



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(1): 910-912
Received: 06-11-2018
Accepted: 09-12-2018

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Documentation of road killed and rescued herpetofauna in and around Gondia city, Maharashtra

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Abstract

The present study deals with the documentation of road killed and rescued herpetofauna in Gondia city as well as territory including some state highways and villages. The documentation of herpetofauna was done by actively searching road killed incidences on state highways as well as rescued reports collected from few NGO's included for this study. The study was done during the month of June to December 2014. Six families were commonly found during the study period i.e. Elapidae, Pythonidae, Colubridae, Boidae, Viperidae and typhlopidae. During the study period, total 2418 snakes were documented from the study area, of which 1660 species were rescued and 758 species were found as road killed. 29 species belonging to six families were recorded with special reference to rare species i.e. Indian egg eater and smooth snake. The resulting occurrence of high road killed and rescued evidence was proved their behavior in-search of the better habitat for food and reproduction purpose.

Keywords: Snakes, road killed, rescued, Gondia

Introduction

Roads are an important part played in the human life as social, cultural and economical benefits to the society. In addition, roads can influence the colonization of the human civilization (Young, 1992) [1]. Ecological effects of roads have been widely studied in North American and European ecosystems (Forman *et al.* 2003; Beckmann *et al.* 2010). A million of vertebrates, invertebrates affected by road accident, for example in Bulgaria five million birds, in Australia five million frogs and reptiles die every year due to the vehicles (Hels and Buchwald, 2001) [5, 6].

Reptiles are one of the vertebrate groups mostly affected by roads (Andrew *et al.* 2008) [1]. Importantly, snakes are slow moving reptiles relative to other animals hence they are highly susceptible to road killed incidence by vehicular collision (Dodd *et al.* 1989) [3]. In India no such study was come out yet to estimate road killed and rescued rate of snakes. Therefore, this information could be baseline data to implement the biodiversity and conservation plans.

Gondia city and its allied region surrounded with the dry deciduous forest which is one of the richest biodiversity areas because of it directly influenced under the great Satpuda Mountain Ranges. But from 2-3 decades, most land had undergone the development such as civilization, agriculture modification and highways construction destructs the habitation of many species directly or indirectly. Due to all these manmade factors, many species have high mortality rate and becoming major eco-bio-sensitive problems. The aim of present study was to document the records of snakes sighted alive or killed in and around Gondia city, villages and state highways.

Materials and Methods

Selection of study area

The area of Gondia city and territory is rich in biodiversity of various flora and fauna with well and dense forestry area. Gondia is located at 21°27' 35.2836'' N and 80°11' -42.0000'' E in Maharashtra, India. Mainly, the area of Tumsar, Sakoli, Badegaon, Goregaon, Hedamadi, Tirora, Kosamtondi, Kardimundari, Lakhani, Sadak Arjuni, Sukadi, Khadipar, Murdoli, Devara and Murdoli, is dry deciduous forest, covers Nagzira territory.

The present work was carried out during the month of June 2014 to December 2014 by active searching of road killed snake species on major highways in and around Amravati city and keeps update record of rescued species by concerned NGO's for the proper documentation.

Road killed snakes were identified with the help of scale count and other morphological characters, snake rescue details were collected from some NGO's.

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Identification of snakes was done with the help of “Snakes of India” by Whitakar (2004), snakes of Maharashtra and Goa by Nilimkumar Khaire (2012) [7].

Result and Discussion

During the study period, a total of 2418 snake species were recorded in and around Gondia city, out of these 1660 species of snake rescued and 758 species were found as road killed (Table no.1). A total of 29 species (Tab. 2) of 27 genera belonging to six families were documented in Gondia city and territory. Based on the above data, Recorded families and their species clearly indicate high richness of herpetofauna in the study area. Among these, family colubridae were recorded maximum 1,748 species, among this 1195 species were found road killed and 553 species documented as rescued. The maximum 121 species were found as road killed in the month of June and rescued 285 in the month of July and minimum in the month of December. Among all the six family, only one species of python was recorded in the month of August (tab.1).

During the study period of six months i.e. June to December, the highest number of rescued incident i.e. 418 were occurred in the month of July and orderly decreases in the months of June, August, September, October, November and December respectively. On the other hand, the highest road killed snakes i.e. 179 were found in the month of June and subsequently decreases from month of July to December. Thus, rescued incidences were higher (Tab. 1) as compared to road killed (tab. 1).

The road killed snake distributed in the 5 major families, i.e. Colubridae, Pythonidae, Elapidae, Viperidae, Typhlopidae and Boidae. Among these family 29 species were recorded as road killed. Bungarus (Krait), coral snake, Bungarus sindanus walli (walls sind krait), were generally found belonging to Elapidae with high density among all other poisonous snake. The species related to family Viperidae have three types viz.

Russell’s viper (*Daboia russelli*), Saw Scaled viper and bamboo pit viper were recorded as road-killed. Two species of family boidae i.e. red sand boa and common sand boa also recorded as road killed. These two species are rare and have endangered status. Among all these, only one road killed species was recorded from family Pythonidae i.e. Indian rock python. The highest density of road killed species from family Colubridae were recorded in this area during the study period (tab.2).

The collected road killed snake data during the period from month of June to December 2014 provides a clear conclusion of higher mortality rate in Amravati city and territory. The maximum road killed evidence occurred during month of June and August in rainy season. It is caused by the basic instinct of reproduction and searching for new habitat. From the month of September to December, the mortality rate gradually decreases by means of hibernation against the protection of cold. Thus the current study clearly showed the measuring mortality rate that influences the diversity and snake population. Study of snake mortality on road killed as well as activity played to kill these species in human residential area has clearly concluded decreasing faunal diversity.

In comparison to other vertebrates, the Gondia city and allied area has a highest density of road killed snakes in this region. The present work provides the first road killed snake species list. Although, some snakes are intentionally killed on roads, most of them are killed accidentally (Rudolph, *et al.* 1999; Truci and Bernarde, 2009) [8, 9]. In accordance, reptile mortality could be reduced by adopting some simple measures such as i) warning sign of crossing animals ii) speed bumps along roads which could reduce road kill animals (Forman and Alexander, 1998) [5]. The information of this study could be used as an initial approach for environmental management and conservation programs for the local fauna.

Table 1: showed month wise documentation of rescued (Res) and road killed (RK) herpetofauna in and around Gondia city.

| Sr. No. | Months Family | June | | July | | Aug | | Sept | | Oct | | Nov | | Dec | |
|---------|------------------|------|-----|------|-----|-----|-----|------|-----|-----|-----|-----|----|-----|----|
| | | Res | RK | Res | RK | Res | RK | Res | RK | Res | RK | Res | RK | Res | RK |
| 1 | Typhlopidae | 94 | 48 | 97 | 27 | 49 | 27 | 12 | 12 | 18 | 16 | 11 | 07 | 04 | 02 |
| 2 | Boidae | 06 | 01 | 02 | -- | 09 | 01 | 01 | 01 | -- | -- | 01 | -- | -- | -- |
| 3 | Pythonidae | -- | 01 | -- | -- | 01 | -- | -- | -- | -- | -- | 01 | -- | -- | -- |
| 4 | Colubridae | 237 | 121 | 285 | 102 | 171 | 79 | 195 | 109 | 141 | 76 | 96 | 47 | 70 | 19 |
| 5 | Elapidae | 32 | 09 | 12 | 14 | 11 | 06 | 16 | 08 | 08 | -- | 04 | 01 | 02 | -- |
| 6 | Viperidae | 06 | -- | 22 | 14 | 09 | 02 | 09 | -- | 15 | 08 | 08 | 01 | 06 | -- |
| Total | | 375 | 179 | 418 | 157 | 250 | 115 | 233 | 130 | 182 | 100 | 120 | 56 | 82 | 21 |

Table 2: Check list of documented road killed and rescued herpetofauna from in and around Gondia city

| Sr. No. | Family | Generic name | Common Name |
|---------|-------------|---|---|
| A. | Typhlopidae | <i>Ramphotyphlops braminus</i> <i>Grypotyphlops acutus</i> <i>Typhlops porrectus</i> | Braminy worm snake Beaked worm snake Slender worm snake |
| | | <i>Typhlops Diardii</i> | Diard worm snake |
| | | <i>Bungarus caeruleus</i> <i>Bungarus sindanus walli</i> <i>Naja naja</i> <i>Calliophis melanurus</i> | Common krait Wall’s sind krait Cobra Slender coral snake |
| C. | Viperidae | <i>Daboia russelii</i> <i>Echis carinatus</i> <i>Trimeresurus gramineus</i> | Russells viper Saw-scaled viper Bamboo pit viper |
| D. | Pythonidae | <i>Python molurus molurus</i> | Indian rock python |
| E. | Boidae | <i>Gongylophis conicus</i> <i>Eryx johnii</i> | Common sand boa Red sand boa |
| F. | Colubridae | <i>Lycodon aulicus</i> <i>Lycodon striatus</i> <i>Lycodon flavomaculatus</i> <i>Macropisthodon plumbicolor</i> <i>Xenocrophis piscator</i> <i>mphiesma stotatum</i> <i>Argerogene faciolata</i> <i>Oligodon arensis</i> <i>Oligodon taeniolatus</i> <i>Boiga trigonata</i> <i>Boiga forsteni</i> <i>Dendrolaphis tristis</i> <i>Coelognathus Helena</i> <i>Helena Coelognathus Helena monticolarius</i> <i>Psammophis longifrons</i> <i>Ahaetulla nusta</i> <i>Ptyas mucosus</i> <i>Sibynophis subpunctatus</i> <i>Coronella brachyuran</i> <i>Elachistidon westermanii</i> | Common wolf snake Barred wolf snake Yellow spotted wolf snake Green keelback Chekered keelback Striped keelback Banded racer Common kukri snake Russell’s kukri snake Common cat snake Forsten cat snake brozeback tree snake Common trinket snake Montane Trinket snake Stout sand snake Common vine snake Common rat snake Black-headed snake Indian smooth snake Indian egg eater |

Acknowledgments

We thankful to Chief Wildlife Warden & Principle Chief Conservator of Forest (Wildlife) Maharashtra State Nagpur, and Member Secretary, Maharashtra State Biodiversity Board, Nagpur for their support to this study. As well as we thankful to the NGO for their kind support and updated documentation used in this study.

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