

Anthropogenic Effect and Seasonal Diversity of Lizards in Amravati Urban area, Maharashtra, India

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Abstract: The present study has conducted in Amravati urban area, an administrative centre of Amravati district of Maharashtra State from January 2015 to March 2016. The survey was carried out by direct and indirect method. A total of 180 individual of different species were observed from residential and non-residential area. After comparing the data, it has been observed that most species of lizards were lower in number in the residential area habitat as compared to the non-residential area. As far as the seasonal diversity of lizards fauna is concerned of the study area, the maximum number of lizard observed in monsoon season and low fauna of lizards found in winter season.

Keywords: Anthropogenic effect, seasonal diversity, urban area, Amravati

1. Introduction

Reptiles are declining at unprecedented rates due to threat of global climate change, human exploitation, habitat loss, invasive species, pollution and disease (Gibbon *et al.*, 2000). Socioeconomic factor such as rapid population growth, poor education and other cultural aspect that lead to the exploitation of natural resource (Durbin *et al.*, 2003). Continued forest clearance will lead to the eventual fragmentation of the remaining area of forest (which consequence on herpetofauna, Vallen, 2000), followed by local and possible complete extinction. The variation in temperature and climatic factors at different season also bring influence on their metabolic activity (Cuvier, 1844) variation in life history attribute such as survival rate, population density are individual growth rate may result from temporal fluctuation in environment variable, such as temperature and ground moisture resulting from the seasonality in rainfall and food availability, (Adolf & Porter, 1993, Fleming and Hooker, 1975).

To know the anthropogenic effect on lizard's fauna in this study, two areas were compared that is residential area and non-residential area. Human residential area is

characterised by number of anthropogenic activity because here most fragmentation and exploitation of natural resource take place. Non-residential area remains somewhat safe from exploitation, fragmentation etc. of natural resources in connection with the anthropogenic activity.

2. Materials and Method

Study area

Amravati is an administrative centre of Amravati district of Maharashtra state. It is located at 20.93°N; 77.75°E. The total area of Amravati is 12,210 km² including 11,967.67 km² rural area and 242.33 km² urban area. The urban area was densely populated. The dominant tree species included *Polyalthialongifolia*, *Terminaliacatappa*, *Azadirachtaindica*, and *Ficus religiosa*. The annual temperature range varies from 14°C to 44°C. Amravati has a tropical wet and dry climate with hot, dry summer and mild to cool winter. Summer last from March to June, monsoon season from July to October and winter from November to March. The average temperature fluctuation during the study period. (Figure No. 1)

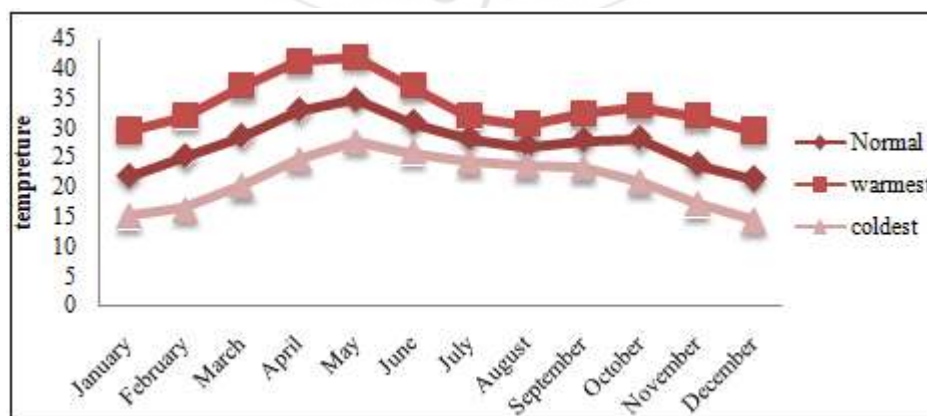


Figure 1: Variation in average monthly temperature in Amravati

Methodology

Survey and Data collection: - The present survey was started from January -2015 to March 2016. In this period

used direct sampling such as visual Encounter Method (Doan 2003), Opportunistic and head to head counting

Volume 6 Issue 9, September 2017

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method and indirect sampling such as acquiring information from local people.

Photographic Documentation: - Natural photographs of the species were by using a Canon digital camera. It was taken at different angles of the species which were observed in natural condition at surveyed period.

Identification and Nomenclature: - After photography, specimens were identified by using diagnostic keys by Smith (1935; 1943). Nomenclature adopted by Das (2000) and Daniel (2002).

Data analysis: - The data were used to obtain significance or non-significance and comparative species diversity and richness of the studied lizard fauna were quantified with the help of PAST version 1.6 software (Hammer *et al.*, 2011).

3. Observation and Result

In this study, a total of 180 lizards were observed by direct and indirect methods at natural environment. The observed species *Hemidactylus flaviviridis*, *Hemidactylus frenatus*, *Hemidactylus giganteus*, *Hemidactylus frenatus*, *Calotes versicolor*, *Calotes rouxi*, *Eutropiscarinata*, *Eutropis macularia*, *Varanus bengalensis*, *Aymblepharussikkimensis* and *Sitanaponteceriana*. Consequently 75 (41.67%) individual of 10 species of Lizards found from residential area where as 105 (58.33%) individual of 11 species of Lizards found from the Non-residential area. Among them *Hemidactylus flaviviridis* has highest proportion to the residential area habitat type. *Sitanaponteceriana*, fan throated lizard was not found in residential area habitat. (Figure -2).

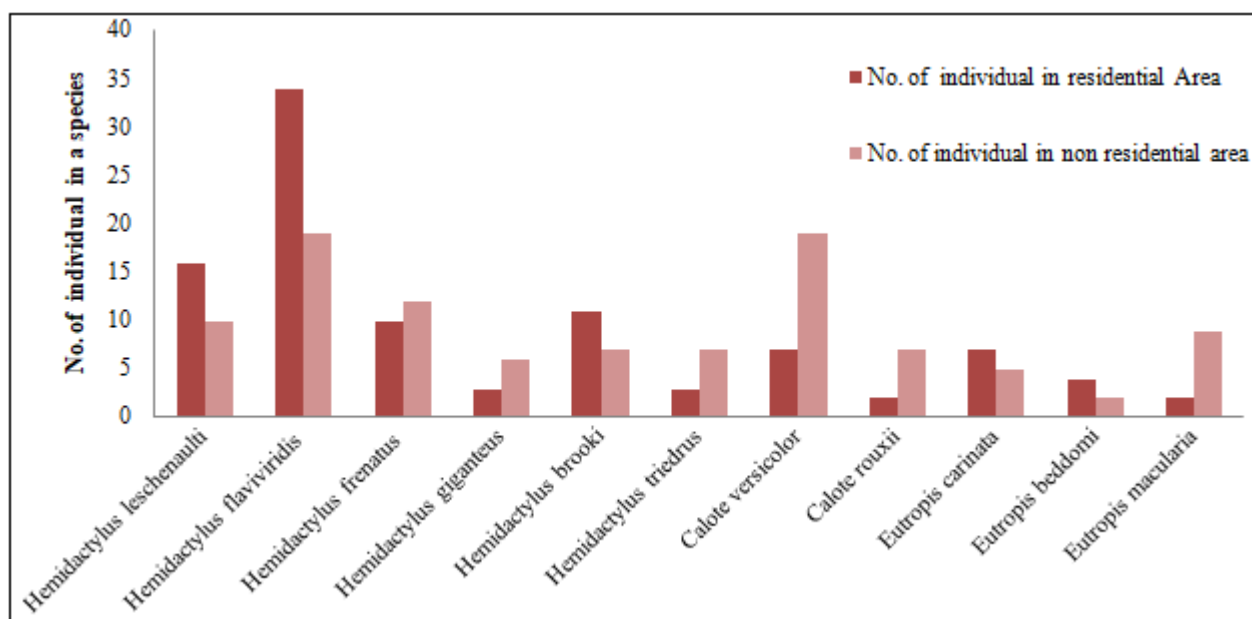


Figure 2: Comparative study of number of individual of different species found in residential area and non-residential area habitat

The total individual of all species of lizard fauna which observed in both residential and non-residential areas were separately tested for species diversity and richness. Non-Residential area habitat was found most diverse for lizard fauna ($H=2.237$) as compared to the Residential area habitat ($H=1.794$) of lizards. (Table no. 1)

Table 1: Diversity and richness of species in Residential and Non-Residential area.

Habitat Type	Shanon-Weaver (mean)	Simpson (mean)	Margalef (mean)	Equitability	Species richness (choa)
Residential area	1.794	0.7495	2.085	0.7793	10
Non-Residential area	2.237	0.8795	2.149	0.9331	11
Total	2.732	0.9155	3.851	0.8974	21

Seasonal diversity

Lizard diversity in Amravati Urban area showed that the maximum diverse species of reptilian in rainy season like

July, August, September and October. In Winter Season low diverse species of reptilian in urban area of Amravati.

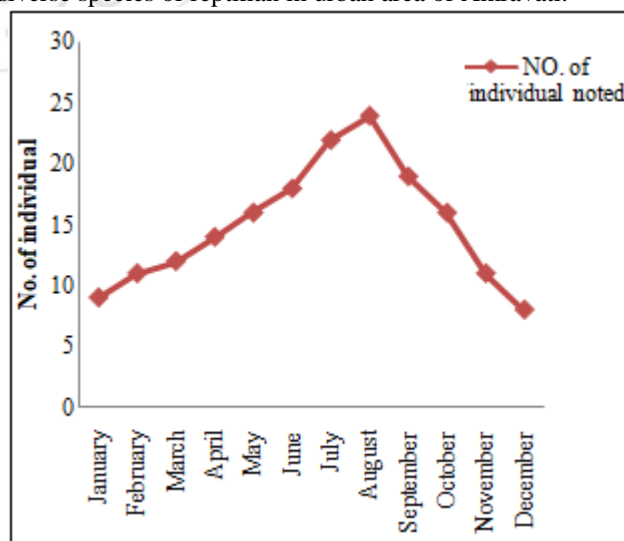


Figure 2: Seasonal diversity of lizard observed in Amravati urban area

4. Discussion

Annual diversity of lizard fauna in the present study showed that the maximum diversity in June, July, August and September. The minimum lizard fauna observed in November to February (Winter Season). This is due to the fact that Lizards are cold blooded animal and hence they hibernate in crevices, borrows or other their resting place, which was the reason to be low diversity in winter season. On the other hand monsoon is favourable breeding season for most lizards' species and hence diverse reptilian fauna observed in rainy season. The present observation is mimicking with the observation of (Joshi *et al.*, 2016; Kumbhare *et al.*, 2013) on the lizards study in other areas of Maharashtra.

Increasing road networks, noise pollution and increasing industrial garbage in human residing area which leads negative response to number as well as variety of species at that area. The maximum number of individual attribution of *Himidactylus flaviviridis*, a wall lizard that resides on the walls of human inhabitant areas is because this species is adaptable to anthropogenically altered habitat. This species has given more proportion of individual to residential area habitat type. The rest of other species on human residential area is low in number as compared to non-residential area.

Increased ground temperature and radiation due to removal of trees for road, bungalows and industrial purpose may also effect on normal temperature regime which influence the lizard distribution. Absence and low number of individual is due to the reduction of resource, protection, camouflage, microclimate and reduction in influence of biotic interaction. (Henkel and Schmidt, 2000; Scot *et al.*, 2006).

5. Conclusion

Concluded that the human activities such as cementation, dumping of garbage on breeding place, deforestation, habitat fragmentation, disturbance due to noise pollution etc. can lead to decline the numbers and variety of lizard's community in urban area. In future, researchers should keep an eye to eye to prevent further alienation and vulnerability of lizards community in response to human activities.

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