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Snake Species In The Vicinity Of Damak Municipality, Jhapa

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Abstract

Transformation of wetland to agricultural land and from agricultural land to urban land is the present layout of the Damak. These changes result in rapid habitat degradation of those plants and animals thathadadopted in this environment from last many thousands of years. This changing scenario led to a rapid decline in the population of different kinds of flora and fauna including snakes also. The present study tries to identify the current status to serpent of Damak Municipality. All together 12 species of snake wereidentified in the study sites that belong to four families of snake species. One species belong to the Typhlopidae, one species belong to the Pythonidae, seven species belong to the Colubridae and three species belong to the Elapidae family of snake species. Out of them only three species belong to Elapidae are venomous (25%)and the rest are non-venomous. Five species i.e. Ptyasmucosusand Amphiesmastolatumfrom Colubridae and BangarusfasciatusandNajanajafromElapidae family were found quite adequate number. The result shows that the most populated human settlement site has least number of snake species as well as rate of snake encounter.

Key words: Snakes diversity, venomous, non-venomous snakes, DamakMunicipality.

Introduction

Nepal is a 93rd largest country in the world in the contest of total land area that it occupies. But the geography that it holds makes it rich in ecosystem, flora and fauna. Within a short distance both towards the north - south as well as east - west direction, the diversity in geography brings diversity in climatic condition which in turn creatediversity in ecosystem. This helps to form a unique environment for the different types to plants and animal. There are ample scientific study regarding the macro fauna of Nepal but the field of herpetology has always received less priority. Scientific investigations concerning the herpetofauna of Nepal specially Serpenthas been sporadic and so the information related to the subject is scanty. The first zoogeographical analysis of Nepalese herpetofauna was done by Swan and Leviton (1962) which laid a

good basis for further studies. In later years several herpetologists like Fleming and Fleming (1974), Kramer (1977), Joshi (1985), Nanhoe and Ouboter (1987), Shah and Giri (1991), Schleich (1993), Shah (1995, 1997), Orlov and Helfenberger (1997),Schleich and Kastle (2002), Shah et al. (2003), Shah and Tiwari (2004) have given important contribution on the study of snake fauna in Nepal.

Snake belongs to the class Reptile with suborder Serpentes. The cylindrical, elongated with lateral undulation of the body is the characteristic feature of snake. Many other morphological characters like vestigial or absence of limbs, absence of eyelids, absence of external ear opening, presence of imbricate dry scale is peculiar in snake. The forked tongue in snake is an organ of smell rather than taste. The pupil of snake may be circular, vertical or horizontal depending on their activity time for feeding. Snake are all carnivorous, feeding on small insects, rat and also of their own species (cannibalism). They are well adapted to live with human as many insect and rats are living with human. In fact snakes are called the silent friend of man because it lives with human without his information and helps to control the various pests around him.

Description of study areas

Damak is a mid-sized and one of the oldest municipalities of Nepal located in Jhapa district of Eastern Development Region. It has Sivalik Hills in its north and ends with the intersection of Ratuwa River and Maawa River in the south. The municipality is bordered by Kamal VDC in the east, Urlabari, Madhumalla, and Rajghat VDC of Morang district in the west, Chulachuli VDC of Ilam district in the north and Kohwara VDC of Jhapa district in the south. The average temperature of Damak has a maximum of 35^0 Cand minimum temperature of 16^0 C. The municipality has sub-tropical climate and is situated at an elevation of only 71m from mean sea level. It lies between 26.65641 to 26.66378"N latitude and 87.70476 to 87.64330"E longitude. It has the total area of 7513 hectares (70.86 sq km) out of which 1406.7 hectares is covered by residential area whereas 5586.30 hectares is used for agriculture and the rest iscovered by forest by forest (Damak Municipality Profile). There were a lot of oxbow lake, marshes, quicksand, holies and swamps inside the thick and dense forests of Damak before 1960. At present most of the wetlands are modified in agricultural land and deep wide fertile cultivated lands are changing

For the collection of snake species from different areas of Damak Municipality, four study sites were undertaken, viz., Site I – including ward no 1 and 2,Site II – including ward no 3 and 4,Site III – including ward no 5,6,7,8, and Site IV – including ward no 9 and 10 (Fig. 1). This division of site is based on the distribution of land as per the human settlement, agricultural land and forest area.

Site I – It includeWard no 1 and 2 of Damak Municipality. Ward no 1 has an area of 3.68 sq km and ward no 2 has an area of 11.09 sq km. Ward no 1 and 2is bordered by Ratuwa river in eastwith sparse forest and agricultural land,north and west is boarded by ward no 2, south is bordered by ward no 5, 6 and 7. Most of this ward is occupied by open plain agricultural land. Ward no 1 has a community forest named Himalaya

community forest with an area of 3 hector and ward no 2 has a community forest named Humse-Dumse Community forest with the area of 631.50 hector including Bhutanese Refugee Camp. Ward no 2 is irrigated by Ratwa river, Batena river, Bhalu river andKharkhara river.

Site II – It include Ward no 3 and 4 of Damak Municipality. Ward no 3 has an area of 20.61 sq km and ward no 4 has an area of 9.54 sqkm.Ward no 3 is irrigated by Ratwa river, Mawa river, Batena river, Dhukura river, Bhalu river, Depini River, Kharkhara river. Ward no 4 is irrigated by Mawa river, Batena river, Dhukura river, Bhalu river and Bharaghara river. This site has the largest area as compared to other sites.

Site III – It include Ward no 5,6,7 and 8 of Damak Municipality. Ward no 5 has an area of 2.05 sq km, Ward no 6 has an area of 0.62 sq km, Ward no 7 has an area of 1.23 sq km and ward no 8 has an area of 1.72 sq km. Ward no 5 is irrigated by Depini River and Kharkhara river. It is the most populated ward of Damak. Ward no 6 does not have any river. It is the least populated ward but as per the population density it is the highest with respect to all wards. Ward no 7 is irrigated by Ratwa river and Rata river. Ward no 8 is irrigated by Ratwa river, Rata river, and Depini River. Site III is the most densely populated site in Damak as compare to other site because it has many developmental facilities to support the people's requirement.

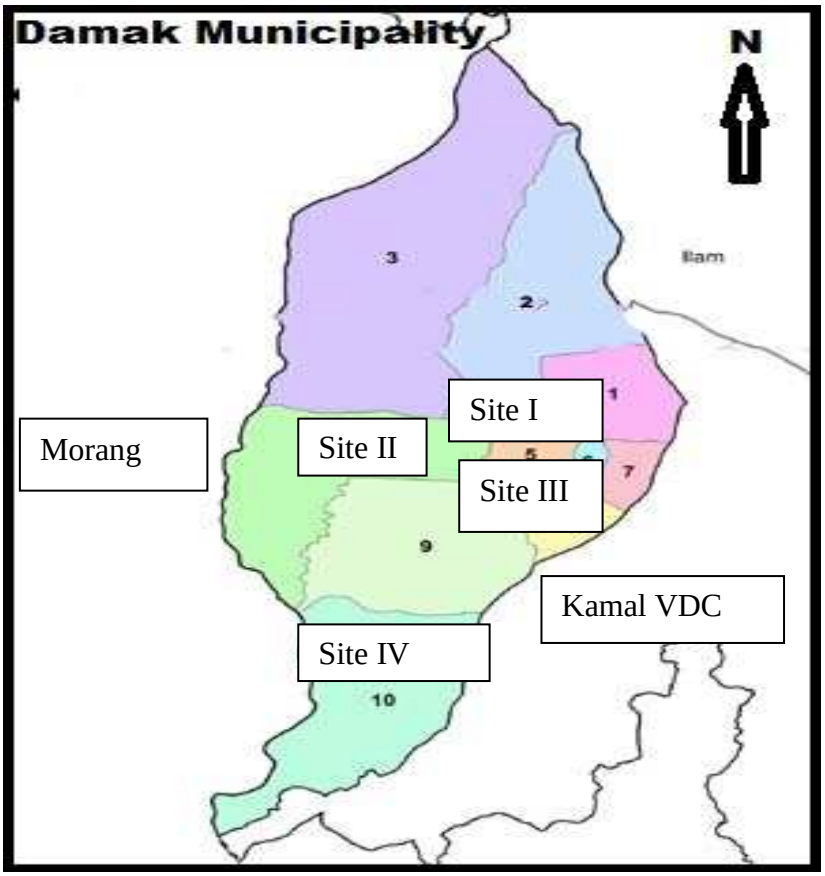

Fig 1: Map of Damak Municipality

Site IV – It include Ward no 9 and 10 of Damak Municipality. Ward no 9 has an area of 9.70 sq km and ward no 10 has an area of 10.62 sq km. Ward no 10 has a community forest named Rama Community forest with the area of 198 hector out of which 38 hector is occupied for Industrial Corroder by Damak Municipality. Ward no 9 is irrigated by Ratwa river, Batena river, Bhalu river, Depini River, Kharkhara river and bharaghara river. It is the least populated ward of Damak.

Materials and Methods

Survey methods

The duration of study period was from March 2022 to July 2024. All the sites were visited on daytime especially in summer and rainy season and species were collected with the help of local people. For snake collection, visual encounter survey method was employed with regular visits to study sites and interaction with local people, teachers and students. The survey was conducted in all possible microhabitats such as shade, under boulder and logs, alongside of streams, agricultural field, forest, bushes and human settlements areas. The killed snake species were collected and preserved in 10% formalin for further study whereas the live species were released in their natural habitat aftertheir identification. The collected snake specimens were identified by the standard books of Deoras (1965), Shrestha (2001), Daniel (2002), Schleich and Kastle (2002) Shah and Tiwari (2004), etc.

Questionnaire

A questionnaire is prepared for the local people. This help to get the information about the different snake species that are found in their localities. The target groups were farmers and other local groups. For the easy identification of the snakes, snake field guides - Herpetofauna of Nepal: A Conservation Companionby Karan Bahadur Shah and S. Tiwari with coloured picture from mobile was employed.

Results

During the study period, total of 12 species of snakeswere identified (Table 1), belonging 4 families (Fig 1). Among these 1 species belong to the Typhlopidae, 1 species belong to the Pythonidae, 7 species belong to the Colubridae and 3 species belong to the Elapidae. Out of the 12 identified species, 9 species are all non-venomous and only 3 species i.e. *Naja naja*, *Bungarus caeruleus* and *Bungarus fasciatus* are highly venomous. *Naja naja* and *Bungarus caeruleushas* been known for causing fatality in humans in Damak and from its nearby villages. *Python morurus* do not have photographic evidence but are placed on the list based on past sighting i.e. before the study period. Four species *Ptyasmucosus, Amphies mastolatum, Naja naja* and *Bangarus fasciatus* were commonly found in Damak and from its nearby villages. Notably, Naja naja and *Ptyas mucosus* are very commonly found to kill by local due to

the poisonous characteristics of Najanajaand *Ptyasmucosus*for their resemblance with *Najanaja* and also potential threat to their poultry birds. *Bangarusfasciatusare* notkilled by local people even though it is poisonous because of misbelieve.

Table 1:

Check-list of snake species observed during the study

S. N	Family	S.N species	Scientific name	Common name	Nepali name	Toxicity
1	Typhlopidae	i	*Ramphotyphlops braminus* (Daudin,1803)	Brahminy worm snake/Common blind snake	Andharasarpa , ,Ganeulesanp.	Nv
2	Pythonidae	ii	*Python morurus*(Linnaeus,1758)	Burmese Python	Ajingar	Nv
3	Colubridae	iii	*Ptyasmucosus* (Linnaeus,1758)	Asiatic rat snake	Dhaman	Nv
		vi	Lycodonaulicus (Linnaeus, 1758)	Common wolf snake	Dhamiloosarpa,	Nv
		v	Amphiesmastolatum (Linnaeus,1758)	Buff striped keelback	Bagala, Ashara, Harara	Nv
		vi	Elaphe helena(Daudin, 1803)	Common trinket snake	Singarasarpa	Nv
		vii	Sibynophissagittaris(Cantor,1839)	Black headed snake	Sarpa	Nv
		viii	*Xenochrophis piscator* (Schneider,1799)	Chequered keelback water snake	Panisanp, Dhodiasanp	Nv
		ix	Atretiumschistosum(Daudin,1803)	Olive keelback water snake	Panisanp	Nv
4	Elapidae	x	Bungarus caeruleus (Schneider,1801)	Common krait	Karet, Churiasarpa	V
		xi	*Bangarusfasciatus* (Schneider,1801)	Banded krait	Gangwari, PanhelokaloChuria sarpa	V
		xii	*Najanaja* (Linnaeus,1758)	Spectacled cobra	Goman, Nag	V

Abbreviation: Nv-Non-venomous

V- Venomous

Fig 2: Number of different snake families observed during the study

From Typhlopidae Family one snake species
From Pythonidae Family one snake species
From Colubridae Family sevensnake species
From Elapidae Family threesnake species

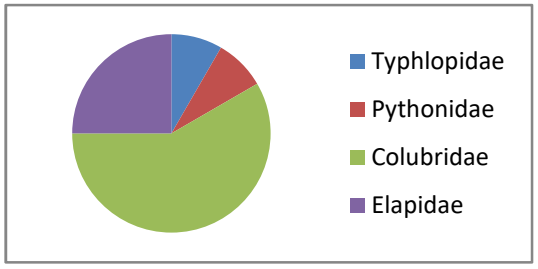

Table 2:

List of snake species recorded from different study sites in Damak Municipality, Nepal.

S.N	Scientific Name	Site I	Site II	Site III	Site IV
1	*Ramphotyphlops braminus*	+	+	-	+
2	*Python morurus*	-	-	+*	-
3	*Ptyasmucosus*	+	+	+	+
4	Lycodonaulicus	+	+	-	+
5	Amphiesmastolatum	+	+	+	+
6	Elaphe helena	-	-	-	+
7	Sibynophissagittaris	-	-	-	+
8	*Xenochrophispiscator*	+	-	-	+
9	Atretiumschistosum	-	+	-	+
10	*Bungarus caeruleus*	+	+	+	+
11	*Bungarusfasciatus*	+	+	+	+
12	*Najanaj*a	+	+	+	+

- Symbol: + indicates species encountered and - indicates species not encountered during the study period.
- * Recorded before study period.
- Local people claim about the existence of many other species of snake also but the research report only considered those snake species that are seen by the researcher only.

Discussion

There are about 3000 species of snakes found in the world, out of which 375 species (12.5%) are poisonous (Sharma, 1999). Shrestha, (2001) reported 90 species of snakes from Nepal, out of which 21 species are venomous. However, no detail survey of the snake fauna of the country has been carried out so far. The present study recorded altogether 12 species belonging to four families. The four families are Typhlopidae, Pythonidae,Colubridae and Elapidae. The snakes of Boidae family, recorded from other parts of Nepal, were not encountered in this area during the study period. Only on family with three snake species i.e.*Bungarus caeruleus*, *Bungarusfasciatus*and*Najanaj*a are found venomous in Damak Municipality. Thestudy reveals that the highest number of snake species was recorded from Site-VI and least number of snakes was recorded from site III. The least number of snake species site III must be because of dense human population in this site. High human density may be the causes of reduction of many other species specially herpetofauna. Different kinds of anthropogenic disturbances in the forms of killing on sight, urbanization, livelihood dependence and pollution are destroying snake population. In most of the cases, people are not able to distinguish the venomous and non-venomous snakes. According to their knowledge and thinking every

snake is poisonous. So, they kill snakes whenever they come with the meeting Thus, the snake species are decreasing day by day. For the conservation of snakes in Nepal, public awareness regarding the importance of snake to keep the ecosystem in balanced condition is essential.

Conclusion

The study highlights the significant impact of rapid land-use transformation in Damak Municipality, with wetlands being converted into agricultural lands and subsequently into urban areas. This shift has resulted in substantial habitat degradation, leading to a decline in biodiversity, including snake populations. The research identified 13 snake species across four families: Typhlopidae, Pythonidae, Colubridae, and Elapidae. Among these, only three species from the Elapidae family were venomous (25%), while the rest were non-venomous. Species like *Ptyas mucosa*, *Amphiesmastolatum*, *Bangarusfasciatus*, and *Najanaja* were relatively more abundant. The findings also revealed a negative correlation between human settlement density and snake diversity, with fewer species and encounters in densely populated areas. This underscores the urgent need for conservation efforts to mitigate habitat loss and preserve biodiversity in Damak Municipality

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Damak Municipality Profile 2075

Appendix

Ramphotyphlopsbraminus

Ptyas mucosa

Lycodonaulicus

Amphiesmastolatum

Sibynophissagittaris

Xenochrophispcator

Atretiumschistosum

Bungarus caeruleus

Bungarusfasciatus

*Najanaj*a

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