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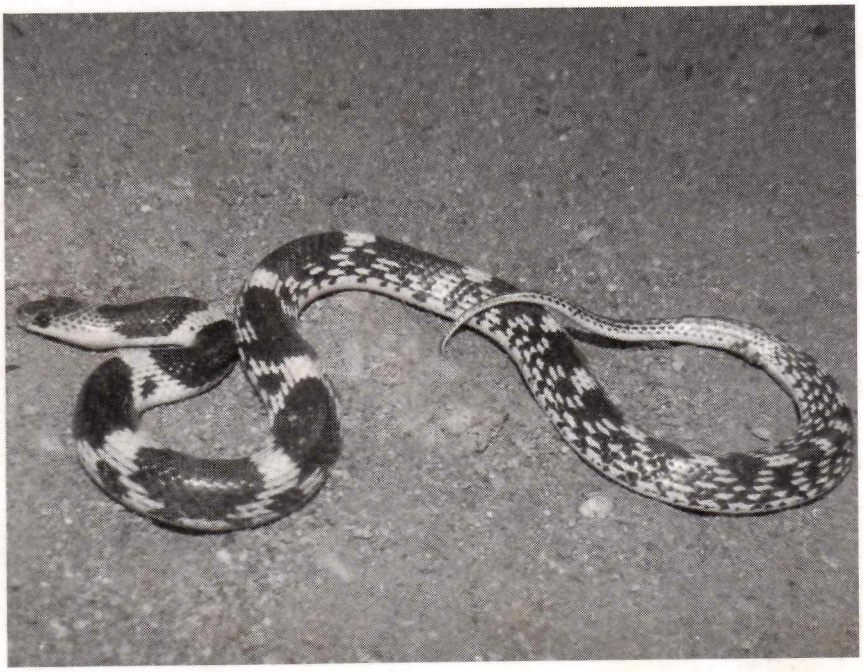

CHENNAI SNAKE PARK TRUST

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Cover

Barred wolf snake (*Lycodon striatus*)

Non-venomous. Almost throughout India. Found in brick piles and rubble. Grows to about 1.5 feet. Feeds on geckoes, small lizards and mice. Lays about 2 – 4 eggs.

Photo: S.R.Ganesh

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Volume : VI Issue 2 July - December 2012

CONTENTS PAGE

The basic premise of the new environmental ethic is that one should never do anything to one's environment (in the widest sense of the word) which would make life more difficult for future generations. The includes the reckless exploitation of nonrenewable resources, destruction of natural habitats, and reproduction beyond the replacement value. This principle is very difficult to enforce because it is inevitably in conflict with selfish considerations. It will require a long period of education for all of humankind to understand this environmental ethic. *Such education should start among young children, whose seemingly natural interest in animals, their behaviour, and their habitat can be used to strengthen environmental values.*

- Ernst Mayr
(in *This is Biology: The Science of the living world.*)

HERPETOFAUNAL MORTALITY IN MAAL–NAGARJUNASAGAR CHENNAI HIGHWAY, WITH SPECIAL REFERENCE TO RED SAND BOA *ERYX JOHNII*

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Abstract: A study was carried out from September 2010 to September 2011 to assess the impact of vehicular intensity on herpetofauna on Chennai Highway between Maal and Nagarjunasagar at Mallepalli, Andhra Pradesh. A total of 22 species of herpetofauna belonging to 19 genera, 9 families and 2 orders were recorded as road-kills. Of 14 species the highest mortality was of common Indian toad (52.63%), followed by red sand boa (12.28%).

Keywords: Herpetofauna, Peddagattu, mortality, road-kill, red sand boa, common toad.

Introduction

Reptiles and amphibians are cold-blooded animals which bask on tarred roads to regulate their body temperature (Sullivan, 1981). The increase in road networks throughout the world has brought about a concern for the effects of vehicular traffic on wildlife. This anthropogenic pressure has contributed to numerous road kills of wild animals. The intensity of this impact depends on many factors, concerning both eco-ethological traits of different taxa and road features (Lebboroni and Corti, 2006). Roads are "impact belts of several kilometers" that cause tremendous disturbance to the local wildlife population. On the whole, wild animals are extremely sensitive to the barrier effect of roads. This results in the isolation of local populations and also threatens to the point of eradication or extinction of the species found in the local area (Vijayakumar *et al.*, 2001). The mortality of reptiles in India due to vehicular movement has generally been documented by various authors (Gokula, 1997; Vijayakumar *et al.*, 2001, Das *et al.*, 2007, Baskaran & Bhuminathan, 2010 and Bhupathy *et al.*, 2011). Lizards and snakes use open habitats and prefer the roads for their regular activities like basking and foraging. Reptiles being slow

in their movement are subjected to many road accidents (Deepak and Riddhika, 2009). The reptile status and distribution in the present study area has not been documented. The present study was carried out to know the herpetofaunal mortality on the roads.

Methodology

The study was conducted from September 2010 to April 2012 on the Maal–Nagarjuna Sagar Chennai Highway (Fig.1). The surveys were carried out during early morning hours (5.00 to 7.00 hrs). The sampling was conducted two days in a week. The road-killed specimens were photographed and identified using standard field guides (Daniel, 1983; Das, 2002; Smith, 1935 & 1943; Whitaker, 1978). A few specimens were also preserved. Sampling error was nullified by removing the road-kills once sighted to avoid recounting. The road kills were divided into two categories based on the intensity of body damage, namely, fully damaged and partially damaged specimens.

Results

A total of 92 individuals of herpetofauna belonging to 22 species, 19 genera, 9 families and 2 orders were recorded. The highest percentage of mortality was the common Indian toad (32.61%, n=30) followed by red sand boa (10.87%, n=10), and followed by rat snake and common trinket snake (9.78%, n=9).

Among these species two species are threatened, namely, the red sand boa (*Eryx johnii*) and Indian chameleon (*Chameleo zeylanicus*). These two are listed in schedules IV & II, Indian Wildlife (Protection) Act, 1972. The mean no. of individuals were reported to be 3.95 (S.D=6.29, SE=1.341 Range1-30). About 75% of individuals were found to be fully damaged and 25% were partially damaged.

Table 1. Frequencies of various herpetofaunal mortalities recorded.

Common name	Scientific name	No. of road-kills
Agamidae		
Common garden lizard	*Calotes versicolor*	2
Boidae		
Red sand boa	*Eryx johnii*	10
Bufonidae		
Common Indian toad	*Duttaphrynus melanostictus*	30
Chamaeleonidae		
Indian chameleon	*Chamaeleo zeylanicus*	4
Colubridae		
Banded racer	*Argyrogena fasciolata*	1
Common wolf snake	*Lycodon aulicus*	1
Green vine snake	*Ahaetulla nasuta*	1
Barred wolf snake	*Lycodon striatus*	2
Buff-striped keelback	*Amphiesma stolatum*	2
Checkered keelback	*Xenochrophis piscator*	2
Common cat snake	*Boiga trigonata*	2
Banded kukri	*Oligodon arnensis*	3
Bronzeback tree snake	*Dendrilaphis tristis*	3
Rat snake	*Ptyas mucosus*	9
Common trinket snake	*Coelognathus helena helena*	9
Elapidae		
Common Indian cobra	*Naja naja*	1
Common krait	*Baungarus caeruleus*	2
Geoemydidae		
Indian pond turtle	*Melanochelys trijuga*	1
Tryonichidae		
Soft-shell turtle	*Lissemys punctata*	1
Dicroglossidae		
Skittering frog	*Euphlyctis cyanophlyctis*	1
Common green frog	*Euphlyctis hexadactylus*	2
Common bull frog	*Hoplobatrachus tigerinus*	3
Total		92

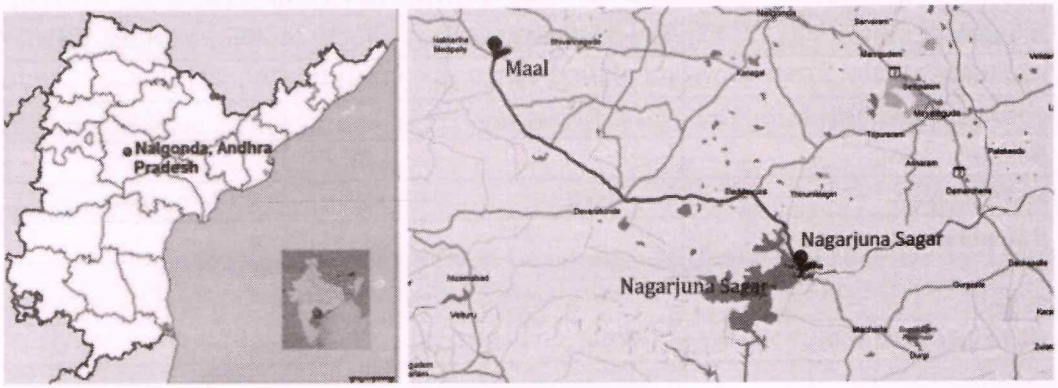

Figure 1. Map showing the study site and the road which was used for the study

Discussion

Reptiles and amphibians being slow in their movement are subject to many road accidents and hence there is a decline in their population (Fahrig *et al.,* 1995). The common toad *Duttaphrynus melanostictus* was found dead in higher numbers in all the study areas, as the species is found commonly. Though this study reports on road kills belonging to common herpetofauna species and those that are not threatened, these species should also be taken into account in our conservation efforts considering the role they play in the ecosystem. In recent years, the impact of vehicular traffic on the decline in reptile population is severe (Baskaran & Boominathan, 2010; Bhupathy *et al.*, 2011; Das *et al.,* 2007; Gokula, 1997). No proper conservation measures have been planned for this problem and this could result in local extinction which would consequently affect the ecosystem.

Acknowledgements:

We thank the Board of Research on Nuclear Sciences for funding the study.

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RECORD OF INDIAN ROCK PYTHON (*PYTHON MOLURUS*) IN KADALUNDY ESTUARY, SOUTH WEST COAST OF INDIA

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Indian rock python (*Python molurus*), Burmese python (*Python bivittatus*) and reticulated python (*Python reticulatus*) are the three species of giant snakes distributed in the Indian sub-continent. Indian rock python is recorded in Pakistan, Nepal, Bangaladesh and Sri Lanka apart from India. Although Indian rock python inhabits a wide array of vegetation types ranging from dry to wet forests with various intensities of anthropogenic pressures, the current distribution limit of the species remains unknown largely because of their sulking behaviour and lack of documented reports. Although research on population status, ecology and threat levels of the free-ranging pythons was documented in Keoladeo National Park (Bhupathy, 1986; Bhupathy and Vijayan, 1989) basic information such as distribution and population status of the python in the rest of the country remains scanty.

Here we report the kill of an Indian rock python in the Kadalundy-Vallikkunnu Community Reserve (11° 7' 28" & 11° 8' 01" N and 75° 49' 36" & 75° 50' 20" E). Apart from scattered patches of mangrove, on the whole, the reserve is surrounded by coconut groves and human habitation. During the long term monitoring of wetland birds in the reserve, on November 14th 2010, we saw a dead Indian rock python on the banks of the estuary (Figure 1). Later, we came to know from the local residents that the snake was killed by them when it entered their hamlet. Other than the old records that the species is known to have distribution from sea level to higher reaches (Daniel, 1983), there was no sight record of the species in the coastal zones. The IUCN (IUCN 2011) categorised this snake as Endangered and Near Threatened with respect to National and world scenario respectively. Lack of awareness among the local residents about the status of the species is the major constraint in the conservation efforts on these snakes in the human-dominated

landscapes. Creating awareness among the people regarding the role of snakes in the ecosystem, their status and identifying venomous and non-venomous snakes may ascertain the stable population of snakes in highly populated countries like the Indian sub-continent. This emphasises the urgency of organising country-wide assessment and awareness campaigns on the pythons to conserve the population of this endangered species of snake in India.

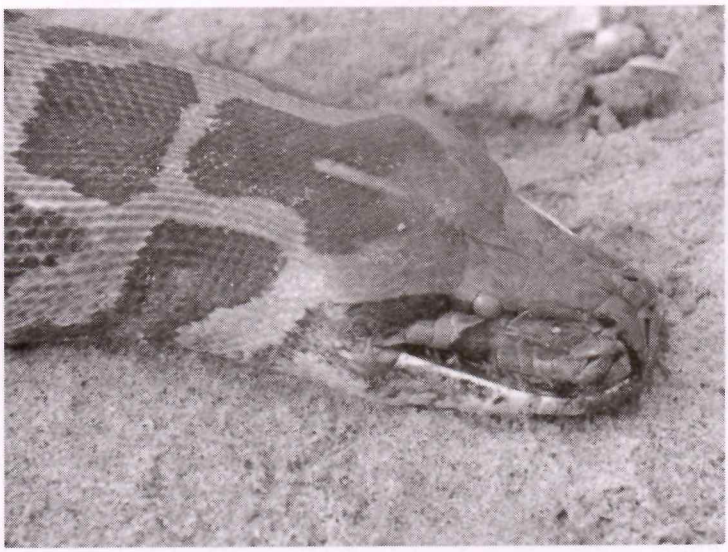

Figure 1: Carcass of Indian rock python *Python molurus* on the banks of Kadalundy river of Kadalundi-Vallikkunnu Community Reserve.

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REPORT OF GUNTHER'S TOAD *DUTTAPHRYNUS HOLOLIUS* (GUNTHER, 1876) FROM NALGONDA DISTRICT, ANDHRA PRADESH

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Gunther's toad (*Duttaphrynus hololius*) is a little-known species of toad endemic to India. It was first described by Gunther in the year 1876 from 'Malabar' (Biju *et al.*, 2004). It was first recorded from Andhra Pradesh by Satyamurti (1967), who, in the Madras Govt. Museum, mentioned three specimens from Chittor and Nellore districts. Later, Pillai and Ravichandran (1991) recorded this species from Nagarjunasagar reservoir of Guntur and Nalgonda districts in Andhra Pradesh. This species is known from above 200 m asl in a small number of widely separated localities in Chittor and Nellore (Satyamurti, 1967) and Nagarjuna Sagar Tiger Reserve (Pillai and Ravichandran, 1991) in the state of Andhra Pradesh in southern India (Biju *et al.*, 2004).

Intervening areas are devoid of records, though it might yet be found more widely and its occurrence in the Western Ghats requires further clarification (Biju, 2001; Biju *et al.*, 2004). Very little is known about its habitat and ecology, although it presumably breeds in water by larval development. It is listed as "data deficient" in view of the absence of information on extent of its occurrence, status and ecological requirements (Biju *et al.*, 2004). The status and distribution of this is poorly known. Dutta (1997) doubted the species identity of Satyamurti's and Pillai and Ravichandran's records from Andhra Pradesh. However a subsequent study by Ganesh & Asokan (2010) confirmed that the identity is correct. Recently, Chandramouli *et al.* (2011) sighted this species in Hosur, Tamil Nadu and clarified many issues on its identity and distribution.

During our field surveys in October and November 2011 we sighted *Duttaphrynus hololius* in and around the Nagarjunasagar Reservoir, in Nalgonda district of Andhra Pradesh state. On this site we recorded various parameters like number of individuals, microhabitat, habitat, neighboring animal, GPS location,

time of sighting and activity. Photographs were taken by Nikon Coolpix P100 digital camera and the geographical locations were recorded using a Global Positioning System (Garmin Oregon 550).

We recorded five individuals of *Duttaphrynus hololius* during our field visits. The area is covered with rocky hills. All the individuals we sighted were found below small stones that were present near water bodies associated with a freshwater source–the Nagarjunasagar Reservoir. Four individuals were sighted near another amphibian species, the cricket frog *Fejervarya* cf. *limnocharis*. One individual was sighted near a common toad *Duttaphrynus melanostictus*. The individuals were sighted during our searches under rocks. The individuals were of different colour combinations but were otherwise well-camouflaged with the rocky surroundings.

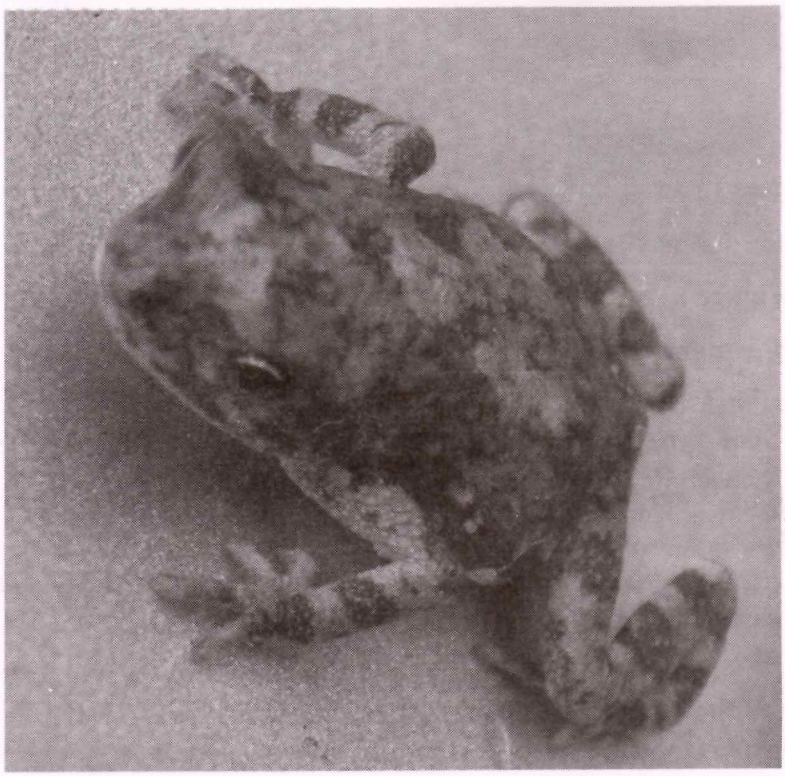

Figure 1. Side view of Gunther's toad (*Duttaphrynus hololius*)

Figure 2. Top view of Gunther's toad (*Duttaphrynus hololius*)

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DISTRIBUTION OF GREEN KEELBACK *MACROPISTHODON PLUMBICOLOR* (CANTOR, 1839) IN RAJASTHAN, INDIA

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The green keelback (*Macropisthodon plumbicolor*) is a non-venomous, natricine snake of hilly areas distributed throughout India except the East Coast, Ganges valley and the extreme northwest (Daniel, 2002; Das, 2002; Whitaker and Captain, 2004). In its distribution map in Whitaker and Captain (2004), the authors have shown this species as being absent in Rajasthan. For the first time in Rajasthan, green keelback was recorded from Udaipur district by Sharma (1995, 1997) and from Sirohi district by Sharma (1996), both are located in the southern Aravalli Hills.

Green keelback is a species having a restricted distribution range in the state of Rajasthan. It is absent in the desert districts of this state (Das & Rathore, 2004). According to Gaur and Pandey (2002, 2007), this species does not occur in Kumbhalgarh Wildlife Sanctuary which is located at the confluence of Thar desert and Aravallian ecosystems. Bhupathy (1999) also found it absent in the eastern part of the state.

To know its distribution range in the state of Rajasthan, we scrutinized our field data from 1992 to 2011. The findings are depicted in Table 1.

Data presented in Table 1 reveals that *M. plumbicolor* is present in hilly forests of south and southeastern parts of Rajasthan. Badaguda of Sojat Tehsil in Pali district and Sirohi city are sites of occurrence of this species towards the western edge of Aravallis. Beyond this edge, the Thar Desert starts. Thus, western edge of Aravallis is the westernmost distribution limit of this snake in India. Towards central Rajasthan, Ajmer district seems its northernmost distribution limit and in eastern side this species have been seen in Sawai Madhopur and Kota districts (Fig.1).

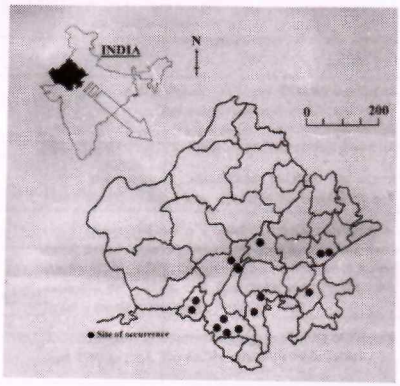

Figure 1. Localities of green keelback (*Macropisthodon plumbicolor*) in Rajasthan.

This species is distributed in the hilly forests of south and central Aravallis and in south-eastern part of Vindhyan hill forests of the state. It is noticed that its occurrence is in decreasing trend from south to north direction. The present study reveals that the green keelback is present in nine districts of Rajasthan as mentioned in Table 1.

Table 1: Records of green keelback (*Macropisthodon plumbicolor*) in Rajasthan

Sl. No.	District	Locality of occurrence	Type of habitat	Source of data
1	Pratapgarh	Sitamata WLS*; Rampuria, Janagarh and Menhdikhera forest blocks	Teak mixed deciduous forest in hilly area	Self observation
2	Udaipur	Magga-ki-nal (Kumbhalgarh WLS)	Dense deciduous forest	Self observation
		Phulwari-ki-nal WLS, Kamalnath RF**, Nalsandol RF, Madri RF, Goraniya Ghata RF, Ubheshwar RF, Samoli RF	Dense mixed deciduous forest in hilly area	Self observation
		Khairwara	Deciduous forest in hilly area	Self observation
		Sjjangarh WLS, Jaisamand WLS	Dry deciduous and Thorny forest in hilly area	Self observation
		Rohida forest nursery, Range Sayra	Forest nursery	
3	Sirohi	Mt Abu WLS	Thorny, Deciduous and Semi-evergreen forest in hilly area	Self observation
		Sirohi city	Urban area	Self observation
4	Kota	Kota city	Urban area	Sh. Rakesh Vyas (Pers. Comm. 2008)
5	Chittoragarh	Bassi WLS	Deciduous and Thorny forest in hilly areas	Self observation
		Mangalwar	Human habitation area	Self observation
6	Ajmer	Nag Pahad	Deciduous and Thorny forest in hilly areas	Self observation
		Dudhaleshwar (Todgarh-Raoli WLS)	*Anogeissus pendula* forest in hilly area	Self observation
7	Pali	Bada Gudu (Range Beejapur, Tehsil Sojat, Todgarh-Raoli WLS)	*Anogeissus pendula* forest in hilly areas	Self observation
8	Sawai Madhopur	Sultanpur forest outpost, Tehsil Sawai Madhopur	*Anogeissus pendula* forest in hilly areas	Dr. Dharmendra Khandal (Pers. Comm. 2010)
9	Rajsamand	Bhim	*Anogeissus pendula* forest in hilly areas	Self observation

* Wildlife Sanctuary ** Reserve Forest

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FURTHER NOTES ON OCCURRENCE OF SLENDER RACER *COLUBER GRACILIS* (GÜNTHER, 1862) IN RAJASTHAN, INDIA

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Slender racer *Coluber gracilis* (Günther, 1862) is a rare snake endemic to India. According to Whitaker and Captain (2004), this species has been recorded only from a few localities in India; Pune district, Nane Ghat and Phaltan, all in Maharashtra, Gujarat (Vyas *et al.* 2011) and Asirgarh in Madhya Pradesh. Rajasthan became the third state of country where this species was recorded from Jhadol area of Udaipur district in southern Aravallis (Sharma 2007; Sharma and Nagar 2007).

After its first record in the state, further surveys were conducted to know its distribution range. The findings of the surveys conducted from January 2005 to 2012 are presented in Table1.

As will be seen from Table 1, *C. gracilis* is present in the hilly forested areas of Udaipur, Rajasmand and Dungarpur districts. This species is sometimes seen inside human habitations also. Its first authentic occurrence in Rajasthan is from Jhadol area (Sharma and Nagar 2007). The northernmost authentic occurrence is from Todgarh-Raoli Sanctuary near Bhim. Aerial distance between Jhadol and Bhim is about 210 km (Fig 1). Bhim is a part of central Aravallis. The evidence indicated that *C. gracilis* is distributed in southern and central Aravallis. To know its distribution range more precisely, further studies are needed.

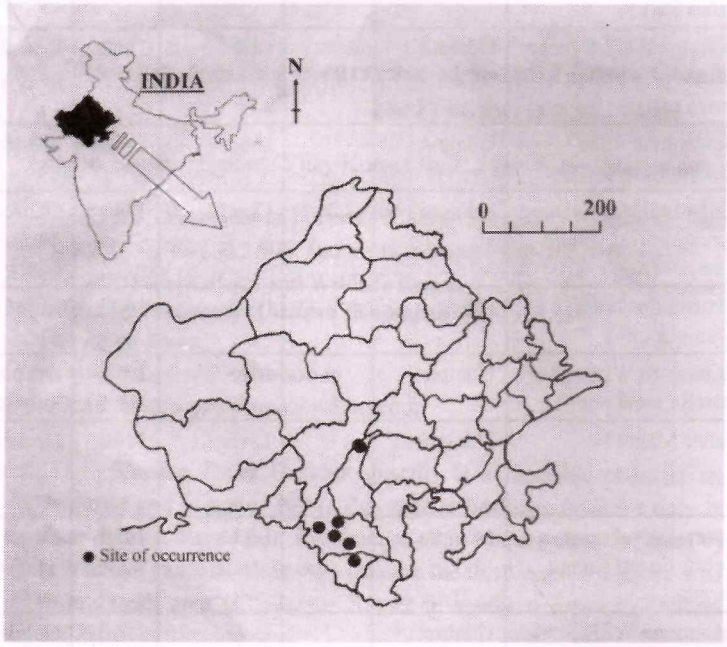

Figure 1. Localities of slender racer snake (*Coluber gracilis*) in Rajasthan.

Table 1. New records of slender racer (*Coluber gracilis*) in Rajasthan

Date	Locality of occurrence	District	No. of road-kills	Road-kill state	Obs. time	Habitat
17.09.2006	Aaspur	Dungarpur	1	Trampled on road	1030	Foot-hill teak forest in hilly zone
13.07.2008	Sajjangarh WLS[1] (near Safari Park)	Udaipur	1	Live	1300	Thorny forest
27.11.2009	Sajjangarh WLS (near cafeteria, at 930 m above msl)	Udaipur	1	Live	1200	Deciduous forest in hilly area
14.06.2010	Gowardhan vilas (Udaipur city)	Udaipur	1	Live	1830	Inside city
20.06.2010	Chirwa Ghata, Reserve Forest, Forest Range Udaipur (East)	Udaipur	1	Live	1130	Dense deciduous and Thorny forest in hilly area
01.07.2010	Laxmi vilas hotel (Udaipur city)	Udaipur	1	Live	1400	Inside city
25.08.2010	Sajjangarh WLS (near Gorella view point)	Udaipur	1	Live	1515	Deciduous forest in hilly area
27.01.2011	Nahar Magra*	Udaipur	1	Live	1400	Deciduous and Thorny forest in hilly area
09.07.2011	Keora-ki-Nal reserve forest, Forest Range Sarada	Udaipur	1	Live	1330	Dense deciduous and Semi-evergreen hilly forest
22.08.2011	Jaisamand WLS (Western edge of sanctuary)	Udaipur	1	Live	1300	Degraded deciduous forest in hilly area
28.09.2011	Jaisamand WLS (Near Gandi village)	Udaipur	1	Live	1400	Light deciduous forest in hilly area
18.01.2012	Todgarh-Raoli WLS (Eastern edge, near Bhim)**	Rajsamand	1	Live	1100	Light deciduous and Thorny forest in hilly area

Wildlife Sanctuary

* Captured by Sh. Pradeep Sukhwal, a snake and presented me for identification.

** Collected and photographed by Sh.P.S. Chundawat, Assistant Conservator of Forest, Todgarh-Raoli Wildlife Sanctuary and presented before me for identification.

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STUMPY TAIL : A CLUE FOR SEX IDENTIFICATION IN CERTAIN REPTILES

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During breeding season, infighting is seen among the males of various reptilian species like garden lizard (*Calotes versicolor*), common Indian monitor (*Varanus bengalensis*), and peninsular rock agama (*Psammophilus dorsalis*) to establish supremacy and to defend their territories. During this season, sometimes male-male wrestling combat lasts till one of them is defeated and the defeated individual runs away.

Male-male wrestling combat is an interesting phenomenon of reptilian breeding biology. This phenomenon has been studied in *Varanus bengalensis* by Auffenberg (1981).

While wrestling is going on, combatants bite each other till one of them turns and runs away as seen in *Calotes versicolor*. During this fighting, sometimes, both the combatant may sustain injuries (Daniel 2002; Sharma 2010).

During these fighting episodes, biting is a common act performed by the combatant males. Thick body parts like hand, trunk and lumbar zone are quite resistant to biting, but thin parts like distal end of tail, limbs, fingers and toes, which can be grabbed in the mouth are prone to biting injuries. Distal end of the combatant's tail is the most susceptible part of body to be bitten (Sharma 2010). When a severe bite happens on the tail of any combatant male, the distal portion of tail, beyond the bite mark, becomes dead and dry and ultimately lost leaving behind a stump. Seeing an animal with a stumpy tail, one can have a clue about the animal's sex and maturity – i.e., it is most probably an adult male.

A study was conducted by us from 2010 to 2011 in various parts of the country on stumpy tailed garden lizards, common Indian monitors and peninsular rock agamas to ascertain their sex. The findings are presented in Table 1.

Since females do not indulge in such type of fights, their tail and other body parts remain intact. However interspecific predation can also cause such tail loss and this can happen in females too.

Stumpy tail in common garden lizard, common Indian monitor and peninsular rock agama could be a clue for sex identification of the animal. If a lizard is seen with amputated tail, it gives an indication that it is an adult male and it was involved in combat with another male of its own species.

Table 1: Sex of stumpy-tailed reptiles of three species observed during the study period.

Sl. No.	Study Period	Species	Locality	Status of specimen	Total no. of stumpy tailed animals	Sex of stumpy-tailed animals	Basis of sex identification
1	May-June 2010	*Calotes versicolor*	Phulwari, Jaisamand Sajjangarh Wildlife Sanctuaries (Udaipur district)	Live	37	All male	Male were identified by bright scarlet colored head, shoulder and fore-leg with black patches on the side of the throat and prominent dorsal crest.
2	Aug. 2010	*Varanus bengalensis*	Kumbhalgarh Wildlife Sanctuary Sariska TR (Alwar dt., Rajasthan)	Trampled on road Live	2 2	Male Unknown	Gonads and prominent dorsal crest --
3	May 2011	*Psammophilus dorsalis*	Angul city (Angul dist. Odisha)	Trampled on road Live	1 17	Male Male	Gonads By seeing brilliant crimson red head and fore parts of the body and back else where (Fig.1).
4	Apr. 2011	*Psammophilus dorsalis*	Madanapali town and Horsley hills (Chittoor dist., A.P.)	Live	4	Male	As in 3
5	Apr. 2011	*Psammophilus dorsalis*	Bangalore city (Karnataka)	Live	2	Male	As in 3
6	Apr. 2011	*Psammophluis dorsalis*	Nandi hill (Chickballapur dist., Karnataka)	Live	1	Male	As in 3
				Total	66	Male 64, Sex Undetermined 2	

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OCCURRENCE OF MELANISTIC KING COBRA *OPHIOPHAGUS HANNAH* (CANTOR, 1836) (REPTILIA : ELAPIDAE) IN MIZORAM, NORTH EAST INDIA

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King Cobra *Ophiophagus hannah* (Cantor, 1836) surpassing 5 m in length is the longest venomous snake in the world (Das, 2008; Sharma, 2003; Smith, 2003; Whitaker & Captain, 2008). It is reported to be distributed in tropical and subtropical south and southeast Asia – in the Western Ghats (Karnataka, Kerala, Goa, and Tamil Nadu), Uttar Pradesh, Bihar, Orissa, Andaman Islands, North East India (Assam, Arunachal Pradesh, Mizoram), Indo China, Indo Burma, Bangladesh, Bhutan, Nepal and Philippines. (Daniel, 2002; Gharpurey, 2006; Das, 2008; Murthy, 1986; Sharma, 2003; Shaw *et al.*, 2000; Smith, 2003; Wall, 2000; Whitaker & Captain, 2008; Harit & Ramanujam, 2002; Harit, 2008; 2009; Mathew, 2007).

The dorsal body colouration of this species is reported as dark olive green or yellowish brown or brownish black with white or yellowish bands across (Daniel, 2002; Gharpurey, 2006; Das, 2002; Murthy, 1986; Sharma, 2003; Shaw *et al.*, 2000; Smith, 2003; Wall, 2000; Whitaker & Captain, 2008). Adults from Arunachal Pradesh are reported to be entirely bluish black without any bands (Whitaker & Captain, 2008). Mizoram in one of the North Eastern Hill states of India lies between 21°57' to 24°30' N latitude and 92°15' to 93°26' E longitude. It is surrounded by International boundaries with Myanmar in east, Bangladesh in the west, and in northern side by Manipur, Assam and Tripura states of India, thereby having a rich biodiversity as it lies in one of the biodiversity hotspots of the World / India – the Eastern Himalayas.

During a Coleopteran faunal survey in New Champhai area of Mizoram state, the author came to know that a king cobra had been killed in that area on the morning of 13th May, 2011. The killed snake was observed (Figs. 1 & 2). The snake had stout body with shining scales; body scalation 15:15:15, head with a pair of large occipital shields behind parietals, total length was 2.30 meters; and thus identified as a king cobra *Ophiophagus hannah,* based on literature available (Daniel, 2002; Gharpurey, 2006; Das, 2008; Murthy, 1986; Sharma, 2003; Shaw *et al.*, 2000; Smith, 2003; Wall, 2000; Whitaker & Captain, 2008). The snake was completely black in colour, without any traces of bands on the body as has been mentioned by several workers.

The king cobra has been listed in Scheduled II Part 2 of Indian Wildlife (Protection) Act, 1972, which gives high legal protection to this species in India. Though it generally occurs in deep forests, away from human habitation, it is also sometimes found near human habitation and this may be due to habitat destruction.

This is perhaps the first report of the occurrence of melanistic king cobra in Mizoram.

Figure 1. Melanistic king cobra (entire)

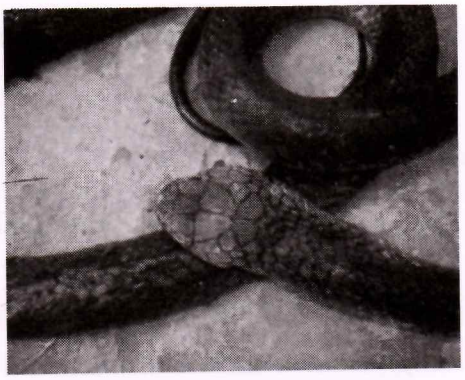

Figure 2. Closeup of head and forebody

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OBSERVATION ON MOULTING AND BREEDING BIOLOGY OF WHITE BARRED KUKRI *OLIGODON ALBOCINCTUS* (CANTOR, 1839)

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White-barred kukri snake *Oligodon albocinctus* (Cantor, 1839) is a small to medium-sized, non-venomous, predominantly nocturnal, hill-dwelling snake species distributed in north-eastern India and adjoining parts of south East Asian countries like Myanmar, Nepal and Bangladesh (Daniel, 2002; Das, 2008; Garpurey, 2006; Sharma, 2003; Smith, 2003; Whitaker and Captain, 2006). Studies on snakes in India have been done by several workers for a long time. However, the literature available on snakes of north-east India is scanty. Therefore, compared to the other widespread species of Indian kukri snakes, this one is relatively poorly-known.

Mizoram (21°57'-24°30'N; 92°15'-93°26'E) is one of the North Eastern Hill states of India, covered with tropical evergreen forests. Average annual rainfall here varies from 2160 to 3500 mm, and the altitude varies from 500 to 800 meters above mean sea level. The temperature of Champhai District of Mizoram, where my observations took place, ranges from 18 to 31°C.

During a reptilian survey of the area, a white-barred kukri snake *Oligodon albocinctus* (Figure 1) was observed in Champhai District of Mizoram, North East India, on 31st May. It was caught and identified based on its scalation and colouration which was compared with the literature available (Daniel, 2002; Das, 2008; Gharpurey, 2006; Mathew, 2007b; Sharma, 2003; Shaw, 2000; Smith, 2003 and Whitaker and Captain, 2006). Harit and Ramanujam, (2002) reported reptilian fauna of Mizoram state for the first time, thereafter Mathew (2007a) reported *Oligodon albocinctus* (Cantor) for the first time from the state of Mizoram, North East India.

Various studies are available on *Oligodon albocinctus*, but there has been no literature available from this region on moulting and breeding biology of *Oligodon albocinctus.* Hence it was decided to document the present observation on *Oligodon albocinctus* from this region.

The snake was caught and to note its behaviour, was maintained for a short period in captivity, in a plastic container of 21 x 11 x 9" size with a lid of 8.8 cm diameter, wherein some holes were made for proper ventilation. The snake was kept under constant watch and all the activities were noted carefully. The snake was periodically transferred to other clean containers of similar size. On completion of the study, the snake was released back to the place from where it was caught.

The observation recorded on moulting and breeding biology is as given below :

1. **Moulting** : First moult of the snake was noted on 27th June, which initiated from head region and proceeded further on to the posterior part of the body. Moulting was completed on the same day.

   Second moult was observed on 20th August, which also followed the same pattern of shedding, initiating from head region to tail region and was completed on the same day.

   An interval period of 54 days was noted between the first and second moults.

2. **Breeding Biology** : The snake after undergoing first moult on 27th June, laid two eggs, in morning hours on 21st July, which were observed and found sticking on the wall of the container. The mother thereafter was separated from the laid eggs.

Second batch of the two eggs was laid on the morning of 27th July, at an interval of 6 days, from first laying, which was also separated from the mother and transferred to another container. Adult and egg are shown in Figures 1 & 2.

Third batch of one egg was laid on 28th July, around 07.00 Hrs, which was eaten by the mother.

Fourth batch of one egg was laid on 30th July, in the morning hours, which was also separated from the mother.

Eggs measured 25-31 x 11-14 mm (Figure-2).

Details of the eggs are briefed in Table -1.

Table 1. Details of eggs laid by white-barred kukri snake *Oligodon albocinctus* (Cantor)

Sl.No	Date of egg laying	No. of eggs laid	Duration of inter-val	Remarks
1.	21 July	2	----	----
2.	27 July	2	6 days	----
3.	28 July	1	1 day	Eaten by mother
4.	30 July	1	2 days	----
Total		**6**	**9 days**	

Moulting : Complete shedding of moult of the body takes a day and successive moulting takes place at the interval of 54 days, in existing climatic conditions, in captivity, in Mizoram, North East India.

Breeding Biology : It has been affirmed from Table 1, that *Oligodon albocinctus* laid 6 eggs, over a period of 9 days in the month of July.

Oviphagous (egg eating) behaviour has also been observed in *Oligodon albocinctus*.

After complete egg laying, it underwent a second moult on 20th August, thereafter the snake was released back to its original place from where it was caught.

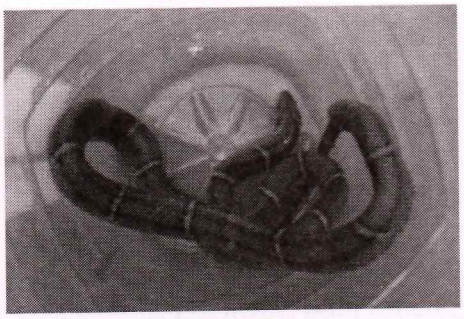

Figure 1. Female white-barred kukri snake

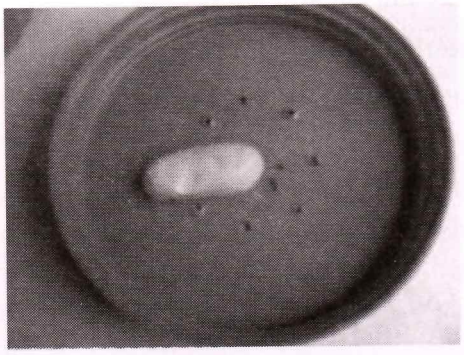

Figure 2. Egg of the white-barred kukri snake

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RANDOM HARVEST

Slowinski and the krait

As is well-known, snake venoms are primarily of two kinds: neurotoxic – venom of elapids like cobras and kraits – which disables the nervous system – and hemotoxic – venom of vipers—which destroys tissue. In an article on the subject in *California Wild* (2000) – quoted by Jamie James in *The Snake Charmer*, a book on the life and death of Joe Slowinski, Slowinski described the difference between the two types of toxins with black humour: "Neurotoxic proteins are extremely effective in bringing about death with minimal disturbance to the body. Viperid venoms, on the other hand, are messy, tearing apart tissue and literally melting cells. So an elapid venom is more likely to kill you but will leave a far prettier corpse".

In a tragic twist of fate, a year after he wrote thus, Slowinski himself was killed at the age of 38 by elapid venom when he was bitten by a many-banded krait (*Bungarus multicinctus*) while on a snake-hunting expedition in Myanmar.

* * * *

King cobra at the BNHS

Edward Hamilton Aitken (born 16 August 1851 in Satara, India, died 11 April 1909 Edinburgh) was in government service in the Salt Department in India.

EHA, as he was widely known, was one of the founder – members of the Bombay Natural History Society (BNHS). Of how the BNHS acquired a king cobra (*Ophiophagus hannah*), there is an account in the 1983 issue of *Hornbill* brought out to mark the centenary of BNHS:

"EHA had written from Kanara to say that one evening one of his subordinates in the Salt Department came to his bungalow with a snake trailing over his shoulder and told EHA 'I saw two big snakes fighting in the jungle – I smashed at them with a stick—one got away, but I killed this one and have brought it to you – What is it?' 'It is a King Cobra, and you have not killed it,' replied EHA. The much belaboured snake was put in a crate and sent by sea to the Society. 'It may not survive the journey' wrote EHA. 'If it does not, you will know it by the smell. If there be no

smell be careful'. There was no smell—and they were careful and the King Cobra lived at the Society for two years serving the cause of science by permitting—with a good deal of suasion—the snake men from the Parel Laboratory to remove his poison about once a month."

* * * *

New snakes sighted in Seshachalam Hills

Seshachalam hills comprising Tirupathi and surrounding hills of Eastern Ghats of southern India, has recently been declared as a Biosphere Reserve, the first for Andhra Pradesh state. Researchers and Forest Department Officials have, in recent years, sighted here four uncommon, little-known snake species – Elliot's shieldtail (*Uropeltis ellioti*), brown vine snake (*Ahaetulla pulverulenta*), slender coral snake (*Calliophis melanurus*) and a species of racer snake related to *Coluber gracilis* and not identified so far.

Until now, the team have documented from Seshachalam hills, a total of 27 species of snakes, 12 species of lizards and 13 species of amphibians.

* * * *

New species of amphibians and reptiles discovered from the Western Ghats

This year, four new species of herpetofauna, a caecilian, a frog, a lizard and a snake have been described, from the Western Ghats, further attesting to its significance as a biodiversity hotspot rich in endemicity. These discoveries come from varying parts of the Ghats, from the far south in Tirunelveli hills near Kanyakumari, northwards through Wayanad in Kerala, on to Karwar in Karnataka, Goa and Amboli in Maharashtra. The type localities of these new species represent all the five Indian states where the Western Ghats occur.

The new caecilian, since named *Gegeneophis primus* was discovered by a team of scientists Ramachandra Kotharambath from the University of Kerala, Oommen V. Oommen from the Central University, Kasargod, and David J. Gower and Mark Wilkinson from the Natural History Museum, London. The team reported their finding in a detailed paper in *ZOOTAXA*, vol. 3272, pp: 26-34. *Gegeneophis primus* belongs to the family Indotyphlidae consisting of African, Seychellean and Indian taxa.

The last *Gegeneophis* discovered from Kerala was in 1964. The team has discovered this new caecilian from Sugandhagiri Cardamom Estate adjacent to

forest patches in Vythiri of north Kerala's Wayanad district. The team has proposed the conservation status of this new species as 'data deficient' as per the IUCN Red List criteria. The suggested English common name for the new species is Malabar Cardamom Gegeneophis, in allusion to its provenance.

G. primus is only the third Indotyphlid caecilian species reported from Kerala after *G. carnosus*, described by Col. R.H. Beddome in 1870 and *G. ramaswamii* described by E.H. Taylor in 1964.

The new frog that was discovered is *Raorchestes kakachi*, found in (and named after) Kakachi, an evergreen forest atop hills in Kalakkad-Mundanthurai Tiger Reserve in Tamilnadu. Scientists Kadaba Shamanna Seshadri and Neelavara Anantharam Aravind from Ashoka Trust for Research in Ecology and Environment (ATREE) and Kotambylu Vasudeva Gururaja from the Indian Institute of Science (IISc.) have discovered and described this new bush frog. This report has been published in *ZOOTAXA*, vol. 3410, pp: 19-34. The frog is a small species reaching 24.7-25.8 mm (males) and 24.3-34.1 mm (females). The scientists describe the new bush frog to be predominantly brownish ranging from lighter ivory colour or darker shades, always with distinct dark brown blotches on thigh, upper arm and digits. Detailed ecolgoical data have been furnished including its advertisement call spectrum, oscillogram, microhabitat associations and activity patterns.

The new lizard discovered is *Dasia johnsinghi* from the same Kalakkad-Mundanthurai Tiger Reserve, but from much lower reaches, than inhabited by the aforesaid frog. A scientific paper reporting this new discovery authored by S. Harikrishnan, Karthikeyan Vasudevan, Anslem De Silva, V. Deepak, Niladri Bushan Kar, Albert Lalremruta, R. Rabheka Prasoona and Ramesh K. Aggarwal, from the Wildlife Institute of India, Amphibian and Reptile Research Organisation of Sri Lanka, North Orissa University, Nature Conservation Foundation Mysore and Centre for Cellular and Molecular Biology Hyderabad has been published in *ZOOTAXA*, vol. 3233, pp: 37-51. The name *johnsinghi* is in honour of the veteran Indian wildlifer Dr. A.J.T. Johnsingh who is a pioneer of wildlife studies in Kalakkad-Mundanthurai region. The scientists remark that the new species has previously been confused with other Sri Lankan and Indian species namely *Dasia haliana* and *D. subcaerulea* respectively. Genetic analysis revealed the specific distinction of the new species augmented by further differences in scalation and colouration. The team also recharacterized the Indian species *D. subcaerulea* based

on newly recorded specimens from Kudremukh in Karnataka – a new locality for this species.

Lastly, the new snake discovered and described is a species of venomous snake called Castoe's coral snake *Calliophis castoe*. A team of scientists including Eric N. Smith of the University of Texas at Arlington, USA, Hemant Ogale, a snake enthusiast from Maharasthtra, V. Deepak from the Wildlife Institute of India and Varad B. Giri of the Bombay Natural History Society discovered many specimens of this new species in the evergreen forests of Karwar, in Uttar Kanara district of Karnataka, Ambe Ghat of south Goa district in Goa and in Amboli, Sindudurg district of Maharashtra. These scientists report their finding, also in *ZOOTAXA*, in vol. 3437, pp: 51-68 in the form of a full-length scientific article. Along with these specimens an age old specimen in the Bombay Natural History Society Museum, already dealt with and discussed by old timers H.M. Phipson and G.W. Vidal way back in 1887 and 1890 was also studied and attributed to the new species. This new coral snake finding was termed a 'surprise' as it was recorded from both low and high land areas including well-populated towns along the Western Coast and the adjoining Ghats. The scientists named it *Calliophis castoe* not only in honour of a coral snake expert Todd A. Castoe but also because in Latin, the word *castus* means 'pure' – an allusion to its unpatterned back.

* * * *

Transitional snake fossil connecting lizards and snakes found

Scientists Nicholas R. Longrich, Bharat-Anjan S. Bhullar and Jacques A. Gauthier have, in the international scientific magazine, *NATURE,* published their finding of a jaw and teeth of an ancient fossil snake *Coniophis precedens.* These materials were previously unknown and hence undescribed for this snake, which was originally described solely based on an isolated vertebra. These new materials, originating from the Cretaceous period, i.e., about 70 million years ago, have now been studied and this has allowed the scientists to refine their previous conclusions about this species. The scientists have remarked that *Coniophis* is definitely not an anilioid snake (i.e., burrowing snakes with vestigial pelvis and rudimentary hind limbs) as previously believed, but certainly represent the oldest ever fossil snake known, as their jaw morphology suggests their evolution when in transition between lizards and modern snakes. *Coniophis* – now recognized as the most primitive known snake – is thought to have lived on "continental floodplain environment, consistent with a terrestrial, rather than marine origin." The team also remarked that the small

spines and reduced neural spines indicate the fossorial habits of *Coniophis* attesting that snakes evolved from burrowing lizards. One of the most remarkable features of *Coniophis* is that the features of its jaws namely, intra-mandibular joint, maxilla that is firmly united with the skull indicative of an "akinetic [i.e., immobile] rostrum" and hooked teeth are features distinctly intermediary between those of lizards and modern snakes. Ecologically, this anatomy is also suggestive of a burrowing life-style and a diet of relatively large but soft-bodied animals. The "snake-like body and a lizard-like head" of *Coniophis* puts this species in a special evolutionary niche between lizards and snakes.

–B. Vijayaraghavan

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iii) To aid and assist research on reptiles and amphibians including the conduct of surveys to assess their status and distribution.

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v) To canvass public support for the protection and conservation of reptiles and amphibians.

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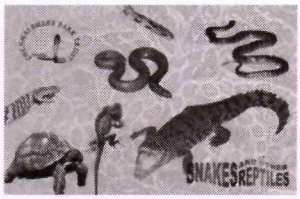

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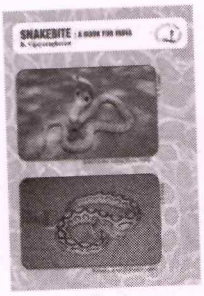

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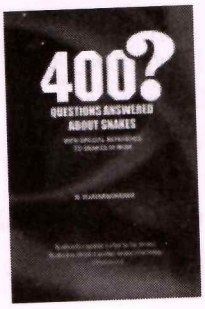

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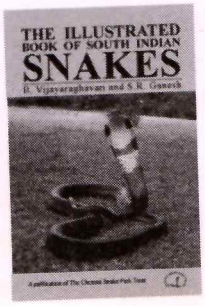

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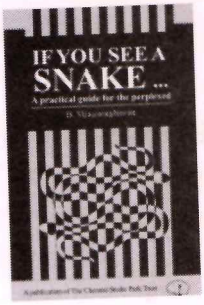

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