

REPETILE RAP

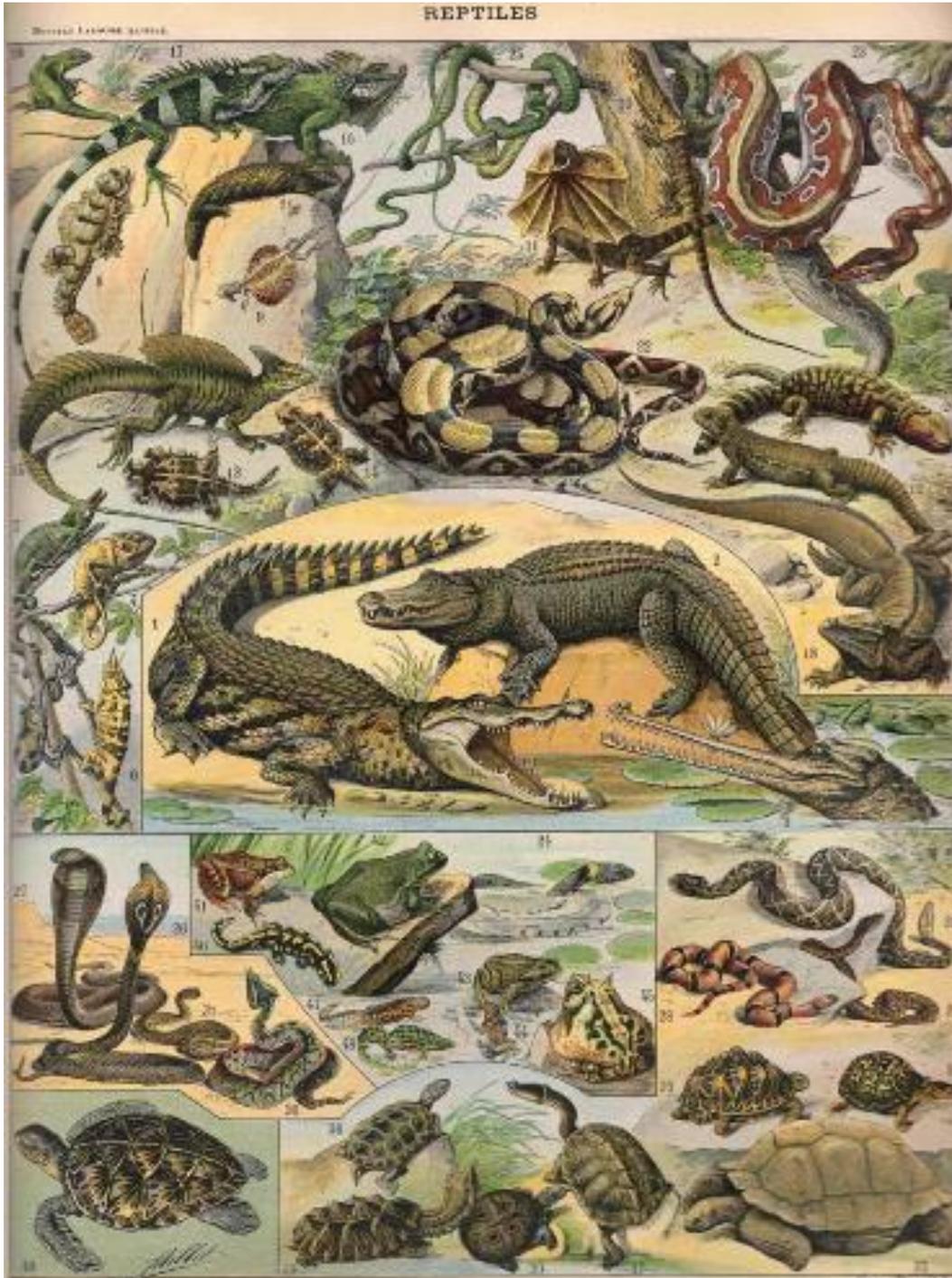
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Reptiles, illustration by Adolphe Millot. Source: Nouveau Larousse illustré, edited by Claude Augé, published in Paris by Librairie Larousse 1897-1904, this illustration from vol. 7 p. 263



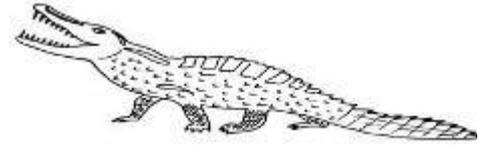
Lizard, 12. Uromastyx, 13. Thomy Devil, 14. Horned Lizard, 15. Common Basilisk, 16. Green Iguana, 17. Lesser Antillean Iguana, 18. Rhinoceros Iguana, 19. European Green Lizard, 20. Gila Monster, 21. Stump-tailed Skink, 22. Boa, 23. Python, 24. Grass Snake, 25. Ahaetulla nasuta, 26. Indian Cobra, 27. Naja haje, 28. African Grater Snake, 29. Asp, 30. Rhinoceros viper, 31. Cerastes cerastes, 32. Rattlesnake, 33. Indian Star Tortoise, 34. Eastern Box Turtle, 35. Galapagos Tortoise, 36. Emydidae, 37. Argentine Snake-necked Turtle, 38. Mata mata, 39. Trionychidae, 40. Loggerhead Sea Turtle, 41. Common Frog, 42. Bullfrog, 43. Toad, 44. Bombina, 45. Ceratophrys, 46. Fire Salamander, 47. Great Crested Newt, 48. Marbled Newt

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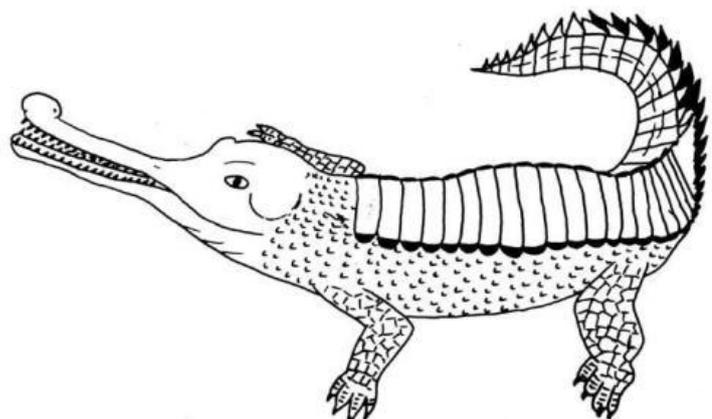
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Gharial



Illustrations by Sanjay Molur

A new record of the Cochin Forest Cane Turtle *Vijayachelys silvatica* (Henderson, 1912) from Shendurney Wildlife Sanctuary, Kerala, India

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The Cochin Forest Cane Turtle *Vijayachelys silvatica* (Image. 1a) is a highly cryptic, Endangered, forest-dwelling chelonian that is restricted to the evergreen and semi-evergreen forests of the Western Ghats in India (Groombridge et al. 1984; Asian Turtle Trade Working Group 2000; Vasudevan et al. 2010). The species is sexually dichromatic and dimorphic and grows to a maximum carapace length of 13cm. It rests under leaf litter and is not associated with perennial water sources (Moll et al. 1986;

Vasudevan et al. 2010). Visual encounter surveys suggest that the species could be rare (0.1-0.4 individuals per man-hour; see Groombridge et al. 1984; Whitaker & Vijaya 2009; Vasudevan et al. 2010). However, a study that included radio tracking suggests that it could be more abundant (Vasudevan et al. 2010). Accurate population estimates have been difficult to ascertain for this species due to difficulty in detecting them (Groombridge et al. 1984). *Vijayachelys silvatica* has been recorded in the states of Kerala,

Karnataka and Tamil Nadu (Vijaya 1988; Vasudevan et al. 2010). In Kerala, it has been recorded in Aralam Wildlife Sanctuary (WS), Peechi-Vazhani WS, Chalakudy Forest Division (FD), Parambikulam Tiger Reserve, Vazhachal FD, Malayattur FD (Pooyamkutty Reserve Forests), Idukki WS, Kulathupuzha Forest Range, Peppara WS and Neyyar WS (Vijaya 1988; Jose et al. 2007; Easa & Ramachandran cited in Deepak & Vasudevan 2009; Deepak & Vasudevan 2009; Vasudevan et al. 2010; Kanagavel

Image 1a. Cochin Forest Cane Turtle *Vijayachelys silvatica*





Image 1b. Carapace



Image 1c. Plastron

& Raghavan 2012 Fig. 1).

In this note, we describe a new distribution record of *V. silvatica* from Shendurney WS in Kollam District of Kerala that was established in 1984 (Shamsudeen & Mathew 2010). Shendurney WS comprises of tropical evergreen, semi-evergreen and moist deciduous forests and harbours populations of several species endemic to the Western Ghats (Andrews et al. 2005; Shamsudeen & Mathew 2010; Abraham et al. 2011).

While surveying plots of two hectare size (selected through random sampling) at the Shendurney WS for the presence of *V. silvatica* and *Indotestudo travancorica* (Travancore Tortoise), a single adult female of *V.*

silvatica was recorded from close to the Derbakulam area (8°54'N & 77°11'E) at an elevation of 458m. Species identity was confirmed from the hooked upper mandible, low three keeled carapace and dull pinkish marks on the head (Image 1a, b) and its gender from the flat plastron (Moll et al. 1986; Image. 1c). Its straight carapace length measured 11.5cm, carapace width 8.3cm, shell height 4.4cm, minimum plastron length 9.3cm, bridge length 3.7cm and it weighed 198g. Cloacal temperature was 23.3°C at 10:48am. When encountered, the individual was seen to be moving around in its habitat (Image 2). The location was 37m from the nearest stream and 51m from a mixed cluster of reed bamboo (*Ochlandra travancorica*) and chooral (*Calamus rheedii*). Humidity was 88%, air temperature 23.4°C and soil

temperature 22.6°C. Other microhabitat characteristics were moderate canopy and shrub cover, low herb cover, moderate a leaf litter cover and leaf litter depth of 1.1cm. The substratum was wet and rocky, on sloping terrain. When picked up, the individual urinated, defecated and withdrew into its shell. It also had algal growth and two ticks on its carapace.

Since *V. silvatica* has been previously recorded from the adjoining Kulathupuzha Forest Range in Kerala and Kalakkad-Mudanthurai Tiger Reserve in Tamil Nadu (Johnsingh 2001; Jose et al. 2007), the record from Shendurney WS was an expected one.

Human consumption is a threat to the species in this area as preliminary results of our questionnaire survey

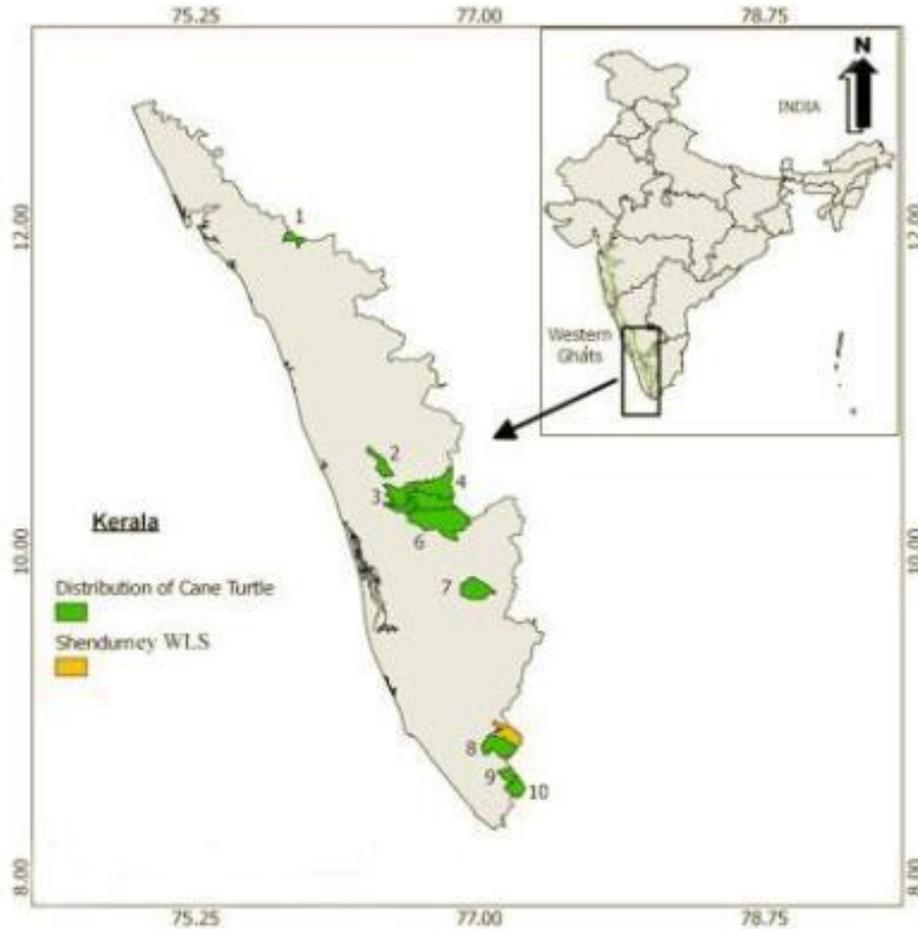


Figure 1. Known distribution and the new record of Cochin Forest Cane Turtle *Vijayachelys silvatica* in the protected areas of Kerala (Protected area identity is as per the sequence in text - Page 3)

suggests that *V. silvatica* is consumed; however, it is less frequently consumed than *I. travancorica* (A. Kanagavel, unpubl. data). Consumption by local communities has been reported from numerous other sites as well (Groombridge et al. 1984; Bhupathy & Choudhury 1995; Kanagavel & Raghavan 2012). While a few individuals were reported in the pet trade earlier; predation by other species, elephant trampling, forest fires, deforestation and dams are the other threats to the species faces

(Groombridge et al. 1984; Moll et al. 1986; Deepak & Vasudevan 2009; Kanagavel & Raghavan 2012).

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the manuscript, Josin Tharian (St. John's College, Anchal) for sharing maps of the area and Vijayalakshmi and P.A. Kanagavel for their help with overall logistics. This research was carried out with official permission from the Department of Wildlife and Forests, Kerala (WL 12-7326/2010) and financially supported by the Rufford Small Grants Foundation (9190-1).

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Image 2. Habitat where the Cochin Forest Cane Turtle *Vijayachelys silvatica* was encountered

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New Record of Elliot's Shieldtail (Gray, 1858) in Seshachalam Biosphere Reserve, Eastern Ghats, Andhra Pradesh, India

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Uropeltidae (Muller, 1832) is a family of charismatic, burrowing alethinophidian snakes endemic to peninsular India and Sri Lanka (Gans 1973, 1976, 1979; Cadle et al. 1990; Bossuyt et al. 2004). *Uropeltis ellioti* is reportedly widespread in the hills of peninsular India from south of Goa gap to Tirunelveli in the Western Ghats and along the Andhra-Odisha border to south of Eastern Ghats (Smith 1943; Rajendran 1985; Whitaker & Captain 2004). Specific locality records include, Shevaroy and Kolli Hills, South Arcot, Jalarpet of Tamil Nadu, Visakhapatnam District of Andhra Pradesh and Ganjam in Orissa in the Eastern Ghats (Smith 1943). In the Western Ghats, it has been reported from Manjolai (Tirunelveli), Courtallam and Anaikatty Hills in Tamil Nadu and Sevenmalai Hills, Kerala (Rajendran 1985; Kannan & Bhupathy 1997) and single record from Araku Valley, Andhra Pradesh (Chettri & Bhupathy 2010).

With this background, on 8 November 2011, at 2045hr during our field surveys, we sighted four *Uropeltis ellioti* species near the Community Based Eco-Tourism (CBET) complex close to Talakona Water falls, (13° 41'N & 79° 14'E) Chittoor District, Andhra Pradesh (Fig 1 & 2). During the time of sighting, it was raining

heavily, and spotted area was wet and cold. All the four specimen were found within a few meters. We collected the specimen, photographed and preserved it in 10% formaldehyde and scalation analysed. The specimens were identified based on descriptions available in the literature (Smith 1943; Schulz 1996; Daniel 2002; Sharma 2003; Whitaker & Captain 2004).

Seshachalam Hills, the first Biosphere Reserve in Andhra Pradesh, located in southern Eastern Ghats of Chittoor and Kadapa districts. It is spread over 4755.99km². The vegetation is a unique mix of the tropical southern dry mixed deciduous types. The elevation ranges from 150 to 1,130 m, the terrain is undulating, with deep forest-covered valleys. Tirumala Hills which are popularly known as the seven hills Lord

Figures 1 & 2. Location of *Uropeltis Elliot*

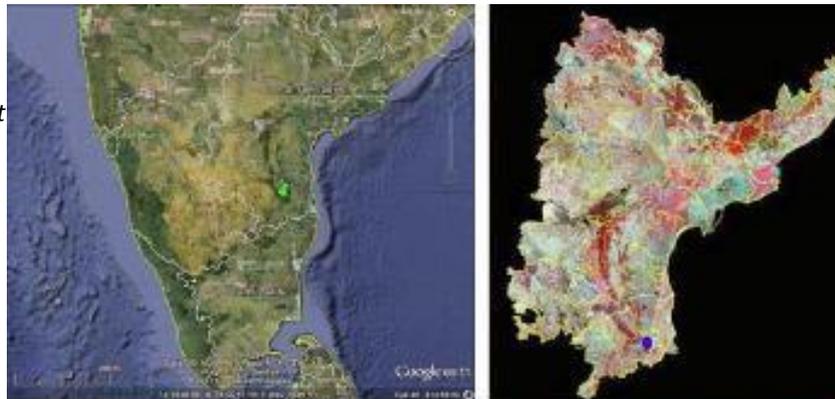


Image 1. *Uropeltis ellioti* (live photo);



Image 2. ventral view of the posterior portion;



Image 3. Caudal part of *Uropeltis ellioti*;



Image 4. Dorsal aspect of *Uropeltis*



Sri Venkateswara. The entire sanctuary is an uninhabited large chunk of dry deciduous Red Sanders bearing forest, forming catchments to Swarnamukhi and Penna rivers.

Description:

Uropeltis ellioti body scales in 17 rows throughout its total body length, 230mm, followed by 190mm, 240mm and 190mm, ventral scales, dark brown body powdered with minute yellow spots on the dorsum and larger blotches on the venter, distinct yellow line on the side of the neck, yellow stripe on each side of the tail connected by a transverse bar over the anal region and obliquely truncate tail forming a feebly u-shaped disc with multicarinate scales. Supra labial scales are 5 and 3rd scale touches eye. From the scale study, it is confirmed as a *Uropeltis ellioti*. (Image 1-4)

Status:

Uropeltis ellioti listed as Lower Risk-near threatened (Molur & Walker 1998).

The record of *Uropeltis ellioti* in Seshachalam Hills show our poor understanding on the distribution of fauna, and we recommend further studies in the Eastern Ghats at the earliest opportunity.

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First Record of Lined Supple Skink *Lygosoma lineata* (Gray, 1839) from Melghat Tiger Reserve, Maharashtra

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Melghat Tiger Reserve established in 1973 is situated in the southern offshoot of the Satpura mountain range (20°51'–21°46'N & 76°38'–77°33'E), total area is about 1676.93km²; it lies between two districts Akola and Amravati in Maharashtra (Narasimmarajan et al. 2011). Whilst 54 species of reptiles have been reported earlier in the Melghat region (Mahabal, 2005), this is first time that a *Lygosoma lineata* was recorded from this region and the present record increases the total count to 55 species of reptiles.

The Lined Supple Skink *Chiamela lineata* was described by Gray in 1839 without any specific locality. Later Boulenger, 1887 allocated it to the genus *Lygosoma*. This species was reported to occur in Bombay District between Poona and North Kanara (Smith 1935). It was later reported from Chidambaram District in Tamil Nadu, Salsette Island (Chari 1960), few records from Gujarat State (Naik & Vinod 1994; Gayen 1999; Vyas 2001, 2009) as well as Khopoli, Kolad, Nashik and Phansad Wildlife Sanctuary in the state of Maharashtra (Mirza et al. 2010). Here we present the first opportunistic record of *Lygosoma lineata* on 20 March 2011, from Melghat Tiger Reserve (21°16'05"N & 76°59'32"E) and also a new altitudinal record (630m) of the

species. This live specimen record shows that this species occurs not only in the Western Eastern Ghats, but also in Gujarat and in Melghat region and may indeed be a more wide spread species.

One specimen was captured under the leaf litter near Darghard Village, in the Melghat Tiger Reserve. About 14.0mm (TBL), the specimen was dark bluish with each scale marked with a central black dot forming longitudinal lines from head to tail; it may have been a juvenile.

We couldn't kill the specimen, only measurements and photographs were taken and thereafter the specimen was released immediately. Mirza et al. (2010) described that the *Lygosoma lineata* is mostly found under rocks, under driftwood and among leaf litter with other sympatric species like *Calliophis melanurus*, *Eutropis carinata*, *Eutropis macularia* and *Ramphotyphlops braminus*. The Lined Supple Skink also occurs in coastal forests and hilly regions with an altitude ranging from 150-457m. *Lygosoma lineata* is

Image 1. *Lygosoma lineata* (photographed on 20 March 2011 at Melghat Tiger reserve, Maharashtra)





Image 2. *Lygosoma lineata* seen here with its very small limbs

probably preyed upon by sympatric predators like giant centipedes *Scolopendra* sp. Slender Coral Snake *Calliophis melanurus*, and Dumeril's Black headed Snake *Sibynophis subpunctatus* (Mirza et al. 2010). Naik & Vinod (1994) stated that though not a rare lizard but its numbers are in decline owing to loss of habitat. Interestingly the present record gives a new altitudinal range of 630m, where the mixed deciduous forests exist.

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Image 3. *Lygosoma lineata* (close up)

Turtles of the Temple Pond of Kamakhya, Assam, India

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INTRODUCTION

Turtles and tortoises are represented by 327 species worldwide (Uetz 2012). There are 29 species of fresh water testudines known from India, 21 of which are reported from

northeastern India and 20 species being reported from the state of Assam (Ahmed et al. 2009). Most of the turtles known from Assam are threatened (Table 1) and unfortunately, turtles of northeastern India also suffers from unsustainable subsistence exploitation (Bhupathy et al. 1992).

Human intervention however, also has its positive impact in the conservation of such animals. Hindus believe turtles to be an incarnation of Lord Vishnu and hence revere them. Even Hindu clan names are derived from turtle ancestors. Religious shrines of the region also accommodate turtles in their pond. In northeastern India, noteworthy community temple ponds sheltering turtles include Garakhia Gohair Than, Sarbhog, Assam; Rajbari pond, Agartala, Tripura; Madhab Mandir, Hajo, Assam; Kamakhya Temple Pond, Guwahati, Assam; Nagshankar Temple, Biswanath Chariali, Assam; Athkhelia Namghar, Golaghat, Assam (Fig. 1).

This study was conducted in the temple pond of Kamakhya temple, the "Kaso Pukhuri" (Image 1) to ascertain the conservation advantages and limitations of such turtle repositories.

MATERIALS & METHODS

This study was conducted involving graduating students so as to generate interest on herpetological research which is lacking in this part of the world. The study was conducted in the month of October and November. A total of four surveys were made and the results shown are the averages. The identification of the turtles residing in the pond were made using Smith (1931). The physicochemical parameters included observation of biochemical oxygen demand (Miller 1914), dissolved oxygen content (Wrinkler 1888), pH (using an electronic pH meter ACM-34091-R), turbidity using Sekkhi Disc.

Table 1. Turtle and tortoise species reported from Assam, India

Scientific Name	English Name	IUCN	CITES
<i>Pangshura sylhetensis</i> (Jerdon, 1870)	Assam Roofed Turtle	EN	1
<i>Pangshura tecta</i> (Gray, 1830)	Indian Roofed Turtle	LC	1
<i>Pangshura tentoria</i> (Gray, 1834)	Indian Tent Turtle	LC	2
<i>Pangshura smithi</i> (Gray, 1863)	Brown Roofed Turtle	NT	2
<i>Melanochelys tricarinata</i> (Blyth, 1856)	Tricarinate Hill Turtle	VU	1
<i>Melanochelys trijuga</i> (Schweigger, 1812)	Indian Black Turtle	NT	--
<i>Morenia petersi</i> (Anderson, 1879)	Indian Eyed Turtle	VU	--
<i>Batagur dhongoka</i> (Gray, 1832)	Three-striped Roof Turtle		
<i>Hardella thurjii</i> (Gray, 1831)	Crowned River Turtle	VU	
<i>Geoclemys hamiltonii</i> (Gray, 1830)	spotted Pond Turtle	VU	1
<i>Cyclemys gemeli</i> (Fritz, Guicking, Auer, Sommer, Wink & Hundsdoerfer, 2009)	Asian Leaf Turtle	NE	--
<i>Cuora amboinensis</i> (Daudin, 1802)	South Asian Box Turtle	VU	2
<i>Cuora mouhotii</i> (Gray, 1862)	Keeled Box Turtle	EN	2
<i>Nilssonina nigricans</i> (Anderson, 1875)	Black Soft-shell Turtle	CR	1
<i>Nilssonina hurum</i> (Gray, 1830)	Indian Peacock Softshell Turtle	VU	1
<i>Nilssonina gangetica</i> (Cuvier, 1825)	Gangetis Soft-shell Turtle	VU	1
<i>Chitra indica</i> (Gray, 1830)	Narrow-headed Softshell Turtle	EN	2
<i>Lissemys punctata</i> (Bonnaterre, 1789)	Indian Flap-shelled Turtle	NE	2
<i>Indotestudo elongate</i> (Blyth, 1853)	Elongated Tortoise	EN	2
<i>Manouria emys</i> (Schlegel & Müller, 1840)	Asian Giant Tortoise	EN	2

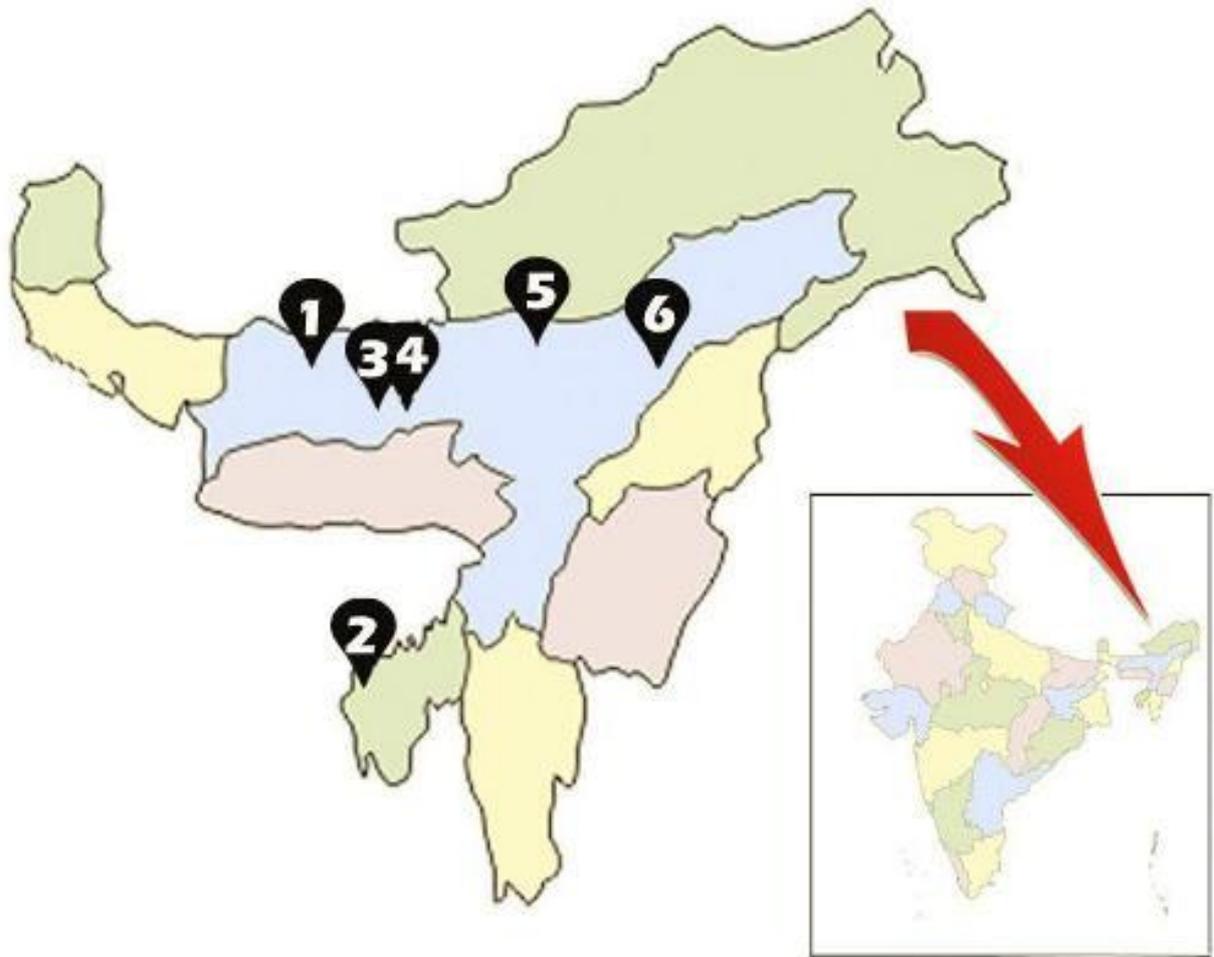


Figure1. A figure showing the map of northeastern India with marked locations of temple pond harboring turtles. 1: Garakhia Gohair Than, Sarbhog, Assam; 2: Rajbari pond, Agartala, Tripura; 3: Madhab Mandir, Hajo, Assam; 4: Kamakhya Temple Pond, Guwahati, Assam; 5: Nagshankar Temple, Biswanath Chariali, Assam; 6: Athkhelia namghar, Golaghat, Assam;

Secondary data were collected from the inhabitants of Kamakhya temple using a questionnaire.

RESULTS

Five turtle species were encountered in the turtle pond of Kamakhya temple, namely *Pangshura sylhetensis* (Jerdon, 1870), *Pangshura tecta* (Gray, 1831), *Pangshura tentoria* (Gray, 1834), *Nilssonia gangetica* (Cuvier, 1825), *Nilssonia hurum* (Gray, 1831), *Nilssonia nigricans* (Anderson, 1875). We, in our study, sighted as many as 45 turtles per visit on an average. Secondary data from the residents sets the figure

nigricans was the most frequently sighted species during our survey.

Species accounts on the turtles found are as follows:

Nilssonia nigricans (Image 2A)
Common name: Black Soft-shell Turtle
Habitat: Semi-aquatic, terrestrial, freshwater.
Characteristics: Carapace is olive or dark grey, slightly rough in appearance. Yellow/orange patches behind eye and across snout are lacking. Juveniles have Bangladesh, now in Bastami tank , Bangladesh.

Red List category: Critically Endangered

Nilssonia gangetica (Image 2B)
Common name: Indian Soft-shell Turtle, Ganges Soft-shelled Turtle
Habitat: This large softshell inhabits deep rivers, streams, and large canals, lakes and ponds with mud and sand bottoms.
Distribution: *Aspideretes gangetica* lives in the Ganges, Indus, and Mahanadi river systems in Pakistan, northern India, Bangladesh, and southern Nepal.
Distinguishing characters: The round to oval carapace (to 94cm) is olive or green, with or without black reticulations;

Image 1.

A: The temple pond of Kamakhya;
 B: Survey in Kamakhya temple pond;
 C: *Nilssonina nigricans* in the temple pond of Kamakhya, Guwahati, India.



yellow-bordered, dark-centered ocelli are not present, or are poorly developed, in adults, but are often well-developed in juveniles. Several longitudinal rows of tubercles occur on the juvenile carapace, but that of large adults is smooth. Carapacial bones have pitted surfaces. The plastron is gray to white or cream.

Red List Category: Vulnerable.

Nilssonina hurum (Image 2C)

Common Name: Peacock Soft-shelled Turtle

Habitat: Inhabits river channels, marshes and wetlands.

Distribution : Nepal, India, Bangladesh (in the Brahmaputra and Ganges rivers), Pakistan.

Distinguishing characters: Low and oval carapace, olive in colour with a yellow rim. Head large with black reticulation, large yellow or orange patch behind eye and one across

snout. Plastron white or light gray with five large callosities.

Red List Category: Vulnerable

Pangshura sylhetensis (Image 2D)

Common name: Assam Roofed Turtle

Habitat: Inhabit slow flowing river, standing water bodies, streams. Seen basking in a group.

Distribution: Northeastern India, West Bengal, Bhutan and Bangladesh.

Red List Category: Endangered

Distinguishing characters:

Carapace greatly elevated, brownish olive dorsally, an S shaped red to orange coloured stripe present behind eyes.

Pangshura tecta (Image 2E)

Common name: Indian Roofed Turtle

Habitat: Inhabit river and standing

water bodies, seen basking on banks, logs.

Distribution: Pakistan, India (Ganges, Brahmaputra and Indus River drainages), Bangladesh and Nepal.

Distinguishing characters:

Carapace elevated, slightly elongated, brownish dorsally, a yellow border along marginals.

Red List Category & Criteria: Lower Risk/Least concern.

Pangshura tentoria (Image 2F)

Common name: Indian Tent Turtle
Habitat: Inhabit both large and small rivers.

Distribution: Bangladesh, India, Nepal and Pakistan.

Distinguishing characters:

Brownish olive dorsally with a pink or lighter pleuro-marginal ring. Reddish post ocular spot between eye.



Image 3. Turtle species encountered in the Kamakhya temple pond, Guwahati, India.

A: *Nilssonina nigricans*, B: *Nilssonina gangeticus*, C: *Nilssonina hurum*, D: *Pangshura sylhetensis*, E: *Pangshura tecta*, F: *Pangshura tentoria*

Red List Category: Lower Risk-least concerned.

Physically, the pond water on first observation does not appear very clean mainly due to litter of non biodegradable materials such as plastics as well as bits of food articles offered by the devotees to the turtles in the pond.

Owing to this the pond water emits a foul odour on closer observation. The colour of the pond water is muddy brown and it is often coated by a greenish algal layer. The surroundings, on the other hand, appear to be clean, although its perimeter was seen to be littered with papers, bread crumbs, plastics, wheat balls, banana peels, etc. which gives

an unhealthy appearance to the pond. Adequate basking places for turtles, such as logs of wood, branches of trees, rock surfaces was found bordering the pond as well as on the water surface.

The length of the pond was found to be 38 metres and breadth of 29m.

REPTILE RAP #15, January 2013

The average pH of the pond water at midpoint of the pond was 6.9 and that of at the end point is 6.8. The pond appeared to be less transparent on apparent observation. The Average turbidity of the pond water showed the pond to be turbid or nil transparency at 44cm depth. The amount of BOD was 6mg/l indicating a certain degree of pollution in the sample. The average amount of dissolved oxygen in the water was 1.98mg/l on the first day and 1.10mg/l on the fifth day. The results indicated depletion in the dissolved oxygen content. There is a considerable difference in DO from Day1 to Day5 (0.88mg/l) which specify oxygen consumption by microbes etc. in the water sample thereby indicating pollution in the water of the pond.

DISCUSSION

The turtle pond of Kamakhya is very significant in terms of its turtle fauna especially because it is one of the very few places where *Nilssonina nigricans* is housed. *Nilssonina nigricans* is under EW category of IUCN, which means that the turtle is extinct in the wild. This makes the conservation of this pond even more important and critical for the existence of this turtle species.

The turtles present here do not constitute a natural population and are released by devotees of goddess Kamakhya to this pond. It is believed that when a child is born devotees donate turtles to this pond as a part of ritual to ensure that the new born attains a long life. This belief is rather helping conserve the turtles

in the pond where in people are even not allowed to bring the turtles out of the pond. The apparent threat faced by these turtles is the outcome of lack of awareness regarding turtle biology on the part of the devotees and the management committee (run by the priests of the temple). Food offered by devotees in many cases are seen to be ones which is not the diet of the turtle. It thereby gets rotten and adds to the organic waste of the pond. Many nonbiodegradable wastes such as plastic wrappers of food items, aluminium foils could be seen floating on the pond surface, which probably make their way through offerings of the devotees. The pond also shows a very high density of turtles in a very confined area. There are no proper breeding sites for the turtles.

To avoid such conservational issues arising from lack of knowledge and awareness, a training programme on turtle management should be organised for the management committee. A dos and don'ts hoarding should be displayed for the visitors. Offering of food by visitors should be discouraged. Breeding sites should be built in consultation with experts. Some of the turtles should be shifted or released into natural habitat.

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Inventory and Natural History of Lizards in Jeypore Reserve Forest, Assam

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INTRODUCTION

Tropical forests are the planet's most biologically diverse ecosystems (Lewin 1986). Northeastern India is a biodiversity hotspot and possesses tropical evergreen forests. In Assam, 59.4% of the total forest area is categorized as reserve forest (RF). Thus, for the study of biodiversity of northeastern region, it is convenient to concentrate in the reserve forests (Sengupta et al. 2000). The Assam Valley Tropical Wet Evergreen Forest (Champion & Seth 1968) of Jeypore is located in eastern Assam and among the last remaining lowland rain forests in northeastern India (Kakati 2004). Faunal and floral characteristics of this reserve forest have attracted

biologists' attentions from British colonial period. *Oligodon erythrorhachis* and *Dendrelaphis gorei* were described from Namsang, Jeypore by British herpetologist Frank Wall in the year 1910. Thereafter, no such investigation has been made by any herpetologist.

The remarkably rich lizard fauna of sub-tropical forest in Assam has been the subject of a few investigations and the present knowledge is based mainly in publications which were decade old (Gogoi et al. 2001). No detailed study has been carried out so far from Assam and only 44 species (Ahmed et al. 2009) have been reported from northeastern region. The present study mainly emphasized to evaluate the lizard diversity and natural history

in Jeypore Reserve Forest of Assam for conservation.

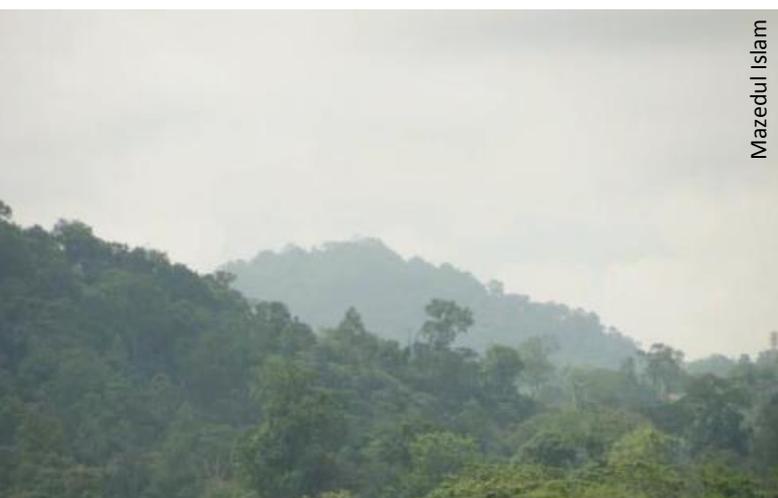
MATERIAL & METHODS

Study area

The study has been carried out in Jeypore Reserve Forest (Fig. 2) located in Dibrugarh District of Upper Assam lying between 27006'–27016'N & 95021'–95029'E. The study area was notified as a reserve forest way back in 1888. The total area of the RF is 108km² of which, 20km² falls under the Dihing Patkai Wildlife Sanctuary that was declared in June 2004. The terrain of the area varies with slightly undulating plains to hills which are the foothills of the Patkai Range. The reserve forest is continuous with the forests of Arunachal Pradesh. Burhi Dihing, Namsang and the Dilli rivers are the main rivers forming a part of the boundary of the reserve. Many small perennial streams and nullahs also flow within the forest. Swamps and grassland patches also occur inside the forest.

The forest is a contiguous forest tract with Upper Dihing RF, Dirak

Image 1a. Woodland



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Image 1b. Grassland





Image 1c. Perennial water body



Image 1d. Bamboo patches

RF, Dilli RF, Makumpani RF, Desali RF and Digboi West Block expanding over three districts of upper Assam namely Dibrugarh, Tinsukia and Sivsagar districts. The area forms the largest contiguous tropical rainforest extant in the whole of Brahmaputra Valley (Choudhury 1996).

Although the forest is located in a matrix of tea plantations, settled agriculture and rural settlements, the degree of disturbance is much less when compared to other protected areas of the state. The peripheral areas of the forest is encroached by the local people for tea plantations but the core area of the forest is intact and without any disturbance. A vast portion in the central part of the RF is relatively inaccessible due to the dense vegetation (Image 1a,b,c,d), hilly terrain and lack of forest trails. The RF is relatively undisturbed in terms of intrusions and disruptions by humans, although logging activities have taken place in the past.

Soil type is alluvium of the Brahmaputra and the Burhi Dihing

river, the former being almost neutral while the latter is acidic (Kakati 2004). Shallow soils are common with underlying rocks and boulders. Sub-soils in the foothills consist of mostly boulders and pebbles, under a layer of sandy loam over which lies a layer of humus. The foothills along the Buri Dihing River in the south are made up of upper tertiary rocks, the

Tipam sandstone, rich in oil deposits (Das 1965; Chand 1990; Choudhury 1995).

The study area has a tropical climate characterized by high humidity, heavy rainfall and cold weather starting from November till February (Kakati 2004). It receives rainfall from the south-

Table 1. List of lizards with some morphometric measurements (one individual), microhabitats and status [C = Common; r = Rare (>5) NM = Not measured].

	Species	SVL (mm)	TL (mm)	Microhabitat	Status in study area
1	<i>Hemidactylus frenatus</i>	42	47	Trees, houses	C
2	<i>Hemidactylus brookii</i>	52	64	Trees, houses	C
3	<i>Hemidactylus garnotii</i>	59	66	Trees	r
4	<i>Hemidactylus platyurus</i>	51	61	Trees, bridge	C
5	<i>Cyrtodactylus khasiensis</i>	77	92	Bridge, forest floor	C
6	Gekko gecko	133	112	Trees	r
7	<i>Calotes versicolor</i>	92	262	Garden	C
8	<i>Ptyctolaemus gularis</i>	67	158	Forest floor, tree barks	C
9	<i>Draco norvillii</i>	68	124	Trees	r
10	<i>Lygosoma albopunctata</i>	59	83	Near human habitation	r
11	<i>Eutropis multifasciata</i>	110	203	Leaf litter, forest floor, near human habitation, stream	C
12	<i>Eutropis macularia</i>	74	65	Leaf litter, forest floor, Near human habitation	C
13	<i>Sphenomorphus maculatus</i>	69	101	Leaf litter, stream	C
14	<i>Sphenomorphus indicus</i>	75	130	Leaf litter	C
15	<i>Takydromus khasiensis</i>	58	190	Bushes, forest floor	C
16	<i>Varanus bengalensis</i>	NM	NM	Forest floor, stream	C
17	<i>Varanus salvator</i>	NM	NM	River side	r
18	<i>Varanus flavescens</i>	NM	NM	River side	r

west monsoon (May–September) and the north-east monsoon (December–April). The monsoon lasts till September, but occasional rains occur throughout the year. Heavy rainfall occurs during July and August. Winds are generally of moderate velocity. Thunderstorms occasionally occur in March–April. The average annual rainfall ranges between 2314–2400 mm. There is relatively dry period between November–February. Average annual maximum temperature ranges from 23 to 36 °C and average annual minimum temperature ranges from 11 to 27 °C. Weather data for the study duration was obtained from the weather station at Namsang Tea Estate, near Jeypore Reserve Forest.

Methods

Field study has been carried out between January–December 2009. Observations were made by walking along forest trails or streams at all times of the day following active search methods and opportunistic observation methods. Lizards were recorded while observing on the ground or trees or potential microhabitats like leaf litters, crevices, beneath the bark, among the base of trees and dead trees

lying on the ground, holes in the base of the hill slope, wetlands, river beds and all of which were abundant around the study area and might possibly provide shelters for lizards. The lizards were caught, identified, photographed, measured the SVL (Snout to Vent Length) and TailL (Tail Length) and released in the same place thereafter. An identification was made only after examining the escalation in detail and obtaining morphometric measurements where needed as per the standard identification guide. Identification of the species was done using the identification keys of Smith (1935) and Das (2003) Common English name of Lizard species follows Das (1997, 2002) and Ahmed et al. (2009). We also noted GPS locations of every species encountered during survey.

RESULTS

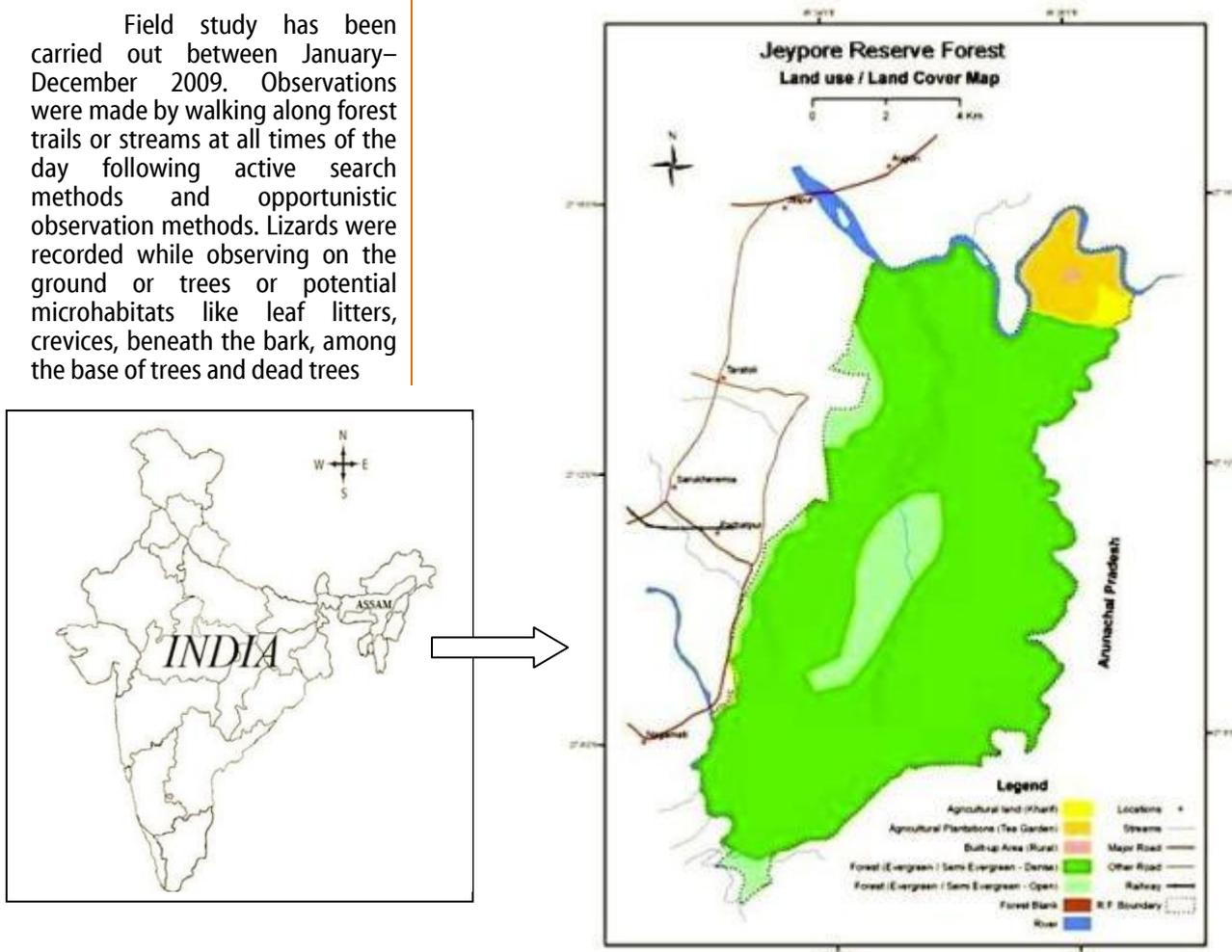
Lizard Diversity

Altogether 301 individuals were encountered belonging to 18 lizard species. The lizards were captured for measurements and photographed during the study. All the 18 identified lizard species belongs to five families comprising of six gekkonids, five scincids, three agamids, three varanids and one lacertid (Table 1). Among the identified lizard species one species was a range extension and another species was rediscovered after 116 years.

Range Extension

The species *Takydromus khasiensis* Boulenger, 1917 was

Figure 1. Land-use and land-cover map of Jeypore Reserve Forest.





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Eutropis multifasciata (juvenile)



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Eutropis multifasciata (adult)

earlier reported from Barail WS by Das et al. (2009) and this was the only locality in Assam. But we found a healthy population in the Jeypore RF.

Rediscovery

The species *Draco norvillii* was described by Alcock in 1895 from Dum Dooma locality of Assam. After that, the species has been reported by certain workers from Arunachal Pradesh and Myanmar (Uetz et al. 2012). However, since 1895, there was not a single report of *Draco norvillii* from the state of Assam. We recorded one adult female and one juvenile from Jeypore RF that shows that viable population still survives in Assam.

Species accounts

Family: Scincidae

1. Many-lined Grass Skink *Eutropis multifasciata* (Kuhl, 1820)

It was commonly found in the study area. The body measurements of the species were: SVL 110mm, TL 203mm and 40 individuals were encountered. We encountered the first individual of the species on 17 March 2009 at 08:20h in Tipam Mandir (27015'00"N & 95024'56"E). The species was subsequently recorded from Charaipung, Namsang Mukh and Dilli Ghat. Most of the sightings of the species were from the forest edge or disturbed habitats within the forest, secondary

and degraded forest areas and roadside areas. The species was also observed in breeding colouration with light orange flank with prominent white spots. The juveniles were recorded in the month of May. The edges of the flank scales in juveniles were white and that was crescent shaped and the margins of the labials were black.

2. Bronze Grass Skink *Eutropis macularia* (Blyth, 1853)

It was commonly found in study area. The body measurements were: SVL 74mm, TL 65mm, and we encountered 20 individuals. We captured a gravid female from Namsang Mukh (27014'56"N & 95025'04"E) that

Eutropis macularia (adult)



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Eutropis macularia (juvenile)



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Sphenomorphus maculatus (breeding colour)



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Sphenomorphus maculatus (non-breeding colour)

laid three eggs in captivity and was collected from leaf litter near the forest edge and disturbed habitats at 13:15h on 14 March 2009. The species were also seen in breeding colouration in the month of May. During breeding season, the flank becomes dark orange in colour and the white spots appear distinct. The juveniles were seen in the month of July. The flanks and limbs of juveniles were black with prominent white spots.

3. Spotted Litter Skink
Sphenomorphus maculatus (Blyth, 1853)

It was commonly found in study area. SVL 69 mm, TL 101mm and we encountered 45 individuals.

We encountered the first individual at 12:54h on 14 March 2009 from Namsang Mukh (27014'51"N & 95025'18"E), from the bank of evergreen forest stream. *S. maculatum* in breeding colour was also recorded on 15 July 2009 at 11:00h near Charaipung which was basking in the sun-flecks on the leaf litters. Another individual was recorded from Namsang Mukh trail while crossing the road on 7 August 2009 at 08:30h and was in breeding color. The juveniles were frequently encountered in the month of June.

4. Himalayan Litter Skink
Sphenomorphus indicus (Gray, 1853)

It was common in study area. SVL 75mm, TL 130mm and 10 individuals were encountered. The first individual was recorded from Mohonsingh area (27013'28"N & 95025'28"E) at 09:39h on 15 March under the leaf litter. The species was also sighted in the Charaipung and Central Road. The habitat was dense and sunlight could not reach the forest floor. There was no significant difference in colouration among the adults and juveniles. The juveniles were first observed during the month of July.

5. White-spotted Supple Skink
Lygosoma albopunctata (Gray, 1846)

It was uncommon in study



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Sphenomorphus indicus (adult)



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Sphenomorphus indicus (juvenile)



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Lygosoma albopunctata (adult)

Lygosoma albopunctata (juvenile)

area. The body measurements of the species were such as, SVL 59mm, TailL 83mm and four individuals were encountered. The first individual was recorded from Nagaghat (27015/00'N & 95024/56'E) area just after the sunset (18:15h) while crossing the road. The species was not found inside the forest area. One female was also caught and laid three eggs in the captivity. The species shows colour variation during different stages of life. During breeding season the flanks become dark yellow colour with prominent white spots and the body of the juveniles becomes bronze colour and tail orange colour.

Family: Agamidae

6. Indian Garden Lizard *Calotes*

versicolor (Daudin, 1802)

It was commonly found in study area. SVL 92mm, TL 262mm and 10 individuals were encountered. Although this species is a forest edge and fencerow species, it is not abundant in the forest and mostly associated with human modified habitats (27014/54'N & 95024'56"E), 12:30h, 15 March 2009. Individuals were sighted from tea gardens, roadside vegetation, forest-habitation and forest-agriculture field edges. Most of the sightings were in arboreal situations up to 2–5 m above ground.

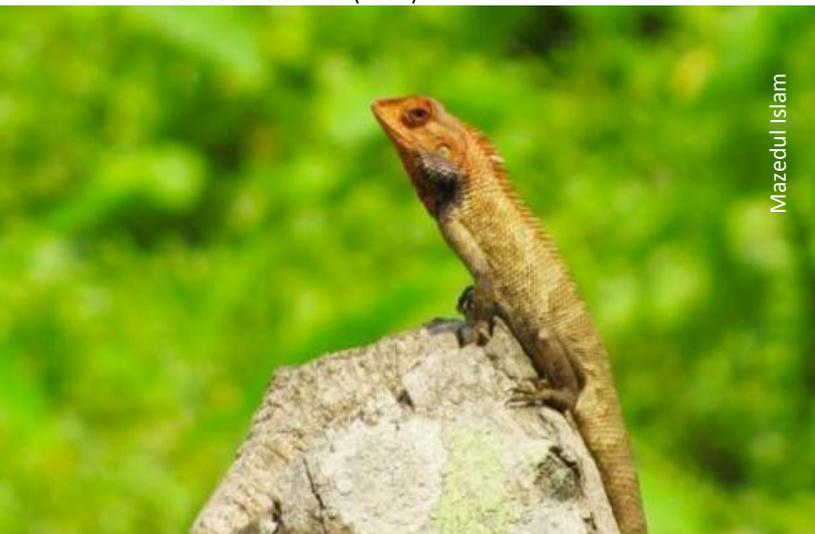
7. Blue-throated Lizard *Ptyctolaemus gularis* (Peters, 1864)
It was common in study area.

SVL 67mm, TL 158mm and 11 individuals were recorded. The first individual was recorded from tree trunk 1m above the ground on Central road (27012'03"N & 95027'03"E) area on 16 March 2009 at 08:29h. We also recoded it from Tipam Mandir area, Hapkata and Beka Dalang area. Most of them were female which can easily be identified from its bar like structure on the blue spot in the gular pouch and the male by dark blue round spot. The juveniles were recorded in the month of May.

8. Norvill's Flying Lizard *Draco norvillii* Alcock, 1895

It was rarely found in study area. SVL 68mm, TL 124mm and two individuals were encountered. The

Calotes versicolor (adult)



Mazedul Islam

Calotes versicolor (sub-adult)



Prasanta Kumar Saikia



Ptyctolaemus gularis (adult)



Ptyctolaemus gularis (juvenile)

first individual encountered, was a juvenile found lying near the roots of *Dipterocarpus macrocarpus* at 11:00h in the Hapkata area (27012'44"N & 95026'31"E) in the month of September. The juvenile was seen with its umbilical cord basking in the sunlight on the ground. Another female was recorded from a tree 4m above the ground basking in the morning light of December. Head wider than long; nostril directed upward; nine supralabials; the tympanum half covered with small scales; gular appendage of female is yellow in colour and less than the length of head (2/3 of head length); five ribs supported the patagium on each side; caudal crest absent and the lateral side of the tail denticulated; the lateral margins of forelims and hind limbs

were with thorn like scales; the distance between the armpit to groin 34mm.

Body grayish above, a more or less distinct light transverse bars across the middle of the back. The base of the gular pouch was scarlet in colour. The neck and head regions were with greenish markings. Patagium of the female with numerous white spotted lateral lines and vertical yellow broken lines. The upper half of the patagium was black in colour and lower half was scarlet. The belly was yellowish in colour. The tail was with alternate white and black bands. In case of juveniles the upper part of patagium was grayish in colour and lower part was orange.

Family: Gekkonidae

9. Asian House Gecko *Hemidactylus frenatus* Duméril & Bibron, 1836

It was commonly found in study area. SVL 42mm, TL 47mm and 30 individuals were encountered. The first individual was sighted on the tree trunk 1m above the ground at 11:30h on 19 September 2009. The species are mostly seen in the forest camps inside the forest and on the *Ficus* trees near the forest edges. This species was also recorded from roadside vegetation near the tea garden.

10. Brook's House Gecko *Hemidactylus brookii* (Gray, 1845)

It was common in the study area. SVL 52mm, TL 64mm,

Draco norvillii (adult female)



Draco norvillii (juvenile)





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Hemidactylus frenatus



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Hemidactylus brookii

five individuals were encountered. Brook's House Gecko was first recorded from the abandoned forest camp near Nagaghat at night on 1 April 2009 at 20:00h. The lizard is also subsequently recorded from human habitation near to RF. The lizard was mainly seen during the night time as it is nocturnal in activity.

11. Garnot's Gecko *Hemidactylus garnotii* Duméril & Bibron, 1836

It was uncommon in the study area. SVL 59mm, TL 66mm and number of individual encountered was two. The first individual was recorded from bamboo near human habitation during day time (2:00h) on 25 September 2009 in Hapjan. The body and limbs were marked

with white spots and the spots were larger in the tail region in compare to the body and limbs.

12. Flat-tailed Gecko *Hemidactylus platyurus* (Schneider, 1792)

It was common in the study area. SVL 51mm, TL 61mm and five individuals were encountered. The first individual was recorded from tree hole of *Vatica lanceaefolia* 2m above the ground during day time on 7 September 2009 from Hapkata. After two days we again recorded two individuals, one male and one female from a tree hole of same species which was full of termites from the same locality.

13. Khasi Hills Bent-toed Gecko *Cyrtodactylus khasiensis* (Jerdon, 1870)

It was commonly found in study area. SVL 77mm, TL 92mm and seven individuals were encountered. The first individual was recorded from Kothalguri area from forest floor on 2 August 2009. Later we recorded more individuals from that area from different habitat. The lizard was also seen in the wooden bridge during our night survey.

14. Tokay Gecko *Gekko gekko* (Linnaeus, 1758)

It was uncommon in the study area. SVL 133mm, TL 112mm and only two individuals were

Hemidactylus garnotii



Mazedul Islam

Hemidactylus platyurus



Mazedul Islam



Cyrtodactylus khasiensis (adult)



Gekko gecko (adult)

during the entire survey periods. The first Tokay gecko was recorded from a Ficus tree which was calling during day time (9:00h) in the Dilli Ghat (27008'33"N & 95022'35"E) area (Namrup). The Tokay gecko was only recorded from the westernmost boundary of the forest near the Dilli River.

Family: Lacertidae

15. Khasi Hills Long-tailed Lizard *Takydromus khasiensis* Boulenger, 1917

It was commonly found in the study area. SVL 58mm, TL 190mm and number of individuals recorded was 100, the first individual whom we recorded was from Golmari (27010'38"N & 95027'27"E) area from the road side which was foraging on the

ground on 13 May 2009 at 12:30h. Later we recorded many individuals from Natun Ali, Central Road, Shilikha Road, Mohan Singh Road. We observed that the colouration changed during the course of time. During May the colour of the flank was white and later it changed to green. We have seen that the juveniles were also with green colouration. From the observation we found that the colouration changed in the breeding season.

Family: Varanidae

16. Bengal Monitor *Varanus bengalensis* (Daudin, 1802)

It was commonly found in the study area. Five individuals were encountered during the study

period This species is often seen during breeding seasons (August–September). They lay eggs in the termite mound and gourd their eggs from nearby trees. The first individual was recorded from Huguri Pathar (27009'30"N & 95027'38"E) area and the species subsequently recorded from Tipam Mandir, Central Road and Naharjan area.

17. Yellow Monitor *Varanus flavescens* (Hardwicke & Gray, 1827)

It was rarely found in the study area. Only one individual was recorded during the entire survey periods. The only individual was recorded from Hati Muta stream (27012'59"N & 95026'35"E). The species is very rare due to hunting pressure.

Takydromus khasiensis (breeding colour)



Takydromus khasiensis (non-breeding colour)





Rajeev Basumatary

Varanus bengalensis



Rajeev Basumatary

Varanus salvator

18. Water Monitor *Varanus salvator* (Laurenti, 1768)

It was uncommon in the study area. Only two individuals were encountered during the survey. The first individual was recorded near from Golmari Beel (27009'28"N & 95027'45"E, 200m). This species is consumed locally and this is a real threat to the species.

DISCUSSION

The high diversity of lizard fauna in Jeypore reserve forest indicates the high potentiality of the habitat in eastern Assam. However, most of the records and collections of lizards are entirely dependent on opportunistic sightings, road killed and upon chance encounters in their natural habitats and the complete inventory is rarely possible. Certainly, there are some species, especially the arboreal, nocturnal and secretive ones that have not been adequately sampled or listed.

It also indicates that, the species richness is higher than any other forest of northeastern India based on numbers sighted in a single forest patch (see Das et al. 2009; Pawar &

Birand 2001). Among all the 18 species recorded in Jeypore Reserve forest, the distributions of three species are only reported from a single locality in Assam, viz., *Varanus flavescens* was only recorded from Kaziranga National Park, *Takydromus khasiensis* from Barail Hills (Das et al. 2009) and *Draco norvillii* from type locality Doom Dooma (Alcock, 1895).

Present study also opined that, the lizards are uncommon within the forested habitat. The most abundant species are those that are associated with the forest edge or disturbed habitats within the study area. *Sphenomorphus maculatus*, *Eutropis multifasciata*, *Eutropis macularia*, *Hemidactylus frenatus* and *Takydromus khasiensis* are the most abundant species in the study area. *Varanus flavescens* and *Draco norvillii* are the two rarest species only three individuals were recorded during entire survey period.

The species *Lygosoma albopunctata*, *Sphenomorphus maculatus*, *Sphenomorphus indicus*, *Eutropis multifasciata* and *Eutropis macularia* are observed foraging under

the leaf litter or basking in the sunflecks besides the road. Again, *Ptyctolaemus gularis* are mainly found in the dense forest foraging on the forest floor or basking on the tree trunks. The species *Calotes versicolor* are usually observed in low shrubs or tree trunk in the forest edge and fencerows of the tea gardens. Again, *Hemidactylus frenatus*, *Hemidactylus brookii*, *Hemidactylus garnotii* are human commensals, they are mainly found in and around the forest camps of the study area. However, the species *Takydromus khasiensis* are found in the bushes in the open canopy areas inside the forest or roadside. *Varanus* are mainly sighted near the streams and termite mounds during breeding seasons where they lay their eggs. A detailed study will likely reveal more numbers of species with ecological and behavioral characters from this area in near future.

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Snake diversity and voluntary rescue practice in the cities of Gujarat State, India: an evaluation

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areas located in the outskirts of the city, including numbers of snake species (Purkayastha et al. 2011). A few species of snakes have adapted to human habitation, especially in the suburban backyards, urban gardens, roofed houses (old style) and open sewages. Thus, urban habitation acts as advantageous habitat for few snake species, in terms of food and shelter.

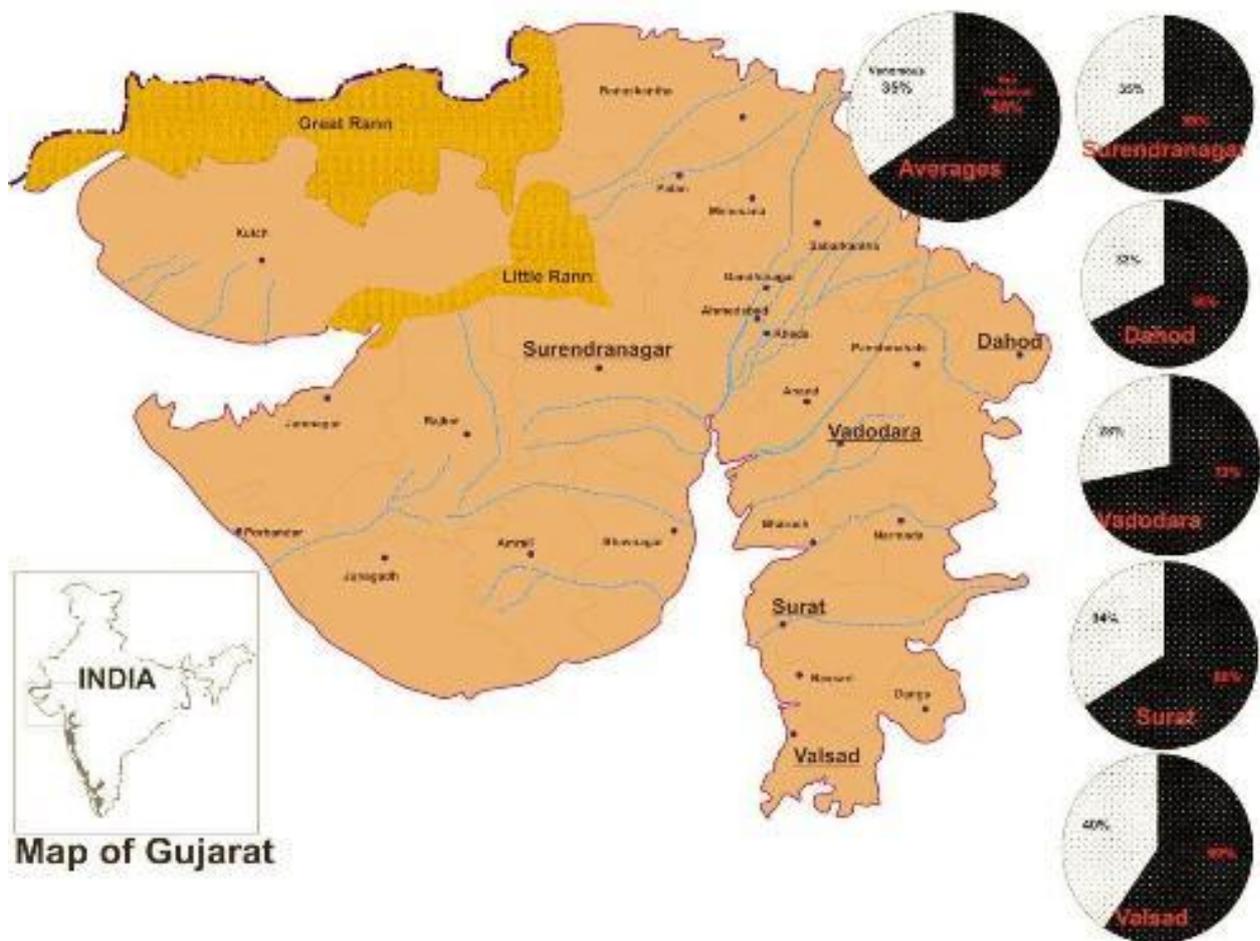
INTRODUCTION

The Reptilian fauna is one of the targeted faunas facing trouble due to anthropogenic developments (Gibbons et al. 2000). An urban development or expansion victimizes reptiles firstly,

ultimately resulting in the deterioration of the fauna by habitat destruction or alteration. Such situation ends up with too many reptilian species co-existing with the urban world (McKinney 2006). This has raised the numbers of reptilian species in the newly developed urban

The Indian snake fauna is very rich and diversified. Whitaker & Captain (2004) listed about 275 species belonging to 11 families of snakes found

Figure 1: The geographical position of Gujarat within India and location of five urban cities of Gujarat. Pie-chart presenting the percentage of rescued snakes from each city.



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Table 1. The list of NGOs of Gujarat, India included in 'snake rescue database' and details obtained from each:

Name of organization	Category of urban area	Geographical location of the organization	Data	Data period	Type of information
Animal Saving Group, Valsad	Big Town	Western Ghats, 5A Malabar Plains, South Gujarat	P	June 2000 to July 2004	Species wise Month Wise
Nature Club Surat, Surat	Big City	Western Ghats 5A Malabar Plains, South Gujarat	P	Jan. 2001 to Dec. 2003	Species Wise
Gujarat Society Privation of Cruelty Animals, Vadodara	Big City	Central Gujarat	P	Jan 2000 to Dec. 2004	Only annual figures
Dahod Prakruti Mandal, Dahod	City	4B6 Malwa Plateau Eastern Gujarat	P	Jan. 2001 to Dec. 2004	Species Wise
Sundervan, Ahmedabad	Mega City	Central Gujarat	N	Data not Supplied	---
Nature Club, Bhavnagar	Big City	4B5 Gujarat-Rajwada, Saurashtra Peninsula	N	Data not Supplied	---
Savannah Conservation Society, Surendra Nagar	City	4B5 Gujarat-Rajwada Saurashtra Peninsula	P	Jan 2001 to Dec 2004	Species Wise
Nature Club Madhopur, Porbandar	Town	4B5 Gujarat-Rajwada Saurashtra Peninsula	P*	Data not Supplied	---

P = Provided; P* = only scattered information; N = No Data

within the political boundary of India. All snake species are legally protected under Indian Wildlife (Protection) Act, 1972 from Schedule I to Schedule IV (Vyas 2007b). In spite of this legal protection, many snake species are killed brutally, especially in the rural areas of India. The layman kills snakes due to ignorance regarding environmental conservation, laws regarding protection of snakes and the significance of snakes in nature. There are frequent incidents where a snake enters a house or a garden and the sight of any snake is a frightening situation for a common man. The observer immediately panics and either gets rid of it or kills it. But a few sensible people act wisely instead of panicking, believing that the snake should not be hurt and should be safely moved out of their property. They immediately call for the snake rescuers, either from the Fire Brigade, Forest Department

or from some local non-government organization (NGO).

Today, a number of NGOs are working dedicatedly towards conserving snakes. These NGOs run awareness and education programs, along with the service of rescuing wild animals and in particular snakes, especially in the developed cities of Gujarat. These NGOs work day and night (24x7) and rescue a large number of animals. In addition to rescuing snakes, they also translocate animals from urban areas to the 'suitable habitats'.

Many of the NGOs maintain meticulous records of their activities. Such data may provide valuable information on the local diversity, abundance and distribution of species, and type of threats to urban wildlife. Therefore, I circulated request notes and

questionnaires (personally) to a few NGOs to know which and what numbers of snakes' species inhabit these cities of Gujarat along with an attempt to know the style of work of these NGOs. It will also help to know their approach towards wildlife.

Literature review indicated that snake rescuing practices occurred in a few cities of foreign countries and a few Indian states, including Assam (Bongaigaon: Soud 2010; Das et. al. 2006), Gujarat (Bhavnagar: Gohil 1983; Vyas 1987a,b; Ahmedabad: Urfi 1999, 2005; Anon 2006, 2008; Surat: Desai 2006) and Madhya Pradesh (Ujjain: Husain 2008).

MATERIALS AND METHODS

A request note and a questionnaire were circulated to a

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Figure 6: Python release event at a reserved forest area of south Gujarat by a snake rescue team.

few NGOs, working voluntarily for reptile conservation and rescue from human habitation. These questionnaires had forms to tabulate the numbers and species of reptiles rescued during the last five years (2000 to 2004). On that request note, I received the 'Snake Rescued Data' from NGOs of five cities of Gujarat. The data included species and year wise rescue, which was further analyzed with the help of 'MS Excel' and the results presented are here. The data also consists of the geographical location of specific NGOs and the working style and records maintained by each NGO.

The Data and Limitations

An appeal note was circulated to eight NGOs, of which, five NGOs responded positively

and provided information and data regarding the work and rescue of snakes. The 'Snakes Rescue Data' obtained from all five NGOs was not as per the required format. As for Gujarat Society Prevention of Cruelty to Animals, Vadodara (GSPCA), the data only provides the total number of non-venomous and venomous snakes rescued, without any species details, and therefore, the data is excluded from the comparative analysis. It was considered only for the calculation of total number of non-venomous and venomous snakes rescued from the state. The Savannah Conservation Society, Surendranagar; Dahod Prakruti Mandal, Dahod and Nature Club, Surat provided the species details and year-wise data. The data

received from Animal Saving Group, Valsad contains specific rescue records with necessary month- and year-wise dates in the details. The overall obtained data and other summarized information pertaining to NGOs are mentioned in Table 1. Hereafter, the NGOs are referred by the city of their location (Figure 1).

Also, the unbalanced information marks the bias towards the work and the priority of the species in various acts of snake rescue. Therefore, usage of such data needs caution in evaluation before an outcome of any conclusion.

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Table 2. The non-venomous, venomous and total snakes rescued from five cities of Gujarat State, from 2000 to 2004

City	Year	Non Venomous	Venomous	Total
Valsad	2000	172	92	264
	2001	620	358	978
	2002	797	533	1330
	2003	715	650	1365
	2004	590	335	925
	Total	2893	1968	4861
	Average	578.6	393.6	972.2
Surat	2001	176	80	256
	2002	137	63	200
	2003	75	59	134
	Total	388	202	590
	Average	129.33	67.33	196.66
Vadodara	2000	574	183	757
	2001	627	180	807
	2002	491	252	743
	2003	552	268	820
	2004	631	239	870
	Total	2875	1122	3997
	Average	575	224.4	799.4
S'nagar	2001	314	144	458
	2002	200	165	365
	2003	339	144	483
	Total	853	453	1306
	Average	284.33	151	435.33
Dahod	2001	123	50	173
	2002	117	59	176
	2003	136	46	182
	2004	49	49	98
	Total	425	204	629
	Average	106.25	51	157.25
Total of five city		7434	3949	11383
Average of five city		1486.8	789.8	2276.6
Yearly Average		334.69	157.96	492.65

RESULTS

Numbers of Snakes

Within this five-year period (2000-2004), a total of 11,383 snakes have been rescued from five cities (Valsad, Vadodara, Surat, Dahod and Surendranagar) of the state, of which 35% are venomous snakes. The highest

number of snakes rescued was in the year 2003 with 2,964 snakes, and the lowest in 2000 with 1,021 snakes from the urban area. Location wise, the highest number of (4,861) snakes were rescued from Valsad and the lowest of (590) snakes was from Surat City (Table 2). Totally 3,949 venomous

snakes from five species were rescued with an average of 157.96 snakes per annum. In 2003, the highest number of rescued venomous snakes was 1,167 and in 2000, the lowest of rescued venomous snakes was 275.

Species Diversity

A grand total of 7,407 snakes of 22 species belonging to six families were rescued from four cities namely Valsad, Surat, Dahod and Surendranagar, including five species belonging to two families of venomous snakes. The highest diversity of snakes was recorded in year 2002 with 22 species and the lowest in year 2000 with 19 species (Table 3).

The number of snakes rescued is the reflection of the diversity of snake fauna of the specific area. Highest diversity with 20 species were rescued at Valsad City and lowest diversity with 11 species were rescued from Surendranagar City (Figure 2).

Snakes Rescued from Valsad City

Totally 4,862 snakes were rescued of 20 species belonging to six families, including 1968 snakes of five species of venomous snakes by Animal Saving Group, Valsad, with an annual average of 972 snakes. These numbers show the diversity of the snakes in the city. The most commonly rescued species was *Naja naja* with 1,188 individuals found and the rarest species was *Trimeresurus* sp. of which only three specimens were found. The highest number of snake rescued was in 2004 and the least number of snake rescued was in 2000. Each species of snake rescued is mentioned in Table 4.

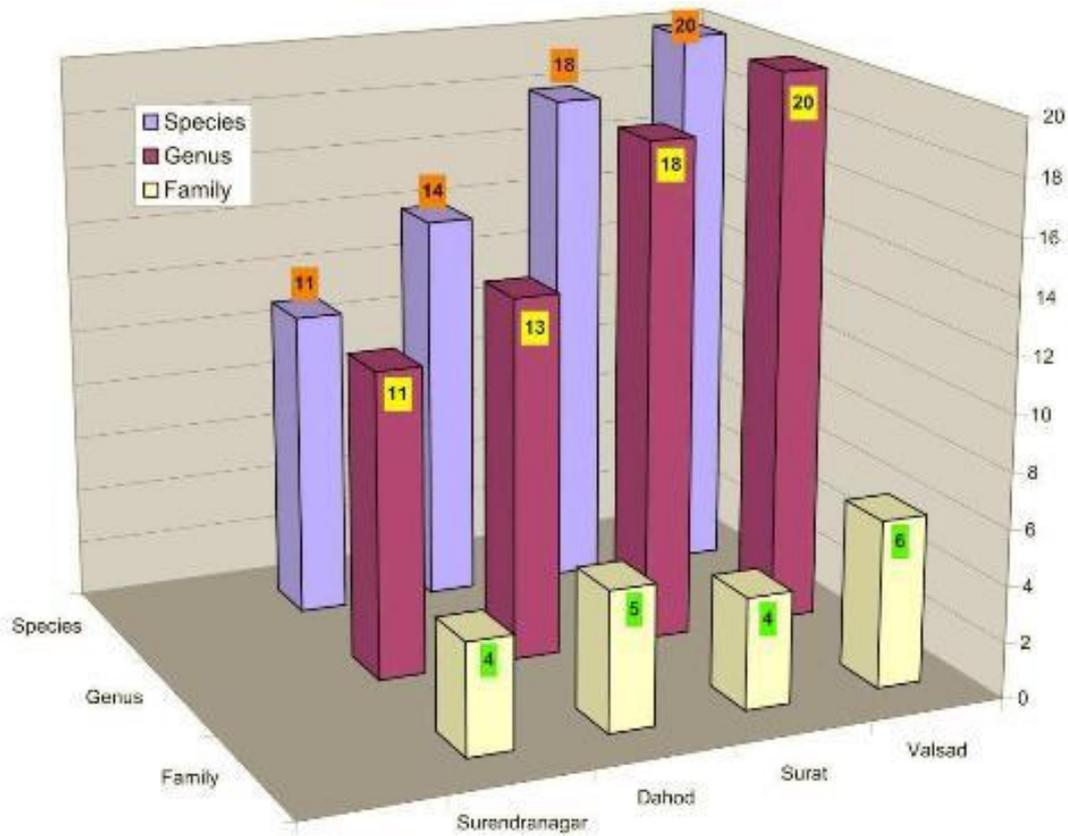


Figure 2: The snake diversity recorded at four urban areas of Gujarat State by snake rescue practice of NGOs.

The monthly analysis of snake rescue data from June 2000 to May 2004 shows co-relation with seasons, comparatively higher number of snake rescues during summer and winter than in monsoon. After monsoon, the snakes rescue figures gradually increase up to the month of January and again decrease a little, rising in May and again decreasing in the month of August (Figure 3). The month-wise snake rescue (mean) of each species (mean) depicts that the highest number of *N. naja* and *P. mucosa* were rescued during the month of May, and the highest number *P. molurus* and *X. piscator* were rescued in the month of February. Whereas, more number of *D. russelii* and *C. helena* were rescued during the months of January and July, respectively (Figure 4).

Snakes Rescued from Surat City

A total of 590 snakes were rescued from 17 species belonging to four families, including 202 snakes from four species of venomous snakes by Nature Club, Surat, with an average of 196.66 snakes per year. *Daboia russelii* was the most common species rescued with 73 snakes and the lowest number of snake species rescued was a single *Macropisthodon plumbicolor*. In 2001, the highest number of snakes rescued was recorded and the lowest number of snakes rescued was in 2003. Each species of snake rescued from 2001 to 2003 has been mentioned in the Table 5.

Snakes Rescued from Dahod City

629 snakes were rescued from 14 species belonging to five

families, including 204 snakes from two species of venomous snakes by Dahod Prakruti Mandal, Dahod, with an average of 157.25 snakes per year. The highest number of *Xenochrophis piscator* were rescued (246 individuals) and the lowest numbers of *Boiga trigonatus* and *Oligodon taeniolatus* were rescued, i.e., two snakes from each species. Maximum snake rescue was in 2003 and minimum snake rescue was in 2004. Each species of snake rescued from 2001 to 2004 is mentioned in the Table 6.

Snakes Rescued from Surendranagar City

Total 1326 snakes were rescued from 11 species belonging to four families, including 453 snakes from three species of venomous snakes by

REPTILE RAP #15, January

Table 3. The species wise list of snakes rescued from 2000 to 2004 at four urban cities of Gujarat, State

	Species Name	2000	2001	2002	2003	2004	Average	Total
	TYPLOPIDAE							
1	<i>Ramphotyphlops braminus</i>	1	4	10	9	7	6.2	31
	BOIDAE							
2	<i>Gongylophis conicus</i>	10	70	57	39	9	37	185
3	<i>Eryx johnii</i>	8	44	67	66	14	39.8	199
	PYTHONIDAE							
4	<i>Python molurus</i>	13	98	94	114	67	77.2	386
	COLUBRIDAE							
5	<i>Ahaetulla nasuta</i>	4	27	28	16	20	19	95
6	<i>Amphiesma stolatum</i>	16	57	43	46	13	35	175
7	<i>Argyrogena fasciolata</i>	8	2	13	13	10	9	46
8	<i>Boiga trigonata</i>	12	15	20	30	29	21.2	106
9	<i>Cerberus rynchops</i>	0	0	2	0	0	0.4	2
10	<i>Dendrelaphis tristis</i>	7	28	34	23	42	26.8	134
11	<i>Coleognathus helena</i>	16	171	190	205	96	135.6	678
12	<i>Lycodon aulicus</i>	5	161	130	159	14	93.8	469
13	<i>Macropisthodon plumbicolor</i>	2	9	17	20	5	10.6	53
14	<i>Oligodon arnensis</i>	4	19	13	12	9	11.4	57
15	<i>Oligodon taeniolatus</i>	0	1	1	0	0	0.4	2
16	<i>Ptyas mucosa</i>	45	254	361	264	188	222.4	1112
17	<i>Xenochrophis piscator</i>	21	273	191	249	116	170	850
	ELAPIDAE							
18	<i>Bungarus caeruleus</i>	11	65	36	97	26	47.2	235
19	<i>Naja naja</i>	46	432	563	549	259	369.8	1849
	VIPERIDAE							
20	<i>Daboia russelii</i>	32	106	204	214	93	129.8	649
21	<i>Echis carinatus</i>	3	29	16	35	5	17.6	88
22	<i>Trimeresurus gramineus</i>	0	0	1	4	1	1.2	6
	Total no. of Snakes	264	1865	2090	2164	1023	1481.4	7407
	Total no. of Species	19	20	22	20	20		

Savanna Conservation Society Nature Club, Surendranagar, with an average of 442 snakes per year. The highest number of snakes, 409 *N. naja* were rescued and the lowest was a single *Bungarus caeruleus* snake rescued. The highest number of snake rescue was in 2003 and the lowest snake rescue was in 2002. Each species of snake rescued

from 2001 to 2003 is mentioned in Table 7.

Ranking of the Species

Frequently found snake species within the area reflects the status of the specific species. The most abundant species found common in the urban areas of Gujarat are as follows:

Common Spectacled Cobra *N. naja*, Rat Snake *P. mucosa*, Checkered Keelback *X. piscator*, Common Wolf Snake *L. aulicus*, Red Sand Boa *E. johnii* and Russell's Sand Boa *G. conicus* (Figure 5).

And most rare snake species observed are the Dog-faced Water Snake *C. rynchops*, Russell's Kukri *O. taeniolatus*

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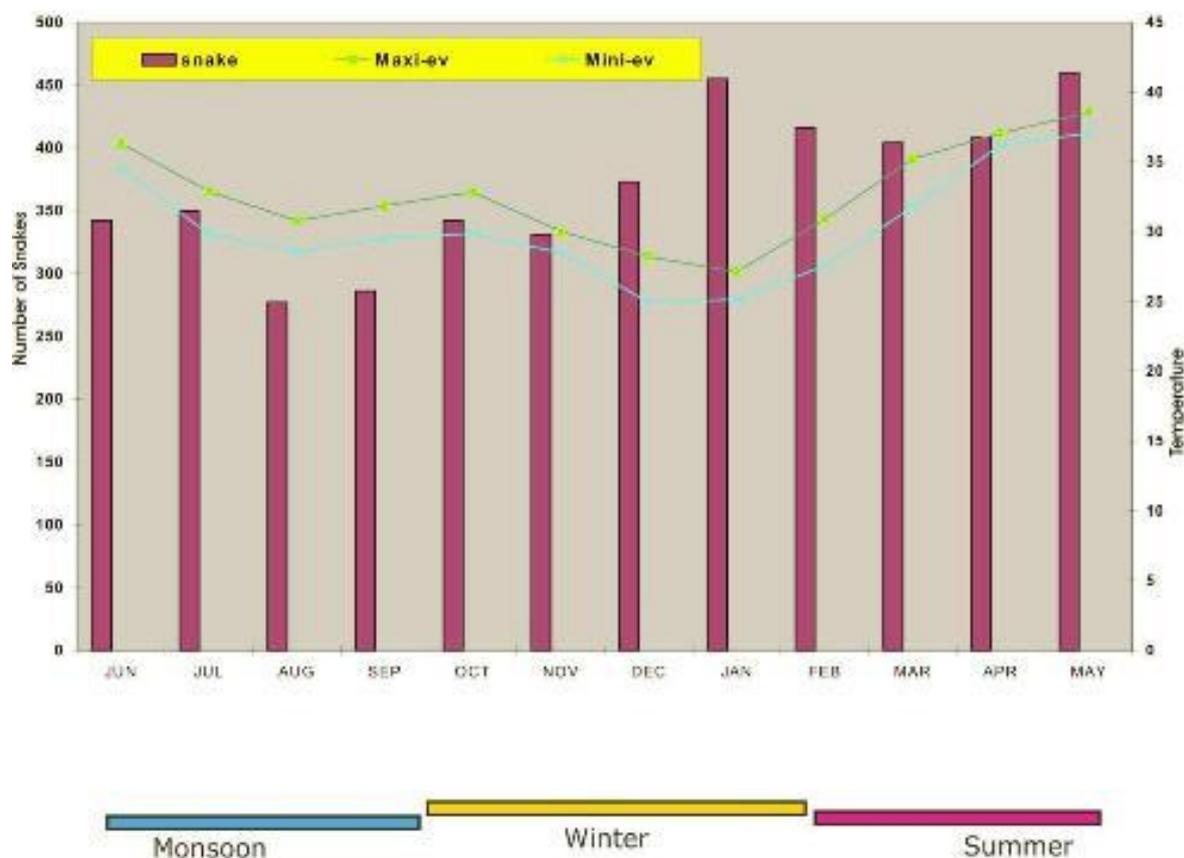


Figure 3. The seasonal and monthly temperatures (mean) showing co-relation with numbers of snake rescue during each month by Animal Saving Group, Valsad City, Gujarat.

and the Bamboo Pit Viper *T. gramineus*, with the remaining 13 species noted with intermediate status, including three venomous species of snakes.

TRANSLOCATION

Within the five-year span, over 11,383 snakes were rescued from the urban areas of five cities of the state and were translocated / released (most of) in new 'suitable habitats' away from urban habitation. Each NGO selected the release site about 30-40 km away from the city area as the new 'suitable habitat' for most of the snakes, except huge-sized serpents like *Python molurus*

which were released in protected areas with the direction and help of official staff of state forest department (Figure 6). The "suitable habitat" is either a scrub land or an agricultural landscape or some small pockets of reserved forest. Such translocation sites selected by the volunteers of NGOs were without any prior studies and only following a single criteria: it should be away from human habitation (Figure 7).

DATA AND RECORDS

With respect to the obtained snake rescue data through non-uniform forms from the local five NGOs, the

personal discussions and the analysis of database of NGOs, I come to the conclusion that these NGOs are not maintaining data as per the scientific requirements. In spite of the fact that the data received from each NGO shows that the data format and styles are limited; the snake rescue information of each entry is varying. This information is dependant on the personal interest of volunteers of each NGO. If they are knowledgeable and enthusiastic, they maintain records to some extent consisting of detailed information of all the entries of snake rescues and even do not hesitate for disclosure, but the drawback is that some volunteers do not

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Table 4 Species and year wise snake rescue data from Valsad City, Gujarat, India

	Species Name	2000	2001	2002	2003	2004	Average	Total
	TYPLOPIDAE							
1	<i>Ramphotyphlops braminus</i>	1	1	6	6	2	3.2	16
	BOIDAE							
2	<i>Gongylophis conicus</i>	10	25	10	15	5	13.0	65
3	<i>Eryx johnii</i>	8	23	46	29	11	23.4	117
	PYTHONIDAE							
4	<i>Python molurus</i>	13	97	93	113	67	76.6	383
	COLUBRIDAE							
5	<i>Ahaetulla nasuta</i>	4	16	22	15	20	15.4	77
6	<i>Amphiesma stolatum</i>	16	27	29	34	13	23.8	119
7	<i>Argyrogena fasciolata</i>	8	0	12	12	9	8.2	41
8	<i>Boiga trigonata</i>	12	0	12	12	29	13.0	65
9	<i>Dendrelaphis tristis</i>	7	25	22	14	42	22.0	110
10	<i>Colelognathus helena</i>	16	102	149	140	96	100.6	503
11	<i>Lycodon aulicus</i>	5	18	26	40	10	19.8	99
12	<i>Macropisthodon plumbicolor</i>	2	6	16	16	4	8.8	44
13	<i>Oligodon arnensis</i>	4	12	10	9	9	8.8	44
14	<i>Ptyas mucosa</i>	45	174	295	183	181	175.6	878
15	<i>Xenochrophis piscator</i>	21	94	49	77	92	66.6	333
	ELAPIDAE							
16	<i>Bungarus caeruleus</i>	11	54	25	90	25	41.0	205
17	<i>Naja naja</i>	46	232	321	378	211	237.6	1188
	VIPERIDAE							
18	<i>Daboia russelii</i>	32	71	184	178	93	111.6	558
19	<i>Echis carinatus</i>	3	1	2	3	5	2.2	14
20	<i>Trimeresurus gramineus</i>	0	0	1	1	1	0.6	3
		264	978	1330	1365	925	972.4	4862

continue serving the NGO.

DISCUSSION AND CONCLUSION

The man-animal conflict is a common phenomenon and is on a gradual increase across the world as well as in India. A number of reasons are responsible, such as human encroachments in the forest habitat, urbanization and unregulated industrial growth.

The snake fauna of Gujarat is diversified and rich, containing over 56 species of snakes belonging to nine families (Vyas 2008; Vyas & Desai 2010; Vyas et al. 2011). In the present study, 22 species of snakes belonging to six families are recorded within the urban context of Gujarat, which is higher than the earlier reported snake species diversity from the cities of Bhavanagar (Vyas 1987a) and Ahmedabad (Urfi 1999, 2005). These 22 species rescued from urban areas show that 40% snake

species inhabit within human habitation only. The human habitation is an altered habitat for these species of snakes or an adapted habitat, either forcibly or naturally.

The rich snake diversity was observed at Valsad City with 20 species and six families of snakes and relatively lower diversity was noted at Surendranagar with 11 species and four families of snakes. These varied numbers of snake species

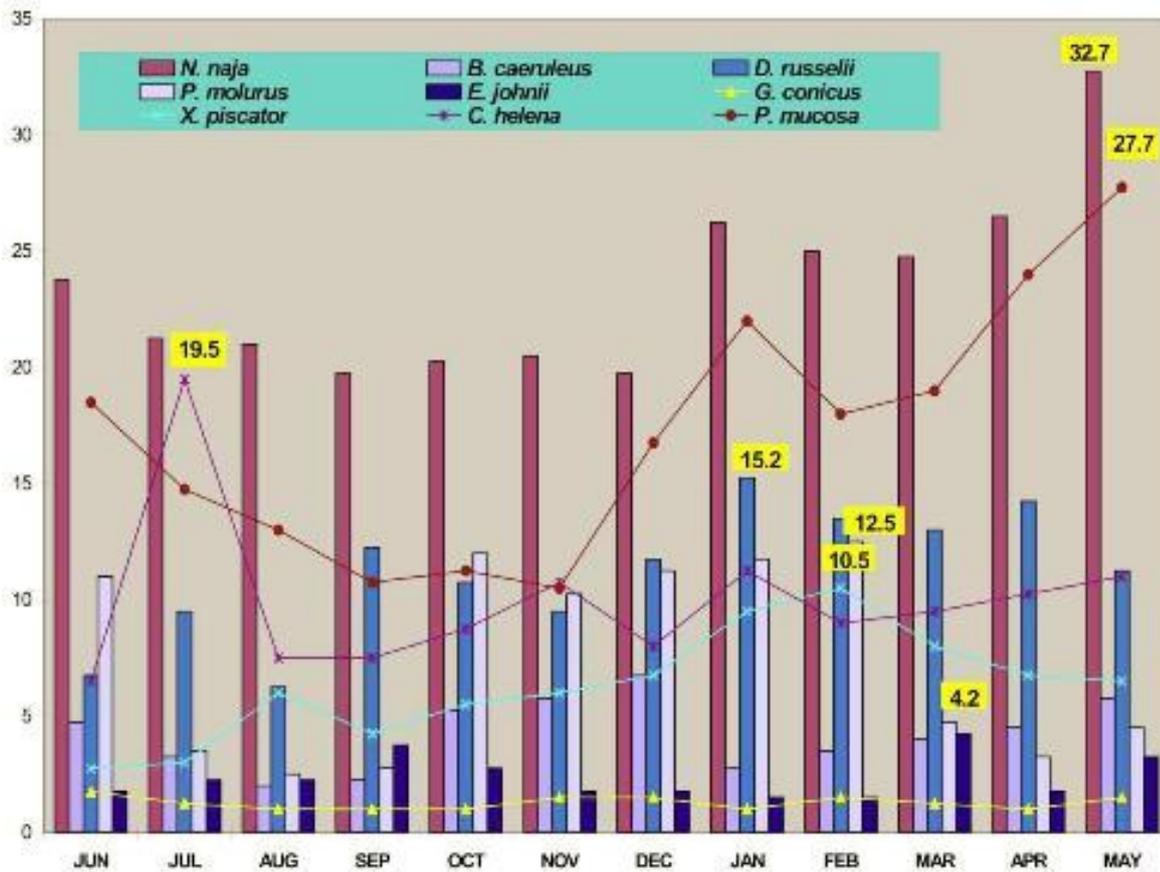


Figure 4: The monthly variation in the collection of type of snakes (mean) at Valsad City, Gujarat.

are due to the geographical locations of the cities. According to Champion & Seth (1968) Valsad and Surat cities fall in the Biotic Provinces 5A Malabar Plains with Biogeographical area of Western Ghats and Surendranagar City is a part of Saurashtra Peninsula with dry area of Biotic Provinces 4B5 Gujarat Rajwada (Rodger & Panwar 1988). Therefore, three species of snakes; Bamboo Pit Viper *T. gramineus*, Green Vine Snake *A. nasuta* and Dog-faced Water Snake *C. rynchops* were reported only from Valsad and Surat, southern Gujarat. The Indian Rock Python *P. molurus* and Green Keelback *M. pulumbicolor* rescue records are from Valsad, Surat and Dahod

but not a single record is noted from Surendranagar, due to the distribution pattern of these species within the state (Vyas 1998).

Ranking wise, higher numbers of snakes, especially *N. naja*, *P. mucosa*, *X. piscator*, *L. aulicus*, *B. caeruleus*, *E. johnii*, *G. conicus* and *B. trigonata* were found within the human habitation, depicting these species as fairly adaptable and widely distributed in the state.

The venomous species *N. naja* is recorded in higher numbers from two cities of Gujarat with an annual average of 369.8 and 136.3

snakes from Valsad and Surendranagar, respectively. This data supports the earlier snake rescue data from the cities of Gujarat Bhavnagar (Vyas 1987a), Ahmedabad (Urfi 1999; Anon 2006, 2008) Surat (Desai 2006) concluding that *N. naja* is the most common and abundant species found within the human habitation than any other recorded species of snakes from Gujarat.

There are four common venomous Indian snakes, out of which, three venomous species were found reasonably in human residences is a fairly notable fact. It is an indirect warning to the government hospitals/

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Table 5. Species and year wise snakes rescued from Surat City, Gujarat, India.

	Species Name	2001	2002	2003	Average	Total
	BOIDAE					
1	<i>Gongylophis conicus</i>	22	25	15	20.6	62
2	<i>Eryx johnii</i>	10	6	2	6.0	18
	COLUBRIDAE					
3	<i>Ahaetulla nasuta</i>	11	6	1	6.0	18
4	<i>Amphiesma stolatum</i>	30	14	12	18.6	56
5	<i>Boiga trigonata</i>	3	1	1	1.6	5
6	<i>Cerberus rynchops</i>	0	2	0	0.6	2
7	<i>Dendrelaphis tristis</i>	0	10	0	3.3	10
8	<i>Colelognathus helena</i>	12	11	3	8.6	26
9	<i>Lycodon aulicus</i>	18	15	3	12.0	36
10	<i>Macropisthodon plumbicolor</i>	0	0	1	0.3	1
11	<i>Oligodon arnensis</i>	5	2	3	3.3	10
12	<i>Ptyas mucosa</i>	40	30	25	31.6	95
13	<i>Xenochrophis piscator</i>	25	15	9	16.3	49
	ELAPIDAE					
14	<i>Bungarus caeruleus</i>	9	8	2	6.3	19
15	<i>Naja naja</i>	30	28	0	19.3	58
	VIPERIDAE					
16	<i>Daboia russelii</i>	35	20	36	30.3	91
17	<i>Echis carinatus</i>	6	7	18	10.3	31
18	<i>Trimeresurus gramineus</i>	0	0	3	1.0	3
		256	200	134	196.6	590

public health centers, to be prepared with all the medical equipments and medicines/anti-snake venoms used in case of snake-bite cases. The state health department should be supportive for the development of infrastructural facilities for snake bite treatments.

Presently a total of 22 species of snakes from the cities of Gujarat State have been recorded through snake rescue practices by the local NGOs. Out of which, eight species are recorded from all four cities of the state; whereas the record of remaining 14 species pertain to the cities, showing the

distribution of those species to be restricted in the state.

Earlier Vyas (2007a) pointed out the fact that the increased number of snake rescues from cities of Gujarat is the result of cities and towns in the state growing fast and the expansion of urban areas day by day. They uproot the large rural areas, agricultural lands, scrublands and forest lands too, resulting in frequent encounters with snakes in neo-urban areas.

The snakes rescue practices run by NGOs in urban

areas of the state are not only one of the best voluntary services to the society but also an aid in the mission of snake fauna conservation. But, on the other side these NGOs lack scientific guidance by any professionals. Therefore, the maintenance of proper scientific documentation/database regarding the snake rescues and their release shows some lacuna. A similar experience has been shared by Shine & Koeing (2001) at New South Wales, Australia. My recent observation regarding these NGOs, not maintaining proper records on such rescues of our precious wildlife, urged me to suggest some

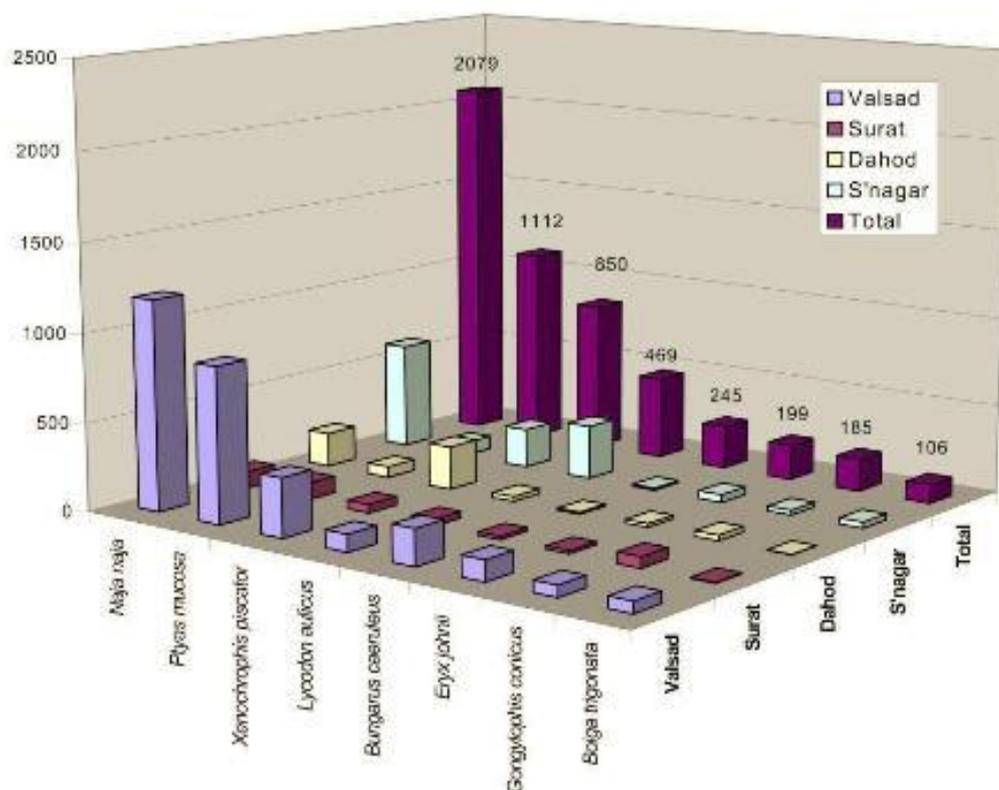


Figure 5: Ranking of most rescued eight species of snakes from the urban areas of Gujarat, India.

effective protocols to be maintained by each NGO, which would be controlled and directed by the forest department. Huge quantity of information on such animal conflicts and natural history collected by these NGOs without any proper guidance (from professional) makes the significant data and records unavailable for scientific use. Such NGOs are unaware of the methods to maintain information and would continue rescuing further without knowing the importance of such valuable information on snake fauna. It's a matter of utmost concern as such snake rescue analysis is very precious in knowing ecology and biology of snakes in detail.

The higher number of snake rescues from cities areas of Gujarat indicates the change in the attitude of urban people towards

snakes, and that now they are well aware of the significance of snakes in an ecosystem and its conservation values. This supports the fact that the society now believes in snake conservation.

Every year large numbers of snakes of various species are translocated from urban habitat to new 'suitable habitats' on the name of 'snake rescues,' being one of the notable translocations of wild animals. Presently, the impacts and consequences of such large snake translocations are unknown, giving rise to further debatable questions. A detailed study and monitoring is needed, to find out the impact on the 'recipient' areas. After the release, the fate of these animals is not known, but few studies abroad indicate that the translocation of reptiles is not encouraging and is proven scientifically (Nowak 1997; Reinert & Rupert 1999).

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Table 6. Species and year wise snakes rescued from Dahod City, Gujarat, India.

	Species Name	2001	2002	2003	2004	Average	2001-2004
	TYPLOPIDAE						
1	<i>Ramphotyphlops braminus</i>	3	4	3	5	3.8	15
	BOIDAE						
2	<i>Gongylophis conicus</i>	8	13	6	4	7.7	31
3	<i>Eryx johnii</i>	6	4	7	3	5.0	20
	PYTHONIDAE						
4	<i>Python molurus</i>	1	1	1	0	0.7	3
	COLUBRIDAE						
5	<i>Argyrogena fasciolata</i>	2	1	1	1	1.2	5
6	<i>Boiga trigonata</i>	1	0	1	0	0.5	2
7	<i>Lycodon aulicus</i>	8	5	11	4	7.0	28
8	<i>Macropisthodon plumbicolor</i>	3	1	3	1	2.0	8
9	<i>Oligodon arnensis</i>	2	1	0	0	0.7	3
10	<i>Oligodon taeniolatus</i>	1	1	0	0	0.5	2
11	<i>Ptyas mucosa</i>	17	20	7	7	15.5	62
12	<i>Xenochrophis piscator</i>	71	66	24	24	61.5	246
	ELAPIDAE						
13	<i>Bungarus caeruleus</i>	2	3	5	1	2.5	10
14	<i>Naja naja</i>	48	56	42	48	48.5	194
		173	176	182	98	157.2	629

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Table 7. Year wise data of snakes rescued from Surendranagar City, Gujarat, India

	Species Name	2001	2002	2003	Average	2001-2003
	BOIDAE					
1	<i>Gongylophis conicus</i>	15	9	3	9.0	27
2	<i>Eryx johnii</i>	5	11	28	14.6	44
	COLUBRIDAE					
3	<i>Boiga trigonata</i>	11	7	16	11.3	34
4	<i>Dendrelaphis tristis</i>	3	2	9	4.6	14
5	<i>Colelognathus helena</i>	57	30	62	49.6	149
6	<i>Lycodon aulicus</i>	117	84	105	102.0	306
7	<i>Ptyas mucosa</i>	23	16	38	25.6	77
8	<i>Xenochrophis piscator</i>	83	61	78	74.0	222
	ELAPIDAE					
9	<i>Bungarus caeruleus</i>	0	0	1	0.3	1
10	<i>Naja naja</i>	122	158	129	136.3	409
	VIPERIDAE					
11	<i>Echis carinatus</i>	22	7	14	14.3	43
		458	385	483	442.0	1326

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Figure 7. One of the volunteers of Savannah Conservation Society, Surendranagar City at a snake release site known as scrubland away from the human residence area and considered as the most 'suitable habitat'.



The second ever record of Nikhil's Kukri *Oligodon nikhilii* (Whitaker & Dattatri, 1982)? Range extension?

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Image 1. The roadkilled snake at Palode Reserve Forest that could probably be Nikhil's Kukri *Oligodon nikhilii*

In this note, a roadkill at Palode Reserve Forest in Kerala (8°45'43"N & 77°06' 36"E) of a snake, which could be the rare Nikhil's Kukri *Oligodon nikhilii* (Whitaker & Dattatri 1982), is described (Fig. 1; Whitaker & Captain 2008). The individual was neither collected, nor were any more photographs or scale counts taken. This roadkill was observed on 15 October 2011 at 0835 hours at an elevation of 966m. The body was light brown in colour with the characteristic "chevron pattern" on its head, distinct to Kukri snakes (Whitaker & Dattatri 1982). Though the species cannot be confirmed from a photograph, the dark brown dorso-lateral lines in this individual which begin from the "chevron pattern" and run across the body are characteristic of *O. nikhilii* (Whitaker & Dattatri 1982). The dorso-lateral lines at the third scale

row from above the fifth ventral which were indistinct in the holotype, are distinct in the individual described here. The underside also appears white. If this is indeed *O. nikhilii*, this is but only the second record of the species after a period of three decades since its description. It could also extend the altitudinal extent of the species below 1000m and its distribution in the Agasthyamalai Hills of the southern Western Ghats, an approximate 170km difference from its reported locality in Kodaikanal, Palni Hills.

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Range extension of Indian Golden Gecko *Calodactylodes aureus* in Andhra Pradesh, India

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INTRODUCTION

The Gondwana relic genus *Calodactylodes* is endemic to India and Sri Lanka and is represented by two species, *C. aureus* (Indian Golden Gecko) and *C. illingworthorum* (Sri Lankan Golden Gecko) (Bauer & Das 2001). During the past two years, the floristic and faunistic surveys in the forests of Anantapur District, especially in Nigidi reserved forests of Andhra Pradesh, the authors could locate and photograph spectacular specimens of yellow-colored geckos. After a thorough perusal of literature (Smith 1935; Murthy 1990 & 2010; Sanyal et al. 1993; Daniel 2002; Das 2002; Sharma 2005; Javed et al. 2007; Sreekar et al. 2010) the species was identified as *Calodactylodes aureus* (Indian Golden Gecko) and revealed that this species has not been reported from Anantapur District. Ten individuals (Fig. 1), including three females and seven males, were seen under huge rock boulders in three locations 5 to 7 km apart in the study area. No samples were collected during the present study. Through this note, we report the range extension of the Indian Golden Gecko in Anantapur District, Andhra Pradesh

further west from the known range. The study area is a broken hill with steep ravines and ridges and is a part of Eastern Ghats spurs. The vegetation in the study area is mainly dry deciduous and scrub. These forests are dominated by huge rock boulders with an elevation range of 300 to 750 m. The soils are mainly red. The temperature fluctuates between 45°C in summer and 25°C in winter. The rock boulders are surrounded by an endemic and endangered plant species *Hildegardia populifolia*. The main trees in the study area are *Acacia catechu*, *Anogeissus latifolia*, *Chloroxylon swietenia*, *Ficus mollis*, *Gardenia resinifera*, *Gyrocarpus americanus* and *Lannea coromandeliana*. The rock boulders are partially covered by climbers like *Combretum albidum*, *Grewia rhamnifolia*, *Secamone emetica*, etc.

The Indian Golden Gecko was first reported by Beddome (1870) from Tripatty Hills in North Arcot District. The type locality is quite ambiguous. The Tripatty Hills correspond to Tiruppatur (Tirupattur or Tiruppatur) which is in North Arcot District of Tamil Nadu. Smith (1935) observed all

the labeled specimens of Beddome, and treated these hills as Tripattur Hills from Tamil Nadu. After Beddome's collection, the Indian Golden Gecko was rediscovered by Daniel & Bhushan (1985) after 115 years from Seshachalam and also from Velikonda Hills of southern Eastern Ghats of Andhra Pradesh (Daniel et al. 1986). They mentioned the type locality of the species as Tirupati Hills. It is also reported from South Arcot District, near Vellore Town of Tamil Nadu (Daniel 2002; Rajasekhar & Kumar 2007), Papikonda Hills, East Godavari, Khammam, Visakhapatnam districts of Andhra Pradesh (Javed et al. 2007; Sreekar et al. 2010), Niyamgiri Hills of Odisha (Dutta et al. 2005) and southern Chhattisgarh (Sreekar et al. 2010). All the above areas are very rich in vegetation, rainfall, humidity (except Vellore town and its vicinity). The present study area is far away from earlier locations and is relatively arid. Most sightings were during the day.

DISTRIBUTION

Endemic to India (Andhra Pradesh, Chhattisgarh, Odisha and Tamil Nadu). From Andhra Pradesh it is known from Chittoor, East Godavari, Nellore, Khammam, Visakhapatnam districts, present study reports it from Anantapur District from Batrepalle Reserve Forest and Kalasamudram Reserve Forest.

The Golden Gecko is listed in Schedule I (Part II) of the Indian Wildlife (Protection) Act, 1972. In Perantalapalle (Khammam District) and Maredumilli (East Godavari District) of Andhra Pradesh the populations are

Fig. 1: *Calodactylodes aureus* (Beddome, 1870)



A. Male



B. Female

common and viable along streams (Javed et al. 2007; Sreekar et al. 2010). In Anantagiri (Visakhapatnam District), the populations are under threat due to human encroachment and conversion of streams and forests into cultivated lands and also due to proposed bauxite mining activity (Javed et al. 2007; Sreekar et al. 2010). In Odisha, bauxite mining has been reported as a threat to this species (Pattnaik et al. 2009). The trade was considered to be a major threat to this endangered gecko (Molur & Walker 1998).

The interferences of human interactions can create pressure as most of the gecko habitats are outside protected areas. The population in Anantapur District is under threat due to illicit tree felling. Widening of Kadiri-Pulivendula road, usage of chemical fertilizers, spraying of pesticides and insecticides are also major threats to the species, because one of the locations is very near to cultivated fields and

road. All the locations are nearly 15km away from Uranium mining site at Thummalapalle in Kadapa District. Keeping all the above threats in mind, there is an urgent need to conserve this endemic species in Anantapur District by local people, government and non-governmental agencies.

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Note on an unusual colour morphism in Oriental Rat Snake *Ptyas mucosa* (Linnaeus, 1758)

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The Oriental Rat snake *Ptyas mucosa* (Linnaeus) is one of the widely distributed colubrine snakes belonging to the family Colubridae, from Iran, Turkmenistan, Afghanistan, Pakistan, India (incl. Andaman Isl.), Sri Lanka, Nepal, Bangladesh, Myanmar, China (incl. Hainan and Hong Kong), Thailand, Lao PDR, Cambodia, Viet Nam, Malaysia, Singapore and Indonesia and the most common snake in its entire distribution range (Auliya 2010).

Generally, the body colour and pattern varies greatly in this species from pale yellow, olive, brown to gray or black with light to dark brown or black reticulation marks. Lips scales are separated by vertical black lines. Ventral side often has prominent dark cross-bars. In juveniles, the anterior body shows light pigmented bands or cross-bars on an overall faintly olive colored body. Juveniles in at least parts of the range show a distinct, bright green coloration (Smith 1943; Daniel 2002; Whitaker & Captain 2004; Auliya 2010).

Very noticeable two color morphs of the species; one gray-olive greenish with dark reticulation and second light gray with a yellowish tinge and dark reticulation, have been recorded in the entire distribution range (Auli-

ya 2010) and the same was observed in Gujarat State. However, recently I came across a new color morph of the species which had orange coloration with brown reticulation. The colour morph and other details are as follows.

Coloration and Other Details:

On 7 November 2011, a snake was rescued from the newly developed urban areas surrounded with agricultural fields, in Padra Town (22°14'27"N & 73°05'06"E), Vadodara District by a local snake rescuer Mr. Pravin Maharaj. It was a meter long (73.0cm snout-vent length +27.0cm tail length) juvenile orange

coloured female Indian Rat Snake *Ptyas mucosa*.

The body colour was orange with light yellowish and brown reticulation, the reticulation was lighter and obscured on anterior body parts than the posterior body parts, belly was light orange without prominent cross-bars, eyes were orange black (Image 1 & 2). Body scale count 19:17:14 rows; supra-labials 8, 4th and 5th touch to eye; 9 infra-labials; 3 loreal, 1 sub-ocular, 1 pre-, 1 supra and 2 post ocular; temporals 2+2; two pair of genials, posterior pair longer than the anterior pair; 2 anal; ventrals 201; 135 sub caudals divided.

This is the first time I have ever come across such an orange colored morph in the species or read about in any available published literatures, except an image of yellow *P. mucosa* on web (www.inw.net). Such unusually orange colored snake is definitely a

Image 1. Dorsal view of orange color morph of the Oriental Rat Snake *Ptyas mucosa* from Padra village, Vadodara, Gujarat, India.





Image 2. The orange color morph of the Oriental Rat Snake *Ptyas mucosa*, belly scales without prominent cross-bars.

result of some anomaly in the pigmentation.

Generally, in reptiles the color and pattern is due to the presence of various types of pigments found in the skin and its pigment systems. The reptile skin is patterned by a combination of pigments and structural compounds. Three types of specialized skin cells or chromatophores, namely melanophores, xanthophores (including erythrophores) and iridophores contain pigments.

Melanophores produce melanin pigments. Melanin pigment is responsible for black and brown color and occasionally some yellow and red coloration. The second, xanthophores (and erythrophores) produce pteridine pigments. Pteridine pigments are predominantly red while carotenoids are predominantly yellow to orange. Xanthophores also store fat-soluble carotenoids which are obtained from the animal's food. Xanthophores and erythrophores are distinguished primarily by color, yellow and red

respectively which is ultimately determined by the proportion of carotenoids to pteridines in each cell. The third variety of chromatophore, the iridophores, contains crystallized purines stacked on top of one another in organelles called reflecting platelets. Platelets are colorless but highly reflective and create different colors depending on how the purine crystals are stacked. Iridophores are found in the dermis and are responsible for iridescence and blue coloration in reptile skin (Bechtel 1995). The pigmentary color anomaly is rarely observed in reptiles and when it occurs it is because one or more of the pigments are absent or are present in imbalanced degree of synthesis. Thus, it expresses some novel pattern of colouration in reptiles; as complete leucistic, or even as irido-, xanthic-, erythro- or pinto-albinism.

Here, orange colour morph in *P. mucosa* is probably responsible due to minimal synthesis of melanin and excessive

synthesis of pteridines in pigmentary system, which reflects the orange color in the specimen. But further research is needed on histopathology and biopsies of skin tissue and 'dopa test', which will enlighten the current data collection on colour anomaly in the species and enrich the subject.

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Image 3. The normal color morph and orange color morph of the Oriental Rat snake



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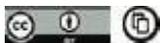
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**Cases of total albinism in Green Keelback
Macropisthodon plumbicolor and Common Wolf
Snake *Lycodon aulicus* (Colubridae)**

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Albinism is a genetically inherited condition in which a recessive gene that affects enzymes involved in the metabolism of pigment melanin inhibits its production. It results either in partial or complete loss of coloration from skin, eyes (and feathers as in birds;

Mikkola 2003) and scales as in fishes and reptiles. Sazima & Pombal (1986) have stated that true albinos are recognised by their pinkish-yellowish body colour and reddish eyes in life. Cyril (2009) has also pointed out that pure albinos are fully pink, white or yellow and

that partial albinos have small patches of white on their body. In general, cases of total (true or pure) albinos are very rare in nature.

The present communication is also a case of total albinism in Green Keelback *Macropisthodon plumbicolor* (Cantor, 1839) (Colubridae). The first author (VH) rescued two young ones of Green Keelback snake from an residential old garage at Kothrud Area (18°30'23"N & 73°048'50"E) Pune, Maharashtra in June 2005. He took these young ones to his residence. Out of the two, one young individual was whitish-yellow in colour (albino) whereas the other young one was normal in colour with blackish chevron on the nape and rest of the colour was dark greenish above

Image 1. Adult albino Green keelback



and paler on the ventral side. Both were kept in captivity and fed regularly. The normal coloured individual was released back to nature after few days. The albino individual grew up as an adult (584mm in 18 months) having totally yellowish body without any markings or pattern and with reddish eyes (Image1). Later on this albino snake was also released in nature.

Second author (ST) came across the following cases of total albinos from colubrine snakes during his herpetological field work. Unfortunately, he could not take the photographs.

1. Green Keelback *Macropisthodon plumbicolor* (Cantor, 1839) was totally whitish-pinkish with reddish eyes. The length of the snake was 600mm. It was with a snake charmer from Battis-Shirala (16o59'10"N & 74o07'39"E), Islampur Taluka, Sangali District, Maharashtra during the 'Nagpanchami puja' (Festival for snake worship) in August 1997.

2. Common Wolf Snake *Lycodon aulicus* (Linnaeus, 1758) (Colubridae) was totally whitish-pinkish with reddish eyes and dark reddish bands on anterior region of the body. The snake was noticed in a residential garden at Indore (22o45'02"N & 75o53'43"E), Madhya Pradesh in February 2005.

Both the authors identified the above snakes using literature Smith (1943), Sharma (2003) and Whitaker & Captain (2008).

Albinism occurs in all the

vertebrate groups. Whitaker (1971) comments that albinism is not common in snakes. The phenomenon of albinism has been reviewed in a number of North American amphibian and reptilian species (Dyrkacz 1981). Vyas (2012) has reviewed some instances of aberrant colour patterns in 17 species belonging to seven families of Indian reptiles including turtles, lizards and snakes. Sayyed (2012) has reported cases of albinism in *M. plumbicolor* in Satara, (Maharashtra) during 2007, 2009, 2012 and *L. aulicus* from Dhule, (Maharashtra). Another albino *L. aulicus* has also been reported from Gujarat by Desai as cited by Vyas (2012).

Hence, it is interesting to note that all the albino cases of *M. plumbicolor* are reported till now, including this report, from Maharashtra state only, though the distribution of this species is throughout India except extreme northwest, Ganges Valley and the eastern coast (Whitaker & Captain 2008).

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