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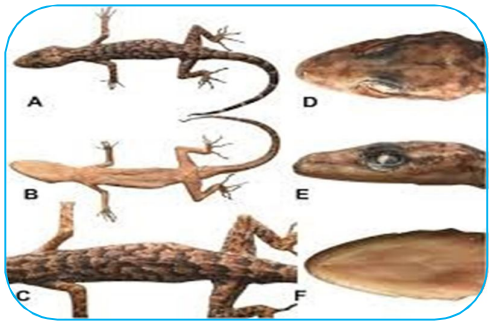
POPULATION DENSITY AND DISTRIBUTION PATTERN OF HOUSE LIZARD IN MAUGANJ DISTRICT (M.P.)

Sandhya Singh
Research Scholar, Department of Zoology,
PMCOE, Govt. S.K. College, Mauganj, Distt.- Mauganj (M.P.)

Dr. Dinesh Prasad Patel
Assistant Professor, Deptt. of Zoology,
PMCOE, Govt. S.K. College, Mauganj, Distt.- Mauganj (M.P.)

ABSTRACT:



The present study examines the population density and distribution pattern of house lizards (Hemidactylus spp.) in Mauganj District, Madhya Pradesh, in relation to habitat characteristics, anthropogenic disturbance, and seasonal variation. Surveys conducted in residential, commercial, institutional, and semi-rural areas revealed marked spatial variation in lizard abundance, with higher densities recorded in residential and semi-urban habitats characterized by moderate vegetation cover, stable microclimatic conditions, and abundant insect prey, while lower densities were observed in heavily disturbed market and traffic zones. The distribution pattern was predominantly clumped, particularly around artificial light sources, wall crevices, and sheltered microhabitats that provide food and refuge. Seasonal trends indicated increased population density during warmer months, corresponding with higher insect availability. The study demonstrates that habitat structure and human-induced environmental factors significantly influence the population dynamics of house lizards in Mauganj District, highlighting their ecological importance and potential utility as indicators of local environmental health.

KEYWORDS: *House lizard, Hemidactylus, Population density, Distribution pattern, Urban ecology and Anthropogenic disturbance.*

INTRODUCTION:

House lizards (*Hemidactylus* spp.) are among the most successful synanthropic reptiles, widely distributed in tropical and subtropical regions and commonly associated with human habitations. Their ability to exploit man-made structures for shelter and feeding has enabled them to colonize urban, semi-urban, and rural environments effectively. In India, house lizards are an integral component of urban biodiversity, playing a significant ecological role in regulating insect populations and maintaining trophic balance within human-dominated landscapes.

Population density and distribution patterns of organisms are fundamental ecological parameters that reflect habitat quality, resource availability, and environmental stability. In reptiles, these parameters are strongly influenced by temperature, humidity, prey abundance, availability of refuges, and human-induced disturbances. House lizards, being ectothermic and insectivorous, are particularly sensitive to microclimatic variations and changes in insect diversity caused by

urbanization, pesticide application, and habitat modification. Therefore, studying their population dynamics provides valuable insights into the ecological condition of inhabited areas.

Urban expansion and infrastructure development in districts like Mauganj, Madhya Pradesh, have resulted in rapid transformation of natural and semi-natural habitats. Increased construction activities, vehicular pollution, artificial lighting, and changing building architecture have altered the availability of suitable microhabitats for house lizards. These changes may lead to uneven distribution, population fragmentation, or local decline of lizard populations, emphasizing the need for region-specific ecological studies to understand their adaptive responses.

Despite their abundance and ecological importance, systematic studies on the population density and spatial distribution of house lizards in central Indian districts remain limited. Baseline data from Mauganj District are particularly scarce. The present study aims to assess the population density, distribution pattern, and habitat preferences of house lizards in different localities of Mauganj District. Such information is essential for understanding urban reptile ecology and can contribute to biodiversity conservation planning and environmental monitoring at the local level.

MATERIALS AND METHODS:

Study: Area:

The present study was carried out in Mauganj District, Madhya Pradesh, India, which represents a mosaic of urban, semi-urban, and rural landscapes. The study area includes residential localities, market and commercial zones, institutional buildings, and adjoining semi-rural villages. Mauganj District experiences a tropical monsoon climate with distinct summer, monsoon, and winter seasons, which significantly influence reptilian activity and population dynamics. Variations in building structure, vegetation cover, artificial lighting, and degree of anthropogenic disturbance among the selected sites provided suitable conditions for assessing the population density and distribution pattern of house lizards.

Collection of Data:

Field surveys were conducted using the Visual Encounter Survey (VES) method during early morning and evening hours when house lizards exhibit maximum activity. Observations were made on walls, ceilings, corners, cracks, window frames, electric poles, and areas around artificial light sources. The number of individuals observed per site was recorded along with microhabitat type, height from ground level, age class (juvenile/adult), and activity status. Surveys were repeated in different seasons to account for temporal variation. The study followed a non-invasive approach, and no individuals were harmed or removed from their natural habitat.

Identification:

Species identification was performed in the field based on external morphological characteristics such as body size, coloration, dorsal tuberculation, toe lamellae, and tail morphology. Standard taxonomic keys, field guides, and published literature were consulted for accurate identification of *Hemidactylus* species. Photographic records were maintained to support identification and minimize handling stress.

Data Analysis:

The collected data were compiled and analyzed to determine population density and distribution patterns across different habitat types. Population density was calculated as the mean number of individuals observed per survey site. Distribution pattern was assessed using frequency of occurrence and dispersion trends across habitats. Descriptive statistical methods, including mean and standard deviation, were applied to interpret spatial and seasonal variations. The analyzed data were used to evaluate the influence of habitat characteristics and anthropogenic factors on the population dynamics of house lizards in Mauganj District.

RESULTS:

The population density of house lizards (*Hemidactylus* spp.) in Mauganj District varied markedly across different habitat types. Residential areas exhibited the highest mean population density, followed by semi-urban and institutional zones, while commercial market areas and high-traffic zones recorded the lowest densities. The variation in abundance was closely linked to availability of shelter, insect prey concentration near artificial lights, and degree of anthropogenic disturbance. The distribution pattern was predominantly clumped, with lizards frequently aggregated around light sources, wall crevices, ceilings, and undisturbed structures.

Seasonal analysis indicated higher population density during summer and monsoon seasons, coinciding with increased temperature and insect availability, whereas winter surveys showed comparatively reduced numbers and activity. Juvenile lizards were mostly confined to protected indoor habitats, while adults showed wider spatial distribution. Overall, the results highlight the strong influence of habitat structure and human activities on the population dynamics of house lizards in the study area.

Table: Population Density and Distribution of House Lizards in Different Habitats of Mauganj District

Habitat Type	Mean Population Density (No./Site)	Dominant Microhabitat	Distribution Pattern	Level of Disturbance
Residential Area	17.6 ± 2.3	Walls, ceilings, light sources	Clumped	Low
Semi-Urban Area	12.4 ± 1.9	Wall crevices, outdoor lights	Clumped	Moderate
Institutional Area	9.8 ± 1.5	Buildings, corridors	Patchy	Moderate
Market/Commercial Area	6.1 ± 1.2	Shops, signboards	Scattered	High
High Traffic Zone	4.3 ± 0.8	Poles, outer walls	Sparse	Very High

Values represent mean ± standard deviation based on repeated seasonal surveys.

The decreasing trend in population density from residential to highly disturbed areas clearly reflects the sensitivity of house lizards to habitat quality and anthropogenic pressure.

DISCUSSION:

The present study demonstrates that the population density and distribution pattern of house lizards (*Hemidactylus* spp.) in Mauganj District are strongly influenced by habitat characteristics and the degree of anthropogenic disturbance. Higher population densities recorded in residential areas indicate that moderate human habitation, availability of stable shelter, and presence of artificial light sources that attract insect prey create favorable conditions for lizard survival. Similar observations have been reported in urban reptile studies, where synanthropic species thrive in environments offering consistent food supply and microclimatic stability.

The predominantly clumped distribution pattern observed across most habitats reflects the species' preference for specific microhabitats such as wall crevices, ceilings, and illuminated areas. Aggregation around artificial lights suggests behavioral adaptation to exploit insect concentrations, thereby enhancing foraging efficiency. Protected indoor spaces supporting juvenile individuals further indicate the importance of safe refuges for early life stages, contributing to population persistence in urban settings.

Lower population density in market areas and high-traffic zones can be attributed to excessive human disturbance, structural modifications, vehicular pollution, and frequent cleaning or renovation activities that reduce shelter availability. Continuous exposure to noise, vibrations, and chemical

pollutants may also negatively affect lizard behavior, physiology, and reproductive success. These stressors collectively limit habitat suitability and lead to sparse or scattered distribution patterns in heavily disturbed areas.

Seasonal variation in population density, with peaks during summer and monsoon periods, highlights the role of temperature and prey availability in regulating lizard activity and visibility. Reduced winter abundance likely reflects decreased metabolic activity and lower insect density rather than actual population decline. Overall, the findings emphasize that house lizards effectively integrate multiple environmental signals and respond predictably to habitat quality, supporting their utility as indicators of local environmental conditions and contributing valuable baseline data for urban ecological assessment in Mauganj District.

CONCLUSION :

The study on house lizards (*Hemidactylus* spp.) in Mauganj District reveals that population density and distribution patterns are strongly influenced by habitat quality, microclimatic conditions, and the degree of anthropogenic disturbance. Residential and semi-urban areas with stable shelters, moderate vegetation, and abundant insect prey supported higher lizard densities, while commercial and high-traffic zones exhibited lower populations and more scattered distributions. The clumped distribution observed around artificial light sources and wall crevices highlights the species' behavioral adaptation to exploit available food and refuge. Seasonal variations further indicate that environmental factors such as temperature and prey availability play a significant role in regulating activity and visibility. Overall, house lizards demonstrate high sensitivity to environmental changes, making them reliable indicators of local habitat health and urban ecological conditions. Their study provides valuable baseline data for biodiversity assessment, environmental monitoring, and conservation planning in urban and semi-urban landscapes of Mauganj District.

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