

## ORIGINAL RESEARCH ARTICLE

**Diversity, Threats and Conservation of Reptiles in Kuvempu University Campus, Shankaraghatta, Mid Western Ghats, Shimoga****Jagadeesh B. Chittaragi\* and B. B. Hosetti**

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**ABSTRACT**

Kuvempu University Shankaraghatta (KUS) campus area is located in the Mid-Western Ghat region, within a protected area called Bhadra Wildlife Sanctuary. It exhibits characteristic reptilian fauna, so far no scientific data is made available on the reptilian fauna of this campus. Hence the investigation was undertaken to fill the lacunae for a period of one year during August 2012 to July 2013 in the study area. KUS is situated in Mid-Western Ghats of Karnataka at 13°41'N and 75°38'E; altitude: 680-720 m. It is spread in an area of about 230 acres and the major area is covered with natural vegetation. The study revealed 34 species of reptiles, which represents about 4.25% of all known reptile species from India. All reported species belong to 29 genera distributed among the 14 families of reptiles. Out of 34 species of reptiles, 16 species (47.05%) are at Lower Risk near threatened (LR-nt), 13 species (38.23%) are at Lower Risk least concern (LR-lc) and 2 species (5.89%) Vulnerable (VU) according to IUCN status. *Calotes versicolor* (Oriental Garden Lizard), *Chamaeleo zeylanicus* (Indian Chameleon), *Eutrophis macularia* (Bronze Grass Skink), *Sybinophis subpunctatus* (Black Headed Snake), *Amphisema stolatum* (Buff Striped Keelback), *Macropisthodon plumbicolar* (Green Keelback) and *Lycodon aulicus* (Common Wolf Snake) were killed on roads by vehicular traffic, which is a major threat to reptiles in the campus. An example of killing of a *Trimeresurus gramenius* (Bamboo Pit Viper) by the workers while weeding and trimming of roadside grass as well as weed plants; indicates human snake conflict in the campus quite often.

**Key words:** Conservation, Diversity, Reptiles, KUS, Snakes, Threats.

**INTRODUCTION**

Reptiles play a significant role in the ecosystem sustenance as links in food chains, bio-monitors in controlling many pests and also as excellent ecological indicators owing to their high degree of sensitivity to even a minor change in the environment<sup>[1-3]</sup>. India harbors 518 species of reptiles which include 3 species of crocodiles, 34 species of turtles and tortoises, 202 species of lizards and 279 species of snakes belonging to 28 families recorded till date from India<sup>[4]</sup>, among which Western Ghats comprise 203 species with 61% (124 spp.) endemism<sup>[5]</sup>.

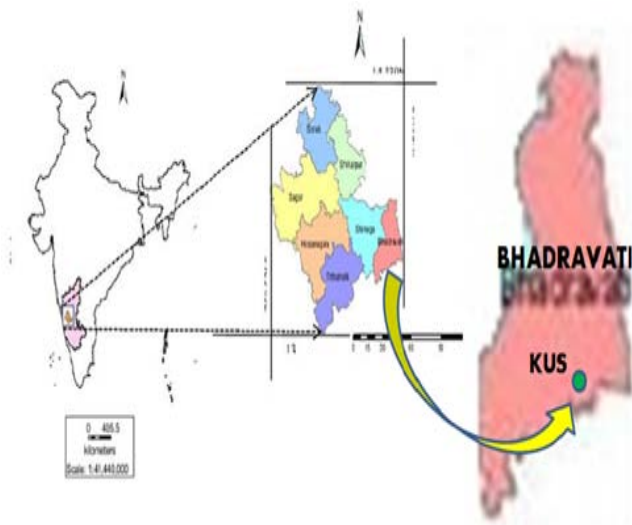
In spite of all the earlier reports no comprehensive studies are conducted on snake diversity of Kuvempu University Shankaraghatta, Campus. The campus lies in semi-malnad region of Mid-Western Ghats of Karnataka with the predominating vegetation which is typically dry

deciduous with considerable similarities with Bhadra Wildlife Sanctuary. Therefore, an attempt was made to fill these lacunae through the investigation to document the diversity of reptilian fauna of KUS.

**MATERIALS AND METHODS****Study area:**

The present study was conducted in Kuvempu University, Shankaraghatta (KUS) campus area situated at Mid-West of Karnataka at 13°41'N and 75°38'E; altitude: 680-720 m, towards South-East of historic Shimoga city (**Map 1**). This area of the campus forms parts of Bhadra Wildlife Sanctuary. The campus is spread in an area of 230 acres and with varied habitats, from undulating hilly terrain to manmade wetlands. During past two decades after the establishment of the university in the

year 1986, there is growth of secondary vegetation of many tree species. As of now, the predominating vegetation is typically dry-deciduous type with considerable similarities with the flora of Bhadra Wildlife Sanctuary (Map 2). The climate is tropical with three distinct seasons, viz., the monsoon (July to October), winter (November to February) and summer (March to June). The temperature has a relatively narrow range between 16 °C to 36 °C. Average rainfall for last five years was 2412.92 mm (Hydromet division, India Meteorological Department, Shimoga). Moreover, There is no Reptilian study carried out so far in Kuvempu University campus area.



Map I. Location map of KUS campus, Mid western Ghats, Shimoga, Karnataka, India



Map 2: Zoomed in image of Kuvempu University Campus. Image source Google Earth, 2014

### Methods:

A detailed survey of reptilian fauna was conducted during August 2012 to July 2013. The survey was done by random active searches made by walking across small streams and roads by searching microhabitats such as under rocks,

gleaning leaf litters, prodding bushes, wood logs, rock crevices and observing walls of buildings etc. Apart from random active searches basking reptiles during day time, snakes recorded during rescue, opportunistic field observations are also included so as to include most of the species in the campus. Moreover, snake species recorded within the University campus as a part of another analogous study also included in the analysis [6]. All species encountered are identified up to species level using keys and other publications [4] [7-14] and released back immediately in situ. The assessment of threat status of the revealed species in the area is based on IUCN red list (2013).

### RESULTS AND DISCUSSION

A total of 34 species of reptiles belonging to 14 families are distributed over 29 genera were recorded during study period (Table 1). Maximum number of species were observed from family Colubridae (n = 11; 32.36%) followed by Viperidae and Natricidae with three species (8.83%); Gekkonidae, Scincidae, Elapidae, Agamidae, Boidae and Typhlopidae with two species (5.88%) each and least number of species was shown by Uropeltidae, Chamaeleonidae, Lacertidae, Varanidae and Pythonidae family, each with single species (2.94%) respectively (Fig 1). Among all species of reptiles reported, a major share (25 species, 7 families) was contributed by snakes.

Out of all recorded species of reptiles in KUS (Image 1 to 18), Lower Risk near threatened (LR-nt) were 47.05% (16 species), Lower Risk least concern (LR-lc) were 38.23% (13 species) and Vulnerable (VU) 5.89% were (2 species) under IUCN status of reptiles was recorded (Fig 2). *Python molurus* and *Trimeresurus gramenius* were rarely sighted in the campus. However, *Ptyas mucosus* (Indian rat snake), *Dendrelaphis tristis* (Common Bronzeback Tree Snake), *Calotes versicolor* (Common Garden Lizard), *Calotes rouxii* (Roux's Forest Calotes), *Ahaetulla nasuta* (Green Vine Snake) and *Uropeltis elliotti* (Elliot's Shield Tail) were quite common in the University campus area.

The hitherto study area is attracted by various degrees of anthropogenic stress. Moreover, *Calotes versicolor*, *Chamaeleo zeylanicus*, *Eutrophis macularia*, *Sybinophis subpunctatus*, *Europeltis elliotti*, *Amphisema stolata*, *Macropisthodon plumbicolar* and *Lycodon aulicus* were killed on roads by vehicular traffic, which



threatened reptiles in the campus. Cutting and clearing grass before end of rainy season disturb the natural habitat of Herpetofauna and these individuals may become prone to predation by their natural enemies as well as by anthropogenic activities [15]. One Bamboo pit viper (*Trimeresurus gramenius*, **Image 12**) was killed by the workers while weeding grass and weed plants evidencing human-snake conflict and need for awareness among people in the campus. In addition, predation may also be another contributing factor for decline of reptiles since; most of the campus area is abundant with predatory birds such as peacock, eagle, owl etc. (our personal observation).

This report indicates that the area is rich in reptile diversity. Occurrence of some snake species like juvenile *Python molurus* (**Image 17**) is interesting which indicates their breeding population in the vicinity of KUS campus. Also everyone should realize that the protection of habitat by monitoring anthropogenic stress on the natural habitats of reptiles is an important aspect in conservation of such species.

The hitherto study on reptilian fauna evidenced the presence of juveniles of various snakes, calotes and geckos revealed their breeding activities, this study also foresees for the in situ conservation of reptilian fauna which are the best links in controlling mosquito and other harmful insect pests in the campus.

Images of Some reptiles of the Kuvempu University, Shankaraghatta Campus.



**Image 1:** *Hemidactylus brookii*  
(Brook's House Gecko)



**Image 2:** *Hemidactylus frenatus*  
(Common House Gecko)



**Image 3:** *Calotes versicolor*  
(Oriental Garden Lizard)



**Image 4:** *Calotes rouxii*  
(Roux's Forest Calotes)



**Image 5:** *Chamaeleo zeylanicus*  
(Indian Chamelion)



**Image 6:** *Lygosoma punctata*  
(Common Snake Skink) Juvenile



**Image 7:** *Eutrophis macularia*  
(Bronze Grass Skink)



**Image 8:** *Ophisops jerdonii*  
(Snake-Eyed Lacerta)



**Image 9:** *Veranus bengalensis*  
(Bengal Monitor)





Image 10. *Naja naja*  
(Spectacled Cobra)



Image 11: *Vipera russelli*  
(Russell's Viper)



Image 12: *Timeresurus.graminus*  
(Bamboo Pit Viper, killed)



Image 13: *Macropisthodon plumbicolor*  
(Green Keelback)



Image 14: *Boiga beddomei*  
(Beddome's Cat Snake)



Image 15: *Sibynophis subpunctatus*  
(Black Headed Snake)



Image 16: *Amphisema stolatum*  
(Striped Keelback)



Image 17: *Python molurus*  
(Indian Rock Python)



Image 18: *Dendrelaphis tristis*  
(Common Bronzeback Tree Snake)

Table 1: Checklist of Reptile species recorded in Kuvempu University campus, Shankaraghatta

NO	SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS
<b>I</b>	<b>Family: Gekkonidae</b>		
1	<i>Hemidactylus brookii</i> (Gray, 1845)	Brook's House Gecko	LR-lc
2	<i>Hemidactylus frenatus</i> (Schlegel, 1836)	Common House Gecko	LR-lc/N
<b>II</b>	<b>Family: Agamidae</b>		
3	<i>Calotes versicolor</i> (Daudin, 1803)	Oriental Garden lizard	LR-nt/N
4	<i>Calotes rouxii</i> (Duméril et Bibron, 1837)	Roux's Forest Calotes	LR-nt/EW
<b>III</b>	<b>Family: Chamaeleonidae</b>		
5	<i>Chamaeleo zeylanicus</i> (Laurenti, 1768)	Indian Chameleon	VU/N
<b>IV</b>	<b>Family: Scincidae</b>		
6	<i>Eutrophis macularia</i> (Blyth, 1853)	Bronze Grass Skink	LR-lc/N
7	<i>Lygosoma punctata</i> (Gmelin 1799)	Common Snake Skink	NE
<b>V</b>	<b>Family: Lacertidae</b>		
8	<i>Ophisops jerdonii</i> (Blyth, 1853)	Snake-Eyed Lacerta	LR-lc
<b>VI</b>	<b>Family: Varanidae</b>		
9	<i>Veranus bengalensis</i> (Linnaeus, 1758)	Bengal Monitor	VU/N

<b>VII</b>	<b>Elapidae</b>		
10	<i>Naja naja</i> (Linnaeus, 1758)	Spectacled Cobra	LR-nt
11	<i>Bangarus caeruleus</i> (Schneider, 1801)	Common Krait	LR-nt
<b>VIII</b>	<b>Viperidae</b>		
12	<i>Vipera russelli</i> (Shaw & Nodder, 1797)	Russell's Viper	LR-nt
13	<i>Echis carinatus</i>	Saw Scaled Viper	LR-nt
14	<i>Timeresurus graminus</i> (Shaw, 1802)	Bamboo Pit Viper	LR-nt/E
<b>IX</b>	<b>Colubridae</b>		
15	<i>Ptyas mucosus</i> (Linnaeus, 1758)	Indian Rat Snake	LR-nt
16	<i>Coelognathus helena Helena</i> (Daudin, 1803)	Common Trinket Snake	LR-nt
17	<i>Lycodon aulicus</i> (Linnaeus, 1758)	Common Wolf Snake	LR-lc
18	<i>Lycodon sp.</i>		
19	<i>Oligodon arnesis</i> (Shaw, 1802)	Common Kukri Snake	LR-lc
20	<i>Oligodon taeniolatus</i> (Jerdon, 1853)	Russel's Kukri Snake	LR-lc
21	<i>Ahaetulla nasuta</i> (Lacepede, 1789)	Green Vine Snake	LR-nt
22	<i>Boiga trigonata</i> (Bechstein, 1802)	Common Cat Snake	LR-lc
23	<i>Boiga beddomei</i> (Wall, 1909)	Beddome's Cat Snake	DD
24	<i>Sibynophis subpunctatus</i> (Duméril et al., 1854)	Black Headed Snake	LR-nt
25	<i>Dendrelaphis tristis</i> (Daudin, 1803)	Common Bronzeback Tree Snake	LR-lc
<b>X</b>	<b>Natricidae</b>		
26	<i>Xenochrophis piscator</i> (Schneider, 1799)	Checkered Keelback	LR-lc
27	<i>Macropisthodon plumbicolor</i> (Cantor, 1839)	Green Keelback	LR-nt
28	<i>Amphisema stotatum</i> (Linnaeus, 1758)	Buff Striped Keelback	LR-nt
<b>XI</b>	<b>Pythonidae</b>		
29	<i>Python molurus</i> (Linnaeus, 1758)	Indian Rock Python	LR-nt
<b>XII</b>	<b>Boidae</b>		
30	<i>Eryx johnii</i> (Russell, 1801)	John's Earth Boa	LR-lc
31	<i>Gongylophis conicus</i> (Schneider, 1801)	Common Sand Boa	LR-nt
<b>XIII</b>	<b>Uropeltidae</b>		
32	<i>Uropeltis ellioti</i> (Gray, 1858)	Elliot's Shield Tail	LR-lc/E
<b>XIV</b>	<b>Typhlopidae</b>		
33	<i>Ramphotyphlops braminus</i> (Daudin, 1803)	Brahmini Worm Snake	LR-nt
34	<i>Grypotyphlops acutus</i> (Duméril & Bibron, 1844)	Beaked Worm Snake	LR-lc

LR -Lower risk, lc-least concerned, nt-near threatened, VU-Vulnerable, NE-Not valuated, N-Nationally, E-Endemic, EW-Endemic to Western Ghats

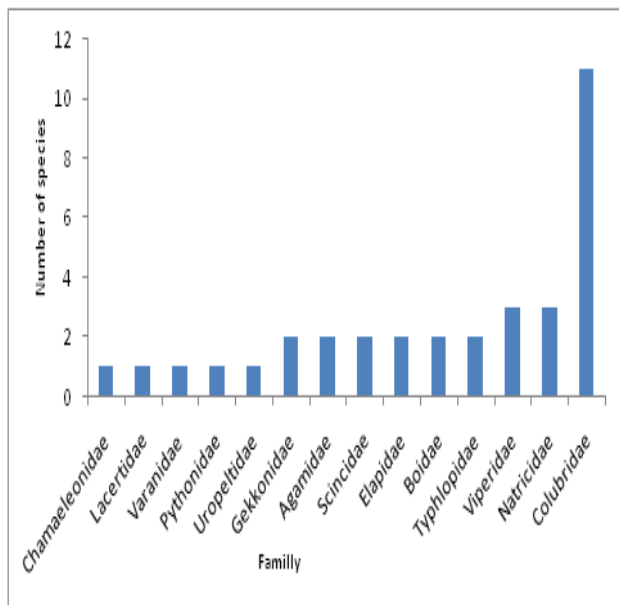


Figure 1: Family wise distribution of Reptilian species in Kuvempu University campus

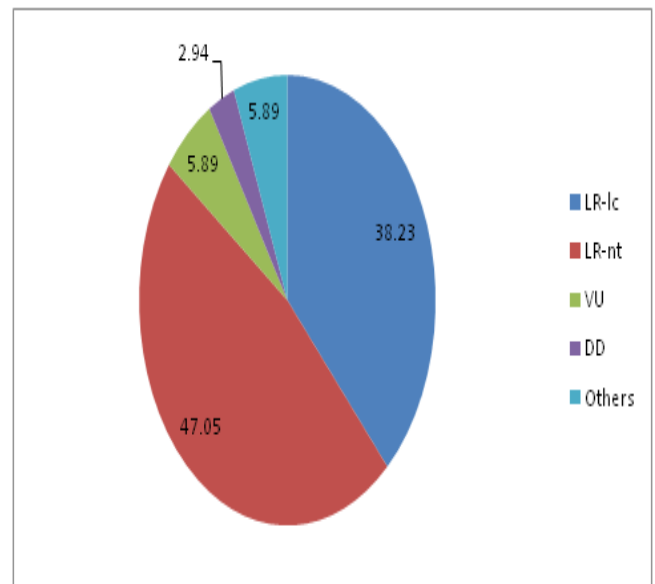


Figure 2: Percentage distribution of IUCN status of reptiles in Kuvempu University campus

Note: LR-lc: Lower Risk-least concerned, LR-nt: Lower Risk-near threatened, VU-Vulnerable, DD-Data Deficit

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