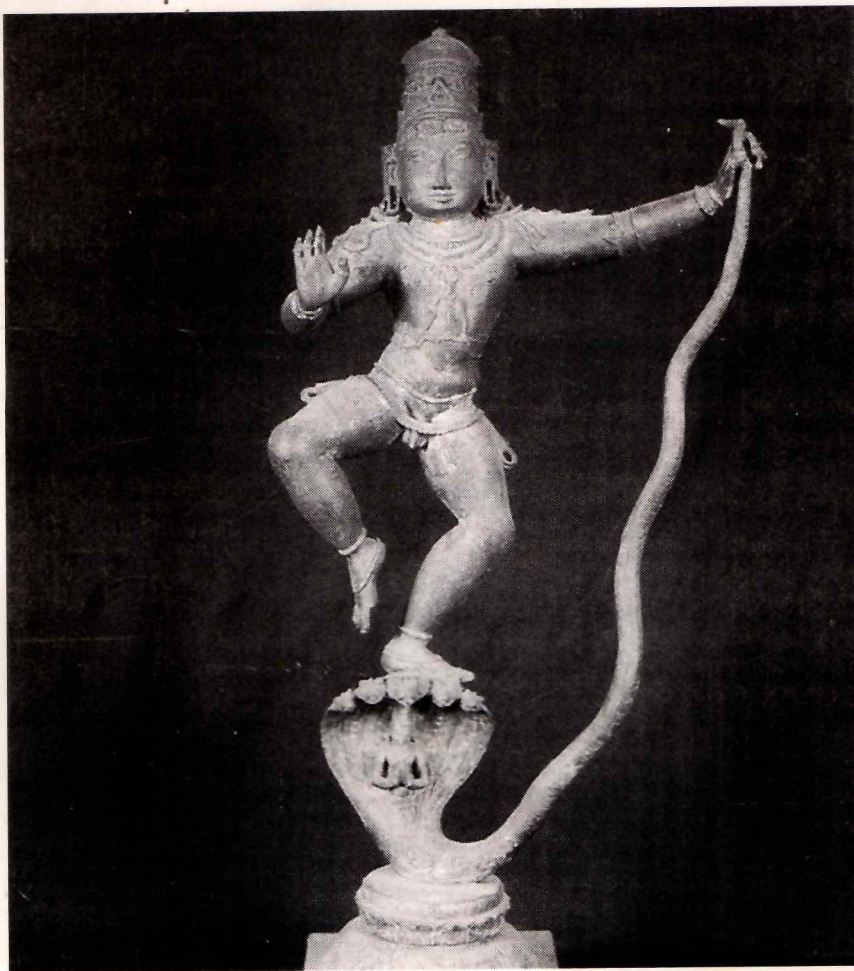


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Cover

Krishna's subjugation of snake Kāliya (See pages 1-5)
Bronze, Nilappadi, Nagapattinam District, Tamil Nadu
Circa 16th Century AD
Courtesy: Govt. Museum, Chennai.

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Science and the humanities, biology and culture, are bridged in a dramatic manner by the phenomenon of the serpent. The snake's image enters the conscious mind with ease during dreams and reverie, fabricated from symbols and bearing portents of magic. It appears without warning and departs abruptly, leaving behind not the perception of any real snake but the vague memory of a more powerful creature, the serpent, surrounded by a mist of fear and wonderment.

- Edward O. Wilson *Biophilia*, 1929.

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THE SUBJUGATION OF SNAKE KĀLIYA AND AN OBJECT LESSON IN PEACEFUL COEXISTENCE

B. Vijayaraghavan

Chennai Snake Park Trust
Rajbhavan Post
Chennai 600 022

The story of how the divine child, Krishna, battled with and subdued the monstrous serpent Kāliya is one of the best-known myths in India and is celebrated in art and literature. The story is told in the *Bhāgavata Purāna* (XVI – 1-67, XVII – 1-9), the *Vishnu Purāna* (V.7), *Harivamsa* (LXVIII-LXIX) and elsewhere.

Kāliya originally dwelt in Ramanaka, the home of the serpents. The serpents had to propitiate Garuda (or Suparna), their inveterate enemy, by leaving a tribute at the foot of a tree every month at the full moon. But Kāliya, arrogant in the knowledge of the power of his venom, ignored Garuda. Incensed by this rebellion, Garuda swooped down on Kāliya and beat him up with his powerful wings. Kāliya was no match to the ferocious Garuda, and had to jump into the river Yamuna or Kālindi to escape further attack. It was clever of him to seek refuge in Kālindi for he knew it was out of bounds for Garuda. Once Garuda had caught a fish from Kālindi and, in doing so, had incurred the wrath of a Rishi, Saubhāri, who was meditating there. The Rishi cursed Garuda that if he ever again visited the river, he would pay with his life. Kāliya, therefore, with his many wives, was quite secure in the river Kālindi. But his venom was so noxious that it rendered the waters unfit for use by men and cattle and burnt up the surrounding landscape. Even the birds flying over the river got scorched by the poisonous vapour. Krishna's kinsmen and friends were all cowherds, who lived on the banks of Kālindi and they were in despair. And so were their cattle. Krishna was once wandering through the forest alone, when he thought of taking a plunge in the river. This infuriated the serpent and he attacked Krishna. Both were formidable and there ensued a mighty battle. Krishna had his superior strength drawn from his divinity but the serpent was a worthy foe. Krishna was victorious in the end and he hammered down the five hoods of Kāliya with his feet and danced upon them. (That explains the indelible mark on the cobra's hood). Kāliya was now totally vanquished, his body broken and he was vomiting blood. Kāliya's many wives, thereupon, swam to the site of the battle and entreated

the Lord to spare their husband's life. Kāliya too prayed for his life to be spared. Krishna relented and let go the serpent on condition that he should abandon his residence in the river since it was the fount of life for men and cattle, and go to the remote ocean. As an added token of grace, he conferred on him protection from the wrath of Garuda so that even away from the safe haven of Kālindi, he had no reason to fear Garuda.

In the vanquished Kāliya's prayer to the Lord, there is a plaintive admission of the helplessness of the serpent to desist from evil. According to the *Bhāgavata*, Kāliya says: "We are born wicked, ignorant and rancorous. And it is hard to get rid of one's natural disposition, O Lord, because of its tenacious hold on one. Thou hast made, by means of the *gunās*, O creator, this universe with its infinite diversity and multifarious dispositions, every creature being unique in its nature, strength, energy, heredity, mind and size. Among these, O Lord, we serpents are of a congenitally vicious temper; how can we, deluded creatures, free ourselves by our own efforts from the power of Thy *māya*, which it is so hard to overcome? As only Thou canst effect that for us, being the Omniscient and Supreme Lord of the universe, vouchsafe us Thy mercy or deal out punishment, just as Thou wilt". (Tr. N. Raghunathan). The Lord recognized the force in this argument and decided that what was called for was not the annihilation of Kāliya but his relocation to the ocean so that even as Kāliya lived his life, according to his lights, the men and beasts on the shores of the river could carry on their lives safe and unafraid.

Heinrich Zimmer (1890-1943), the German scholar and Indologist, had at the time of his untimely death, left an assorted collection of notes on Indian themes valuable for their range and perception. Some of these were collected and edited by Joseph Campbell, famous mythologist. In one such note, Zimmer had dealt with the theme of Kāliya's subjugation by Krishna.

Zimmer sees in the tale of Kāliya and Krishna many layers of meaning. At one level, it was the story of suppression of a primitive serpent cult by the worship of an anthropomorphic divine saviour. "Thorough the intermediary, Krishna, the special cult of a local demon became merged into the widespread, general cult of Vishnu, the Supreme Being, and thus was linked into a context of superior symbolic import, representing concepts and intuitions of a general validity". He sees a parallel in the account in Greek mythology of Apollo's conquest of the earthbound serpent lord at Delphi and establishing himself in the serpent's place as the fount of the Delphic prophecies.

But a better parallel is found in Indian scripture itself. If Krishna had freed the waters of Kālindi from the venom of Kāliya, thus restoring to the waters their life-giving property once again and giving succour to men and cattle, that was similar to what the supreme god, Indra, had done, according to the Rig Veda. The serpent-demon Vritra had imprisoned the rain-bearing clouds in a mountain and scorched the earth below. After a mighty battle, Indra slayed *Vritra* and liberated the waters.

Coming back to Zimmer, he points out that in the tale of Kāliya's defeat, "Krishna played the role rather of moderator than of annihilator. He liberated mankind from a threat and a peril, favouring life against the slaying breath of the serpent, and yet recognized the rights of the destructive power; for the venomous serpent was as much manifestation of the Supreme Being as were the pious cowherds. It was a manifestation of one of the darker aspects of God's essence, and had appeared out of the all-producing, primary, divine substance. There could be no elimination, once and for all, of this presence which to man seemed wholly negative. Krishna effected only a kind of boundary settlement, a balanced judgment as between demons and men. For the good of the human kingdom, Kāliya was assigned to a remoter sphere, but he was allowed to remain unchanged both in nature and in power. Had he been transformed, redeemed, or altogether eliminated, the counter-play between human and demonic, productive and destructive energies would have been disrupted – and such an eventuality was far from the intent of the Highest Being".

We may recall here the story in Genesis in the Bible. When the serpent in the Garden of Eden betrayed God and tempted Eve to eat the fruit of the tree of the knowledge of good and evil, which God had forbidden Adam and Eve from eating, God punished the serpent along with Adam and Eve. They were also banished from Paradise. Later on, when God, concerned with the growth of evil on earth, decided to bring on the Great Deluge to destroy all his creations but wanted Noah to preserve in the Ark seed-stock of all creations for future procreation on a cleaned-up earth, he did not forget or ignore the snake and specifically included "every creeping thing of the earth" to be inducted into the Ark. (Genesis 6:20). After the Deluge, God also wanted the 'creeping things', just as his other creations, to "abound on the earth and be fruitful and multiply on the earth" (Genesis 8:17). God, therefore, not only let off the serpent lightly when it committed a major transgression in the Garden of Eden but also, notwithstanding that a convenient opportunity had arisen later to see the

last of the serpent when the Deluge overtook the Earth, did not want the serpent and its kin to be wiped out for ever.

Apart from the Bible, the analogous theme of serpent verses divine or semi-divine power is found in Western mythology in the story of Herakles, son of Zeus, the Supreme Lord of the Gods, and hence a semi-divine power himself, who, as an infant, strangles the two serpents sent by a jealous Hera, the mistress of Zeus, into the infant's cradle. Here again, it is worthwhile recalling what Zimmer says: "In the West, the hero-saviours descending from heaven to inaugurate a new age on earth are regarded as embodiments of a spiritual and moral principle superior to the blind, animal life-force of the serpent power. In India, on the other hand, the serpent and the saviour are two basic manifestations of the one, all-containing divine substance. And this substance cannot be at variance with either of its polarized, mutually antagonistic aspects. Within it, the two are reconciled and subsumed".

Even leaving aside the higher philosophical interpretations of the story of Kāliya and Krishna, the obvious message is the need for men and animals to peacefully co-exist on earth. We, humans, are interlopers on this planet, in a manner of speaking, and the innumerable plant and animal species have been here millions of years before we arrived. We made the earth safe for our habitation and productive to suit our needs by destroying these creations using our superior brain-power and the weaponry we designed. But this is not a process that can be carried on for ever. At some stage, Nature will strike back as, indeed, it has in many instances.

No doubt, as a species, we have a responsibility to ourselves to see that we survive and survive in some comfort. This makes it necessary to inflict some degree of violence on Nature and on other life-forms. Conversion of vast extents of wilderness to agricultural lands and urban habitations and damming of the rivers have been necessary for human survival. But these have denied their original inhabitants space to exist. This has inevitably led to man-animal conflicts in many places. We, in India, often hear of stories of elephants and leopards from the forest areas intruding into human-occupied lands nearby causing much damage to crops and property and posing a threat to human life itself. A few decades of sensitization has taught us that the solution to this problem is not to blindly kill the animals. And we, therefore, explore the possibilities of avoiding excessive habitat conversion, fence in occupied lands, restore elephant corridors in the forest areas and, finally, translocate wild animals on the periphery of human-occupied lands to safe areas. In fact, in extreme situations as in the case of conservation of precious tiger populations

in “protected areas” such as sanctuaries and national parks, we do even consider translocation of the human population in and adjacent to such areas so as to enable the tigers to live in peace and multiply. The effort is to ensure that, on the one hand, damages to the eco-system are kept down to the minimum or avoided altogether and, on the other, effective ways explored to enable men and animals to co-exist peacefully. This, indeed, is also the message of the story of Krishna’s translocation of Kāliya from the river Kālindi to the recesses of the ocean.

References

- Raghunathan, N.** *Srimad Bhagavatham* vol.II 1976. Vighneswara Publishing House, Madras. Bangalore.
- Zimmer, Heinrich.** *Myths and Symbols in Indian Art and Civilization* Ed. Joseph Campbell, 1946. Indian edition: Motilal Banarasisidass publishers Pvt. Ltd., Delhi. 1990.

ON THE COLOURATION OF DOG-FACED WATER SNAKE *CERBERUS RYNCHOPS* (SCHNEIDER, 1799) IN TUTICORIN, TAMIL NADU, INDIA

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Introduction

Dog-faced water snake *Cerberus rynchops* (Schneider, 1799) is a mildly venomous, brackish water snake found in mudflats, estuaries, mangrove swamps and, sometimes, in off-shore wetlands and inundated paddy fields throughout much of south and southeast Asian and Australian coastal areas. It feeds chiefly on fishes and crabs and usually lives in crab-holes. Its projecting upper-jaw gives a 'dog-like' appearance to its face and hence the name. It has a thick body with dull, strongly keeled scales; head slightly broader than neck; eyes small; pupil vertical; nostrils and eyes set high on head. It is dark or slate-gray, brown or olive with a darker pattern of bars or (sometimes faint) spots on the back; a black streak passing through eye onto the neck; upper lip and chin buff; belly white or yellow with black checks or plain dark gray; lower parts from pale to deep yellow, variegated or barred with black or almost entirely dark grey; the outer three scale-rows usually entirely yellow (Daniel, 2002; Das, 2002; Smith, 1943; Whitaker, 1978; Whitaker & Captain, 2008).

Lobo (2006) surveyed Gulf of Mannar Biosphere Reserve (MBR), Tamil Nadu, for marine and brackish water snakes but did not find this species in Tuticorin Island groups (Villanguchalli, Karaichalli, Kasuwar, Van Tivu). Elsewhere, in the MBR, he observed 36 individuals of both adults (males & females) and juveniles. Furthermore, he mentioned a significant variation in colouration between island and mainland individuals with the island individuals being predominantly unpatterned when compared to the heavily patterned mainland (locality unspecified) individuals. Although, only one specimen was preserved and vouched, morphological data has been provided for all the 36 specimens.

On 18th November 2007 at 9.15 hrs I observed nineteen dog-faced water snakes entangled in fishing nets in the nearby backwaters. I recovered these snakes and recorded their measurements, colouration and body pattern. In this note, I present my observations on these individuals from Tuticorin (8°N 78°E) port harbour of Tamil Nadu, due to discrepancies with literature.

Observations

Adults (n=11): Snout to vent lengths (480-640 mm); tail lengths (103-155 mm). Colouration - dorsum pale grey with faint cross bars. No black streak passes through eye on to the neck. Supralabials, lateral and ventral regions creamy white. Underside heavily patterned with brown checkered markings on the creamy white background, with both the colours being in equal proportion.

Juveniles (n=8): Snout to vent lengths ($\approx$ 125 mm); tail lengths ($\approx$ 40 mm).

Colouration - dorsum grey with distinct black bands that are bold and visible all over the body. Supralabials and lateral body region whitish, with a dark, distinct stripe across, dividing the dorsal, dark colour and the ventral, light colour. Belly typically checkered, as in the case of adults.

Discussion

Changes in colouration within the same snake species can be due to several reasons, including age, geographic locality, physiological condition of the snake etc. Colouration helps in camouflage and thus plays vital ecological roles.

Lobo (2006) did not record this species in Tuticorin group of Islands. But I recorded this species in Tuticorin coast.

The possibility that individuals from the same population inhabit both the island and mainland coasts in Tuticorin area cannot be ruled out. Tuticorin port harbour, where my observations were made, is a part of mainland Indian coastline. My observation of predominantly unpatterned adults and heavily-patterned juveniles, are at variance with Lobo's. My observations of colour variation between juveniles and adults of the same population (in this case, mainland coastline), reveals the ontogenetic colour change in this species. This phenomenon is well known in a few other snakes: red sand boa, banded racer, king cobra, green keelback (Whitaker & Captain, 2004). Lobo (2006) did not mention whether the individuals he sighted (whether in the mainland or the islands) were adults or juveniles. But yet, he went on to remark that the colour disparity is due to geographic variation. My

observation suggests that a much more thorough survey is required before coming to any conclusion on this aspect.

Acknowledgements

I am thankful to Tamil Nadu Forest Department, Tuticorin district for encouraging my work on herpetofauna. I am also thankful to Mr. A. Naveen Joseph for providing me information about these specimens. I thank Mr. R. Rajarathinam (Director), Mr. S. Sivakumar (Environmental Education Officer) and Mr. S.R. Ganesh (Research Scholar), Chennai Snake Park, for their encouragement and guidance.

References

- Daniel, J.C. 2002.** *The Book of Indian Reptiles and Amphibians*. Bombay Natural History Society, Bombay. Oxford University Publication.
- Das, I. 2002.** *A Photographic guide to snakes and other reptiles of India*. New Holland Publication, United Kingdom.
- Lobo, A.S. 2006.** *Sea Snakes of the Gulf of Mannar Marine National Park - the species and their conservation*. Technical Report submitted to the Rufford Foundation, United Kingdom.
- Smith, M.A. 1943.** *The Fauna of British India. Including Ceylon and Burma*. Vol. III-Serpentes. Taylor and Francis Publications, London. 583 pp.
- Whitaker, R. 1978.** *Common Indian Snakes – A Field Guide*. Macmillan press, India Limited, Daryaganj, New Delhi, India.
- Whitaker, R. and Captain, A. 2008.** *Snakes of India–The Field Guide*. Draco Books, Chengalpattu, Tamil Nadu, India.

PRELIMINARY SURVEY OF THE HERPETOFAUNA OF KHEONI WILDLIFE SANCTUARY, DEWAS, MADHYA PRADESH

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Introduction

Kheoni Wildlife Sanctuary (KWS) was established in 1955 and is situated in Dewas District, M.P. It is a protected area representing the unique ecosystem of Central India, i.e. Vindhyaachal hill range and valleys. KWS (22°30' N 76°45' E, 535 m asl). Spread over an area of 123 sq. km, it has dry deciduous forest containing, bija (*Pterocarpus marsupium*), saja (*Terminalia tomentosa*), khair (*Acacia catechu*), shisham (*Dalbergia sissoo*), baheda (*Terminalia belerica*), bamboo (*Dendrocalamus strictus*) and dominated by teak (*Tectona grandis*) and dhawda (*Anogeissus latifolia*). The faunal composition of KWS represents the Deccan peninsular zone of biogeographic classification of India by Rodgers and Panwar (1988). The area has a typically monsoon climate with three distinct seasons: June is the hottest month, while December is the coolest; September and October are humid. The minimum and maximum temperatures are 6°C and 42°C respectively. The average annual rainfall is about 880-1000 mm. The terrain comprises of both plains as well as hills. The forest area of Dewas district is divided into eight ranges-Dewas, Panigaon, Kannod, Satwas, Kantafod, Punjapura, Udainagar and Bagali.

Adequate information on the herpetofauna of KWS is not available in the literature although Chandra et al. (2005) presented an inventory of the herpetofauna of Madhya Pradesh and Chhattisgarh. There is a recent record of an arboreal snake *Chrysopelea ornata* by Ingle (2010) which also indicates that the state fauna has so far been under-surveyed and needs more exploration to know the actual reptilian diversity. We implemented this study from 15 August to 14 September 2010. We spent 30 days in the field during both day and night. Species were identified using the keys of Smith (1931, 1935, 1943), Das (2002), Dutta (1997), Frost et al. (2008) and Whitaker & Captain (2008).

Methodology

In this rapid herpetofaunal survey, we used visual encounter survey (VES) technique. We surveyed different habitat types within the KWS during both day and night. We searched a variety of habitats (e.g., water bodies, under rocks, logs and decaying vegetation, trees and bushes).

Results

A total of 30 species of herpetofauna belonging to 2 orders and 15 families were recorded in KWS. In order Anura 5 families, 6 species; in order Testudines 1 family, 1 species; in suborder Sauria 4 families, 8 species; in suborder Serpentes 5 families, 15 species were recorded.

Species Account

Class: Amphibia

Order: Anura

Family: Bufonidae Gray, 1825

1. Common Asian Toad

Duttaphrynus melanostictus
(Schneider, 1799)

Family: Dicroglossidae Anderson, 1871

2. Bull Frog

Hoplobatrachus tigerinus
(Daudin, 1802)

3. Indian Skipping Frog

Euphlyctis cyanophlyctis
(Schneider, 1799)

Family: Microhylidae Gunther, 1858

4. Ornate Narrow-mouthed Frog

Microhyla ornata
(Dum. & Bibr., 1841)

Family: Rhacophiridae Hoffman, 1932

5. Indian Tree Frog

Polypedates maculatus
(Gray, 1834)

Family: Ranidae Rafinesque-Schmaltz, 1814

6. Short-headed Burrowing Frog

Sphaerotheca breviceps
(Schneider, 1799)

Class: Reptilia

Order Testudines

Family: Trionychidae Bell, 1828

7. Indian Flap shell Turtle

Lissemys punctata
(Lacépède, 1789)

Order: Squamata

Suborder: Sauria

Family: Agamidae Gray, 1825

8. Indian Garden Lizard

Calotes versicolor
(Daudin, 1802)

9. Fan-throated Lizard

Sitana ponticeriana
Cuvier, 1829

Family: Gekkonidae Gray, 1825

10. Brook's House Gecko

Hemidactylus brookii
Gray, 1845

11. Yellow-Green House Gecko

Hemidactylus flaviviridis
Ruppell, 1835

12. Indian Termite Hill Gecko

Hemidactylus triedrus
(Daudin, 1802)

Family: Scincidae Gray, 1825

13. Keeled Grass Skink

Eutropis carinata
(Schneider, 1801)

14. Spotted Supple Skink

Lygosoma punctata
(Gmelin, 1789)

Family: Varanidae Gray, 1827

15. Bengal Monitor

Varanus bengalensis
(Daudin, 1802)

Suborder: Serpentes

Family: Typhlopidae Merrem, 1820

16. Brahminy Worm Snake

Ramphotyphlops braminus
(Daudin, 1803)

Family: Boidae Gray, 1825

17. Common Sand Boa

Gongylophis conicus
(Schneider, 1801)

18. Indian Rock Python

Python molurus
(Linnaeus, 1758)

Family: Colubridae Oppel, 1811

19. Common Vine Snake

Ahaetulla nasuta
(Lacepede, 1789)

20. Buff-striped Keelback

Amphiesma stolatum
(Linnaeus, 1758)

21. Banded Racer

Argyrogena fasciolata
(Shaw, 1802)

22. Common Indian Cat Snake

Boiga trigonata
(Bechstein, 1802)

23. Common Kukri Snake

Oligodon arnensis
(Shaw, 1802)

24. Common Trinket Snake

Coelognathus helena
(Daudin, 1803)

25. Common Wolf Snake

Lycodon aulicus
(Linnaeus, 1758)

26. Indian Rat Snake

Ptyas mucosa
(Linnaeus, 1758)

27. Checkered Keelback Snake

Xenochrophis piscator
(Schneider, 1799)

Family: Elapidae Boie, 1827

28. Common Indian Krait

Bungarus caeruleus
(Schneider, 1801)

29. Spectacled Cobra

Naja naja
(Linnaeus, 1758)

Family: Viperidae Boie, 1827

30. Russell's Viper

Daboia russelii
(Shaw & Nodder, 1797)

Acknowledgments

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References

- Chandra, K. & P.U. Gajbe. 2005.** An Inventory of Herpetofauna of Madhya Pradesh and Chhattisgarh. *Zoos' Print Journal* 20(3): 1812-1819.
- Das, I. 2002.** *A photographic Guide to Snakes and other Reptiles of India*. New Holland Publishers (UK) Ltd, 144 pp.
- Dutta, S. K. 1997.** *Amphibians of India and Srilanka (checklist and bibliography)*. Odyssey publication House, Bhubaneshwar, Orissa, India, 342 pp.
- Frost, D. R. 2008.** *Amphibian species of the world: an online reference*. Version 5.2 electronic database accessible at <http://research.amnh.org/herpetology/amphibia/index.php>. American Museum of Natural History. New York, USA.
- Ingle, M. 2001.** Snakes of Madhya Pradesh, Ujjain & Malwa Region. *Cobra* 45: 23-28.
- Ingle, M. 2003.** Ecology & Status of the ophiofauna of eight districts of Malwa region of Madhya Pradesh. *Cobra* 50: 1-17.
- Ingle, M. 2004.** Ophiofauna of Ujjain and certain areas of Malwa region (Madhya Pradesh), *Records of the Zoological Survey of India* 103 (1-2): 17-31.
- Ingle, M. 2010.** First locality record of *Chrysopelea ornata* (Shaw, 1802) from Kheoni Wildlife Sanctuary, Dewas, Madhya Pradesh. *Reptile Rap*, 10:5-6.
- Rodgers, W. & Panwar, H. 1988.** *Planning wildlife protected area network in India*. A report prepared for Ministry of Environment and Forests and Wildlife, Govt. of India, Vol. 1-2.
- Smith, M.A. 1931.** *The Fauna of British India including Ceylon & Burma*, Vol. 1 (Loricata & Testudines). Taylor & Francis, London. 185 pp.
- Smith, M.A. 1935.** *The Fauna of British India including Ceylon & Burma*, Vol. 2 (Sauria). Taylor & Francis, London. 440 pp.
- Smith, M.A. 1943.** *The Fauna of British India including Ceylon & Burma*, Vol. 3 (Serpentes). Taylor & Francis, London. 584 pp.
- Utez et al. 2008.** *The Reptile Database*, <http://www.reptiledatabase.org> accessed on Oct. 2009.
- Whitaker, R. & Captain A. 2004.** *Snakes of India - The Field Guide*. Draco Books, Chengalpattu, Tamil Nadu, India.

A NOTE ON THE FOOD HABITS OF THE CHECKERED KEELBACK WATER SNAKE *XENOCHROPHIS PISCATOR* (SCHNEIDER, 1799)

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During our Gekkonidae survey of the Southern Western Ghats, we went for a faunal survey of the Mookambika Wildlife Sanctuary, Kollur. The sanctuary is situated in Kundapur taluk of the newly-formed Udupi district in Karnataka state and lies between 13° 42' and 13° 59' north latitude and 74° 39' to 74° 50' east longitude and spread over 247 sq km.

When we reached the forest guesthouse at Aanejari on the banks of the Sowparnika river, about 5 km from Kollur, we were told that from the "tiger pond", located 200 m away, a prolonged squealing sound was being heard. We searched thoroughly in the water inside the cement rings in the pond and we noticed an adult checkered keelback water snake (*Xenochrophis piscator*) with bulged belly. The snake was taken out with a snake-stick and placed inside a cotton bag. The snake measured about 87 cm and weighed 260 g. After sometime we released the snake out of the bag when it slowly regurgitated a prey. The hind legs of the prey came out first and the head portion came out last. The process took nearly 45 minutes (3.45 to 4.30 pm). We identified the prey as the Indian bullfrog *Hoplobatrachus tigerinus* (Daudin, 1803). Its head-width was 5 cm, body-width was 14 cm, snout to vent-length was 13 cm; it weighed about 200 g.

Daniel (2002) reported that the checkered keelback feeds mainly on frogs, fishes and tadpoles. Whitaker and Captain (2004) reported that the young feed on frog eggs, tadpoles and water insects; older snakes eat fish and frogs; occasionally rodents and birds. The species have not been mentioned. Daniels (2002) reported checkered keelback feeding on the tadpoles of the common Indian toad (*Duttaphrynus melanostictus*) and also reported death of this snake while attempting to swallow an adult toad. However, the present observation refers to the Indian bullfrog (*Hoplobatrachus tigerinus*) as the prey.

Acknowledgements

The author is grateful to Dr. K. Venkataraman, Director, Zoological Survey of India (ZSI), for his encouragement and to Dr. K. Rema Devi, Officer-in-Charge of Southern Regional Centre, Chennai for the facilities given.

References

- Daniel J.C. 2002.** *The Book of Indian Reptiles and Amphibians*. Bombay Natural History Society, Oxford University Press. India.
- Daniels R.J.R. 2002.** Checkered keelback dies after swallowing a common Indian toad. *Cobra*, 49:15.
- Whitaker, R & Captain, A. 2004.** *Snakes of India-The Field Guide*. Draco Books. Chengalpattu, Tamil Nadu, xiv+479, pls, text-figs.

SURVEY OF SNAKES IN KUNRATHUR-CHEMBARAMBAKKAM AGRICULTURAL LANDSCAPES, CHENNAI

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Introduction

India being one of the top 12 mega-biodiversity countries of the world, boasts of a rich herpetofauna with 299 amphibian species (Dinesh and Radhakrishnan, 2009) and 506 reptiles (Das, 2003). In India's Fourth National Report to the Convention on Biological Diversity, India had recorded 91,212 species of animals (around 7.43% of world's faunal species) and 45,500 species of plants. More species are being discovered and described subsequently. Endemism in the country's fauna is also very impressive with high endemism of Amphibia (61.2%) followed by Reptilia (47%) among the vertebrates. Indian report revealed that 413 species (4.9%) of globally threatened faunal species are found in India. A total of 33 species of reptiles are reported to be in the IUCN threatened list.

Few studies on the reptiles from Chembarambakkam lake has been carried out. Therefore, to provide information on the diversity and distribution of snakes from this lake a one year survey was undertaken.

Study Area

Chembarambakkam Lake (13°0'32.69" N, 80°3'36.88"E) is situated about 25 km southwest of Chennai coast and the lake is fed by two major water channels running through the city, that is, Adyar and Cooum. The lake with its 357 km² catchment area and 9 km lake bund was once a major source of drinking water (Daniels and Rajagopal, 2004). This lake also serves as an irrigation source for neighboring fields with numerous water outlets in the form of sluice gates and small water channels.

The present study was primarily focused on the east face of Chembarambakkam Lake close to the road which joins the NH-4 and Sri Perumbudur Highway. A short stretch of Sri Perumbudur highway road (800 m) outside of Kunrathur forms the collection site of Road-Kills [REDACTED].

Methods

This survey was carried out for a duration of one year, between September 2009 and 2010. Extensive field visits throughout the Chembarambakkam lake and adjoining areas were made. Upon sighting a live snake species, its identity, activity (if any) and microhabitat details were noted. Snake sloughs found in the study area were recorded and the species identity ascertained. For road-kills, a short stretch of road of about 800 meters on Sri Perumbudur Highway outside Kunrathur was chosen and surveyed. This highway joins Kunrathur and Sri Perumbudur and runs almost parallel to the lake. Early morning rides (6 - 6.30 am) on the road at a speed of about 15–20 kmph were conducted. The road as well as the area flanking both the sides was carefully observed for road-killed snakes. The collected road-killed specimens were packed in plastic zip-lock bags and brought to laboratory and preserved in 10 % formalin. We used Whitaker (1978) for identifying the snakes.

Results

A total of 12 species of snakes were recorded. Among them, the family Colubridae had the maximum representation of species. Rat snake (*Ptyas mucosa*) was the commonest snake species found in the study site. Only three species of venomous snakes (*Naja naja*, *Bungarus caeruleus* and *Daboia russelii*) were found.

Due to their cryptic and elusive nature and nocturnal habits, only secondary signs of a few species were observed. Common wolf snake (*Lycodon aulicus*) was recorded based only on sloughs. Trinket snake (*Coelognathus helena*), banded kukri (*Oligodon arnensis*), vine snake (*Ahaetulla nasuta*) and common krait (*Bungarus caeruleus*) were documented only based on road-kills with no live individuals of these species being sighted.

Without considering the sloughs and road kills, only 13 individuals of snakes were left for microhabitat usage assessment (see Table 2). Four rat snakes (*Ptyas mucosa*) were found in the open ground, two olive keelbacks (*Atretium schistosum*) were found in water and two more were found on land, near to water channels; one checkered keelback (*Xenochrophis piscator*) was found in water channel; two bronzebacks were found on tree branches; two cobras (*Naja naja*) were seen among bushes; one common sand boa (*Gongylophis conicus*) was found under a big boulder.

Discussions

Rat snake (*Ptyas mucosa*) was the most abundant while the other species were represented by only a few individuals. Nocturnal surveys would have yielded better direct sightings of many species and consequently a richer microhabitat dataset. Snake road-kills were found to be prevalent. The snakes tend to bask on the warm tar road during night time or cross the road. This clearly shows that roads contribute to habitat fragmentation and snake-mortality.

Recommendations

Reptiles especially snakes are threatened due to people's poor knowledge about these creatures influenced by superstitious beliefs. To protect these animals, education of the general public on the biology, ecological value of snakes and eradication of snake-myths are important. Conservation laws have to be strictly enforced.

Table 1. Check-list of snake species found in Chembarambakkam area.

	Species Name	Common Name	Threat Category
1	<i>Ahaetulla nasuta</i> (Lacepede, 1789)	Common vine snake	Lower Risk
2	<i>Atretium schistosum</i> (Daudin, 1803)	Olivaceous keelback	Lower Risk
3	<i>Bungarus caeruleus</i> (Schneider, 1801)	Common krait	Lower Risk
4	<i>Coelognathus helena</i> (Daudin, 1803)	Trinket snake	Lower Risk
5	<i>Daboia russelii</i> (Shaw & Nodder, 1797)	Russell's viper	Lower Risk
6	<i>Dendrelaphis tristis</i> (Daudin, 1803)	Common bronzeback	Lower Risk
7	<i>Gongylophis conicus</i> (Schneider, 1801)	Common sand boa	Lower Risk
8	<i>Lycodon aulicus</i> (Linnaeus, 1758)	Common wolf snake	Data Deficient
9	<i>Naja naja</i> (Linnaeus, 1758)	Spectacled cobra	Lower Risk
10	<i>Oligodon arnensis</i> (Shaw, 1802)	Common kukri snake	Lower Risk

11	<i>Ptyas mucosus</i> (Linnaeus, 1758)	Common rat snake	Lower Risk
12	<i>Xenochrophis piscator</i> (Schneider, 1799)	Checkered keelback	Lower Risk

Table 2. Microhabitat preferences by snakes.

Microhabitats	Snakes
On walls/buildings	0
Burrow	0
Under rock/debris	1
< 2m on tree/bush	3
> 2m on tree/bush	1
Near water	2
In water	2
Open ground	4
Total	13

References

- Daniels, R.J.R & Rajagopal, B. 2004.** Fishes of Chembarambakkam Lake – A wetland in the outskirts of Chennai. *Zoos' Print Journal* 19(5):1481-1483.
- Dinesh, K.P., Radhakrishnan, C., Gururaja, K.V. & Bhatta, G. 2009.** An annotated checklist of Amphibia of India with some insights into the patterns of species discoveries, distribution and endemism. *Records of Zoological Survey of India, Occasional Paper* (302): 1-133pp.
- Das, I. 2003.** Growth of knowledge on the reptiles of India, with an introduction to systematics, taxonomy and nomenclature. *J.Bom. Nat. His. Soc.* 100(2&3): 446-501.
- Whitaker, R. 1978.** *Common Indian Snakes – A Field Guide.* Macmillan Press, India.

**OCCURRENCE, DISTRIBUTION AND RECENT
THREATS TO INDIAN STAR TORTOISE *GEOCHELONE
ELEGANS* (SCHOEPFF, 1795) IN THE CENTRAL ARAVALLI
MOUNTAIN RANGES, RAJASTHAN, INDIA**

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Turtles and tortoises are fascinating reptiles with heavy armor shell covering, unique morphological adaptations and unique genomic organization. In the course of evolutionary makeovers in their genome, these animals have acquired various modifications to make themselves capable of surviving in many different habitats. Due to their slow movement and elusive nature, very little is known about their habitat preference, distribution, recent threats etc.

The star tortoise (*Geochelone elegans*) belongs to the family Testudinidae. It is a land dweller tortoise which prefers arid, semiarid and sometimes forested habitats. It is distributed mainly in southern and western parts of India and Sri Lanka. Some workers have reported three discrete sub-populations of *G. elegans*, two from mainland of India and one from Sri Lanka (Vyas, 2009). Gaur *et al.*, (2006) found that the star tortoise exhibited strong genetic diversity in India — the population from western India was genetically different in microsatellite DNA and mitochondrial loci arrangement from the southern population. The taxonomic consequences of this genetic difference has to be confirmed using more molecular analyses.

The western sub-population is found in most parts of western India (Daniel, 2002; Das, 2002) and Sindh province of Pakistan (Anderson and Minton, 1963).

The Central Aravalli hill ranges is one of the last wilderness areas in the region supporting many plant and animal species. Very little is known about the

distribution, population abundance as well as recent threats faced by this sub-population of star tortoise at the Central Aravalli mountain ranges. The present study deals with the distribution of *G. elegans* in Central Aravallis and recent threats faced by this species. This base line data from this part of India is useful in the proper management and conservation of this species.

Methodology

Study Area: Rajasthan has four major physiographic regions, viz. the western desert (the Thar Desert), the Aravalli mountain ranges, the Eastern plains and the South-Eastern plateau (Hadoti plateau). The Aravalli mountain ranges bisect the state and form a geomorphic and climatic boundary. The Ajmer district of Rajasthan and nearby areas are the central parts of Aravalli ranges and locally known as Merwara Hills. The average altitude of the central Aravalli is 550 m (Heron, 1953). There are a few peaks that rise above 800 m. This area experiences a mean annual rainfall of 573 mm and temperature ranging between 2° and 46° C. Summers are extremely hot in this part.

Field surveys: During the study period (2009-10), five hill peaks were chosen. Most of the studies were conducted during the rainy season which is the breeding period of *G. elegans* and the individuals are most active at this time. All study sites were explored thoroughly by searching likely microhabitats for the presence and population abundance of *G. elegans*. Geographical coordinates were noted down for each study site using Geographical Positioning System (etrex Garmin, Germany). Visual encounter survey method with the support of line transects method was adopted for sighting the target species in this study. Species identification was done with the help of various diagnostic keys and compared with observed diagnostic characters (Daniel, 2002; Das, 2002; Kenneth, 2008).

Study species: Star tortoise (*Geochelone elegans*) body medium sized; shell heavy, made up of strong shields; carapace dome-shaped with conspicuous humps; hump peak with yellow star-like markings that radiate as streaks till the edge of hump; head bears small irregular scales; hind limbs cylindrical; fore limbs flattened; both limbs (hind limbs and fore limbs) covered with scales and spike-like formations; nails present; male's mid ventral line is slightly curved; female's ventral part flattened; tail of male comparatively longer than in female. Distributed in drier parts of the Indian subcontinents (Kenneth, 2008; Daniel, 2002; Das, 2002).

Results

Geochelone elegans was found at four localities at the central Aravalli mountain ranges with a patchy distribution pattern and very thin population out of the five observed study sites. The distribution pattern and population status at various sites is shown in Table 1. Study sites Taragarh Hill and Naka Madar Hill are having thin population due to anthropogenic pressure, mining, increasing rate of urbanization and hunting. On the contrary Nag Pahar Hill had fairly good population and provides a good habitat for its survival. This area is away from human disturbance zones except for a few mining sites. Mining activity was observed as a major threat to this species in this area. Pushkar Hill Valley and Maharshi Dayanand Saraswati University Back Side Hill is showing moderate population abundance of this species.

Table 1. Distribution of *Geochelone elegans* from Central Aravalli

Study Site	Geo-coordinates	Adult	Juvenile
Pushkar Hill Valley	26° 29'611" N 74° 34'967" E	2	1
Nag Pahar Hill	26° 26'840" N 74° 32'468" E	3	4
Naka Madar Hill	26° 27'529" N 74° 39'351" E	1	-
Maharshi Dayanand Saraswati University Back Side Hill	26° 30'186" N 74° 39'009" E	2	1
Taragarh Hill	26° 25'668" N 74° 37.266" E	1	-

Conclusion

Regular monitoring of *G. elegans* during the study period has demonstrated that the population is very sparse. This should be attributed mainly to the expansion of urbanization in the habitat resulting in habitat fragmentation, deforestation, mining activities and pet trade, illegal trade for food and medicinal uses etc.

Threats observed during the study

Mining activities: Now-a-days, Central Aravalli mountain ranges are facing serious problems from mining activities which lead to habitat loss.

Hunting pressure: Certain local tribes and labor at brick manufacturing units who reside in the nearby habitats of *G. elegans* hunt this species for food and other uses.

Pet practices and Orthodox issues: It is a herbivore and easy to rear and, therefore, many people opt for it as a pet. According to Chinese fengshui, rearing of turtles and tortoises brings prosperity to the family. One Indian myth is that the tortoise is the representative of Laxmi, goddess of wealth, and rearing of *G. elegans* brings wealth to the family. Removal of individuals from the habitat for these reasons affects the population adversely when the individuals are breeding.

Illegal trade: Illegal trade of wild animals is a worldwide issue and *G. elegans* is not an exception (Jenkins, 1995; Sekhar *et al.*, 2004; Shephard *et al.*, 2004; Vyas, 2009). Several records show that *G. elegans* and other turtles and tortoises are facing serious problems for their survival due to illegal trade for food, medicinal uses and in pet trade all over the world.

Conservation Strategies and Recommendations: *G. elegans* has been listed under Schedule IV of the Indian Wildlife Protection Act 1972; Appendix II in CITES and Vulnerable in IUCN, but this is not sufficient for its conservation. Hardly any action has been evidenced by the forest authorities or district administration against illegal rearing, hunting and in trade of this species. Its distribution and population status need to be properly documented so that the resulting data would clarify its status both inside and outside the protected areas. This will help in proper conservation planning and management. There is a need to develop awareness among the local people about its ecological importance. So the trends of pet practices get reduced. It is also required to eradicate the myths and orthodox issues related to this species. Most people are not aware of the legal protection to this species by the Indian Wildlife Protection Act (1972). It is necessary to develop awareness about this and other acts protecting the environment, wildlife and animal welfare. Habitat restoration, in situ and ex situ breeding and helping the individuals crossing the highway shall definitely increase the population of *G. elegans* in the central Aravalli region.

Acknowledgements

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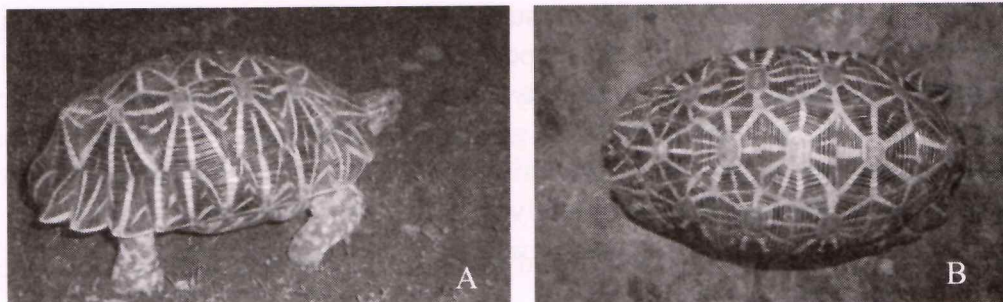


Fig. 1. A: Adult *Geochelone elegans* at Central Aravalli Mountain Ranges. **B:** Dorsal view of an adult



Fig. 2. Ventral view of adult male and female *Geochelone elegans* at Central Aravalli Mountain Ranges.

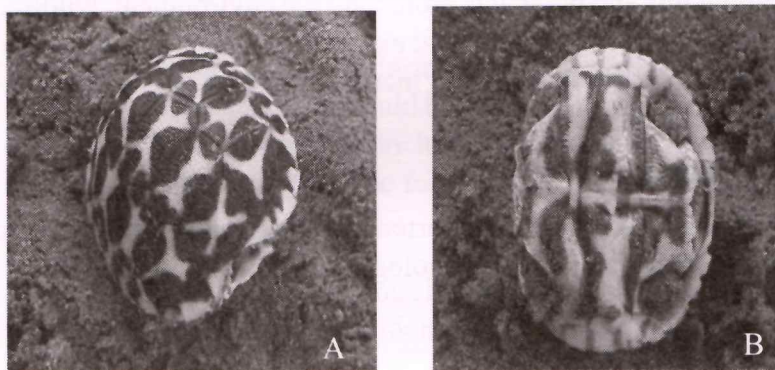


Fig. 3. A: Dorsal view; **B:** Ventral view of a Juvenile of *Geochelone elegans* at Central Aravalli Mountain Ranges.

References

- Anderson, J. A. & Minton, S. A. 1963.** Two noteworthy herpetological records from the Thar Parker Desert, West Pakistan. *Herpetologica* 19: 152.
- Daniel, J. C. 2002.** *The Book of Indian Reptiles and Amphibians*. Bombay Natural History Society and Oxford University Press, Mumbai.
- Das, I. 2002.** *A Photographic Guide to Snakes and Other Reptiles of India*. New Holland Publishers, London, U.K.
- Frazier, J. 1987.** *Biology and Conservation of Indian turtles and tortoises*. Interim Report to the American Institute for Indian Studies, New Delhi, 64 pp.
- Gaur, A., Reddy, A., Annapoorni, S., Satyerebala, B. & Shivaji, S. 2006.** The origin of Indian Star Tortoise (*Geochelone elegans*) based on nuclear and mitochondrial DNA analysis: A story of rescue and repatriation. *Conservation Genetics*, 7(2): 231-240.
- Heron, A. M. 1953.** Geology of Central Rajasthan. *Mem. Geol. Surv. India*, 79: 339.
- Iverson, J. P. & College, E. 1992.** *A Revised Checklist with distribution maps of the Turtles of the World*. Privately Printed, Richmond, Indiana, U.S.A. 363 pp.
- Jenkins, M. D. 1995.** *Tortoises and Freshwater Turtles: The trade in South Asia*. TRAFFIC International, U. K.
- Kenneth, M. 2008.** *A Photographic Identification Guide to Star-Patterned Tortoises*. Identification Guides for Wildlife Law Enforcement No. 12. USFWS, National Fish and Wildlife Forensic Laboratory, Ashland, OR. 1-17 pp.
- Murthy, B. H. C. K. and Das, I. 2009.** *The Turtle Collection of the Zoological Survey of India, Kolkata, India*. In: Vasudeven, K. (Ed.) *Freshwater Turtles and Tortoises of India*. ENVIS Bulletin: Wildlife and Protected areas, Wildlife Institute of India, Dehradun, India, 12(1): 15-24.
- Rao, R. J. 2005.** Captive Breeding of Star Tortoise (*Geochelone elegans*) in the Deer Park, NFCL, Kakinada, Andhra Pradesh. *Reptile Rap* (7): 7-9.
- Sekhar, A. C., Gurunathan, N. & Anandhan, G. 2004.** Star tortoises – A victim of the exotic pet trade. *Tiger Paper* 31 (1): 4-6.

- Shepherd, C. R., Burgess, E. A. & Loo, M. 2004.** *Demand Driven: The Trade of Indian Star Tortoises Geochelone elegans in Peninsular Malaysia.* TRAFFIC Southeast Asia.
- Vyas, R. 2009.** The status of North-Western population of Star tortoise (*Geochelone elegans*). In: Vasudeven, K. (Ed.) *Freshwater Turtles and Tortoises of India. ENVIS Bulletin: Wildlife and Protected areas*, Wildlife Institute of India, Dehradun, India, 12(1): 95-104.
- Vyas, R. & Parasherya, B. M. 2000.** Distribution and status of the star tortoise (*Geochelone elegans*) in Gujarat, India. *Zoos' Print J.* 15 (4): 239-242.

INCIDENCE OF METABOLIC BONE DISEASE IN SIAMESE CROCODILE *CROCODYLUS SIAMENSIS*

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The Siamese crocodile *Crocodylus siamensis* is native to South East Asia, Thailand, Vietnam, Indonesia, and Malaysia (Fowler, 2003). They are found in the captive collections in five of the zoos in India including the Chennai Snake Park.

On 28.03.2011, a request was received by the Dept of Wildlife Science, Madras Veterinary College from the Chennai Snake Park with regard to the dull demeanour of some of the Siamese crocodiles.

On a visit made, it was found that there were twelve Siamese crocodiles. Apart from the two parents, there were ten juveniles, two of which were of July 2007 clutch and eight of the 2009 clutch. The two individuals of July 2007 clutch were normal. Of the eight of the 2009 clutch, seven were found to be hunch-backed and one was normal.

The hunch-backed individuals were found to be dull and emaciated.

Blood samples were taken from two of the seven hunch-backed individuals of 2009 and one of two normal individuals of 2007.

Blood was collected by the intra-cardial route based on clinical procedures. Thereafter, the animals were left undisturbed.

Wallach and Boever (1983) and Mader (1996) say that cardiocentesis, as carried out with the crocodiles under investigation, could be used in reptiles for the

collection of blood samples. This route was earlier used in mugger crocodiles by Jayathangaraj *et al.* (2007).

Results of the examination of the samples are given below: -

Results of the Haematological Examination

Parameters	Crocodile no. 1 (apparently normal)	Crocodile no. 2 (hunch back)	Crocodile no. 3 (hunch back)
PCV(%)	14.5	7.0	14.0
Hb (gm%)	4.5	2.0	4.5
Heterophils (%)	64	78	73
Lymphocytes(%)	34	22	27
Monocytes(%)	2	-	-

Blood Picture : Anaemic changes and heterophilia in Crocodile no. 2

Blood parasite : Negative

Results of Biochemical Examination

Parameters	Crocodile no. 1 (apparently normal)	Crocodile no. 2 (hunch back)	Crocodile no. 3 (hunch back)
Total Protein (gm%)	5.12	4.83	Not done due to less separation of serum.
Albumin(gm%)	1.41	1.10	
Globulin (gm%)	3.71	3.73	
Calcium(mgm%)	10.04	9.65	
Phosphorous(mgm%)	3.31	1.03	

Imbalances in the calcium-phosphorous ratio of the affected crocodiles along with exhibition of the typical hunch-backed condition indicated metabolic bone disorders.

Encountering of vertebral deformities in the Siamese crocodiles studied were in agreement with the findings of Huchzermeyer (1986) in young captive crocodiles.

Interestingly, the occurrence of metabolic bone disorders is high in captive crocodiles in general unlike in the case of snakes and this is, probably, due to the

fact that snakes consume whole prey species, bone and all, whereas crocodiles in captivity are fed with meat with little bone content.

Suggestions were offered with regard to supplementation of diet with calcium and Vitamin in the form of minerals and vitamin mixture. Similarly, exposure to sun light and UV-B was emphasized. The diet of beef was recommended to be supplemented with chicken with bones sprayed with oral calcium and phosphorus powder (Calcium sandoz tablet) as additional feed and also syrup with iron content (Dextro orange syrup) were recommended. These suggestions have been effected in the dietary pattern.

Acknowledgements

The authors are thankful to the Dean, Faculty of Basic sciences, Madras Veterinary College, Chennai and Chairman, Chennai Snake Park Trust for the cooperation and facilities extended.

References

- Fowler, M.E., 2003.** *Zoo and Wild Animal Medicine*. V edn. W.B.Saunders Company. Hongkong.
- Huchzermeyer, F.W., 1986.** Osteomalacia in young captive crocodiles (*Crocodylus niloticus*), *J.South Afr. Vet. Assoc.*,57(3).
- Jayathangaraj, M.G. S.Ramesh, K,Senthilkumar & S.Abdul Basith, 2007.** Cardiocentesis in Mugger crocodiles (*Crocodylus palustris*) *Ind.J.Vet.Med.* 27(2).
- Mader.D.R.1996.** *Reptile Medicine & Surgery*. W.B.Sanders Company, Tokyo.
- Wallach, J.D. and Boever, W.J. 1983.** *Diseases of Exotic Animals – Medical and Surgical Management*. W.B.Saunders Company, Tokyo.

A NOTE ON THE REFURBISHING OF THE LIBRARY IN THE CHENNAI SNAKE PARK

The room housing the library in the Chennai Snake Park has recently been improved by extension of the floor area, provision of false ceiling, fresh electrification and wall-to-wall cupboards for books.

The library has been replenished by purchase of many valuable books in herpetology from different sources including overseas. The library now has 1845 titles, including 531 on herpetology and 664 on other life-sciences.

Suitable books have also been purchased or xerox copies taken from herpetological libraries and other sources including the Zoological Survey of India, Kolkata, the National Library, Kolkata, Madras Crocodile Bank Trust, Chennai and Salim Ali Centre for Ornithology and Natural History, Coimbatore.

The library of the Chennai Snake Park can now be said to be one of the finest libraries in herpetology in India.

B. Vijayaraghavan

RANDOM HARVEST

The cock-headed snake

There is a belief in parts of Kerala that a large cock-headed snake occurs in the deep forests. The story goes that this highly venomous snake, some 15 feet long, that is, about the size of a king cobra *Ophiophagus hannah*, black and brown in colour, has a prominent crest like that of a cock. The further embellishment is that it has, sometimes, been heard to crow like a cock, sometimes to cluck like a hen, and, sometimes, to whistle. It is also reported to spit venom*.

In Malayalam, the snake is called *Kozhippoovan* (cock-headed), *Karinchāthi* and *Karinkoli*, the last two being used also for the king cobra.

William Crooke of the Bengal Civil Service of British days in his book *Things Indian- being discursive notes on various subjects connected with India*, John Murray, London, 1906, P.440 quotes one Fra Paoline to speak to the belief that the 'Malabar basilisk' kills by a look. The Malabar district of the British times is now part of the state of Kerala, India. He must have been referring to the cock-headed snake even though the stories about this snake do not mention of it 'killing by a look' as the basilisk of the Western myths was reputed to do.

There is no such snake known to science. Interestingly, this story is very similar to that of the cockatrice of the legends in the West. The cockatrice or the basilisk is a mythical creature born of the egg of a cock (yes, not a hen), hatched by a serpent. It has a cock's head complete with the comb and a serpent's body and it is reputed to kill by a look. The cockatrice finds mention in the Bible (Isaiah 11:8).

One ingenious explanation for the cockatrice has to do with the habit of snakes to shed their skins. Speaking of the black mamba *Dendroaspis polylepis*, Vivian Fitzimons (*Snakes of Southern Africa*, 1962) says: "In old specimens, the skin is often incompletely shed, particularly over the top and back of the head, and a loosely attached plume or crest of old skin may remain for sometime before being completely detached; this has given rise to the belief in the existence of a so-called 'crested mamba', as distinct from the normal form. So widely established has this belief become in Zululand that the Zulus have a special name for it, 'Indlondlo'".

* Readers familiar with Malayalam may like to see *Vishavaidyam* (Treatment of Envenomation) by P.E. Thomas, 1957. Revised edition: DC Books, Kottayam 1993. Pp. 48-49, *Keralathile Vishappambukal* (Venomous snakes of Kerala) by Dr. K.G. Adiyodi, 1965. Second impression: Mathrubhumi Books, 2005. Pp. 68-74 and *Pāmbuvishavum Chikitsayam* (Snake Venom and Treatment) by Dr. K. Subhash, Kalpadrumam Hospital, Trivandrum-10, 1970. Pp. 57-62.



meaning an “old snake with a crest or protuberance at the back of the head”. Referring to this account, Sherman A. Minton Jr. and Madge Rutherford Minton (*Venomous Reptiles*, 1969) say: “It is possible that stories of such snakes, carried by word of mouth from deep in Africa to the Mediterranean seaports, formed part of the basis for the cockatrice and basilisk legends.”

Similarly, it is not unlikely that a king cobra, incompletely moulted, with part of the dead skin projecting from its head – no doubt a rare sight – has been mistaken for the ‘cock-headed snake’. Incomplete shedding or dysecdysis can occasionally occur in snakes because of poor health, dermatitis, mite infestation, malnutrition, inappropriate humidity, trauma, etc.

The king cobra, of course, does not spit venom. Nor does it crow like a cock or cluck like a hen or whistle, but, it has occasionally been heard to growl!

* * * *

How the crocodiles can help us to help them

Associating all stake-holders in our efforts to save the environment is a good idea. Then, why not get the help of crocodiles to help us conserve their own habitats?

U.S. scientists in the Florida Everglades have hit upon just such an idea. The crocodiles and alligators which make their way through the different parts of wetlands in the National Park have been fitted with satellite chips and these beam back information through satellites on changes in the eco-system and their impact on the size and movement patterns of the reptiles. This information provides important data that are instrumental in analysing the health of the Everglades eco-system.

Source : *The Hindu Business Line* March 13, 2011.

* * * *

Mud snake from Kerala

In ‘Random Harvest’ in the last issue of *Cobra*, mention was made of a study by Ashok Captain of the Kerala mud snake (*Enhydris dussumierii*). A detailed account of this has now appeared in *Current Science* Vol.100 No.6 25 March 2011.

This rare, little-known and endangered species of mud snake, endemic to Kerala, has been reported from Vellayani lake, Kerala, India. The paper details its occurrence, colour pattern and diet.

This snake is named after Jean-Jacques Dussumier (1792 – 1883), a French naturalist who collected fish and other specimens from many parts of Asia. There are few published reports on its occurrence, distribution and biology.

The first photograph of this species in life was taken by Ingrid Simpson in Kerala and was published as recently as in 2007.

Captain thinks that 'Kerala mud snake' is a more appropriate common name for this species rather than Dussumier's smooth-scaled water snake as given in *Snakes of India – The Field Guide* by Whitaker and Captain, 2004.

Some individuals of this species are inoffensive but some bite in defence. The bite is painful. The snake is mildly venomous.

* * * *

Caudal luring by a viper

Some species of snakes, particularly sit-and-wait ambushers like some vipers, are known to use their brightly-coloured tail tips to attract prey species like frogs and small birds making it easy to effect a quick strike. This is known as "caudal luring" (caudal = relating to the tail). A spectacular example of this trick is found in the *Pseudocerastes urarachnoides*, a viper from Iran.

The paper entitled 'Notes on the Natural History of *Pseudocerastes urarachnoides*' by Behzad Fathinia et al. published in the *Russian Journal of Herpetology* Vol.16, No.2, 2009 Pp 134-138 gives a detailed account of this snake.

This viper inhabits the hill and high grounds, mostly composed of gypsum, and prefers to hide in the deep cracks and holes which are cool in the summer months. The camouflage is perfect. Its tail has a prominent swollen appendage with a cluster of swollen elongated scales leading to it making the tail-tip resemble a bottle brush somewhat. Unlike the rest of the body which is camouflaged, the tail appendage is quite visible. The snake keeps its curious tail embellishment near its mouth. Small birds, reptiles and small mammals are attracted to this embellishment, presumably mistaking it to be some kind of prey, and then the viper strikes.

* * * *

The good that frog-skins can do

The Hindu of June 9, 2011 carries a report of the research done by Prof. Chris Shaw and his team of scientists at the Queen's University, Belfast, leading to the identification of two proteins or peptides in the secretions on the skins of the waxy monkey frog and the giant fire-bellied toad that have great potential in medical research.

The peptides in the skin secretions of the waxy monkey frog can arrest the growth of blood vessels nourishing cancerous tumours thus inhibiting the cancerous growth. Conversely, the peptides in the skin secretions of the fire-bellied toad can stimulate the growth of blood vessels, thus promoting the quick repair of damaged blood vessels and helping in the healing of wounds, diabetic ulcers and conditions caused by strokes or heart conditions.

The waxy monkey frog which has the scientific name *Phyllomedusa sauvagii* is a native of Central and South America. The giant fire-bellied toad which has the scientific name *Bombina maxima* is a native of Yunnan, China.

* * * *

A gharial expert passes away

Dhruvajyoti Basu, a renowned expert on the gharial, passed away on Apr. 21, 2011 at Guwahati. In *Sanctuary Asia* Vol. xxxi No.3, June 2011, editor Bittu Sahgal pays him a touching tribute. Bittu Sahgal says that Basu's life-long involvement with wildlife began in 1975 when, as an IIT graduate, he visited the Chennai Snake Park. Ever since 1976, when he pioneered the gharial rehabilitation project working with the U.P. Forest Dept. and right upto the time of his death, he was passionately involved with the critically endangered gharial. His contribution during these three decades was immense in "bringing the gharial back from extinction". Even at the time of his death, he was engaged in a survey of gharials and Gangetic dolphins.

* * * *

Critically endangered Indian reptiles and amphibians.

In March 2011, the Ministry of Environment and Forests, Govt. of India, in collaboration with the Zoological Survey of India, have released a comprehensive document on critically endangered animal species in India. The amphibians and reptiles so listed are as follows:-

Amphibians:-

Anamalai flying frog *Rhacophorus pseudomalabaricus*

Gundia Indian frog *Indirana gundia*

Kerala Indian frog *Indirana phrynoderma*

Charles Darwin's frog *Ingerana charlesdarwini*

Kottigehar bubble-nest frog *Micrixalus kottigeharensis*

Amboli bush frog *Pseudophilautus amboli*

Chalazodes bubble-nest frog *Raorchestes chalazodes*.

Reptiles:-

Gharial *Gavialis gangeticus*

Hawksbill turtle *Eretmochelys imbricata*

Leatherback turtle *Dermochelys coriacea*

Four-toed river terrapin *Batagur baska*

Bengal roof turtle *Batagur kachuga*

Sispara day gecko *Cnemaspis sisparensis*

Source: *Current Science*, Vol.100. No.11 (10 June 2011)

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A new tree-snake from Myanmar

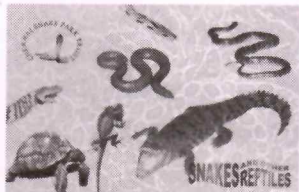
In the *Bonn Zoological Bulletin* 60 (1) : 17-24, Gernot Vogel and Johan Van Rooijen describe a new species of tree-snake of the genus *Dendrelaphis* from Myanmar. After carrying out a multivariate analysis of geographic variations, the authors conclude that in addition to *D.gorei* Wall, 1910 which, according to them, is actually a junior synonym of *D. biloreatus* Wall, 1908, there is a second lineage which they have described in the paper as a new species inhabiting the South Myanmar lowlands and neighbouring mountain chains. It is distinguished from *D. biloreatus* by its higher ventral counts, higher average number of anterior temporal shields and undivided anal shield.

In recognition of Maj. Frank Wall's outstanding contributions to our knowledge of the genus *Dendrelaphis*, the name *Dendrelaphis walli* has been conferred on this new species.

– B. Vijayaraghavan

Our Publications

1. *Snakes and other Reptiles* (English and Tamil) (2000), by B. Vijayaraghavan
Size: 13.5 x 21.5 cm, pp. 22, Price: ₹ 20 (English) ; ₹ 10 (Tamil)
A useful compendium for beginners



2. *Snake Studies: India* (English) (2005), by B. Vijayaraghavan
Size: 16.5 x 24 cm, pp. 30, Price: ₹ 25
Containing a brief history of Indian ophiology and much else



3. *Snakes in the Bible* (English) (2006), by B. Vijayaraghavan
Size: 16.5 x 24 cm, pp. 24, Price: ₹ 25



4. *Name - dropping — In Latin* (English) (2007), by B. Vijayaraghavan
Size: 17 x 24 cm, pp. 24, Price: ₹ 25
An inquiry into the scientific names of Indian snakes.



5. *Snakebite: A Book for India* (English) (2008), by B. Vijayaraghavan
Size: 16.5 x 24 cm, pp. 96, Price: ₹ 65



6. *400 Questions Answered about Snakes – with special reference to snakes in India* (English) (2010), by B. Vijayaraghavan
Size: 15.5 x 23 cm, pp. 232, Price: ₹ 120
All you wanted to know about snakes but didn't know whom to ask or where to search



7. Colour posters:
Size: 61 x 43 cm, Price: ₹ 10 each
- Common Snakes of Chennai
 - Four Common Dangerously Venomous Snakes of India



Available at:
The Chennai Snake Park or by post.
Postage extra

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- i) To maintain and display a captive collection of snakes and other reptiles as a means of eliciting public interest in them and prompting the public to empathize with them.
- ii) To promote knowledge among the public on reptiles and amphibians and dispel the widespread erroneous beliefs about snakes in particular and, to this end, conduct awareness programmes targeting school children primarily and bring out low-priced publications with technical, semi-technical and popular contents on reptiles and amphibians.
- iii) To aid and assist research on reptiles and amphibians including the conduct of surveys to assess their status and distribution.
- iv) To undertake captive breeding of endangered species of snakes and other reptiles.
- v) To canvass public support for the protection and conservation of reptiles and amphibians.

* * * * *

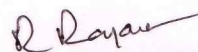
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All manuscripts must be sent in hard copy or on CD-Rom to the Editor, *Cobra*, Chennai Snake Park Trust, Rajbhavan Post, Chennai – 600 022. Or through e-mail to cspt1972@gmail.com

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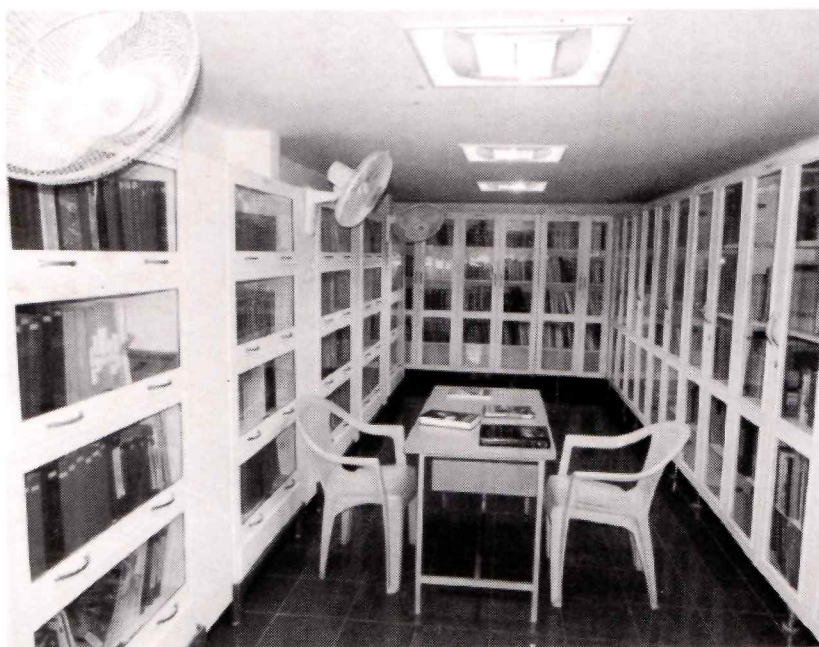
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The newly-constructed Interpretation Centre at the Chennai Snake Park.
(See *Cobra* Vol. IV Issue 2 Pp.29-33)



The refurbished library at the Chennai Snake Park
(See page 30 inside)