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Snake Species Diversity of Swami Ramanand Teerth Marathwada University, Nanded, Maharashtra State, India

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A B S T R A C T

S. R. T. M. University, Nanded in Maharashtra State, India established in 1994 till them to present situation in year 2016 several changes occurred in the land use under the various development plans of this University. Earlier to existence of this University the plants existed are replaced by new introduced plant species under the plantation program in the University campus. Every ecosystem has its specific floral and faunal diversity but if this diversity is going on changing by manmade activities it gives different reflections for its flora and fauna. There are no reports on the snake species diversity of this University campus and nearby 10 Km^2. Area, which was worked out first time through this research. Total 12 species of snakes including 03 venomous, 01 Semi-Poisonous and 08 non-poisonous species belongs to 04 families were found. Direct encounter method, public reports and special observation survey was conducted to report the snake diversity. Snake killing by human and road killing was common.

Introduction

Snakes are friends of mankind if we could understand their ecology and biology but they may be harmful if not handled properly and not understood them properly. Not all snakes are poisonous, few are semi poisonous while majority are non poisonous. Snake poison and biting apparatus that mainly include 'Fangs' are made to kill their prey but not to bite the human being or other non-food item creatures of these shy creatures. Snakes never waste their poison to harm anyone except their prey. Therefore real problem in blaming the snakes as harmful creatures is in not understanding their life. There are about 3000 species of all kinds of snakes in the world. Snakes harbour all major kinds of habitats and ecosystems in the world. Snakes found in sea are deadly poisonous, even the antidotes of several sea snakes are not yet known. Species of Cobra, Krait and Viper are common poisonous snakes found in Maharashtra with their

species diversity. Rat snakes (Dhaman), Water snake (Pandivad), Grass snake, Boa's (Mandul, Durkya Ghonas) are non-poisonous snakes and few snakes have semi poisonous kind of ability. There are various regional, local and common names of snakes in various parts of India and the world but the scientific name doesn't change. Some species of snake may show little or major varied colour pattern with change in habitat however the body colouration. Shape and size of scales on head, abdomen and dorsal body surface; shape of tail; presence of special features on the head region are some of the important features taken in to account in differentiating the snake species and that has immense importance in the classification of snakes. About 50,000 people in India die due to snake bite which is high death rate than accidental and epidemic deaths; this indicates in general negligence of people about their surrounding, illiteracy of people about snake life and behaviour and so on. Snake bites can be 100 % prevented by educating the people on snake ecology and behaviour. As a curiosity to determine the diversity of snake species in the different microhabitats (Niches) of Swami Ramanand Teerth Marathwada University Campus, Nanded this study was conducted under M.Sc. (Zoology) dissertation. It will be an important baseline data for the further studies on snakes of this region because in this region one of the ten most deadly snakes in the world is abundantly found i. e. 'Saw-Scaled Viper' (*Echis carinatus*) generally this snake comes out from its hides at night time. The main danger with this snake is that, a victim may make a mistake of waiting too long to go for treatment because the venom is so slow-acting. To prevent death in the majority of cases the treatment should be immediate; but without treatment, death will occur slowly and painfully over the course of two to four weeks time.

Materials and Methods

Study area

To determine the species diversity of snakes the survey was conducted in Swami Ramanand Teerth Marathwada University, Nanded (SRTMUN). The University campus consists of 27 different sites that include various buildings of Schools and Departments; Lakes, Student Hostels, Staff Quarters, etc.

Majority of snakes are nocturnal in mode of living for feeding and locomotion. Snakes prefer the hiding places during rest under the stones and rock crevices, under the wooden logs, in the mound of termites and abandoned mound of ants. Also the snakes from deciduous forest areas they may live under the dry fallen leaf foliage, they also found in the shades of bushes, on the tree branches. In the selected study area of SRTMUN Campus, Nanded and area of 10 km^2 around the University, there is varied kind of habitat conditions. The University area mainly has low height hilly area and low land with few plain platue. There are two minor water bodies (1.0 – 5.0 ha. area) that remain dry during summer (April - may) each year. As per recent survey there are about 10 tree species in the region that mainly comprises *Acasia nilotica, A. karroo, Azadirachta indica, Ziziphus mauritiana, Palas (Butea monosperma), Fecus religeosa, Teak plantation, Jatropha plantation,* few trees of Tamarind and thorny shrubs. The soil colour in the region is yellowish red and the soil surface is covered by small to medium sized stone logs. There are 27 residential buildings in the University campus that includes Students Hostels, University Staff quarters, Officers quarters, Guest house, student's canteen, Canteen at Guest House. The land under the University Jurisdiction is also used

for the plantation of Mango, Jatropha and social forestry. During monsoon and winter season whereas the grass get dried and converts from green to straw coloured. The land in the region remains covered with grass (*Palm fronds*).

The overall geographical conditions in the University Campus is having hilly area with savannah land with rarely spread bushes and trees spread rarely. Due to ample availability of grass in the region there are grasshopper species and dependent Calotes species (*C. versicolor*), Frogs (*Rana tigrina*), Mice and Rats near human habitations available in good number. This makes the area with rich availability of food for snakes in the region. Due to human habitation in the region the domestic wastage generated as garbage and waste food attracts the rodents like rats, shrews and some bird species. Near the termite mounds the frogs were found feeding on the termite workers during night. All the geographical and ecological conditions favours the occurrence of snake species in the University area. Lewis (2010) reported 28 species of snakes in North Karnataka and South-West of Maharashtra in India, as compared to this vast area study present study represents high diversity of snakes up to 12 species in the 10 Km^2 are of this University. This study is first report on snakes of SRTMU Campus, Nanded and nearby area

Survey Methods used

Following three methods were used to collect the data on existence of snake species in the University area during June 2015 to May 2016.

Direct encounter method

In this method during walk in area during day time and night time the snakes encountered on the way for the researchers and the requested volunteers (05 friends of author living in the same area) were recorded. By actual visit to the area reported for the occurrence of snake was immediately visited for the confirmation of species. Mobile phone communication was mostly used in this study.

Directed and time bound observations of snake habitats

Three days/weak during 6.00 – 9.00 a. m.; evening 7.00 – 9.00 p.m. and 11.00 p.m. – 1.00 a.m. the snake species were searched in the selected study area. Each day the number and type species encountered were recorded.

Public reports for the snake occurrence

For the people in the University campus and three villages around the University campus Pangri, Vishnupuri, Kawtha the author provided mobile phone number to the villagers to inform the presence of snake species in their respective villages.

NIKON Coolpix 510 Camera was used for the steel photo and video recording using 43X Zoom and 16 Mega pixl specifications. All the data collected was deposited in the Zoology Department, School of Life Sciences, S. R. T. M. University, Nanded. No any snake species was preserved either in live or dead condition.

The snakes found in the residential area were caught safely using snake handling sticks and packed in cotton made snake bags with metal rings and carried to the wild habitats at safe places from human habitations. Snakes that observed were identified by using standard literature by Boulenger (1890), Devrus (1970), Daniel (2002), Smith (1931, 1943), Nicholson (1870) and Gunther (1864).

Types of habitats favoured by snakes

The reported species of snakes (Table 1.) were observed at different habitats in the University campus (Fig.1-12) that mainly comprises grass land, hilly area with rarely spread stone cover, water bodies and nearby weedy vegetation and shrubs, various tree species as shelters, area near human habitations, in the mounds of termites etc.

The observed habitats in the study area are classified as arboreal, aquatic, terrestrial and rock and stones and mentioned against each snake species (Table1.).

Results and Discussion

In the study area total 12 species of snakes (Fig.1-12) belonging to 04 different Families was recorded namely Elapidae, Viperidae, Colubridae and Natricidae (Nicholson,1870; Gharpurey, 1954; Whitaker, 1977,2008; Khaire 1996,2006). From the recorded snake species 08 species were non-poisonous, 03 poisonous and 01 semi-poisonous (Table 1.). Spectacled Cobra, Russell's viper and Saw scaled Viper were the poisonous snakes from these Saw Scaled Viper comes under most deadly venomous 10 snakes of the world. Two species of Lycodon (*L. aulicus, L. striatus*) were found in same part of study area.

Rat snake (*Ptyas mucosa*), Wolf snake (*Lycodon aulicus*) and Russell's Kukri (*Oligodon taeniolatus*) were commonly occurring non poisonous snake species whereas Russell's viper (*Daboia russelii*) the poisonous snake species were commonly occurring in this region. The semi-poisonous (Midly Poisonous) Green vine snake (*Ahaetulla nasuta*) was rarely found especially during late monsoon and early winter. The occurrence of the snake species was comparatively more in the University campus especially University hostels (Boys and Girls), Area near sports complex, University staff quarters and along the tar road from Dr. Shankarrao Chavan Govt. Medical College to village Pangri close to SRTM University campus

Table.1 Checklist of snake species in SRTM University campus at Nanded
Subphylum: Vertebrata, Class: Reptilia, Order: Squamata, Sub Order: Serpentes

Sr. No.	Common Name	Scientific Name	Category	Habitat
Family : Elapidae				
1.	Spectacled Cobra	*Naja naja* (Linnaeus,1758)	Poisonous Snake	Tr, RS
Family : Viperidae				
2.	Russell's Viper	*Daboia russellii* (Shaw and Nodder,1799)	Poisonous Snake	Tr, RS
3.	Saw-scaled Viper	*Echis carinatus* (Schneider,1801)	Poisonous Snake	Tr, RS
Family : Colubridae				
4.	Common Kukri	*Oligodon arnesis* (Shaw, 1802)	Non-poisonous Snake	Tr
5.	Russell's Kukri	*Oligodon taeniolatus* (Jerdon, 1853)	Non-poisonous Snake	Tr
6.	Rat Snake	*Ptyas mucosa* (Linnaeus, 1758)	Non-poisonous Snake	Ab, Tr, Aq,
7.	Common Wolf Snake	*Lycodon aulicus* (Linnaeus, 1758)	Non-poisonous Snake	Ab, Tr, RS
8.	Barred Wolf Snake	*Lycodon striatus* (Shaw, 1802)	Non-poisonous Snake	Ab, Tr, RS
9.	Common Trinket Snake	*Coelognathus Helena* (Daudin, 1803)	Non-poisonous Snake	Ab, Tr
10.	Banded Racer	*Argyrogena fasciolata* (Shaw, 1802)	Non-poisonous Snake	Tr
11.	Green Vine Snake	*Ahaetulla nasuta* (Lacepede, 1789)	Midly-poisonous Snake	Ab
Family : Natricidae				
12.	Checkered Keelback or Asiatic Water-snake	*Xenochrophis piscator* (Schneider, 1799)	Non-poisonous Snake	Aq, RS

Fig.1 *Ptyas mucosa* (Rat snake).

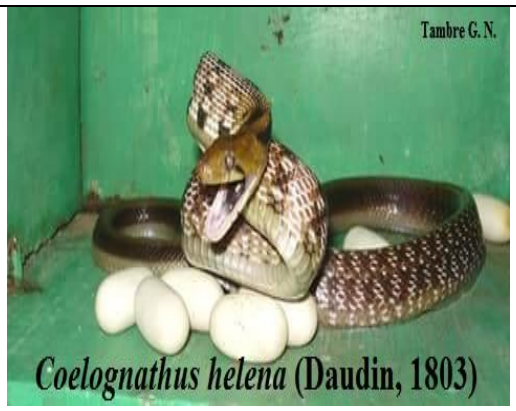

Fig.2 *Coelognathus helena* (Common Trinket)

Fig.3 *Oligodon arnesis* (Banded Kukri)

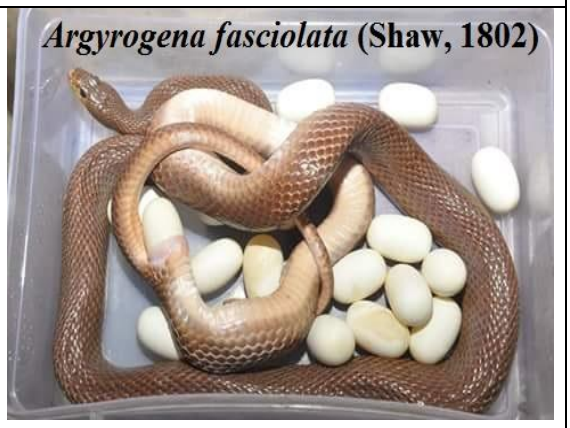

Fig.4 *Argyrogena fasciolata* (Banded Racer)

Fig.5 *Lycodon aulicus* (Common wolf snake)

Fig.6 *Lycodon striatus* (Barred wolf snake)

Fig.7 *Ahaetulla nasuta* (Green vine snake)

Fig.8. *Oligodon taeniolatus* (Russell's Kukri or Variegated Kukri)

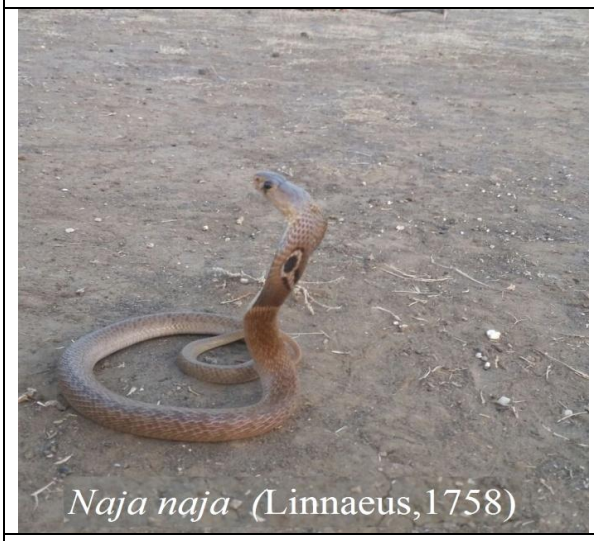

Fig.9. *Naja naja* (Common Cobra).

Fig.10. *Daboia russellii* (Russell's Viper).

Fig.11. *Echis carinatus*
(Saw-scaled Viper)

Fig.12. *Xenochrophis piscator*
(Checkered keelback).

Habitats/Hiding places of the snakes in the study area (SRTM University, Nanded, Maharashtra):

Fig.1. Drainage pipes as hiding place for snakes

Fig.2. Dry, hilly area with bushes.

Fig.3. Termite mound as temporary hiding place.

Fig.4. Dried wooden logs as common hideouts for snakes.

Fig.5. Rocks and stones covered dry land which helps the snake to hide.

Fig.6. Dry fallen leaves as hiding place.

Fig.7. Aquatic weeds near the water body as habitat. (Lake placid, SRTMUN)

Fig.8. Snakes can hides under the discarded tyres.

Fig.9. *Calotes versicolar* as food for snakes.

Fig.10. in which eggs and nestlings in Baya weaver nests as food for Rat snake.

Fig.11. Handling of Russell's Kukri during catching.

Fig.12. Catching of Saw-scaled Viper.

Nande and Deshmukh (2007) reported 32 snake species in Amravati district. Joshi (2015) reported 22 species of snakes in Buldhana district, Harney (2011) found 17 species from 06 families at Bhadrawati of district Chandrapur, Walmiki *et al*., (2012) studied the herpetofauna of Maharashtra nature park at Mumbai and found 24 species of snakes belonging to 06 families; in this study he found that *Daboia russelii* (Russells Viper) were commonly and abundantly cited snakes of this region. In

other reports on occurrence of snakes in Maharashtra, Rout *et al.,* (2014) has studied the snake diversity in Palghar region of District Thane, Maharashtra and found 25 species of snakes that includes 07 venomous, 03 semi-venomous and 15 were non-venomous. Karangutkar *et al.*, (2013) studied the faunal diversity of Kolak estuary Vapi, Gujrat and found 10 different species of snakes. Lewis *et al*., (2010) studied on the herpetological observations from field expeditions to North Karnataka and South-West Maharashtra and found 28 species of snakes. From the all above mentioned studies it can be concluded that, in India in various States including Maharashtra the non-poisonous snake species were found in maximum number as compared to the poisonous and semi-poisonous snakes. Andrew (2009) reported the presence of 21 species of snakes from Oman in United Arabian region, presence of Russell's viper species were found as one of the dominant species of this region.

The present study area is nearly arid zone and remains dry and hot except 2-3 months of July-September in monsoon season also represents the occurrence of Russell's viper and Saw-scaled viper. Upadhye *et al*. (2012) studied the herpetofauna of Vidyanagari Campus of the University of Mumbai, Ahsan *et al*. (2015) has studied the status and diversity of snakes of Chittagong University Campus, Bangladesh and found 36 species. Yadav *et al*. (2014) Herpetofaunal diversity in Radhanagari Wild Life Sanctuary, Kolhapur, Maharashtra and also studied the diversity, threats and conservation of herpetofauna in Shivaji University Campus at Kolhapur and found 14 species of snakes; and also reported the grassland burning, tree cutting, cattle grazing, human encounter and killing are the most important factors for the destruction of Herpetofauna from this University campus. Whereas in the present study these threats were not found except killing of snakes by human beings was most common destructive factor for the snake species. We found that 99% people without knowing the importance of snakes in ecosystem and without having sufficient knowledge of morphological difference between poisonous and non-poisonous snakes they directly kill them by declaring it as poisonous and harmful creature. It is our effort through this study to make aware and literate the people in the region to understand and cooperate on snake conservation; because we have sincere opinion that all the creatures including snakes have equal right to live on this mother Earth. No any snake bite case was reported during this study but 15 snakes were found killed by the people, most of them were non-poisonous while 08 snake species were found in road killing by vehicles.

Conclusion

From this study, it is concluded that SRTM University Campus, Nanded has 12 species of snakes belongs to 04 different families (Elapidae, Viperidae, Colubridae and Natricidae) were found. Amongst the snake species Rat snake (*Ptyas mucosa*), Wolf snake (*Lycodon aulicus*), Russell's Kukri (*Oligodon taeniolatus*) non-poisonous while Russell's viper (*Daboia russelii*) which is poisonous snake were common in this region. The present study reveals that the non-poisonous snakes were found in maximum number as compare with the poisonous and semi-poisonous snakes.

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