways in turn pose a threat to animals, not only by way of habitat fragmentation, but resulting in direct mortality by being run over by motor vehicles, and also due to thermal stress while trying to cross a heated surface. Herpetofauna are subjected to road accidents, either accidentally or deliberately. The latter happens mainly to serpents, which are driven over by drivers who consider all serpents as lethal to humans. Herpetofaunal species frequent highways not only to cross over between fragmented habitats, but also as an open area to ambush prey, as well as for thermal regulation. This results in herpetofaunal species being subjected to the risk of frequent road accidents, especially in areas such as cause ways and highways that cuts across forests and wetlands. Therefore, the present study was carried out to determine the magnitude of herpetofaunal mortality due to road accidents. The survey was conducted from March to August 2001, along Sooriyawewa to Mirijjawila - a regular highway 6m in width and extending 23 Km. The study area falls within the Southern Dry and Arid bio-climatic zone of Sri Lanka. The land use/habitat types located within 500m on either side of the highway included dry thorny scrubland, abandoned chenaland, rice fields, banana cultivations, home gardens and a system of seasonal cascading tanks. Field visits were made at fortnightly intervals, each visit spanning three days, and herpetofaunal species in the highway were recorded between 20.00 to 23.00 hrs, by driving along the road back and forth at a speed of 20-25 Km/hour. The optimum nocturnal sampling time was selected based on an initial reconnaissance survey. A parallel survey was conducted during both diurnal and nocturnal hours to document the species composition of herpetofauna in representative land use/habitat types located within 500m on either side of the highway. Species were identified and measured in the field itself.

A total of 16 amphibian species (1 endemic, 2 threatened) and 42 reptile species (6 endemic, 9 threatened) were recorded from land use/habitat types on either side of the highway. Of these, a total of 11 species of amphibians and 26 species of reptiles (10 species of tetrapods and 16 species of serpents) were recorded in the

highway, during 108 hours of field sampling, either as live or dead specimens. The total herpetofaunal species recorded in the highway included 3 endemics and 8 threatened species. Among the total individuals of amphibians recorded in the highway, 37.4% had succumbed to road accidents. Of the total individual tetrapod reptiles observed, 27.2% had succumbed to road accidents, while that of serpents included a much higher percentage of 54.1%. Of the total herpetofaunal individuals that were subjected to road accidents, the species of amphibians, tetrapod reptiles and serpents that showed the highest mortality included the Common Paddy field Frog - *Limnonectes limnocharis* (60%), Common Garden Lizard - *Calotes versicolor* (46.2%) and Gamma Cat Snake - *Boiga trigonata* (38.3%), respectively. Interestingly, the highest amphibian mortality (90 %) was recorded in sections of the highway that was bordered with a mosaic of land use types including rice fields and home gardens, while the highest reptile mortality (50%) was recorded in areas that consisted of home gardens and abandoned chenaland. The highest amphibian deaths were recorded on a single day that had a heavy downpour for about half an hour in the evening, mainly in areas bordered with rice fields. An additional threat to herpetofauna that was recorded in the highway included the presence of opportunistic predators and scavengers that were observed feeding or attacking herpetofaunal species on several occasions during the study period. The dominant nocturnal predators observed included the domestic feral cats (*Felis catus*), dogs (*Canis familiaris*), and Jackal (*Canis aureus*), while bird species such as the Eurasian Thick-Knee (*Burhinus oedicnemus*), *Red*wattled Lapwing (*Vanellus indicus*) and the Yellow-wattled Lapwing (*Vanellus malabaricus*) were observed feeding on dead/injured herpetofauna. A higher proportion of mortality observed among the serpents may be due to drivers who drive over them deliberately upon sight. As this survey was restricted to the dry season of the sampling area, a similar exercise during the wet season will help to reveal differences in herpetofaunal mortality in highways, at different climatic seasons.

A survey on Saltwater Crocodile (*Crocodylus porosus*) in the Muthurajawela Urban Marsh

W.S. Devapriya

The Saltwater Crocodile (*Crocodylus porosus*) is the largest tetrapod reptile in Sri Lanka. Today, it is considered as nationally threatened (IUCN Sri Lanka, 2000). It is mainly found in coastal wetland ecosystems in Sri Lanka. The present Survey was intended to document the status and ecological aspects of *Crocodylus porosus* in Muthurajawela marsh, which is a vanishing urban wetland in Sri Lanka. The survey extended from October 1998 to February 1999 (5 months). During this period, the population of *Crocodylus porosus* in two main study sites within the Muthurajawela marsh – Dandugam Oya River and the marsh proper. Observations were made by travelling in a motor boat (8-horse power outboard motor) during the nocturnal hours (2000-0000 hrs) and diurnal hours as well. Individuals were spotted with a powerful spotlight. Juveniles were caught with the aid of a hand net and measured. Individuals were easily spotted when their eyes were glowing due to the spotlight. The general body size of adults was estimated visually. The feeding activities of individuals were observed and the microhabitat of them was also documented. Data was gathered over 100 field hours during the study period.

A higher number of individuals were observed in the Dandugamoya river (2.8/Km; 20 individuals per boat trip) than in the marsh proper (1.7/Km; 2-9 individuals per boat trip).

The juveniles were observed to feed on insects on the water edge. Adults were observed to feed on decomposing cattle carcasses during daytime. Several juveniles were observed within or closer to brush piles fishing traps feeding upon fishes and crustaceans trapped in them. The reason for the occurrence of more individuals in river may be due to 2 major reasons; presence of more brush pile fishing traps in river compared to the marsh and dumping of animal waste from nearby slaughter sheds. These two factors have resulted in an abundance of food resources for crocodiles in the Danduganoya river compared to the marsh. The survey enabled to document several threats to *Crocodylus porosus* in the muthurajawela marsh. Most of the traditional fishermen in the area tend to kill crocodiles, which are found near their brush pile fish traps. Some fishermen kill crocodiles for meat and to collect eggs for consumption. They also kill them for skin. False beliefs have also contributed for hunting of crocodiles. For instance some believe that crocodile flesh is a cure for asthma. Many juvenile crocodiles get trapped in the fishing cages (traditional cage nets) and are eventually drowned. The marsh is rapidly being degraded due to reclamation and drainage activities, which has resulted in adverse impacts on crocodile habitats. Furthermore recent studies have clearly shown that industrial effluents as well as organic waste material are polluting the Dandugamoya River. This would result in harmful consequences to the *Crocodylus porosus* populations in the river. Limited accessibility in the marsh, and the disturbance of crocodiles due to the motor boat were major constraints of this survey.

Cost analysis in managing snakebite envenomed patients admitted to a rural hospital in the North Central Province in Sri Lanka

Samath D. Dharmaratne

Galnewa is a rural area situated about 25 km from Kekirawa in the North Central Province. The Government Hospital serving this area is the Galnewa Peripheral Unit situated in the center of the area. This hospital is manned by a MBBS qualified Medicial Officer and has a Registered Medical Officer (RMO) and an Assistant Medical Officer (AMO) under him.

Galnewa Peripheral Unit has a general male and female wards and an obstetric ward for Antinatal mothers. The hospital also conducts antenatal, well baby clinics and a medical clinic for the patients. There are no facilities to conduce even the basic investigations.

The average monthly attendance at this hospital during the year 2000 was as follows: To the Out Patient Department there were 6000 patients, to the Medicial Clinic 800 and to the Antenatal Clinic 80. About 30 deliveries take place per month in this hospital.

The bed strength of the hospital is 100 and it is distributed as follows: General male ward 40, General female ward 40 and the Obstetric ward 20.

The staff of the hospital consisted of the following: a Dental Surgeon, 9 Nursing Officers, 11 attendants, 5 labourers, a microscopist, a dispenser, three Public Health Midwives, a Field Assistant and a driver. The hospital has an ambulance and the transfers are usually sent to the General Hospital, Anuradapura.

Objective

This study was conducted to estimate the hospital costs of managing snakebite envenomed patients admitted to this hospital.

Materials and Methods

The Bead Head Tickets of patients admitted with snakebites during the year 2000 was used for this study. The relevant socio-demographic factors and the type of treatment administered were collected into a questionnaire by the principle investigator. These were entered into an Excel data sheet and the appropriate analysis was done using SPSS 10.1 statistical software.

Results

142 patients got admitted for snakebite to this hospital in the year 2000. Of them 14 were transferred to Anuradapura for specialized management and two died. Of the deaths one patient was dead on admission and the other died-on transfer to Anuradapura.

Of these only 36 BHTs were traceable and therefore they were used in this study. Of them nineteen (52.8%) were males. The mean age of these 36 patients was 31.92 years with a standard deviation of 16.74. The youngest was 10 years old and the oldest was 77 year old. Nearly all were (35) Sinhalese and 47.0 percent were from Galnewa area.

Of these 36 patients only one was transferred to Anuradapura while 31 of them were completely cured at this hospital. The body site of the bite was not documented in these BHTs and only 8 of them had information on the type of the snake. In all these the snake was a humped nose viper. A quarter of the patients was bitten between 18.00 to 20.59 hrs while another one fifth was bitten between 21.00 to midnight.

25 (69.5%) of the 36 patients left the hospital within a day of admission. The mean duration of stay was 1.47 days with a standard deviation of 0.88 days. The maximum duration of stay was 5 days.

The cost of a patient day for this hospital is Rs 522.75. The individual treatment costs of these patients summed to Rs 7160.77 with a mean cost of Rs 198.91. The maximum individual cost was Rs 3295.34 while one patient was not given any treatment before he left the hospital. 69.5 percent of the patients were treated with a very low cost (<Rs 10.00) for snakebite. Only 2 patients being given anti-venom were interesting.

Estimation of sex ratio of Green Turtle hatchlings at Rekawa Turtle Rookery in Sri Lanka

E.M. Lalith Ekanayake & K.B. Ranawana

Genetic sex determination (GSD) predominates among most vertebrate species. Nevertheless, in many reptiles and in some other taxa, sex is determined by environmental factors, such as temperature (Temperature-dependent sex determined - TSD), which act after conception (Mrosovsky & Yntema, 1980). In many species of reptiles, incubation of eggs at some temperature yields 100% phenotypic males and 100% females at other temperatures (Godfrey *et al*., 1996). Both sexes may be obtained only in a narrow range of temperature between these male and female producing temperatures. This narrow range is called the transitional range of temperature usually not more than 2-3^{0}C wide (Godfrey *et al*., 1997). The pivotal temperature" is centered within this range, which gives 50% individuals of each sexual phenotype (Mrosovsky & Yntema, 1980). For the sea turtles lower temperature produces more males and the temperature higher than pivotal temperature produce more females (Godfrey *et al*., 1997). The mean temperature during the middle third of the incubation period is a good indicator of the sex ratio of the clutch (Standora & Spotila, 1985:). The phenotypic sex of sea turtles depends on the temperature during the incubation. Hence, incubation duration can be used as an index of sex (Mrosovsky, 2000). Mrosovsky and Yntema (1980) stated that 1^{0}C drop in temperature results of five days increase of incubation duration. If the temperature of the nest during the critical period correlated with the total incubation period (IP) it is possible to estimate the approximate sex ratio of the population of the turtles.

The sex ratios of turtles were range from 1:1 to more than 8:1 in favour of females (Godfrey *et al*., 1996). Many studies carried out at the green turtle nesting sites around the world estimated primary sex ratios basically skewed towards females (Standora & Spotila, 1985; Godfrey *et al*., 1996). Therefore, it is important to know the information on temperature.

The average egg count for nesting sea turtles on Rekawa Beach in Sri Lanka

E.M. Lalith Ekanayake & K.B. Ranawana

Sea turtles spend their entire lives in marine or estuarine habitats and only for nesting (rarely for basking) they comes to land. Physiological, anatomical and behavioural adaptations of sea turtles have evolved largely in response to selection in the aquatic environment. Sea turtles are unevenly distributed throughout the tropical and subtropical seas depending on their food and habitat requirements (Marquez, 1994; Miller, 1997; 1983; Hirth, 1997). Generally female sea turtles do not reproduce every year. The duration between two reproductive seasons is defined as the remigration interval, and it varies between sea turtle species. The range of the remigration interval is from one to nine years, or more (Hirth, 1980; Miller, 1997).

The eggs are laid individually or in groups of two, three or occasionally four. Marine turtles lay two types of eggs: normal and odd shape eggs. Normal eggs are white, spherical cleidoic eggs with (1) flexible calcareous shell (3% of total weight), (2) a capsule of albumen (48.5%) & (3) yolk (48.5%)(Miller, 1997 & 1999). Odd shape eggs may be very large multi yolked or very small yolkless. The diameter, shape and the weight of the eggs laid in one clutch slightly varies within the clutches laid by the same female, which vary considerably within and between species (Hirth, 1980; Miller, 1997). A clutch is defined as the number of eggs laid into the nest, excluding the yolkless eggs. The mean number of eggs in a clutch varies among the species. The number of eggs in a clutch can be determined when the turtle is laying the eggs, or it can be counted if the eggs are to be moved and reburied (Miller, 1997 & 1999). Sea turtles lay several clutches of eggs during a nesting season, with a gap of approximately two weeks between each clutch. The number of eggs was counted at the time of laying.

Table 1. The average egg count for the five species of turtles nested at Rekawa beach from September 1996 to September 1999.

Species	Average egg count
Green turtle	112.1 (x = 1985)
Olive Ridley	105.1 (x = 30)
Leatherback turtle	100.5 (x = 30)
Hawksbill turtle	115.2 (x = 6)
Loggerhead turtle	105.2 (x = 5)

(x = number of nests observed)

The average egg count for green turtles nesting on Rekawa beach is 112.1 (range 10-195) and according to Miller (1997) it is 112.8 for 24 green turtle populations around the world. Therefore, the green turtles in Sri Lanka also laid similar size clutch, which agrees with Millers (1997) observations. In contrast green turtle laid average of 147 eggs in Europa Island and in the Galapagoes Islands green turtles laid the average of only 81 eggs (Hirth, 1980). Therefore, we can say that green turtles in Sri Lanka lay a middle size clutch. The average egg count for Olive ridley turtles is 105.1 eggs (range 57-161) on Rekawa beach and it is 116 in Gahimatha, in India (Dash and Kar, 1990). The average clutch size for 11 olive ridley populations around the world was 109.9 (Miller, 1997). Therefore, olive ridleys in Sri Lanka lay smaller clutch comparing to the other places and the olive ridleys in Playa Naranjo, Costa Rica also laid same size of (105) clutch (Hirth, 1980). Average egg count for leatherback is 100.5 (range 29-140) while it is 115.2 (range 61-154) for hawksbills and 105.2 (range 90-119) for loggerheads on Rekawa beach. The average egg count for 12 population of leatherback is 81.5, 17 populations of hawksbill is 130 and 19 population of loggerhead is 112.4 (Miller, 1997). The leatherbacks in Matina, Costa Rica laid about 80 eggs per clutch and in Tongaland , South Africa it was 103.7 (Hirth, 1980). According to this data the leatherbacks in Sri Lanka laid larger number of eggs and it is closer to the South African population. The hawksbills in Cousin Island, Seychelles laid average of 182 eggs and Seil Ada Kebir Island, Sudan laid average of 73.2 eggs (Hirth, 1980). Therefore, the hawksbills in Sri Lanka laid middle size of clutch comparing to other populations in the world. The loggerheads in Cape Romanian, South Carolina

laid average of 126 eggs and Masirah Island, Oman laid 101 eggs. Hence, in Sri Lanka also loggerheads lay smaller size of clutch.

Identification of *Candida* species on *Acrochordus granulates* in Sri Lanka

Jayalath L. Ferdinando

During the low salinity periods, <5ppt, of the year, Wart snakes show a growth of white patches on their skin. These are firmly fixed to the epidermis and in many instances leads to open wounds which is sometimes fatal. When a microbiological study was conducted it was clearly observed that a pure culture of the yeast *Candida rugosa* was present in all the tested spots. Under natural conditions these patches disappears when the salinity increases >15ppt,.

Ecology of Wart Snake, *Acrochordus granulates* in Sri Lanka

Jayalath L. Ferdinando

Of the three species of Wart Snakes, *Acrchordus,* only one species, *Acrochordus granulates is* found in Sri Lanka. They live submerged in the clay mud of almost all the estuaries around the island. Their behaviour is directly related to the salinity variations in the lagoons and the river mouths connecting to the sea. Breeding takes place once a year, in January – February, when salinity increase and they feed mostly on fish, ground dwellers such as gobies etc. *A. granulates* is nocturnal.

Freshwater chelonians of northeastern India: an anthropogenic impact analysis

Abhik Gupta

The northeastern region of India is one of the biodiversity-rich zones of the Indian subcontinent and the Oriental zoogeographical realm. Besides the other faunal elements, chelonians also comprise an important component of the freshwater fauna occurring here. This region abounds in different types of freshwater ecosystems including torrential mountain streams of both groundwater and glacial origins; large meandering rivers in the valleys with their relict channels, oxbows and seasonally inundated floodplain lakes; swamps, marshes, ponds, pools and others. Such rich ecosystem diversity is accompanied by a correspondingly rich diversity of freshwater turtles. Around eleven species are known to occur in the various freshwater systems of Northeastern India, of which four are included in Schedule I of the Indian Wildlife Protection Act, 1972 (1991 update). This schedule lists as many as 7 critically endangered species of freshwater chelonians distributed over the whole country. Thus more than 50% of the endangered species are found in the Northeast, making it an important repository of chelonian diversity. However, a plethora of anthropogenic stresses are now exerting a severe pressure on this interesting group of reptiles. The major threats may be categorized as the following:

Habitat destruction: Deforestation and the resultant loss of soil, especially in the hill areas, are leading to increased siltation of rivers and streams. The deep pools that are the favoured habitats of many species, are rapidly becoming shallow and choked with silt, leading to a shrinking of habitat. At the same time, swamps, marshes, and other wetlands are increasingly being reclaimed for urban and agricultural expansion. These changes are reflected in a sharp decline in the density of the chelonians.

Hunting / trapping for flesh: A vast majority of the indigenous inhabitants of this region are strictly non-vegetarian in their food habits and have a craving for turtle meat. The eggs are also in great demand as a savoury food item. Many communities have expert hunters, trappers and fishermen. While the hunting / trapping was done with considerable prudence in the past, with many taboos and restrictions, a rapid incursion of consumerist culture and lure of easy money offered by the wildlife traders are fast turning it unsustainable.

Use in traditional/alternative medicine: Both the flesh and eggs of turtles and tortoises are believed to have several medicinal properties. The blood also is in great demand, as it is supposed to be a certain cure for piles and fistula. The flesh is supposed to be a remedy for gout and arthritis, while the marginals on the carapaces are also used as medicine. Live animals as well as gunny sacks full of carapaces possibly belonging to *Kachuga* spp., including *Kachuga sylhetensis,* a very rare species - used to be exported out of this region to the other parts of India, at least till the mid-eighties. With turtles and tortoises becoming more and more rare, traders in these items now offer very high price for the carapaces to the tribal hunters and fishermen.

Superstitious beliefs: There are many superstitious beliefs that lead to the killing of the chelonians. For instance, hanging up the carapace in the cattle-shed is believed to act as a good luck charm, and prevent snakes from. sneaking into the premises.

A recent survey conducted in Assam, have identified certain areas rich in freshwater chelonian diversity. These include the Dibru-Saikhowa Biosphere Reserve in the Northeastern corner of Assam, where eight species have been recorded, with unconfirmed reports of another three species occurring there. However, progressive siltation of the floodplain lakes and pools, as well as poaching, are proving to be hazardous for the turtles as well as tortoises. The other diversity-rich areas include the Hajong Lake and marsh in the Langting-Mupa Forest Reserve in North Cachar Hills district of Assam, inhabited by seven or eight species, several floodplain lakes in Nagaon, Kamrup and Sonai districts of Assam, and the Rukni river that flows out of Mizoram into the plains of Cachar, Assam. Besides declaring more such areas as chelonian sanctuaries, widespread awareness campaigns need to be undertaken to wean away potential consumers from eating meat and eggs and to remove the superstitious beliefs from their minds. After all, it may be remembered that although poaching is galore, turtles have also been receiving community-sanctioned religious protection in many temple tanks of this region since historical times.

Gary Larson's World

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