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## RESEARCH ARTICLE

## DIVERSITY, THREATS AND CONSERVATION OF HERPETOFAUNA IN AND AROUND BARKATULLAH UNIVERSITY, BHOPAL (MP), INDIA

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### Abstract

A study of Herpetofauna in and around Barkatullah University Campus was conducted from June 2013 to December 2014 which revealed the presence of 20 species of Herpetofauna (4 amphibians and 16 reptiles). Out of which amphibians belongs to 2 families of order anuran while reptiles belongs to 6 families of 2 sub orders. Family Colubridae has represented 6 species while family Gekkonidae and Dicroglossidae represented by 4 and 3 species respectively followed by family Scincidae which contributed 2 species and all other families Agamidae, Bufonidae, Boidae, Elapidae and Typhlopidae were represented by single species each. The university campus is under various degrees of threats due to human disturbances including habitat destruction by cutting vegetation and vehicular movements. Out of the above all 20 species *Ptyas mucosus*, *Checkered keelback*, *Olive keelback* and *Naja (naja) naja* is protected under Wild Life Protection Act, 1972 in Schedule-II.

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## INTRODUCTION

Herpetofauna includes amphibians and reptiles. Amphibians are represented by frogs, toads, caecilians and salamanders, whereas reptiles include crocodiles, turtles, tortoises, snakes and lizards including skinks. Both the groups are ectothermic (in Greek, ectos = outside, thermos=hot) animals, so they are extremely sensitive to habitat changes which qualify them as excellent bio-indicator of environmental health. Both these groups are important to human well-being. They perform a vital role in various food webs and act both as prey species and predator. As predator of insects, rodents, and other pest species they provide a significant benefit to agriculture.

India harbors 342 species of amphibians which includes 306 anuran species, 35 species of Gymnophiona and 1 salamander species (Dinesh *et al.* 2012) whereas 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 (Angels *et al.*, 2012). From Madhya Pradesh 18 species of amphibians and 76 species of reptiles were reported (Chandra *et al.*, 2005). Herpetofauna are declining all over worldwide and along with amphibians; these are considered among the most threatened vertebrate groups (Gibbons *et al.*, 2000; Stuart *et al.*, 1997). Human beings affect the survival of reptiles, not only by modifying their habitats, but by what is worst, killing them because of fear and false beliefs about the injure that same species could cause to humans (Dubey and Khare 2013). Habitat destruction and modification is one of the most common serious anthropogenic threats to biodiversity (Krauss *et al.*, 2010). In present study we took the initiative to document the herpetofaunal diversity of Barkatullah university campus, Bhopal (MP).

#### Study area:

The present study was conducted in Barkatullah University situated in Tehsil Huzur of District Bhopal. Geographical the university campus is located at latitude  $23^{\circ} 12' 3.1176''$  N and longitude  $77^{\circ} 26' 58.2936''$  E (**Fig.1**). The campus is spread in an area of 360 acres ( $1.5\text{km}^2$ ) and with varied habitats, from grassland to man-made wetlands. It is on the **National Highway 12** which passes through Bhopal. 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  $16^{\circ}\text{C}$  to  $36^{\circ}\text{C}$ . Moreover, there is no herpetofaunal study carried out so far in Barkatullah University campus.

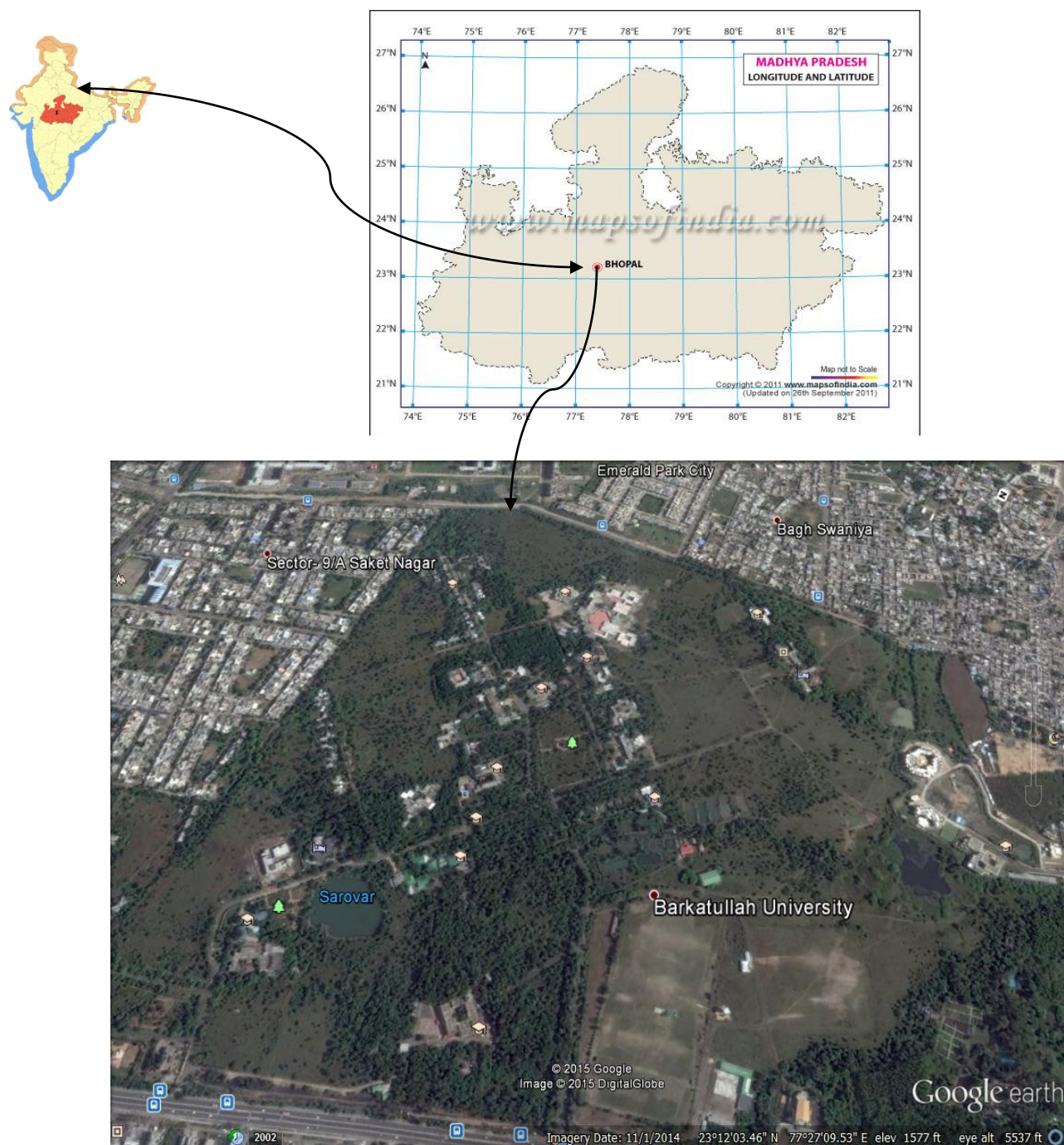


Fig.1 Barkatullah University area (Source: [www.googleearth.com](http://www.googleearth.com))

## MATERIALS AND METHODS

The survey was conducted from June 2013 to December 2014 having an aim of providing present status and a list of Herpetofauna from the current study area. The survey was conducted visually. An identified survey area was walk extensively while visually searching with the help of torch lights for amphibian species at night while reptile were surveyed mostly during day time and snake were also surveyed by rescue calls. However, active searches involving turning rocks and logs, digging through leaf litter, and sometimes excavating rat burrows, observing walls of buildings and termite mounds. During the day, besides active search, basking reptiles were also recorded from forest edges and stream sides. Records of road kills were also recorded during the study. Identification of all the species was based on morphological characters which were supported by colour photographs taken with a Sony Dsc-HX-300 camera. Geographic coordinates for survey sites were recorded with GPS (Chart cross Ltd) and Polaris GPS. Encountered specimens were observed, photographed and identified using literature and field guide (Smith 1935; 1943; Whitaker and Captain 2004) after confirming specimen was released back at same place.

## Result and Discussion

Present study revealed the presence of 20 species of Herpetofauna. Out of which amphibians were represented by single order belonging to 4 species of 2 families while reptiles represented by 16 species of 7 families and 2 sub orders which fall under a single order squamates. Family-wise distribution of the herpetofaunal species of Bu campus is given in Fig. 3. Family Colubridae contributed the most 6 species while family Gekkonidae represented by 4 species, family Dicoglossidae by 3 species followed by family Scincidae with 2 species and all other families Agamidae, Bufonidae, Boidae, Elapidae and Typhlopidae are represented by single species each (**Table.1**).

As per the IUCN status (IUCN 2014) out of 20 species of Herpetofauna, 45 % of species (11 species) fall under Lower risk-least concern (LR-lc) category which includes 7 species of reptiles and 4 species of amphibians while 55 % of species ( 9 species) come under Lower Risk -Near threatened (LR-nt) category (**Fig .2**).

Amphibians are the best ecological indicators and in recent years there has been a dramatic decrease in their populations. Only 4 amphibian species were recorded during the present study while India has the third largest amphibian population in Asia. A previous study shows that 9 amphibian species were reported from Bhopal by (Napat, 2012) whereas (Das, 1988) reported Indian Peacock shell turtle from Bhopal. However more studies are required to be carried out related to the habitat, ecology, climate change and impacts of human on the Herpetofauna.

The present study area is under various degrees of anthropogenic stress like destruction of habitats by cutting vegetation for making building, vehicular movements etc, which are affecting the herpetofaunal species, number of lizards, toads and snakes were killed on roads by vehicular traffic, which threatened reptiles in the campus. Wounding and reimbursement of grass before monsoon disturb the natural habitat of these creatures and become prone to predation by their natural enemies as well as by anthropogenic activities. 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.

**Table 1: List of herpetofaunal species recorded during the study in Barkatullah University, Bhopal**

S.No	Order/ Suborder/ Family/Species	Common Name	Coordinates	Location In study area	Ambient air Temperature (°C)	IUCN Status
Class <b>AMPHIBIA</b> Order <b>ANURA</b> Family <b>BUFONIDE</b>						
1	<i>Bufo melnostictus</i> (Schneider, 1799)	Common Asian toad	23°12'38.18"N 77°26'51.49"E	Saket Nagar	22°C	LR-lc
			23°12'17.34"N 77°27'21.02"E	BU	25°C	
			23°13'4.66"N 77°25'24.58"E	SP	20°C	
Family <b>DICROGLOSSIDAE</b>						
2	<i>Holobatrachus tigernus</i> (Daudin, 1803)	Indian bull Frog	23°11'58.36"N 77°27'8.72"E	BU	20°C	LR-lc
			23°12'38.18"N 77°26'51.49"E	Saket Nagar	19°C	
3	<i>Euphlyctis cyanophlyctus</i> (Schneider, 1799)	Skittering frog	23°11'59.06"N 77°27'10.79"E	Fish pond of Zoology departments	22°C	LR-lc
4	<i>Fejervarya limnocharis</i> (Gravenhort, 1829)	Common pond frog	23° 12' 2.86"N 77° 27' 10.77" E	BU	20°C	LR-lc
			23° 12' 24.57" N 77° 27' 17.26" E	Saket Nagar	18°C	
Class <b>REPTILIA</b> Order <b>SQUAMATA</b> Suborder <b>SAURIA</b>						
Family <b>Gekkonidae</b>						
5	<i>Hemidactylus brookii</i> (Gray, 1845)	Brook's House Gecko	23°12'11.49"N 77°27'14.84"E	BU	20°C	LR-lc
6	<i>Hemidactylus flaviviridis</i> (Ruppell, 1840)	Yellow-green house Gecko	23°12'31.77"N 77°27'22.58"E	Saket Nagar	19°C	LR-lc
			23°12'0.16"N 77°27'11.38"E	BU	28°C	
7	<i>Hemidactylus frenatus</i> (Schlegel, 1836)	Asian House Gecko	23°12'11.49"N 77°27'14.84"E	BU	19°C	LR-lc
			23°12'26.83"N 77°27'26.83"E	Saket Nagar	25°C	

8	<i>Hemidactylus sps</i>	House Gecko	23°12'10.85"N 77°27'19.78"E	BU	18°C	LR-lc
Family <b>AGAMIDAE</b>						
9	<i>Calotes versicolor</i> (Daudin, 1802)	Indian Garden Lizard	23°12'10.59"N 77°27'12.65"E	BU	27°C	LR-nt
			23°12'26.83"N 77°27'26.83"E	Saket Nagar	30°C	
Family <b>SCINICIDAE</b>						
10	<i>Mabuya macularius</i> (Blyth, 1853)	Bronze Grass Skink	23°12'11.49"N 77°27'14.84"E	BU	17°C	LR-nt
11	<i>Lygosoma punctatus</i> (Gmelin, 1799)	Snake skink	23°12'26.061"N 77°27'13.914"E	Saket Nagar	19°C	LR-lc
Order <b>SQUAMATA</b> Suborder <b>SERPENTES</b> Family <b>BOIDAE</b>						
12	<i>Gongylophis conicus</i> (Schneider, 1801)	Common Sand Boa	23°12'3.84"N 77°27'7.39"E	Dept of Zoology	21°C	LR-nt
Family <b>COLUBRIDAE</b>						
13	<i>Oligodon amensis</i> (Shaw, 1802)	Banded Kukri Snake	23°12'11.37"N 77°27'13.32"E	Near university park	20°C	LR-lc
14	<i>Xenochrophis piscator</i> (Schneider, 1799)	Checkered Keelback water snake	23°12'11.49"N 77°27'14.84"E	Dept of applied aquaculture	30°C	LR-lc
15	<i>Ptyas mucosus</i> (Linnaeus, 1839)	Indian rat snake	23°12'10.12"N 77°27'12.74"E	Near University Guest house	23°C	LR-nt
16	<i>Atretium cf. schistosum</i> (Daudin, 1802)	Olive Keelback water snake	23°12'11.49"N 77°27'14.87"E	Dept of Aquaculture	31°C	LR-nt
17	<i>Amphiesma stolata</i> (Linnaeus, 1758)	Buff-Striped Keelback	23°12'11.49"N 77°27'14.84"E	Dept of Zoology	26°C	LR-nt
18	<i>Argyrogene fasciolatus</i> (Shaw, 1802)	Banded racer	23°12'11.49"N 77°27'14.84"E	Near physics Dept	22°C	LR-nt
Family <b>ELAPIDAE</b>						

19	<i>Naja (naja) naja</i>	Black Cobra	23°12'17.34"N 77°27'21.02"E	University Staff quarters	27°C	LR-nt
Family <b>TYPHLOPIDAE</b>						
20	<i>Ramphotyphlops braminus</i> (Daudin, 1803)	Brahminy worm snake	23°12'17.39"N 77°27'21.10"E	Back of central library	30°C	LR-nt
			23°12' 24.63" N 77°27' 17.85" E	Saket Nagar	18°C	
			23°11' 36.10" N 77°27' 38.57" E	Baghsewania	15°C	
<b>Abbreviations:</b> BU= Barkatullah University; SP= Surrender Palace						
<b>IUCN Status:</b> LR-lc= Lower Risk least concern; LR-nt= Lower Risk near threatened.						

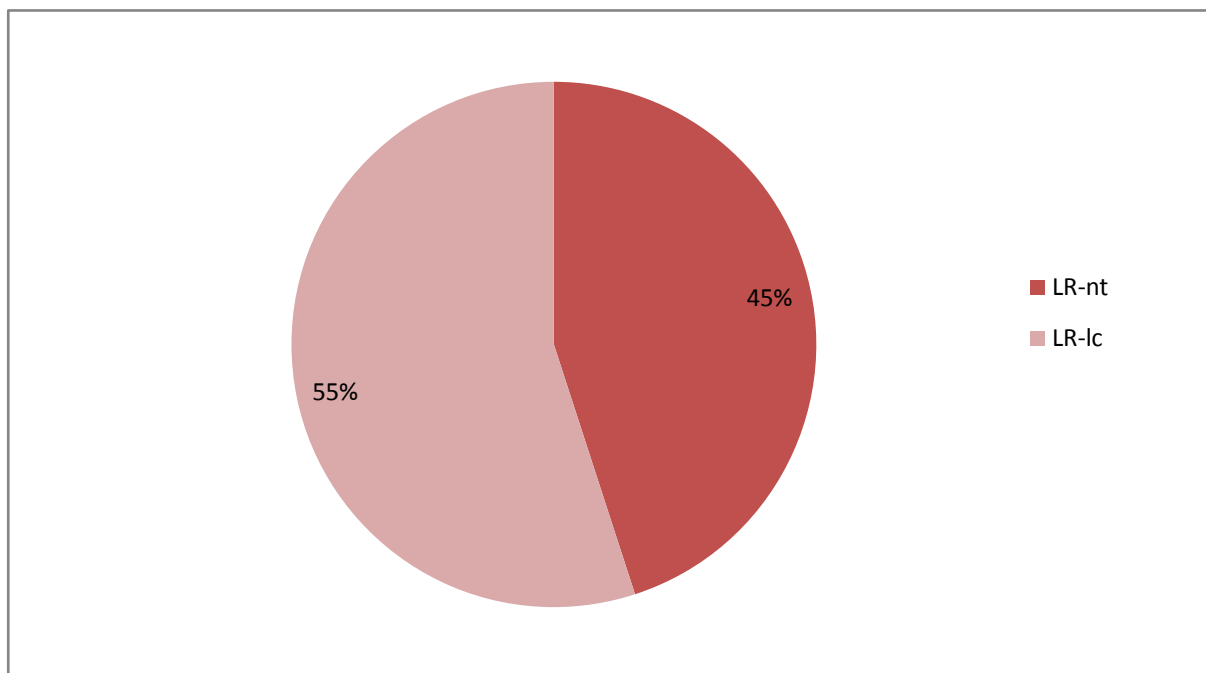


Fig.2 Iucn status of herpetofaunal species recorded during present study

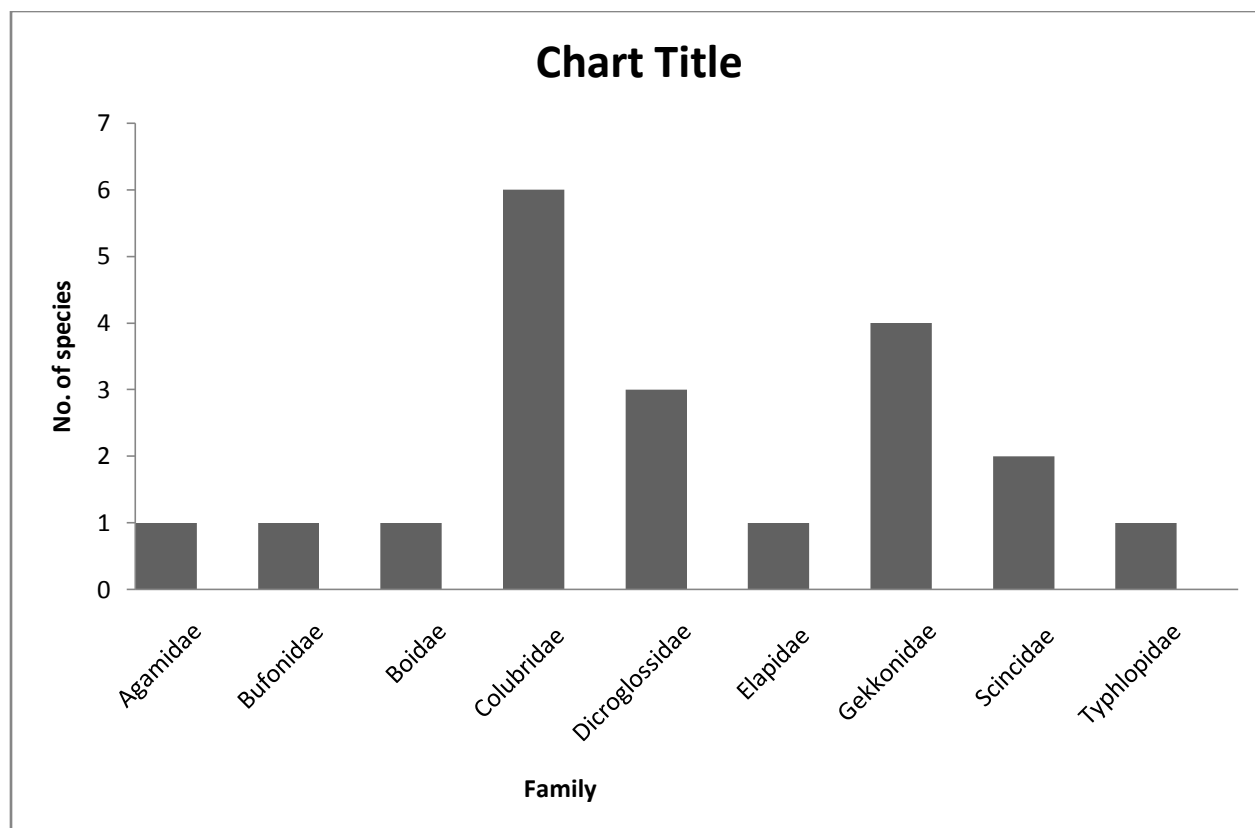


Fig.3 Family wise distribution of herepetofauna in Bu campus

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