

# Status, Distribution and Conservation Significance of Reptile Diversity in Gudalur Forest Division, Nilgiri Biosphere Reserve, Tamil Nadu, India

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## Abstract

A specific Reptile survey was conducted at Gudalur Forest Division, part of Nilgiri Biosphere Reserve for conservation. A total of 31 species were recorded and species distribution, diversity and Western Ghats endemism of the recorded species are discussed. Species conservation recommendations are given.

**Key words:** conservation, Gudalur, Nilgiri Biosphere Reserve, Reptiles

## INTRODUCTION

Knowledge on the herpetofauna of India is meagre, and mostly we know from the British researchers survey and collections over last 130 years. Currently, most of these materials are largely found at the National Museum (ZSI), Kolkatta and Museum of the Bombay Natural History Society, Mumbai in India and in British Museum of Natural History, United Kingdom. It may be noted that ecological research on the Indian reptile fauna is still in initial stage. Recent advances in taxonomy, systematics and classification on the Indian reptiles are reviewed by Das (2003). Reptiles found in Gudalur forest division has not been studied so far and thus present study is significant.

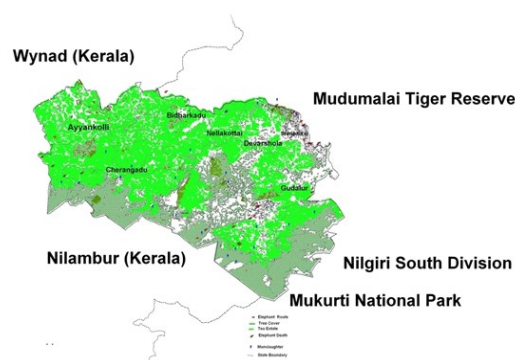


Fig. 1. Gudalur Forest Division

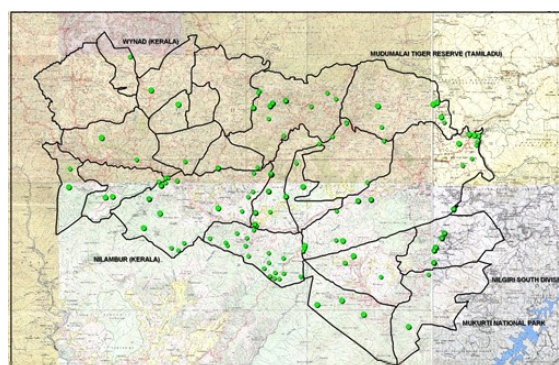


Fig 2. Locations of Quadrats Surveyed for Reptiles in Gudalur Forest Division



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## STUDY AREA

The Gudalur Forest Division covers an area of 10551.202 and it is a North West part of the Nilgiri Biosphere Reserve (NBR). The area is situated between latitude 11° 23' and 11° 36' and longitude 76° 14' to 76° 33. The terrain is undulating with an altitudinal range of 300 Mts. to 1870 Mts. The mean annual rainfall ranges from 850 mm in the foothills to about 2000 mm on the hills. The vegetation types vary from tropical thorn forest to evergreen forest, in association with terrain, altitude and rainfall. Humidity of the area is as high as 80-90% during the southwest monsoon.

**Table 1.** List of Reptiles recorded in the Gudalur Forest Division

Sl. No.	Family	Common Name	Scientific name	Status	Endemics
1	<b>Gekkonidae</b>	Asian House Gecko	<i>Hemidactylus frenatus</i>	LR	
2		Brook's House Gecko	<i>Hemidactylus brookii</i>	LR	
3		Bark Gecko	<i>Hemidactylus leschenaultii</i>	LR	
4		Mysore Day Gecko	<i>Cnemaspis mysoriensis</i>	DD	E
5		Termite-hill Gecko	<i>Hemidactylus triedrus</i>	LR	
6	<b>Agamidae</b>	Indian Garden Lizard	<i>Calotes versicolor</i>	LR	
7		Green Forest Calotes	<i>Calotes calotes</i>	LR	
8		South Indian Rock Agama	<i>Psammophilus blanfordanus</i>	LR	E
9		Southern Forest Calotes	<i>Calotes rouxi</i>	LR	E
10		Gliding Lizard	<i>Draco dussumieri</i>		
11	<b>Scincidae</b>	Beddome's Grass Skink	<i>Mubuya beddomei</i>	LR	
12		Keeled Grass Skink	<i>Mubuya carinata</i>	LR	
13		Bronze Grass Skink	<i>Mabuya macularia</i>	LR	
14		Three-lined Grass Skink	<i>Mubuya trivittata</i>	LR	E
15	<b>Varanidae</b>	Bengal Monitor Lizard	<i>Varanus bengalensis</i>	VU	
16	<b>Typhlopidae</b>	Brahminy Worm Snake	<i>Ramphotyphlops braminus</i>	LR	
17	<b>Boidae</b>	Common Sand Boa	<i>Gongylophis conicus</i>	LR	
18		Red Sand Boa	<i>Eryx johnii</i>	LR	
19		Indian Rock Python	<i>Python molurus</i>	LR	
20	<b>Elapidae</b>	Common Krait	<i>Bungarus caeruleus</i>	LR	
21		Spectacled Cobra	<i>Naja naja</i>	LR	
22	<b>Viperidae</b>	Russell's Viper	<i>Daboia russelli</i>	LR	
23		Saw Scaled Viper	<i>Echis carinata</i>	LR	
24	<b>Colubridae</b>	Common Vine Snake	<i>Ahaetulla nasuta</i>	LR	
25		Bridal snake	<i>Dryocalamus nympha</i>	LR	
26		Trinket snake	<i>Coelognathus helena</i>	LR	
27		Common Cat Snake	<i>Boiga trigonata</i>	LR	
28		Common Bronzeback Tree Snake	<i>Dendrelaphis tristis</i>	LR	
29		Indian Rat Snake	<i>Ptyas mucosus</i>	LR	
30		Dumeril's black Headed Snake	<i>Sibynophis subpunctatus</i>	LR	E
31		Checkered Keelback	<i>Xenochropis piscator</i>	LR	

Nomenclature following Das (2003).

Mean maximum temperature recorded was (26°C) and mean minimum temperature (10°C) was recorded during January.

There are four major vegetation types are there in Gudalur forest division namely dry deciduous forest (DDF), moist deciduous forest (MDF), and mixed MDF and semi-evergreen forests. These forest types are rich in microhabitat characteristics and rich in reptile diversity.

## OBJECTIVES

Present study aims to

- ◆ To document the reptile diversity of the study area, and
- ◆ To recommend suitable suggestions to conserve the reptile diversity of the study area

## METHODS

The survey was carried out to find out the Reptile diversity and its status in Gudalur Forest Division by applying more than one method, viz., Visual Encounter

**Table 2.** Reptile species diversity in different habitats obtained from VES method.

Diversity Attributes	Dry deciduous forest (DDF)	Moist deciduous forest (MDF)	Mixed MDF	Semi Evergreen forest
Species richness	27	18	12	12
Diversity H'	2.453	2.5178	2.0794	2.0766
Hill's diversity N <sub>1</sub>	11.62	12.4013	7.999	7.9773

**Table 3.** Reptile species diversity in different habitats obtained using quadrat method

Diversity Attributes	Dry deciduous forest (DDF)	Moist deciduous forest (MDF)	Mixed MDF	Semi Evergreen forest
Species richness	20	10	14	2
Diversity H'	2.6612	1.8209	2.1729	0.6365
Hill's diversity N <sub>1</sub>	14.31345	6.177416	8.78372	1.889855

Survey popularly known as (VES). Quadrat method and opportunistic method, to get more accurate and complete results. In Visual Encounter Survey (VES), an area or habitat was walked through for a prescribed time period systematically searching for animals. During the search leaf litter, fallen logs, trees (bark, buttress, root, holes), shrubs, boulders, rocks (rock crevices), were examined. Streams and water bodies were surveyed walking along the waterline and scanning the water bodies. This is an area constrained sampling technique, which involves laying out a series of squares (Quadrats) within a habitat and thoroughly searching for Reptiles. Each Quadrat was placed apart so as to avoid pre-sampling disturbance. Quadrat survey was conducted to cover all the forest area of Gudalur Forest Division. Following reference guides were referred for survey techniques and identifications of reptiles: (Sutherland 1996, Smith 1935, 1943, Whitaker and Captain 2004, Das 1997, Daniel 1992, 2002 and Bhupathy 2004).

## RESULTS

List of reptile species recorded during the present study are given in table 1.

In addition to these species a good number of King Cobra populations are present in Gudalur Forest Division. But during the survey the researchers were not able to document the species. Recent records shows King Cobra frequently entering into human habitation and the species was rescued by trained environmentalists.

### Species Richness and Diversity of Reptiles

Species accumulation curve was estimated using EstimateSWin 820 software to understand the species richness accumulation using the abundance data collected during the survey. Both quadrat method and VES have shown more or less similar trend in species accumulation and the curve did not reach asymptote

denoting the need of more sampling in all habitats present in the Gudalur forest division.

Reptiles species richness from the Visual Encounter data was high in dry deciduous forest (DDF) (N=27) followed by moist deciduous forest (Table 2). Species richness was less in mixed moist deciduous and semi-evergreen forests. The Shannon-Weinner diversity index give higher value ( $H' = 2.5$ ) in moist deciduous forest even though the species richness is lesser than the DDF. This was because of the number of contributing species in MDF is more ( $N_1 = 12.4$ ) than DDF ( $N_1 = 11.6$ ). The study is for a short term and as such we need to sample more to avoid underestimates.

The data from quadrat method showed that the reptile species richness was less in DDF (N=20). The quadrat method is time consuming and it has its own limitations. This is one of the reasons for recording less number of species during the quadrat survey. From the quadrat survey, the second highest richness was found in the mixed moist deciduous forest (N=14; Table 3). Diversity indices were calculated using quadrat method. The reptile diversity was high in DDF followed by Mixed MDF and MDF. The lowest species diversity was recorded in Semi-evergreen forest. The number of species contributing to the diversity was high in DDF followed by mixed MDF (Table 3).

Most of the reptile species of Gudalur Forest Division were in Lower Risk (91.43%), followed by Vulnerable (2.86%) and Data Deficient (5.7%).

### Endemic Reptiles

The endemism of reptiles in Western Ghats is very high compared to other parts of India. Among the reptiles recorded during the survey 28% of them were endemic to Western Ghats and 72% of the reptiles were common. Some of the endemic snakes recorded were Beddome's

coral snake, Slender coral snake and Bridal snake. Interesting endemic lizards recorded during the survey were flying lizard, forest calotes and Mysore day gecko.

## CONCLUSION

During the survey researchers noticed several problems related to Reptiles conservation in Gudalur Forest Division. These problems are analysed and suitable management implications are discussed in this paper.

### Anthropogenic Pressure

Anthropogenic pressures such as lopping, fire wood and timber wood collections, and cattle grazing should be avoided in the entire forest division for the better management of vegetation. Since dry sticks and grasses are the good micro-habitat for the reptiles, the forest department officials should encourage alternate fuel sources for domestic purposes in the peripheries of forest zone. This can be implemented through various socio-economic improvement programmes conducting by forest department such as Tamilnadu Afforestation Programme (TAP). Apart from this, the formation of social forests and/or agro-forests by village forest councils with the help of forest department for the benefit of local people can reduce the anthropogenic pressure on forest for fodder and fire wood.

### Protection of forest fire

During the summer months (March-June), the local people or local tribes should be engaged to assist the beat watchers for controlling the forest fire and for the better growth of plants, which are the major habitat for reptiles. Livestock grazing and other trespassers should not be allowed inside the forest area during the dry seasons. They might ignite fire inside the forest area.

### Formation of anti-poaching camps

Even though Reptile poaching was not recorded during the present survey, engaging the anti-poaching watchers are important. The local tribes or local people may be engaged to assist the beat watchers to organize special camps in the remote area and for regular patrolling of the area to prevent poaching activities.

### Eco-awareness centre

An environmental awareness centre can be set up in the tourism zone, which can propagate environmental awareness among tourists; including, the importance of reptiles in forest ecology and their conservation. Small film shows or slide shows can be conducted for floral and faunal wealth and the conservation of the region. This process might induce tourists to conserve the forest wealth and avoid the pollution in forest areas.

### Publicity materials and eco-awareness programmes

The printed hand books, posters and brochures may be circulated to the tourists coming to the tourism areas. These materials must be designed to propagate the message of conservation to the public and student communities.

## Management Recommendations for Reptile Conservation

- ◆ Awareness on Herepetofauna, in particular on snakes has to be created to eco-tourists, local villagers and tribes by various programmes.
- ◆ Nowadays poaching on snakes, particularly Red Sand Boa is very common in Tamil Nadu based on various myths. Hence, anti-poaching watchers has to be engaged for regular patrolling and monitoring to avoid poaching activities in Gudalur Forest Division.
- ◆ Since, data on Reptiles in Gudalur Forest Division is very meager, thorough scientific way of study and documentation has to be made to conserve threatened species on priority basis.
- ◆ A data base on Reptiles that occur in Gudalur Forest division may be created and maintained by the Forest Department for better management.

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