

Research Article

A Preliminary Survey on Snake Diversity and Status in and around Villages of Shankaraghatta, Shivamogga, Karnataka, India

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Abstract

Shankaraghatta is a small village in Bhadravathi Taluk in Shimoga District and is situated 24 km from shimoga city and 4 km to Bhadra Reservoir amidst the dry deciduous forest and is located on the edge of Bhadra Tiger Reserve. The snake diversity and status was studied from May 2018 to April 2019 and it was found that the 25 species of snakes belonging to 7 families were reported. From the total identified species, 18 were non-venomous, 3 were venomous and 4 were mildly-venomous. Among the rare species, Brown vine snake (*Ahaetulla pulverulenta*), Ornate flying snake (*Chrysopeleo ornate*) and Green keelback (*Macropisthodon plumbicolor*) were reported. The family Colubridae dominates other families and Indian spectacle cobra (*Naja naja*) is the most rescued snake.

Keywords: Snake diversity, Shankaraghatta, venomous, brown vine snake, Indian spectacle cobra.

Introduction

Snakes are the reptiles and considered as a successful group of predatory vertebrates that occupy a wide range of environments in tropical as well as temperate environments (Smith, 1943; Pauwels *et al.*, 2008). There are about 3273 species of snakes known worldwide, out of which 302 species have been reported from India (www.indiansnakes.Org). There are about 153 species of fresh water snakes making about 5% of all known snakes (Pauwels *et al.*, 2008). A total of 52 venomous species are reported from India, among which 32 are over the land (Pythons, Vipers, coral snakes, Cobras, King cobra and Kraits) and 20 are Sea snakes (Chandra and Gajbe, 2005). The big four dangerous and major venomous snakes are the Indian Cobra, Krait, Russel's viper and Saw scaled viper. There are three main types of snake venoms that are hemotoxic venom (affects the heart and cardiovascular system), neurotoxic venom (affects the nervous system and brain) and cytotoxic venom (localized effect on bite area). Those all venomous snakes belong to the family Elapids, Vipers and Colubrids. Snakes are well adapted for the climatic conditions morphologically modifying their body size, shape and colour (camouflage) some of them are being arboreal and burrowing type. Snakes have no external ears they sense through the eyes, smells by using its bifid tongue and also some have heat-sensitive pits (pit viper and python) between the nostril and eye which allow them to heat sense to catch the prey and also to escape from the predator. All snakes are carnivorous in nature mostly feeds on mammals, birds, eggs, reptiles, amphibians.

Some snakes like cobras, vipers as they are highly venomous have ability to paralyse their prey and some like python squeezes its prey and then swallow whole food. As snakes are ectotherms (cold blooded) they regulate their own body temperature and bask in the sun to warm their body. They are found in the forests, deserts, undergrounds, rocky terrain, wetlands, agricultural fields and it can even found in the populated urban areas such as villages and city outskirts in search of food and hiding places. Especially in the human dominated area people use to kill the snakes because of fear of bite and moreover the lack of knowledge that it may bite, that leads to the declining population of the snakes. These snakes (python, cobras and vipers) are now protected under the Indian Wildlife Protection Act 1972. Considering the above facts in view, this study investigated on the snake diversity and status in and around Villages of Shankaraghatta, Shivamogga, Karnataka, India.

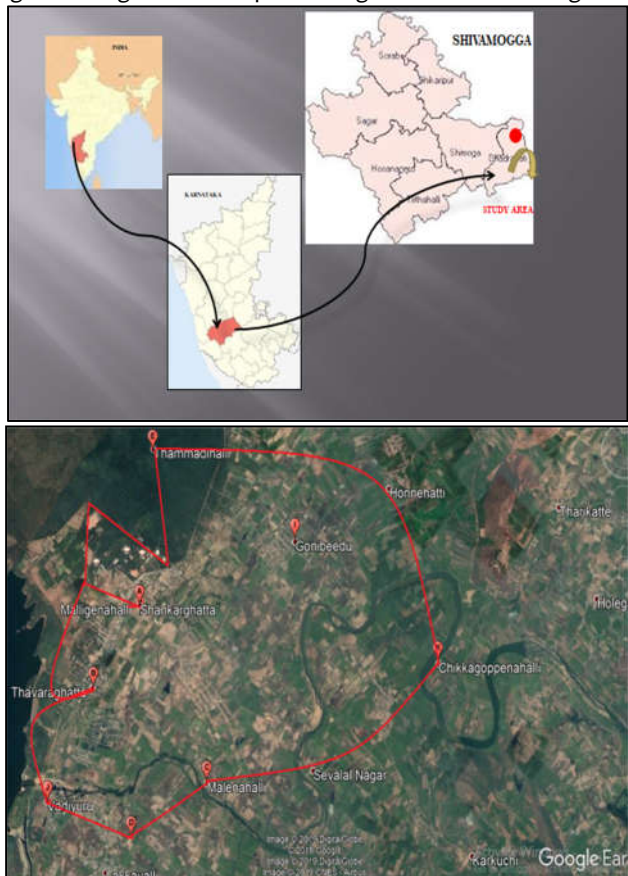
Materials and methods

Study area: Shankaraghatta is a small village in Bhadravathi Taluk in Shimoga District of Karnataka State, India. It comes under Singanamane gram Panchayath. It is located between latitude of 13°41' N and longitude 75°38' E at an elevation of 680-720 m above MSL. The village is situated 24 km from shimoga city and 4 km to Bhadra Reservoir amidst the dry deciduous forest and is located on the edge of Bhadra wildlife sanctuary (Fig. 1). The village encompasses 697 hectares of land with varied habitat, from undulating hilly terrain to manmade wetlands the majority of the land cover

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with the agriculture land, dominating paddy cultivation and areca plantation. There is a considerable secondary vegetation of many tree species like teak, eucalyptus and terminalia species. The predominating vegetation is typically dry deciduous with considerable similarities with the wildlife sanctuary. The annual temperature ranges from 18-36°C and average rainfall is 1000 mm (Meteorological Department, Shimoga). The villages have good irrigation facility due to presence of Bhadra River. Shankaraghatta village is surrounded by various villages like Malligenahalli, Nellisara, Malenahalli, Gonibeedu, Thavaraghatta, Vadiyuru, Chikkagopenahalli and Thammadihalli.

Fig. 1. Shimoga district map and villages around Shankaraghatta.



Source: Google earth, 2019.

Methodology: The identification of snake was done by capturing/rescuing of snake. The description by the caller and time (day/night) itself gave an idea of the presence of probable type of snake species. Snakes were caught/rescued by aluminium hooked sticks or by soft catch-grips that do not hurt the snake and long pole/stick were used for safety. After catchment/rescue the snakes were immediately put into snake bag or plastic bottles with holes to circulate the air. The caught/rescued snakes were released within their home range and those injured snakes were released in the forest area with the help of foresters.

The materials used are hooked stick, snake bag, torch for night search, field diary and Canon Eos 760d camera was used for the photographs. The photographs were compared with the book Whitaker and Captain (2004) and Snakes of India field guide. The collected snakes were classified as venomous, non-venomous and semi-venomous snakes.

Results and discussion

From the survey in the study area, it was found that the grand total of 379 snakes of 25 species of snakes belonging to 7 families was reported (Table 1). From the total identified species, 18 are non-venomous, 3 are venomous and 4 are mildly-venomous. Among the rare species, brown vine snake, ornate flying snake and green keel-back are reported. Majority of the snakes species rescued are non-venomous snakes. Among that Rat snake, Brahminy worm snake and Elliot's shield tail are the highest rescued snakes. In venomous snakes, spectacle cobras are the most rescued snake next to that Russell's viper. In mildly-venomous snakes, green vine snake is the highest rescued snake (Table 2).

Monthly incidence of snake rescue data was related with the season. Comparatively higher number of snakes during monsoon season, post-monsoon and winter season equally and less in the summer season was recorded. As the snakes are cold-blooded animals they come outside for basking during the warm summer but the variation in the number compared to all seasons is not only because of the seasonal variation it also depends on the crops that the farmers are growing and also the crop rising and ploughing time. The most common and abundant species are the spectacle cobra *N. naja* and rat snake *P. mucosa*. The highest number of spectacle cobra was rescued during the month of February and next to that rat snake in the month of August 2019. Figure 2 represents the status of venomous, non-venomous and mildly-venomous snakes. The most of the rescued snakes are the non-venomous snakes of the family Colubridae, 18 different species out of 25 species, 2 different species from the family Elapidae and remaining are pythonidae, typhlopidae, uropeltidae and viperidae.

Conclusion

Local people kill (not all) both venomous and non-venomous snakes due to lack of the knowledge and fear that it may bite, they think that every snake is poisonous and fail to recognize the poisonous and non-poisonous snakes. Most of the land is the agricultural land that attracts the rodents followed by the snakes whereas; home provides the suitable climatic condition that is both food and shelter to snake to harbor. The monthly/seasonal variation is due to crop rising and ploughing.

Table 1. Checklist of snake species in and around villages of Shankaraghatta.

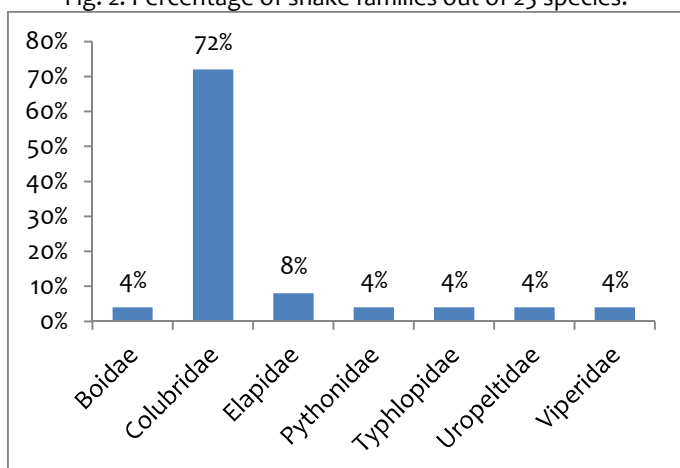
S. No.	Family	Common name	Scientific name	Category	Status
1.	Boidae	Red Sand Boa	<i>Eryx johnii</i> (Russel, 1801)	NV	R
2.	Colubridae	Banded Racer	<i>Argyrogena fasciolata</i> (Shaw, 1802)	NV	R
3.	Colubridae	Common Cat Snake	<i>Boiga trigonata</i> (Schneider, 1802)	MV	R
4.	Colubridae	Montane Trinket	<i>Preocryptophis porphyracea</i> (Daudin, 1803)	NV	UC
5.	Colubridae	Common Bronze Back Tree Snake	<i>Dendrelaphis tristis</i> (Daudin, 1803)	NV	UC
6.	Colubridae	Common Trinket	<i>Coelognathus Helena</i> (Daudin, 1803)	NV	UC
7.	Colubridae	Common Kukri	<i>Oligodon arnesis</i> (Shaw, 1802)	NV	UC
8.	Colubridae	Russell Kukri Snake	<i>Oligodon taeniolatus</i> (Jerdon, 1853)	NV	UC
9.	Colubridae	Rat Snake	<i>Ptyas mucosus</i> (Linnaeus, 1758)	NV	C
10.	Colubridae	Checked Keelback	<i>Xenochrophis piscator</i> (Scheinder, 1799)	NV	C
11.	Colubridae	Green Keel Back	<i>Macropisthodon plumbicolor</i> (Cantor, 1939)	NV	R
12.	Colubridae	Ornate Flying Snake	<i>Chrysopeleo ornate</i> (Shaw, 1802)	MV	R
13.	Colubridae	Green Vine Snake	<i>Ahaetulla nasuta</i> (Lacepede, 1789)	MV	UC
14.	Colubridae	Brown Vine Snake	<i>Ahaetulla pulverulenta</i> (Dumeril and Bibron, 1854)	MV	R
15.	Colubridae	Common Wolf Snake	<i>Lycodon aulicus</i> (Linnaeus, 1758)	NV	UC
16.	Colubridae	Buff Striped Keelback	<i>Amphiesma stolatum</i> (Linnaeus, 1758)	NV	UC
17.	Colubridae	Dumerill's Black Headed Snake	<i>Sibynophis subpunctatus</i> (Dumeril and Bibron, 1854)	NV	UC
18.	Colubridae	Travancore Wolf Snake	<i>Lycodon travancoricus</i> (Beddome, 1870)	NV	UC
19.	Colubridae	Beddom's Keel Back	<i>Hebius beddomei</i> (Gunther, 1864)	NV	UC
20.	Elapidae	Common Krait	<i>Bangarus caeruleus</i> (Scheinder, 1801)	V	UC
21.	Elapidae	Spectacled Cobra	<i>Naja naja</i> (Linnaeus, 1758)	V	C
22.	Pythonidae	Indian Rock Python	<i>Python molurus</i> (Linnaeus, 1758)	NV	UC
23.	Typhlopidae	Brahminy Worm Snake	<i>Ramphotyphlops braminus</i> (Daudin, 1803)	NV	UC
24.	Uropeltidae	Elliot's Shield Tail	<i>Uropeltis ellioti</i> (Gray, 1858)	NV	C
25.	Viperidae	Russell's Viper	<i>Vipera russelii</i> (Shaw and Nodder, 1797)	V	C

V=Venomous, NV=Non-venomous, MV=Mildly-venomous, R=Rare, C=Common, UC=Uncommon.

Table 2. Monthly incidence of snake species rescued in the study area.

S. No.	Common name	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
A. Venomous														
1.	Indian Spectacle Cobra	6	5	10	8	8	12	11	16	17	19	17	12	141
2.	Russel's Viper	1	4	3	9	7	7	5	3	2	0	1	2	44
3.	Common Krait	0	0	0	1	0	0	0	0	1	0	0	0	2
B Non-Venomous														
1.	Red Sand Boa	0	0	0	0	0	0	0	1	0	0	1	0	2
2.	Banded Racer	0	0	0	0	0	0	0	0	0	1	0	0	1
3.	Montane Trinket	0	0	0	1	0	0	0	0	0	0	0	0	1
4.	Common Bronze Back Tree Snake	1	1	0	1	2	1	1	2	0	0	2	1	12
5.	Common Trinket	0	0	0	1	0	0	0	0	1	0	0	0	2
6.	Common Kukri	0	0	0	0	0	0	0	0	0	0	0	1	1
7.	Russell Kukri Snake	0	0	0	0	0	1	0	0	0	0	1	0	2
8.	Rat Snake	4	7	5	7	2	6	3	5	2	1	1	1	44
9.	Checkered Keelback	3	1	1	2	1	1	1	4	1	2	1	0	18
10.	Green Keel Back	0	0	0	0	1	0	0	0	0	0	0	0	1
11.	Common Wolf Snake	2	0	0	1	0	0	0	0	0	2	1	0	6
12.	Buff Striped Keelback	1	0	0	0	0	0	0	0	1	0	0	0	2
13.	Dumerill's Black Headed Snake	1	0	0	0	0	0	0	0	0	1	1	1	4
14.	Travancore Wolf Snake	0	1	0	1	0	1	0	0	1	2	0	0	6
15.	Beddom's Keel Back	0	0	0	0	0	0	0	1	0	0	0	0	1
16.	Indian Rock Python	0	0	0	1	1	0	0	1	1	0	0	0	4
17.	Brahminy Worm Snake	6	10	6	11	2	2	0	0	0	0	0	0	37
18.	Elliot's Shield Tail	2	2	5	13	9	4	0	0	0	0	0	0	35
C. Mildly-Venomous														
1.	Common cat snake	0	0	0	1	0	0	0	0	0	0	0	0	1
2.	Brown Vine Snake	0	0	0	0	1	0	0	0	1	1	0	0	3
3.	Green Vine Snake	0	2	0	2	1	1	0	0	1	1	0	0	8
4.	Ornate Flying Snake	0	0	0	0	0	0	0	1	0	0	0	0	1

Fig. 2. Percentage of snake families out of 25 species.



Farmers cultivate paddy in most of the land and that provide the good habitat for snakes and this may be the reason to get highest number of snakes. After harvesting, they plough and clean the land so that the snake number is comparatively less due to less suitable habitat and this may be the reason to get lowest number of snakes during the summer season. Due to human settlements and human dominated area these numbers are decreasing. While rescuing the snakes, we also gave awareness about the snakes that how it keeps checks on the rodent population and how it is ecologically helpful. To protect the snake population measures like, the habitat preservation, education and outreach programs are important and also to avoid the human-snake conflict. Due to presence of snake friend in this area people show more concern to save the snake rather than killing and that indicate the people attitude towards the conservation of snake.

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References

1. Arijit, P., Somenath, D. and Utpal, S. 2012. Seasonal diversity and abundance of herpetofauna in and around an industrial city of West Bengal, India. *J. Appl. Sci. Environ. Sanit.* 7(4): 281-286.
2. Bennerman, W.B. and Pocha, J.P. 1905. On the distribution of the varieties of cobra (*Naja tripudians*) in India. *J. Bombay Nat. Hist. Soc.* 16: 638-643.
3. Bitupan, B. and Gaurab, N. 2017. Diversity of Herpetofauna and their conservation in and around North Orissa University campus, Odisha, India. *NeBio Int. J. Environ. Biodivers.* 7(4): 138-145.
4. Bruce, A. and Kenneth, V.K. 2010. The functional morphology of hooding in cobras. *J. Exp. Biol.* 213: 1521-1528.
5. Chandra, K. and Gajbe, P.U. 2005. An inventory of herpetofauna of Madhya Pradesh and Chhattisgarh. *Zoos' Print J.* 20(3): 1812-1819.
6. Daniel, J.C. 2002. The Book of Indian Reptiles and Amphibians. Bombay Natural History Society. Oxford University Press, Mumbai. p.238.
7. Evans, G.H. 1902. The King Cobra, or Hamadryad-*Naia bungarus* (Boulenger), *Ophiophagus elaps* (Günther). *J. Bombay Natural History Soc.* 14(3): 409-418.
8. Gangadhar, T. and Shivaji, C. 2016. Snake Species Diversity of Swami Ramanand Teerth Marathwada University Nanded, Maharashtra state, India. *Int. J. Curr. Res. Aca. Rev.* 4(6): 104-115.
9. Ghavw, B.V. 2010. 400 Ques and about snake with special reference to snake of India. pp.189-355.
10. Hrima, V.L., Hriatzuala, S., Zodiniana, F., Samuel, L., Lalrinchhana, C., Zothansiana and Lalremsanga, H.T. 2014. Nesting ecology of the King Cobra, *Ophiophagus hannah*, (Reptilia: Squamata: Elapidae) in Aizawl District, Mizoram, India, Issues and Trends of Wildlife Conservation in Northeast India. Biodiversity and Nature Conservation Network (Biocone), Aizawl, Mizoram.
11. Pauwels, O.S.G, Wallach, V. and David, P. 2008. Global diversity of snakes (serpents; Reptilia) in freshwater. *Develop. Hydrobiol.* 54: 599-605.
12. Smith, M.A. 1943. The Fauna of British India, Ceylon, and Burma, Including the Whole of the Indo-Chinese Sub-region. Reptilia and Amphibia. Vol. 3, Serpentes. Taylor and Francis, London.
13. Whitaker, R. and Captain, A. 2004. Snakes of India—The Field Guide. DracoBooks, Chengelpattu. p.438.

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