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Pavan Laxmanrao Jadhav

Department of Zoology,
School of Life Sciences, Swami
Ramanand Teerth Marathwada
University, Nanded,
Maharashtra State, India

Shivaji P Chavan

Department of Zoology,
School of Life Sciences, Swami
Ramanand Teerth Marathwada
University, Nanded,
Maharashtra State, India

Harshad Sudarshan Trimukhe

Shari Academy of Professional
Photography, Colaba, Mumbai,
Maharashtra State, India

Snake species diversity and their distribution in and around Nanded city, Maharashtra, India

Pavan Laxmanrao Jadhav, Shivaji P Chavan and Harshad Sudarshan Trimukhe

Abstract

Snakes are one of the most wide spread vertebrates on the globe, mostly they prefer arid zone of the globe in terms of diversity. Data collected based on reports from volunteers, snake friends and rescuers 26 species of snakes reported from Nanded region of Maharashtra of that 10 species were venomous and 16 were semi-venomous and non-venomous. Road kills, encounter during work in agriculture fields and poor knowledge of the people in general about failure in distinguish between venomous and non-venomous species were main reasons behind destruction of snakes from this region. Major four venomous species Spectacled Cobra, Russell's viper, Common Krait, Wall's Sindh Krait and Saw scaled Viper. Occurrence of Python in the arid parts of SRTM University at Nanded away from main natural habitats was remarkable note of this research. Need of snake conservation to balance the ecosystem and to protect the food chain is main challenge identified. Continuous monitoring on snake species diversity of the region is suggested.

Keywords: Snakes, diversity, Nanded, Venomous, India

1. Introduction

Snakes are important part of various food chains in the ecosystems. The snakes are distributed in various kinds of habitats that include grasslands, wetlands, forests, agriculture fields, around the residential areas, scrublands, deserts and sea. The snakes are predatory on rodents, amphibians, birds, mammals, all reptiles, insects, eggs and young ones of birds. It indicates the variation in food selectivity of these creatures. Since ancient time the snakes are one of the successful vertebrates on the earth. Most of the snake species are found in the arid zone of the world^[14]. Snakes are well known for their hibernation and aestivation. It is possible due to their ability to survive without feeding for long duration. Snakes are said to be friends of farmers because they are natural predators of harmful rodents, and insects in agriculture fields, but in India the lack of awareness among the farmers and people in rural area hundreds of snakes are killed by the people. The venom apparatus in the mouth of venomous snakes include a pair of fangs is an effective structure useful for the snakes to kill their prey animal. Due to human mistake of careless work in the fields in the agriculture fields without protection measures the snake bite happens. Without knowing the snake species as venomous or non-venomous it is killed. All over the world people fear and dislike the snakes moreover inadequate knowledge of people about snakes results into killing whenever and wherever they are seen^[10].

Snakes are one of the most successful living vertebrates^[12]. These are from clade Squamata (Lizards, Snakes and Amphisbaenians) consists of 9193 species of that 3378 are snake species in the world^[9], from year 2000 to 2012 species added in the list as new species were 458^[9]. The Indian Cobra, Russell's viper, Saw Scaled viper, Common Krait called as big four venomous snakes found in India.

Due to habitat destruction, scarcity of prey animals, pollution, road kills and destruction by humans are the major threats for the survival of snakes^[10, 11]. Therefore it needs continuous monitoring on diversity and distribution of snakes in an ecosystem. Present study was aimed to determine the diversity, distribution and varied morphs of the snake (Fig. 4, 5) species in Nanded region of Maharashtra as a next step after earlier reports^[4, 5]. Collection of venom from snakes, animal trafficking, to pet the snakes, snake shows by charmers, use in black magic are some important challenges in the survival and conservation of snakes.

Correspondence

Pavan Laxmanrao Jadhav

Department of Zoology,
School of Life Sciences, Swami
Ramanand Teerth Marathwada
University, Nanded,
Maharashtra State, India

2. Materials and Methods

To determine diversity and distribution of snake species in various habitats in Nanded region the data was collected from volunteer snake friends, reports on road kills and encounter during amateur tracking and field observations. During this study only photographs were used. The data was collected during year 2014 to 2017. The snake species were categories as venomous, semi-venomous and non-venomous and also classified as per the habitat difference. The species were identified by using snake identification keys in the standard taxonomic literature and online database 'Snakes of India' [1, 2, 13, 15].

3. Results and Discussion

There are many studies on snake diversity in Maharashtra and nearby states like Karnataka [10, 11], from Chhattisgarh [9], from Vidarbha region and parts of Buldhana [5]. The study was specially conducted in S. R. T. M. University, Nanded area first time [4] and reported occurrence of 12 species. During present study 26 number of snake species were recorded, of that five species were venomous, three were semi-venomous and 16 species were non-venomous. The result indicates that 61.5% of snake species were non-venomous, but once they appear in public place, residential areas or in the agriculture fields they were killed by local people. At very few occasions the people who were aware about the importance and conservations of snakes they informed to the snake friends and the species was saved (table 1.).

It was found that the major habitats preferred by snakes are encroach by human being and there is impact of human activities, hence the snake kill is maximum by human being as compare to any other factor in nature. From the snake species recorded during this study, the Indian Cobra, Common Krait, Rat snake, Checkered keel back, common Sand Boa, Common trinket, Common wolf snake, Common Kukri species found in the study area throughout year in all seasons whereas Russell's Viper and Saw scaled viper occurred during the month of October to June as their most active period and in rest of the time these species remain inactive and rarely sighted. The species like Indian Smooth Snake, Barred Wolf Snake, Stripped Keel-back, Red Sand Boa, Indian Rock Python, Green Vine Snake, Bronze Back Tree-Snake, Common cat snake occurred during monsoon season (June to September). Overall the snake species occur in this particular study were during monsoon season. The juvenile and young snakes also found during monsoon because it is hatching period and also abundance of food in this period. It was found that on an average occurrence of 1-2 snake species per day were reported from the residential areas in the cities and villages. Therefore about 400 cases were reported in a year. From that most common snake species were Indian Cobra, Common Wolf snake, Common krait, Russell's Viper, Common Sand Boa, Common Trinket Snake, Common Kukri snake, Banded Racer, Yellow-spotted Wolf Snake and Barred Wolf Snake. All these prefer night time for feeding, hence encountered while Indian Rat snake, Checkered keel back, Stripped keel back, Green Keel back, worm snakes and other often spotted during day time by the locals and reported. In the study area in crop fields of Soybean, Ground nuts, Jowar, Wheat and other pulses crops the snake species encountered during harvesting of these crops were Indian Cobra, Russell's viper, Rat Snake, Common Sand Boa, Red Sand Boa and Common Kukri snake. All these species are predatory on the field Rat, Brown

rat, Mouse, Young ones of Hare, eggs and young ones of land birds.

There is always possibility of snake bite as an accident if not taken care during field works in agriculture, in the store rooms, at dark places etc. All the venomous and non-venomous snake species bite except worm snakes. Snake bite is not due to mistake of snake but only due to mistake of human being. Misunderstanding on difference between venomous and non-venomous snakes leads to the death of all type of snake species if not rescued. Therefore it is important to save snakes to maintain the biodiversity and food chains in ecosystem. As compared to all other factors human is the most harmful creature for the life of snakes.

The snake species of conservational importance the Indian Rock Python was found during this study especially in S. R. T. M. University area Nanded and villages like Musalmanwadi, Vishnupuri near Nanded was rescued and released in the natural habitat by District Forest Department Nanded, Maharashtra. The inventory of snake diversity in Maharashtra State was conducted by random selection of area results in hafazardous formation of data. Therefore present study moreover is follows up of the earlier study in this region [4, 5]. Reports of rarely occurring Bramhiny worm snake and Common Banded Kukri from this study area is rare and these species are facing threats from being killed by human. The forest dwelling giant snakes like Python was found intervening the human habitation area by movement through narrow streams and rivers is an alarming sign of food scarcity and habitat destruction. Fortunately the python are rescued and released indicates the fast rescue operating system of volunteers and State Forest department of this region.



Fig 1: Spectacled Cobra (*Naja naja*)

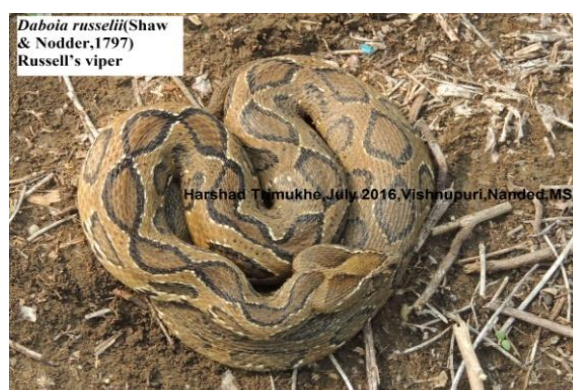


Fig 2: Russell's Viper (*Daboia russelii*)



Fig 3: Saw Scaled Viper (*Echis carinatus*)



Fig 7: Common Cat Snake (*Boiga trigonata*)



Fig 4: Common Krait (*Bungarus s. sindanus*)



Fig 8: Bronz Back Tree-Snake (*Dendrelaphis tristis*)



Fig 5: Albino Krait (*Bungarus s. sindanus*)



Fig 9: Green Vine Snake (*Ahaetulla nasuta*)

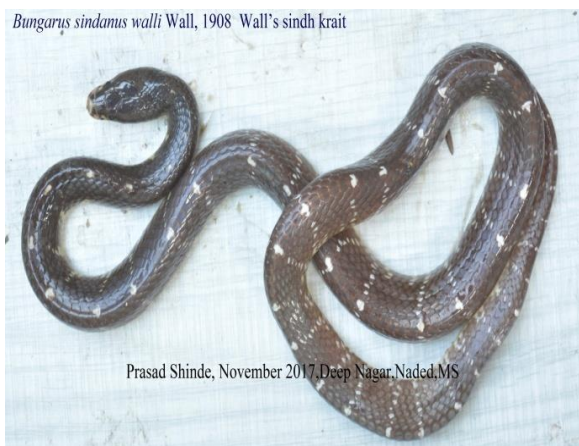


Fig 6: Wall's Sindh krait (*Bungarus sindanus walli*)



Fig 10: Indian Rock Python (*Python m. molurus*)



Fig 11: Common Wolf Snake (*Lycodon aulicus*)



Fig 15: Banded Racer (*Argyrogena fasciolata*)



Fig 12: Yellow-spotted Wolf Snake (*Lycodon flavomaculatus*)



Fig 16: Indian Smooth Snake (*Coronella brachyura*)



Fig 13: Barred Wolf Snake (*Lycodon striatus*)



Fig 17: Red Sand Boa (*Eryx johnii*)



Fig 14: Stripped Keel-back (*Amphiesma stotatum*)



Fig 18: Common sand Boa (*Gongylophis conicus*)



Fig 19: Dumeril's Black Headed Snake (*Sibynophis subpunctatus*)

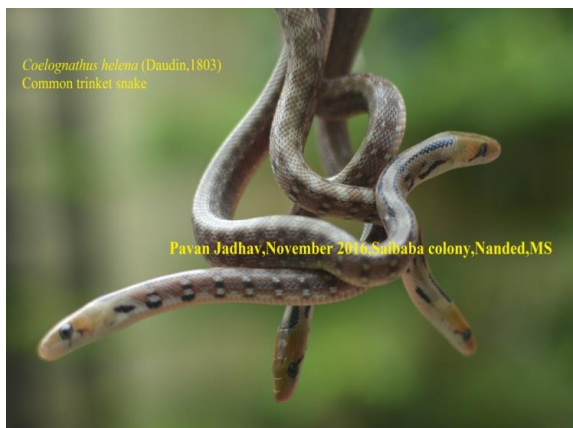


Fig 23: Common trinket snake (*Coelognathus helena*)



Fig 20: Russell's kukri snake (*Oligodon taeniolatus*)



Fig 24: Brahminy Worm snake (*Indotyphlops braminus*)



Fig 21: Checkered keelback (*Xenochrophis piscator*)



Fig 25: Green keel-back (*Macrophistodon p. plumbicolor*)



Fig 22: Indian Rat snake (*Ptyas mucosa*)



Fig 26: Common/Banded kukri (*Oligodon arnensis*)

Table 1: Checklist of venomous, Semi-venomous and non-venomous snakes in Nanded region, Maharashtra

Sr. No.	Scientific Name	Common Name	Type
1	<i>Naja naja</i>	Spectacled Cobra	Venomous
2	<i>Bangarus sindanus walli</i>	Wall's Sindh Krait	Venomous
3	<i>Bungarus s. sindanus</i>	Common Sindh Krait	Venomous
4	<i>Daboia russelii</i>	Russell's Viper	Venomous
5	<i>Echis carinatus</i>	Saw Scaled Viper	Venomous
6	<i>Boiga trigonata</i>	Common Cat Snake	Semi-Venomous
7	<i>Ahaetulla nasuta</i>	Green Vine Snake	Semi-Venomous
8	<i>Lycodon flavomaculatus</i>	Yellow-spotted Wolf Snake	Non-Venomous
9	<i>Dendrelaphis tristis</i>	Common Bronze-Back tree Snake	Semi-Venomous
10	<i>Xenochrophis piscator</i>	Checkered Keelback	Non-Venomous
11	<i>Macrophistodon p. plumbicolor</i>	Green Keelback	Non-Venomous
12	<i>Ptyas mucosa</i>	Indian Rat Snake	Non-Venomous
13	<i>Eryx johnii</i>	Red Sand Boa	Non-Venomous
14	<i>Lycodon striatus</i>	Barred Wolf Snake	Non-Venomous
15	<i>Amphiesma stolatum</i>	Striped Keelback	Non-Venomous
16	<i>Sibynophis subpunctatus</i>	Dumeril's Black-headed Snake	Non-Venomous
17	<i>Gongylophis conicus</i>	Common Sand Boa	Non-Venomous
18	<i>Argyrogena fasciolata</i>	Banded Racer	Non-Venomous
19	<i>Oligodon taeniolatus</i>	Russell's Kukri Snake	Non-Venomous
20	<i>Python m. molurus</i>	Indian Rock Python	Non-Venomous
21	<i>Coronella brachyura</i>	Indian Smooth Snake	Non-Venomous
22	<i>Oligodon arnensis</i>	Common Kukri Snake	
23	<i>Lycodon aulicus</i>	Common Wolf Snake	Non-Venomous

4. Conclusions and Recommendations

It is concluded that in all 26 species of snakes were recorded which include 10 species venomous species whereas semi-venomous and non-venomous species were 16 species found in Nanded area. Most of the snakes were reported from the residential area. Lack of knowledge, fear of bite, mishandling and careless behavior were the main reasons behind the snake killing. snakes were not at all responsible for any mishap. Continuous monitoring on the snake species diversity of this region is essential, it is possible through the special awareness program for the people, common man, farmers, students so that snake bite, snake kills may be prevented and snake diversity, food chain and food web of this ecosystem will be conserved. This will help to protect the survival of human and snakes both.

4. Acknowledgment

Thanks to all the people who reported the occurrence of snake species from the study area. This helped snakes and we people to save these beautiful creatures from being killed by the gathered mob of people or individuals. Thanks to all snake friends to assist in rescue the snakes.

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