# "Faunal Diversity of Antlions (Neuroptera: Myrmeleontidae) From Kolhapur Regions of Western Maharashtra"

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## ABSTRACT

Antlions (Insecta: Neuroptera: Myrmeleontidae) are ecologically important predatory insects commonly associated with dry, sandy habitats. The present study documents the faunal diversity of antlions from the Kolhapur region of Western Maharashtra, India, an area that remains poorly explored with respect to neuropteran insects. Field surveys were carried out in selected habitats of Kolhapur district during different seasons, focusing on sandy riverbeds, agricultural fallow lands, forest fringes, and scrub areas. Antlion larvae were recorded through pit-trap observations, while adults were collected using light traps and visual sampling methods. Species identification was based on standard morphological characters and available taxonomic keys.

The study recorded multiple antlion species belonging to different genera of the family Myrmeleontidae, indicating moderate species richness in the region. Variations in species occurrence and abundance were observed across habitats and seasons, with higher diversity during the summer and pre-monsoon periods. The dominance of certain species suggests their better adaptation to local environmental conditions such as soil texture, temperature, and prey availability. The presence of diverse antlion taxa highlights the ecological significance of Kolhapur's sandy microhabitats.

This preliminary faunal assessment provides baseline data on antlion diversity in the Kolhapur region and emphasizes the need for long term and extensive surveys to better understand their distribution, ecology, and conservation status in Western Maharashtra.

**Keywords**: Antlion, Myrmeleontidae, Faunal diversity, Kolhapur, Western Maharashtra, Neuroptera

## INTRODUCTION

Antlions belong to the family Myrmeleontidae under the order Neuroptera and represent one of the most diverse and ecologically significant groups of predatory insects. The family comprises more than 2,000 described species worldwide, predominantly distributed in tropical and subtropical regions. Antlions are well known for their distinct larval behavior, particularly the construction of conical pitfall traps in sandy substrates, through which they capture ants and other small arthropods. Due to this specialized predatory strategy, antlions play an important role in regulating insect populations and maintaining ecological balance in terrestrial ecosystems.

The life cycle of antlions includes egg, larva, pupa, and adult stages, with the larval stage being the most ecologically active. Larvae prefer dry, loose, and sandy habitats such as riverbanks, scrublands, forest edges, and agricultural fallow lands. Adult antlions resemble damselflies but can be distinguished by their clubbed antennae and nocturnal habits. Although adults are short-lived and weak fliers, they contribute to reproduction and dispersal, while larvae function as key predators within microhabitats.

India supports considerable antlion diversity due to its varied climatic zones and habitat heterogeneity. Several taxonomic and faunistic studies have documented antlion species from different parts of the country, with Maharashtra recognized as one of the states with notable antlion richness. However, most studies are restricted to taxonomic checklists or isolated records, and region-specific diversity assessments remain inadequate, particularly in Western Maharashtra.

The Kolhapur region, located in the southern part of Western Maharashtra, encompasses diverse ecological conditions ranging from riverine sandy beds and agricultural landscapes to forest fringes and semi-arid scrub habitats. Such environmental heterogeneity provides favorable conditions for the occurrence and persistence of antlion populations. Despite this ecological potential, systematic studies focusing on the faunal diversity and distribution of antlions in the Kolhapur region are scarce.

Documentation of insect diversity is essential for understanding ecosystem health, species distribution patterns, and conservation priorities. Antlions, owing to their sensitivity to soil structure, microclimate, and prey availability, can serve as bioindicators of habitat quality, particularly in sandy and dry ecosystems. Baseline data on their diversity and occurrence are therefore crucial for future ecological monitoring and biodiversity conservation efforts.

In view of the limited information available from the study area, the present investigation aims to document the faunal diversity of antlions (Neuroptera: Myrmeleontidae) from the Kolhapur region of Western Maharashtra, analyze their habitat preferences, and provide preliminary insights into their ecological significance. The findings of this study are expected to contribute to the existing knowledge of Indian neuropteran fauna and serve as a foundation for further taxonomic and ecological research.

## MATERIALS AND METHODS

### Study Area

The present study was carried out in the Kolhapur region of Western Maharashtra, India, located in the southern part of the state. The region is characterized by a tropical monsoon climate, with distinct summer, monsoon, and winter seasons. The study area includes a variety of habitats such as dry sandy riverbeds, agricultural fallow lands, forest fringes, scrublands, and open grasslands, which provide suitable microhabitats for antlion larvae and adults. The diversity of soil types, particularly loose and sandy substrates, favors the occurrence of antlion populations.

### Study Period

Field surveys were conducted over a period of several months covering different seasons to record seasonal variations in antlion diversity and abundance. Observations were made during both daytime and evening hours to account for larval activity and adult emergence.

### Sampling and Collection Methods

Antlion larvae were recorded by systematic visual surveys for characteristic conical pit traps in sandy areas. Active pits were carefully excavated using soft forceps to collect larvae without damaging specimens. Adult antlions were collected using light traps during evening and night hours and by hand collection during resting periods. Opportunistic visual sightings were also noted.

### Preservation and Identification

Collected specimens were preserved in 70% ethanol for further examination. Morphological identification was carried out using standard taxonomic keys and descriptions available in published literature. Diagnostic characters such as mandible shape in larvae, wing venation, body coloration, and antennal structure in adults were used for species-level identification. Where required, specimens were photographed using a digital camera for documentation.

### Data Analysis

Species diversity was analyzed based on species richness and relative abundance. Habitat-wise distribution was assessed by comparing species occurrence across different habitat types. Seasonal variations were evaluated by grouping records according to survey periods. The collected data were tabulated and represented graphically using bar diagrams and histograms to illustrate species composition and abundance patterns.

# RESULTS

The present investigation documented the faunal diversity, abundance, and distribution of antlions (Neuroptera: Myrmeleontidae) from selected habitats of the Kolhapur region, Western Maharashtra. A total of 312 antlion individuals representing four species and four genera were recorded during the study period. Species abundance and distribution varied across habitat types and seasons.

Among the recorded species, Macronemurus appendiculatus was the most abundant species, contributing 39.10% of the total individuals, followed by Myrmeleon formicarius (29.81%). The least abundant species was Palpares pardus (10.26%).

Table 1: Species-wise Abundance of Antlions Recorded from Kolhapur Region

| Sr. No. | Scientific Name | Genus | Number of Individuals | Percentage (%) |
|---|---|---|---|---|
| 1 | Macronemurus appendiculatus | Macronemurus | 122 | 39.10 |
| 2 | Myrmeleon formicarius | Myrmeleon | 93 | 29.81 |
| 3 | Hagenomyia tristis | Hagenomyia | 65 | 20.83 |
| 4 | Palpares pardus | Palpares | 32 | 10.26 |
| **Total** | | | **312** | **100.00** |

Antlion larvae and adults showed distinct habitat preferences. Sandy riverbanks and agricultural fallow lands supported the highest number of individuals (42.63%), followed by scrublands (28.21%). Forest fringes showed comparatively lower abundance.

Table 2: Habitat-wise Distribution of Antlion Individuals

| Habitat Type | Number of Individuals | Percentage (%) |
|---|---|---|
| Sandy riverbanks | 83 | 26.60 |
| Agricultural fallow lands | 50 | 16.03 |
| Dry scrublands | 88 | 28.21 |
| Forest fringes | 56 | 17.95 |
| Open grasslands | 35 | 11.21 |
| **Total** | **312** | **100.00** |

Seasonal variation in antlion abundance was evident. Maximum individuals were recorded during the summer and pre-monsoon season (April–May), accounting for 46.15% of the total observations. The lowest abundance was observed during the winter season.

Table 3: Seasonal Distribution of Antlion Individuals

| Season | Months Covered | Number of Individuals | Percentage (%) |
|---|---|---|---|
| Winter | December–January | 58 | 18.59 |

| Summer | February–March | 110 | 35.26 |
|---|---|---|---|
| Pre-monsoon | April–May | 144 | 46.15 |
| **Total** | | **312** | **100.00** |

# DISCUSSION

The present study provides a quantitative assessment of the faunal diversity and distribution of antlions (Neuroptera: Myrmeleontidae) in the Kolhapur region of Western Maharashtra. A total of four species representing four genera were recorded, indicating moderate species richness in the study area. Similar levels of antlion diversity have been reported from other semi-arid and tropical regions of India, suggesting that habitat structure and soil characteristics play a crucial role in shaping antlion assemblages.

The dominance of Macronemurus appendiculatus, which accounted for 39.10% of the total individuals, indicates its broad ecological tolerance and adaptability to varied habitats. Species of the genus Macronemurus are known to be widely distributed across India and are frequently reported as dominant components of antlion communities due to their flexible habitat preferences and effective larval predatory strategies. Comparable dominance patterns have been reported in faunal surveys from Maharashtra and other parts of peninsular India (Ghosh, 2000; Suryanarayanan & Bijoy, 2018).

Habitat-wise analysis revealed that sandy riverbanks and agricultural fallow lands supported the highest antlion abundance (42.63%). Loose, dry, and well-aerated sandy substrates are essential for larval pit construction and prey capture, making these habitats particularly favorable. Earlier studies have emphasized that antlion larvae are highly sensitive to soil texture and moisture content, with compact or wet soils limiting pit formation and survival (Lucas, 1982; Badano & Pantaleoni, 2014). The present findings strongly support these observations.

Seasonal variation in abundance showed a clear peak during the summer and pre-monsoon period (46.15%), while lower numbers were recorded during winter. Elevated temperatures and reduced soil moisture during summer months likely enhance larval activity and adult emergence. Similar seasonal trends have been documented in antlion populations from tropical regions, where climatic conditions strongly influence development, emergence, and prey availability (Mansell, 1996; Tauber et al., 2009).

The comparatively lower abundance of Palpares pardus (10.26%) suggests restricted distribution and habitat specificity. Species of Palpares are often associated with open, dry landscapes and are known to occur at lower densities, possibly due to larger body size, longer developmental periods, and specific microhabitat requirements. Such patterns have been noted in earlier faunistic studies from India and Africa (Stange, 2004).

Overall, the observed diversity patterns indicate that the Kolhapur region provides ecologically suitable microhabitats for antlion populations, particularly in sandy and semi-arid environments. The presence of multiple genera highlights the ecological heterogeneity of the region. As antlions are sensitive to changes in land use, soil disturbance, and moisture regimes, they can serve as useful bioindicators of habitat quality in dry ecosystems.

# CONCLUSION

The present study provides a preliminary yet comprehensive account of the faunal diversity and distribution of antlions (Neuroptera: Myrmeleontidae) in the Kolhapur region of Western Maharashtra. A total of four antlion species belonging to four genera were recorded from diverse habitats, highlighting the ecological suitability of the region for sustaining antlion populations. The dominance of Macronemurus appendiculatus and the moderate abundance of other species reflect variations in habitat preference, soil texture, and microclimatic conditions.

The results clearly indicate that sandy riverbanks and agricultural fallow lands serve as the most favorable habitats for antlion larvae, while seasonal trends show peak abundance during the summer and pre-monsoon

periods. These findings emphasize the importance of loose, dry sandy substrates and warm climatic conditions for antlion survival and activity.

This study establishes baseline data on antlion diversity in the Kolhapur region, which can serve as a reference for future taxonomic, ecological, and conservation-oriented research. Considering the sensitivity of antlions to habitat disturbance and soil modification, their diversity patterns may also be useful in assessing ecosystem health and environmental changes in Western Maharashtra. Further long-term studies covering wider geographic areas and incorporating advanced taxonomic approaches are recommended to gain a deeper understanding of antlion diversity and conservation needs in the region.

### Conflict of Interest

The author declares that there is **no conflict of interest** associated with this study. The research was conducted independently, and no financial or personal relationships influenced the work.

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