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## An assessment of reptilian diversity and their distribution in Jammu and Kashmir state from Jammu city in northern India: A case study

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**Abstract**

Based on 30 days of field visit, a total of 16 species of reptiles were recorded from the four localities of Jammu region and their surroundings (32°43'27.92"N 74°51'7.75"E) which are Nawabad, Lakadmandi Janipur, Shanti Nagar and around University road Jammu. Out of the total 16 species sighted 03 species were contributed by family Gekkonidae and Colubridae whereas family Boidae, Elapidae and Scincidae has been represented by 02 species each. Family Agamidae, Typhlopidae, Varanidae and Viperidae have contributed with only one species each. In snakes *Ptyas mucosus* was found to be most common species and was observed mostly near human surroundings. For efficient conservation achievement of these faunal groups we require comprehensive information about the species, their distribution and ecology as well as the flow of threats which affect them. Therefore we suggest studies related to these points should be taken under consideration in further studies.

**Keywords:** Reptiles, Snakes, lizards, Jammu and Kashmir.

**Introduction**

Reptiles are the most significant components of biodiversity which breathe through lungs throughout their life; their bodies are covered by scales and are represented by crocodiles, turtles, tortoises, snakes and lizards. They share habitat like aquatic, terrestrial and arboreal. These are one of the first vertebrate groups who occupied the land successfully. They are well adapted to live in wide range of habitats ranging from tropical lowlands to cold temperate mountains and are among the animals which do not show an aquatic larval stage like amphibians. Reptiles are generally oviparous i.e. egg-laying creatures, though some of the species of order squamates are ovoviviparous in which hatching takes place within the body of the species. These are the ectothermic animals that require external heat sources for maintaining their body temperature for pursuing their metabolic activities.

This group of vertebrate fauna is declining around the world because of the increasing human population and now they are among the threatened groups of vertebrate [3, 9]. From India around 518 reptilian species are reported including 279 species of snakes, 202 species of lizards 34 species of tortoises and turtles and 03 species of Crocodiles, whereas 192 species out of them are documented endemic to the country [1]. From Jammu and Kashmir the first comprehensive herpetological survey was conducted by Sahi and documented 23 species of lacertilians while 35 species of ophidians from the different parts of Jammu And Kashmir State [6].

In this portion of Himalayan foothills the work on this faunal group was carried out long ago after that no initiation was taken towards their study. That is why it is worth to work and for that purpose we have initiated this work to provide a check list of reptiles to carry out studies related to reptiles further.

**Study area**

The State of Jammu and Kashmir has been regarded as a heaven on earth and is also called the bio-mass state of India. It has three main territories Jammu, Kashmir and Ladakh that differ in terms of climate, physiography, ethnic groups and culture. The current study was carried out at four localities (urban) in Jammu city (32.73° N 74.87° E) located in the city of temples namely Lakkar Mandi Janipur and its surroundings (32° 45'40.94"N 74° 51'4.52"E), Nawabad and its surroundings (32° 43'27.92"N 74° 51'7.75"E), Shanti Nagar and its surroundings (32° 44'25.71"N 74° 50' 29.14"E) and around University road Jammu (32°42'56.34"N 74°52'3.08"E) (Fig. 1).

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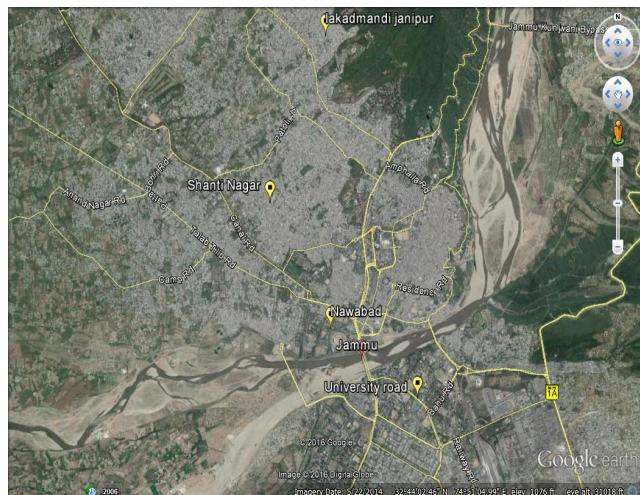


Fig 1: Map showing the localities of current study in Jammu city.

**Material and Methods**

The present study contains a checklist of reptilian fauna based on the field work conducted from March 2014 to June 2014 and March 2015 to June 2015 with their present Iucn status from four localities of Jammu City situated on the banks of river Tawi.

For this piece of the work data collections was carried out by following visual encounter survey. The surveys were conducted in the morning (6:00 a.m. to 10:00 a.m.) and evening (8:00 p.m. to 10:00 p.m.) sessions. At some spot in the day, basking reptiles were also recorded along the stream sides. Whenever the snakes were sighted they were handled by using snake hooks whereas lizards were handled by hand. After the collection of reptiles required morphometric measurement were taken out and specimens were released back to the nearby habitat away from human interference. All the specimens were studied alive. They were not collected or preserved. Morphological data of specimens was obtained for identification, supporting by color photographs taken with a Sony HX-300 camera. Geographic coordinates for study area and animals sighting sites were recorded with GPS (Chartcross Ltd.) and Polaris navigation GPS. Air temperature was recorded with the help of gradated mercury Celsius thermometer. The specimens studied were identified with the help of using literature and field guide [2, 7, 8, and 11].

**Result and Discussion**

Based on the field work, the present study revealed 16 species of reptiles belonging to 09 families with their Iucn status was presented in table 1. Family Gekkonidae and Colubridae were represented by 03 species each. All the contributors of family Gekkonidae was sighted were common and was recorded near human surroundings or within the buildings at all the four localities of the current study area whereas the specimens of family Colubridae was recorded from three localities namely

Nawabad, Lakadmandi Janipur and Shanti Nagar. Family Agamidae, Typhlopidae, Varanidae and Viperidae were represented by one species each while 2 species were contributed by family’s viz., Elapidae, and Scincidae. Two specimens were contributed by family Boidae and both the specimen was sighted at Lakadmandi locality only.

Family Gekkonidae and Colubridae contributed the maximum number of species (03 species each). The average atmospheric temperature ranged between 17°C to 30°C (Morning-Evening) during the entire survey visits made in the present study. The members of snakes and lizards are most active during the months of June and July. Previously Koul [4] stated in his thesis that Jammu region has seen to be rich in reptilian fauna and studied 17 species of reptiles where as we have recorded 16 species of reptiles during the current study. Family wise species contribution was followed as given in fig 2. In current investigation snakes contributed the maximum 09 species (54%) while lizards contributed 07 species (46%) of the total sighting and is specified in fig 3. A checklist and a key of the reptilian fauna of Jammu and Kashmir State were given by Sahi and Duda [5] in which they have reported 35 species of snakes, 19 species of lizards whereas we have observed 16 species of reptiles during present investigation which includes 09 species of snakes and 07 species of lizards from four urban localities. The current investigation revealed the only contributor of family Varanidae *Varanus bengalensis* sighted inside a sewage pipe at Shanti Nagar mid-day around 2:00 pm in the month of June (Fig 4). Previously the studies related to the distribution, ecology and status of *Varanus bengalensis* was carried out by Verma and Sahi [10] and concluded that it is a threatened lizard of the J&K state and there is urgent need for enlisting it in the wild life act of Jammu And Kashmir State. Images of some of the species of reptiles sighted in current investigation have been given in Figure 4.

These faunal groups are facing many anthropogenic pressures as well natural calamities around the world. J&K is a rich source of biodiversity and still many of them are poorly known while some are threatened and some are at the edge of extinction. Their cryptic nature, low conspicuousness and high seasonal activity have limited their study. The number of reptiles is diminishing worldwide, with habitat destruction and fragmentation as the main cause of decline. The protection of these species depends upon long term studies and an understanding of species-habitat interactions. Therefore we suggest there is urgent need of conserving these species and for that awareness programs are needed to be conducted to aware people about the importance of these animals in maintaining ecological balance in various ecosystems. Awareness regarding these should be started from schools. In order to conserve these species it becomes important to reduce diverse anthropogenic activities like habitat destruction, traffic near forest trails and killing of these creatures.

Table 1: A checklist of reptiles recorded during the survey at four localities of Jammu.

S. No	Zoological name	Common Name	IUCN Status
Class Reptilia Order Squamata			
Suborder Sauria			
Family Gekkonidae			
1	<i>Hemidactylus brookii</i> (Gray, 1845)	Brook’s house gecko	LR-lc
2	<i>Hemidactylus flaviviridis</i> (Ruppell, 1840)	Yellow-green house Gecko	LR-lc
3	<i>Hemidactylus frenatus</i> (Schlegel, 1836)	Asian House Gecko	LR-lc
Family Agamidae			

4	<i>Calotes versicolor</i> (Daudin,1802)	Indian Garden Lizard	LR-nt
Family Scincidae			
5	<i>Mabuya dissimilis</i> (Hallowell, 1857)	Striped Grass Skink	LR-nt
6	<i>Mabuya macularia</i> (Blyth, 1853)	Bronze Grass Skink	LR-nt
Suborder: Lacertilia Family: Varanidae			
7	<i>Varanus bengalensis</i> (Daudin,1802)	Indian monitor lizard	LR-nt
Suborder Serpentes Family Boidae			
8	<i>Gongylophis conicus</i> (Schneider, 1801)	Common Sand Boa	LR-nt
9	<i>Eryx Johnii</i> (Schneider, 1801)	Earth boa/Red boa	
Family: Elapidae			
10	<i>Bungarus caeruleus</i> (Schneider, 1801)	Common krait	LR-nt
11	<i>Naja naja</i> (Linnaeus, 1758)	Common Indian cobra	LR-nt
Family Colubridae			
12	<i>Amphiesma stolatum</i> (Linnaeus, 1758)	Buffed striped keelback	LR-nt
13	<i>Ptyas mucosa</i> (Linnaeus, 1758)	Rat snake	LR-nt
14	<i>Oligodon amensis</i> (Shaw, 1802)	Banded Kukri Snake	LR-nt
Family Typhlopidae			
15	<i>Ramphotyphlops braminus</i> (Daudin, 1803)	Brahminy worm snake	LR-nt
Family Viperidae			
16	<i>Daboia russelii</i> (Shaw & Nodder, 1797)	Russell's Viper	LR-nt

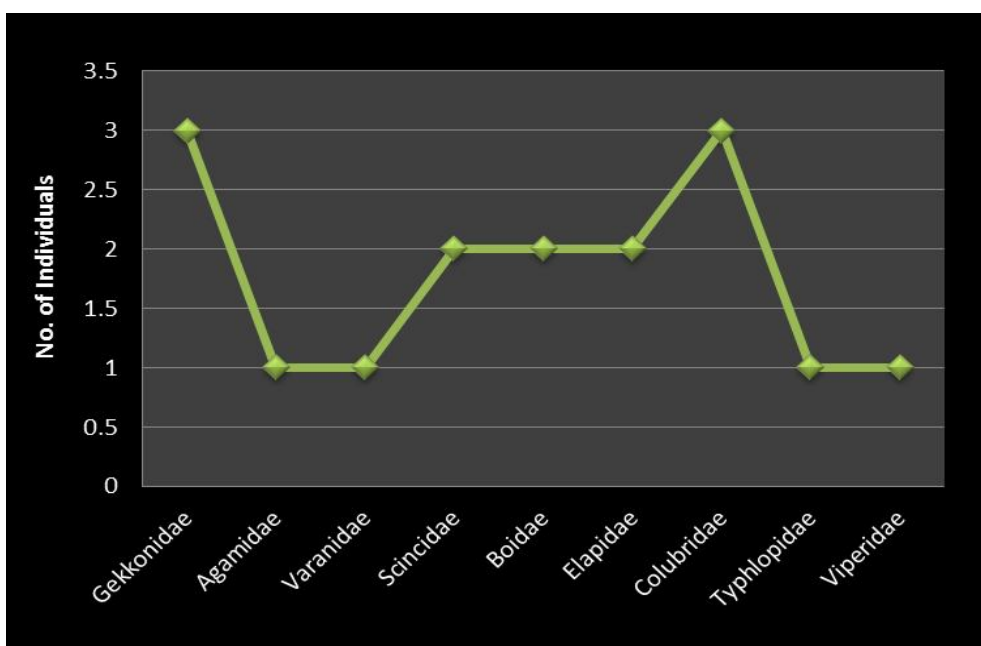


Fig 2: Family wise contribution of reptiles sighted during the study.

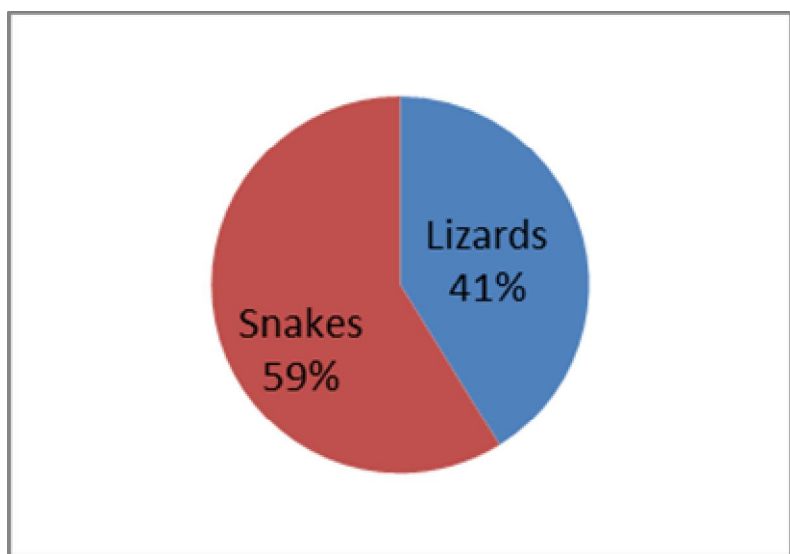
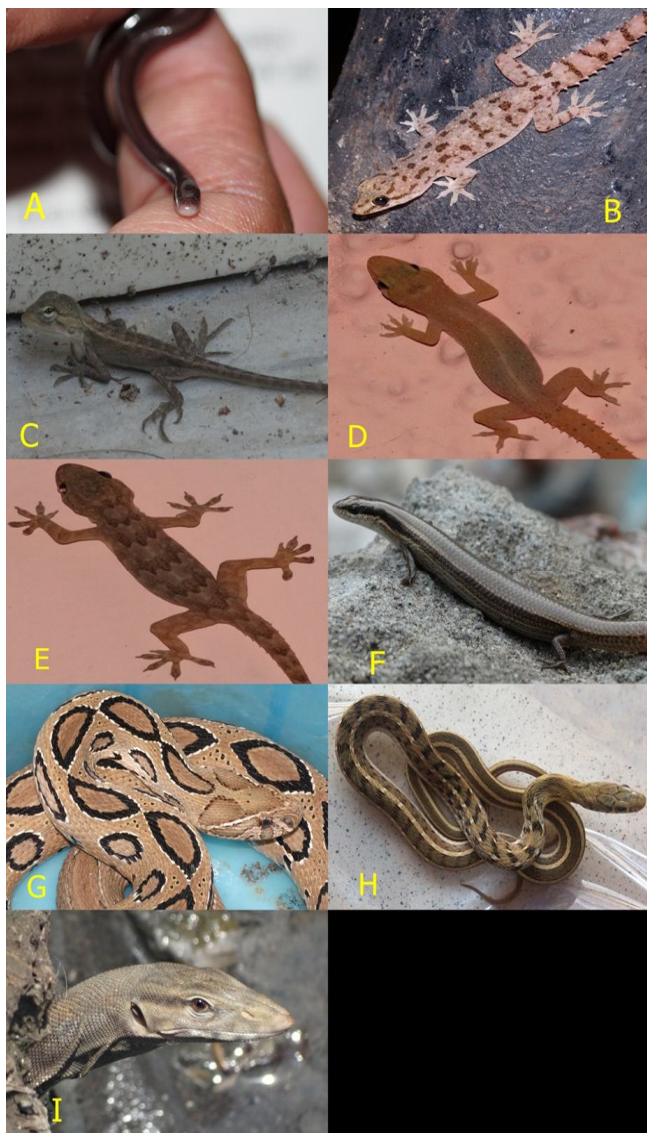


Fig 3: Percentage wise contribution of snakes and lizards recorded.



**Fig 4.** Showing images of some of the reptile species observed in current investigation; A-*Ramphotyphlops braminus*; B-*Hemidactylus brookii*; C- *Calotes versicolor*; D- *Hemidactylus frenatus*; E- *Hemidactylus flaviviridis*; F- *Mabuya macularia* ; G- *Daboia russelii*; H- *Amphiesma stotatum*; I- *Varanus bengalensis*.

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