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## Road kill of Snakes (Squamata: Serpents) on state highway 276: a case study in protected forest area of Deori Forest range Gondia

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| **Received:** 21 January 2021 | **Accepted:** 2 March 2021 | **Published Online:** 5 March 2021 |

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**How to cite:** Bhandarkar S, Paliwal G. 2021. Road kill of Snakes (Squamata: Serpents) on state highway 276: a case study in protected forest area of Deori Forest range Gondia. J New Biol Rep10 (1): 7– 10.

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### ABSTRACT

Reptiles and amphibians are biological significant as they provide priceless services to the ecosystems, now they are endangered organisms in the world. They often affected by killing on road by traffics. As they are cold blooded organism but eventually they prefer the open area for basking and try to cross the roads, ultimately they might killed by vehicular activities on roads. Number of specimens was found killed abruptly in the morning or early morning in the cold days. Very few studies on mortality of snakes were done in India. Snakes mortality rate becomes faster due to chief source road kill and contributing for global decline of diversity. The present paper is deals with the road killing mortality of snakes on a State Highway segment SH 276 near Deori to Amgaon which is passing along the NNTR's eastern boundary Maharashtra India. The study is conducted from November 2018 to October 2019. The Snakes was killed more than that of other organisms. The present paper in short time period of observation indicates that the local reptilian fauna is damaging vastly. This study is thoughtful to document of these endemic snakes species for which usually unreported because of nocturnal habit of organism. In the present paper the total of 75 road kills of snakes belongs to 12 species and 05 families were recorded.

**Key words:** Road kill, snakes, vehicular movements, Deori, SH 276, mortality.

### INTRODUCTION

The snakes play a vital role in the natural environs and integral of food chain. These are the successful hunters as well as ambush predators. Many species of snakes are globally affected by anthropogenic habitat fragmentation; constructions and widening of roads are the major threat for snakes and other reptiles. According to United Nations Food and Agriculture organization, more than seven million hectares of forest are destructed every year, eventually it affects biodiversity including snakes. It is one of the most integral components in the food web. Road traffic affects the adjacent environment in many ways that are damaging to the adjoining flora and fauna (Forman and Alexander, 1998).

Roads are the barriers for many wild animals. The snakes due to their sluggish movement on roads can cause killed by the fast running vehicles. Moreover, the rates of crossing roads by snakes vary significantly, suggesting that snakes may suffer a greater range of road morbidity and mortality than other group of animals (Andrews and Gibbons, 2005). The increasing traffic on roads can cause decline or turn down the reptile population. Some workers have attended this matter of road kill of snakes (Chittaragi and Hosetti 2014; Vijayakumar et al. 2001). Eastern Maharashtra, especially Vidarbha region is rich in herpetofauna (Paliwal and Bhandarkar 2017a&b; Bhandarkar et al. 2012). Many of unrecorded evidences and snakes kills on roads were occurred on roads but not recorded yet as the scientific document.

The road kill mortality indicates that the herpetofauna is rich species diversity and population. They killed on roads due to vehicular migrations because they come out for reproduction, food finding and habitat search (Langen, et al. 2007). We attempted to quantify the road kills of snakes across a stretch of state highway SH 276 which runs through the protected forest near buffer zone of “Navegaon-Nagzira Tiger Reserve” (NNTR) region in Deori forest range.

**MATERIALS AND METHODS**

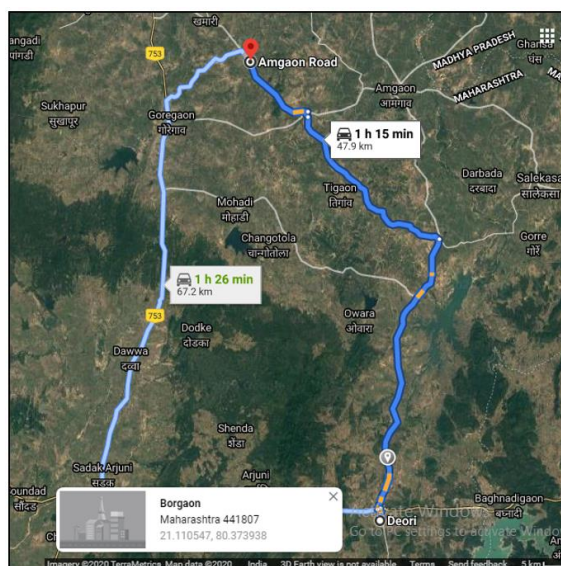
The study was carried out from Oct. 2019 to Oct. 2020 on a 35 km road segment of state highway (SH 276) passing adjacent to stretch of state highway SH 276 (Figs 1&2) which runs through the Protected Forest near Buffer Zone of NNTR’s region (21.240370N, 79.983865E) in the Deori Forest Range, Gondia, Maharashtra, India. The New road is constructed replaced by Old Tar road. Many of the patches of the roadside include paddy fields, human habitations of villages and protected forest area. All these adjacent forest habitats are animal corridors & are frequently used by large mammals like Tiger, Leopard, Sloth Bear, and many ungulates etc.

Early morning and an evening or night driving method is used to notice the kills of reptiles on the road. The 15 km road transect was conducted from the National Highway 6 (Now it is known as Asian Highway 46 or Mumbai-Kolkata Highway) to Surtoli-Lohara. Transect was covered (Deori as starting point and back) thrice every week. The reptilian kill seen was recorded, photographed & removed from the road to avoid multiple counts. The encountered organisms were identified with standard literature (Fauna of British India Volumes by Smith Vol. 2 (Sauria), Vol. 3 (Serpents), (Daniel 2002; Khaire 2006).

**Table 1:** List of Snakes in Road Kill in Deori.

Sr. No	Common Name	Scientific Name	Vernacular Name (Marathi)	Freq. (N)	Kill %
1	Common Sand Boa	<i>Gongylophis conicus</i>	Dukrya Ghonas	04	05
2	Indian Rock Python	<i>Python m. molurus</i>	Ajgar	05	07
3	Stripped Keel Back	<i>Amphiesma stolatum</i>	Naneti, Vashya	14	16
4	Checkered Keel Back	<i>Xenochrophis piscater</i>	Divad, Dhondya	09	12
5	Banded Krait	<i>Bungarus fasciatus</i>	Patteri Manyaar	06	08
6	Common Krait	<i>Bungarus caeruleus</i>	Manyaar	03	04
7	Common Wolf Snake	<i>Lycodon aulicus</i>	Kavdya Sarp	13	17
8	Indian Rat Snake	<i>Ptyas mucosa</i>	Dhaman	06	08
9	Dumeril’s Black Headed Snake	<i>Sibynophis subpunctatus</i>	Kaltondya	01	01
10	Banded Kukri Snake	<i>Oligodon arnensis</i>	Kukri Sarp	03	08
11	Spectacled Cobra	<i>Naja naja</i>	Nag Sarp	05	07
12	Russell’s Viper	<i>Daboia russelli</i>	Ghonas	05	07

There was greater mortality in amphibians and reptiles during rainy season than summer due to the slow moving behavior of these species (Baskaran and Boominathan, 2010). In the present study the species diversity of the Non-venomous snakes are lesser but quantitatively it is larger, while the diversity of venomous snake is more (Table 1). Venomous snakes



**Fig. 1** Road map of study area

**RESULTS AND DISCUSSION**

Total Road kills in the protected forest area was 75 individuals of Snakes belonging to 12 species and 05 families were recorded. Snakes belonging to family Colubridae with 06 species, family Elapidae with 03 species, family Boidae with 01 species, 01 Python species belongs to the family Pythoniae and only 01 species from the family Viparidae were recorded during the study period. Out of total Snakes recorded individuals in road kill; the higher the rate of Stripped keel back (N=14) with 21% and lower with 1% of Dumeril’s black headed Snake (N=1), (Table 1), (Figs 2&3).

crossing the road were more than non-venomous snakes (Andrew and Gibbons, 2005). Snakes killed by vehicular activities might be due to the organisms used the roads as substrate for thermoregulation (Vijaykumar et al., 2001; Das et al., 2007). The population of snakes may reduce if such road kill mortality persisted for longer time. From some

anecdotal information and evidences it is proved that the protected forest area in Deori exhibit good diversity of snakes. Poaching snakes is another and one of the main threats. In December 2013, Forest officials of Deori in Gondia district captured an International gang of Snake Poachers. The incident was held at Maharashtra and Chhattisgarh boarder. In that operation total of 43 varieties of venomous and non-

venomous snakes were founded (Paliwal and Bhandarkar, 2017a). In that happening the snakes like Spectacle Cobra, Brown wine, Krait, Monocled Cobra, Green Viper, Cobra, and Common sand boa were found. The population level may be detrimental for species as road mortality of snakes has been identifying a sink for local population (Rosen and Lowe, 1994).

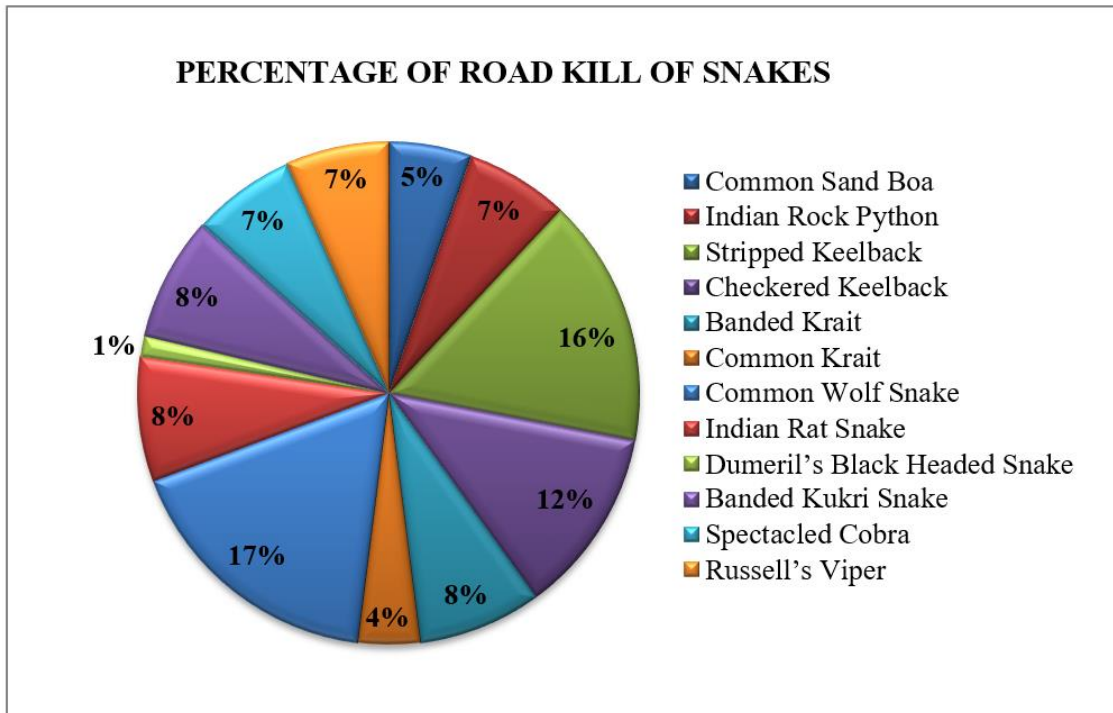


Fig. 2. Percentage of Snakes in Road Kill in Protected Forest in Deori.



Fig. 3. Some of dead snakes in Road kill in protected forest area near Deori.

Snakes are significant in control rat populations. They maintain the sustainable balance in environment. The road kill of snakes by vehicular accident is frequent dilemma in this protected area due to diverse adjoining close to road; the dense forest cover, water bodies, paddy fields and vast biodiversity in this area. The percentage of road kill is always found to be more in monsoon might be due to the rate of food search and

shelter. Snakes charming are one of the major threats in our area. The present study is helpful to collect the data on degree of snake's mortality near the protected area; reveals diversity and density of snakes, sometime the diversity remains unknown due to their nocturnal habit.



## CONCLUSIONS

The Study illustrates that the total of 75 snakes' were killed in road in a year of study period, in which the diversity of venomous snakes was more than non-venomous. The impact of road on snakes and other wild animals may be attributed to any anthropogenic activities and vehicular accidents. The need of making speed breakers in wildlife habitat in protected forest range can minimize the road killing of all types of animals.

## ACKNOWLEDGEMENTS

Authors are thankful to member of "Aranya-Yatri Wildlife Foundation" (AWF) for their cooperation in the study period.

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