**An Assessment of Insect Diversity in Different Habitats Of Raipur, Chhattisgarh**

**Ankita Dansena1\*, Dr. Manoj Singh2**

1\*Research scholar, Department of Zoology, Kalinga University Raipur [C.G.], India

2Assistant Professor, Department of Zoology, Kalinga University, Raipur [C.G.], India

**Abstract**

The study aims to assess the insect diversity in different habitats of Raipur, Chhattisgarh. The researchers collected specimens of insects from various locations, including villages with kharif and Rabi crops, as well as urban areas with abundant flora and fauna. The availability of diverse flora and fauna in these habitats provides a suitable environment for the survival of different insect species. The collected specimens were either preserved in vials with 70% alcohol or killed in killing bottles for further analysis and identification. This study is crucial as it will not only help in understanding the diversity of insects in Raipur but also contribute to the conservation of biodiversity in this area and aid in further research efforts. The researchers conducted a study on insect diversity in Raipur, Chhattisgarh to assess the impact of different habitats on the abundance and variety of insect species. They collected specimens from villages with kharif and Rabi crops, as well as urban areas with diverse flora and fauna. The collected specimens were preserved and analyzed to determine the diversity of insect species in each habitat. The study is significant as it provides valuable information on the insect diversity in Raipur and its impact on the overall biodiversity of the region. An assessment of insect diversity in different habitats of Raipur, Chhattisgarh was conducted to understand the impact of these habitats on the abundance and variety of insect species. The study focused on collecting specimens from villages with kharif and Rabi crops, as well as urban areas with diverse flora and fauna. The researchers preserved the collected specimens and analyzed them to assess the insect diversity in each habitat. The study is important as it provides insights into the biodiversity of insects in Raipur and highlights the role of different habitats in supporting insect populations. The researchers aimed to assess the insect diversity in different habitats of Raipur, Chhattisgarh.

**Keywords:** Insects, Diversity, Ecosystem, Environment

1. **INTRODUCTION**

**1.1 Introduction to Insect Diversity in Raipur**

Insect biodiversity refers to the wide range of insect species found in a given area. These insects play a crucial role in ecosystems, contributing to various ecological processes such as pollination, decomposition, and nutrient cycling. In Raipur, the capital city of Chhattisgarh, India, insect diversity is abundant due to the presence of diverse flora and fauna (Tuhin et al., 2023) (Alisha et al., 2020).Insects in Raipur thrive in different habitats, including terrestrial, freshwater, and forest ecosystems. They exhibit remarkable diversity in terms of their size, shape, color, and behavior. Insects have adapted to various ecological niches, allowing them to fulfill specific roles within the ecosystem. They possess an amazing diversity in size and the ability to fly permits them to run away from the enemies and scatter to new environment as they got a protective shell shell or exoskeleton (Tuhin et al., 2023).Furthermore, insects have a unique nervous system that allows them to perceive and interact with their environment. In Raipur, the insect biodiversity is supported by the presence of diverse flora and fauna (Prakhar et al., 2021). These factors contribute to the rich insect diversity observed in Raipur.The insect diversity in Raipur is influenced by the presence of ample vegetation in rural areas where crops are grown, such as kharif and Rabi crops. Additionally, urban areas in Raipur also have good insect biodiversity due to the abundance of host plants and animals (Majumder et al., 2013). In conclusion, Raipur exhibits a high level of insect diversity due to its diverse habitat types and abundant flora and fauna. In Raipur, there is a significant presence and variety of insect species due to the abundance of flora and fauna in the region. This allows for a rich and diverse ecosystem, with insects occupying various ecological niches. Insects in Raipur play important roles in ecosystem processes such as pollination, decomposition, and nutrient cycling (Takhelmayum & Gupta, 2015). They are also indicators of environmental health and can provide valuable insights about the overall biodiversity and ecological balance of an area. Insect biodiversity in Raipur is influenced by the presence of diverse flora and fauna, including ample vegetation in rural areas and host plants and animals in urban areas(Sharma et al., 2020). The high insect diversity in Raipur is attributed to the presence of diverse habitats and abundant flora and fauna.In Raipur, Chhattisgarh, the insect diversity is abundant due to the presence of diverse flora and fauna. This abundance of vegetation and various ecological niches allows for a wide range of insect species to thrive (Srivastava, 2016).

**1.2 Assessment of Insect Diversity in Raipur, Chhattisgarh**

Insect diversity plays a crucial role in maintaining ecosystem balance and functioning. Different habitats in Raipur, Chhattisgarh likely support a wide range of insect species. Understanding the composition and distribution of insect species across these habitats is essential for assessing the overall health and biodiversity of the region. This information can be valuable for conservation efforts and guiding land management practices (Khairiyah et al., n.d).To conduct an assessment of insect diversity in different habitats of Raipur, Chhattisgarh, various parameters can be considered, such as species richness, abundance, and diversity. These parameters can be measured through field surveys, where insects are sampled and identified. Use of standard sampling methods, such as sweep netting, pitfall traps, and light trapping, can provide a comprehensive assessment of insect diversity across different habitats (Hutcheson, 1997).

Additionally, ecological factors such as vegetation type, habitat structure, and microclimate should be taken into account when analyzing insect diversity. By comparing the insect diversity across various habitats, we can gain insights into the specific environmental conditions that support different insect communities (Duelli et al., 1999).This information can then be used to develop targeted conservation strategies that promote the preservation of insect species and their habitats. Insects are especially useful for assessing the effects of anthropogenic activities on the terrestrial ecosystem, as they are in close contact with toxic elements present in soil, water, and air (Parikh et al., 2020).

This makes them excellent indicators of environmental pollution and the overall health of ecosystems. Furthermore, insects, such as beetles, ants, honeybees, and butterflies, are sensitive to even slight changes in the environment. These insects can be used as biological indicators to monitor pollutants in the environment and assess changes in air, water, and soil quality.

In conclusion, conducting an assessment of insect diversity in different habitats of Raipur, Chhattisgarh is crucial for understanding the overall health and biodiversity of the region(Duelli et al., 1999) (Hughes et al., 2000) (Hatta et al., 2011) (Wezel et al., 2013) (Harsh, 2014) (Effects of climate change on agriculture, 2015) (DIVERSITY OF ENVIRONMENTAL HEALTH MARKERS ODONATA AND LEPIDOPTERA IN GWARIGHAT REGION OF RIVER NARMADA, JABALPUR (M.P.) INDIA, 2016) (Ismail et al., 2018) (Wagner, 2018).

**1.3 Overview of Habitats in Raipur**

Raipur, Chhattisgarh is a region that encompasses various habitats, including Plains Riparian areas, Montane Woodland sites, Grassland areas, and Foothills Riparian sites. These habitats differ in their characteristics, such as vegetation type, habitat structure, and microclimate (Duelli et al., 1999)(Hughes et al., 2000)(Tripathi et al., 2005). For example, Plains Riparian areas are characterized by the presence of water bodies and riparian vegetation. On the other hand, Montane Woodland sites are characterized by dense forests and higher elevations. Grassland areas consist primarily of grasses and open landscapes, while Foothills Riparian sites are located at the edge of hills and have vegetation similar to Plains Riparian areas (Patten, 1998). By assessing insect diversity in these different habitats, we can gain insights into the specific environmental conditions that support different insect communities (Robinson et al., 2012).This information can then be used to develop targeted conservation strategies that promote the preservation of insect species and their habitats.

**1.4 Assessment of Insect Diversity in Raipur, Chhattisgarh**

An assessment of insect diversity in different habitats of Raipur, Chhattisgarh is important for several reasons(Hatta et al., 2011).Firstly, assessing insect diversity can provide valuable information about the overall health and biodiversity of the region (Parikh et al., 2020). It can help identify any changes or declines in insect populations, which can have cascading effects on the entire ecosystem. Secondly, insects play crucial roles in ecosystem functioning, such as pollination, decomposition, and nutrient cycling (New & Yen, n.d)(Steffan‐Dewenter & Tscharntke, 2002).Thus, assessing insect diversity can provide insights into the functioning and resilience of ecosystems in Raipur. Additionally, insects are often used as indicators of environmental pollution due to their sensitivity to changes in the environment. Therefore, by studying the diversity of insects in different habitats, we can assess the effects of anthropogenic activities on the terrestrial ecosystem and the environment as a whole. Furthermore, studying insect diversity can also provide information about the suitability of different habitats for insects(Jana et al., 2011)(Hatta et al., 2011)(Banerjee, 2014).This can help inform land management and conservation efforts, as certain habitats may need protection or restoration to support diverse and thriving insect populations. For example, if certain habitats are found to have low insect diversity, it may indicate that there are issues with habitat fragmentation, pollution, or other factors that are impacting insect populations. The assessment of insect diversity in different habitats of Raipur, Chhattisgarh can also contribute to our understanding of the ecological relationships between insects and the surrounding ecosystem (Steffan‐Dewenter & Tscharntke, 2002)(Painkra et al., 2016)(Pal et al., 2018). This understanding can then be used to inform conservation strategies and management practices that promote the preservation of insect species and their habitats. By conducting an assessment of insect diversity in Raipur, Chhattisgarh, we can gain a deeper understanding of the environmental conditions that support different insect species and their populations (Payne & Itterbeeck, 2017)(Noriega et al., 2018)(Guntupalli et al., 2018). This information can be used to develop effective conservation strategies and management plans to protect insect biodiversity in the region.

Furthermore, studying insect diversity can also provide information about the potential impacts of climate change on insect populations (Ponomarenko, n.d)(Kyerematen et al., 2014). This is important because insects are highly sensitive to changes in temperature and precipitation patterns, and shifts in their populations can have far-reaching effects on ecosystem dynamics. Understanding the diversity of insect populations in different habitats of Raipur, Chhattisgarh can provide valuable insights into the overall health and functioning of ecosystems in the region (Steffan‐Dewenter & Tscharntke, 2002). By assessing insect diversity in different habitats of Raipur, Chhattisgarh, we can gather important information about the overall health and functioning of ecosystems in the region(Khandekar & Srivastav, 2014)(Samways, 2015). This information can then be used to inform land management and conservation efforts, with the aim of preserving insect species and their habitats. By conducting an assessment of insect diversity in Raipur, Chhattisgarh, we can gather valuable information about the suitability of different habitats for insects and identify any potential threats or issues affecting their populations (Harsh, 2014)(Takhelmayum & Gupta, 2015).This information can then be used to implement targeted conservation measures and management practices to protect and promote insect diversity in the region.

In conclusion, conducting an assessment of insect diversity in different habitats of Raipur, Chhattisgarh is crucial for understanding the ecological relationships between insects and their surrounding ecosystem(Pal, 2016)(Gupta & Chandra, 2017)(Dangles & Casas, 2019)(Crespo‐Pérez et al., 2020)(Chourasia et al., 2020). This understanding can inform conservation strategies and management practices to preserve insect species and their habitats, as well as assess the potential impacts of climate change on insect populations and ecosystem health. By conducting an assessment of insect diversity in different habitats of Raipur, Chhattisgarh, we can gain a deeper understanding of the environmental conditions and factors that support insect populations and contribute to overall ecosystem health (Chourasia et al., 2020)(Kulkarni & Zade, 2020)(Yang & Chen, 2021).Moreover, studying insect diversity in Raipur, Chhattisgarh can also contribute to our understanding of the region's overall biodiversity and ecosystem functioning. This knowledge can aid in making informed decisions regarding land use, conservation efforts, and sustainable development practices to ensure the long-term health and resilience of Raipur's ecosystems(Sharma et al., 2020)(Arya et al., 2020)(Manhice, 2021)(Prakhar et al., 2021).By assessing the diversity of insects in different habitats of Raipur, Chhattisgarh, we can gain insights into the effects of anthropogenic activities on insect populations and their habitats(D, 2016)(Chowdhury et al., 2023).

1. **METHODOLOGY**

**2.1 Methodology for Evaluating Insect Populations**

To assess insect diversity in different habitats of Raipur, Chhattisgarh, a systematic methodology can be followed. This would involve conducting surveys and sampling of insects in various habitats, such as forests, grasslands, wetlands, and urban areas. Different sampling techniques can be utilized, including sweep netting, pitfall traps, light traps, and visual observations (Guntupalli et al., 2018). The collected specimens would then be identified and recorded, taking into account factors such as species richness, abundance, and composition. By analyzing the collected data, patterns of insect diversity can be identified across different habitats and seasons(Okelo, 1985)(Diefenbach & Becker, 1992).This information can then be used to evaluate the effects of anthropogenic activities on insect populations and their habitats, as well as identify areas of high conservation value for insect species in Raipur, Chhattisgarh. Through this assessment of insect diversity, we can also determine the potential ecological services provided by insects in Raipur, Chhattisgarh (Stengel et al., 2000)(Shashank et al., 2022). This knowledge can aid in the development of effective conservation strategies and management practices to preserve insect species and their habitats, as well as assess the potential impacts of environmental changes on insect populations, such as climate change and habitat destruction (Hawksworth, 2011)(Crespo‐Pérez et al., 2020). This study on insect diversity in different habitats of Raipur, Chhattisgarh will provide valuable insights into the overall biodiversity and ecosystem health of the region, ultimately contributing to sustainable land use practices and conservation efforts.” In today's rapidly changing world, the significance of accurate weather forecasts cannot be overstated(Sehgal et al., 2006)(Prakhar et al., 2021).Insects are especially useful to assess the effects of anthropogenic activities on the terrestrial ecosystem, as they are in close contact with toxic elements present in soil, water, and air. In this study, we will focus on using insects as important indicators of environmental pollution and assessing the presence of pollutants in air, water, and soil. We will primarily focus on insects such as beetles, ants, honeybees, and butterflies, as they are known to be sensitive to even slight changes in their environment and can serve as reliable indicators of environmental quality. Additionally, we will explore the diversity of butterfly species in Raipur's different ecosystems and seasons (Haneda & Panggabean, 2019). This information will be essential in understanding the potential impacts of environmental pollution on insect populations and their habitats.

**2.2 Data Collection and Analysis**

In order to conduct a comprehensive comparative analysis of insect diversity in Raipur and Durg, it is essential to employ a robust data collection and analysis methodology(Quantitative estimation of insect diversity inhabiting Calotropis procera in industrial and nonindustrial areas of West Bengal, India, 2011).

**2.3 Data Collection Methods**

1. Insect Surveys: Conducting detailed insect surveys in both Raipur and Durg will involve the use of various sampling methods such as sweep netting, pitfall traps, and light traps. These methods will help in capturing a diverse range of insect species present in different habitats within the urban landscapes of the two cities (Bolger et al., 2000).

2. Environmental Variables: Data collection will also include the measurement of environmental variables including temperature, humidity, vegetation cover, and land use. These variables play a crucial role in influencing the diversity and distribution of insect populations in urban environments (Hartley et al., 2007).

**3. DATA ANALYSIS**

1. Species Richness and Abundance: The collected insect samples will be analyzed to determine the species richness and abundance of insects in each location. This analysis will provide valuable insights into the variety and population sizes of insect communities in Raipur and Durg(Sattler et al., 2010).

2. Diversity Indices: Calculating diversity indices such as the Shannon-Wiener index and Simpson's diversity index will aid in quantifying the overall diversity of insect populations in both cities. These indices provide a deeper understanding of the evenness and richness of insect species within the urban landscapes (Steffan‐Dewenter & Tscharntke, 2002).

3. Statistical Comparison: The collected data on insect diversity and environmental variables will be subjected to statistical analysis to compare and identify any significant differences or patterns between Raipur and Durg. This statistical comparison will help in understanding the influence of urbanization and environmental factors on insect diversity in the two locations(Mulieri et al., 2011).

**3.1 Comparative Analysis of Insect Diversity across Habitats**

"To assess insect diversity in different habitats of Raipur, Chhattisgarh, a comparative analysis will be conducted. Multiple sampling sites will be selected representing various habitats, including forests, grasslands, wetlands, and urban areas. Insects will be collected using standardized sampling methods, such as sweep netting, pitfall trapping, and light trapping(Jana et al., 2011)(Hatta et al., 2011).The collected insect specimens will be identified to species level using taxonomic keys and further analyzed for diversity metrics, including species richness, abundance, and evenness. The data collected will be compared across habitats to identify any variations in insect diversity. The findings of this study will contribute to our understanding of how insect populations are affected by different habitats and can inform conservation efforts and land management practices in Raipur, Chhattisgarh (DIVERSITY OF ENVIRONMENTAL HEALTH MARKERS ODONATA AND LEPIDOPTERA IN GWARIGHAT REGION OF RIVER NARMADA, JABALPUR (M.P.) INDIA, 2016).

Additionally, the study will also assess the potential impact of environmental factors, such as temperature, humidity, and vegetation composition on insect diversity. By comparing insect diversity across different habitats and seasons in Raipur, Chhattisgarh, this study seeks to gain insights into the ecological impacts of urbanization and habitat fragmentation on insect populations and to inform conservation strategies for preserving insect diversity in this region (Andrewes, 1923). The study will also involve the analysis of environmental pollutants in insects collected from different habitats (Parikh et al., 2020).

This will help in understanding the potential impacts of pollution on insect populations and their habitats. The research aims to calculate and compare the abundance, diversity, richness, evenness, and similarity of insect species in different habitats of Raipur, Chhattisgarh (Quantitative estimation of insect diversity inhabiting Calotropis procera in industrial and nonindustrial areas of West Bengal, India, 2011)(Parikh et al., 2020). The study will also examine the effect of seasonal differences on insect abundance, with sampling conducted in both dry and wet seasons. The results of this study will provide valuable insights into insect biodiversity and the potential impacts of pollution and habitat degradation on these populations (Singh & Rawal, 2016).

**Frequently Found Insects in Raipur's Habitat**

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| S.No. | Insect | Comments | Reference |
| 1. | Ants (Formiciade) | Several ant species, such as fire ants, pavement ants, and carpenter ants. | (Dadmal, S. M. and Khadakkar, S. 2014) |
| 2. | Termites(Isoptera) | Usually found in damp places, especially in the rainy season. | (Harper, J. L. and Hawksworth, D. L. 1994) |
| 3. | Mosquitoes(Culicidae) | A multitude of mosquito species, particularly in the wet season. | (Koli, Y. J., Aland, S. R. and Bhawane, G. P. 2009) |
| 4. | Butterflies and Moths (lepidopteran) | A wide variety of butterflies, such as blues, skippers, and swallowtails. | (Rocheforta et.al. 2005) |
| 5. | Beetles | Many species of beetles, such as longhorn, scarab, and ladybugs, are found in this diverse region. | (Santos et al.,2007) |
| 6. | Dragonflies and Damselflies | These insects are frequently observed near bodies of water. | (Harper, J. L. and Hawksworth, D. L. 1994) |
| 7. | Cockroaches | Both outdoor and indoor species are present. | (Dadmal, S. M. and Khadakkar, S. 2014) |
| 8. | Flies | Various fly species, including houseflies and fruit flies. | (Harper, J. L. and Hawksworth, D. L. 1994) |

**3.2 Factors Influencing Insect Diversity in Raipur**

Factors that may influence insect diversity in Raipur include:

1. Habitat type: Different habitats may provide different resources and microclimates that can support different insect species.For example, forested areas may support more species diversity compared to urban areas with limited green spaces(Majumder et al., n.d)(Arun & Vijayan, 2004).

2. Climate: Temperature, humidity, and precipitation patterns can have a significant impact on insect diversity. For example, certain species may be more responsive to warmer temperatures or higher humidity levels(Paul, 2021).

3. Vegetation composition: The types and density of plants in a habitat can influence insect diversity by providing food sources, shelter, and breeding sites (Steffan‐Dewenter & Tscharntke, 2002).

4. Environmental pollutants: Exposure to pollutants such as pesticides, air pollution, and water contamination can have negative impacts on insect populations.In this study, the researchers will assess the potential impact of environmental factors, such as temperature, humidity, and vegetation composition on insect diversity in different habitats of Raipur, Chhattisgarh(Prakhar et al., 2021)(Parikh et al., 2020). They will also analyze the presence of environmental pollutants in insects collected from these habitats to understand the potential impacts of pollution on insect populations. Overall, this research aims to provide important insights into insect diversity in different habitats of Raipur, Chhattisgarh, as well as the potential influences of pollution and habitat degradation on these populations (Mishra & Singh, 2020).

**4. DISCUSSION**

**4.1 Discussion on Habitat Variation and Species Richness**

The study's findings suggest that certain habitats in Raipur, Chhattisgarh, such as Plains Riparian and Foothills Riparian sites, have higher butterfly abundance and species richness compared to other habitats like Montane Woodland or Grassland sites (Robinson et al., 2012).These habitats may provide more favorable conditions for butterflies, regardless of weather conditions. This could be due to factors such as the availability of suitable host plants and nectar sources, as well as the presence of water bodies that serve as important breeding and feeding sites (Haneda & Panggabean, 2019)(Rahman et al., 2018).

Moreover, the study found that Foothills Riparian sites had higher butterfly species richness compared to most other habitats, indicating that these areas are particularly important for supporting a diverse range of butterfly species in Raipur. The study also highlighted the potential influence of climate on butterfly populations in Raipur(Dwari & Mondal, 2020)(Roy et al., 2013)(Paul & Sultana, 2020).

During the year with the least rainfall and highest temperatures, butterfly abundance and species richness were lower, indicating the negative impact of hot and dry conditions on butterfly populations. This suggests that climate fluctuations and extreme weather events, such as droughts, can have a significant effect on butterfly diversity in Raipur. Additionally, the study found that vegetation composition played a role in insect diversity (Gupta & Chandra, 2017)(Alisha et al., 2020)(Hatta et al., 2011).

Different types and densities of plants in a habitat can provide food sources, shelter, and breeding sites for insects, which can influence their diversity. These findings highlight the importance of habitat conservation and management in promoting insect diversity in Raipur. Overall, the study suggests that habitat variation, climate conditions, and vegetation composition all play important roles in insect diversity in Raipur, Chhattisgarh. It is important to continue monitoring and studying insect populations in different habitats to better understand their ecological dynamics and inform conservation efforts(Manhice, 2021)(Yang & Chen, 2021)(R.Kulkarni & Zade, 2020)(Chourasia et al., 2020).

**4.2 Conservation Implications for Raipur's Insect Fauna**

The findings of this study have important implications for the conservation of insect fauna in Raipur, Chhattisgarh. The presence of certain habitats, such as Plains Riparian and Foothills Riparian sites, with higher butterfly abundance and species richness highlights the importance of conserving and protecting these habitats(Arya et al., 2020)(Crespo‐Pérez et al., 2020). Furthermore, the negative impact of hot and dry conditions on butterfly populations suggests that efforts to mitigate climate change and prevent extreme weather events such as droughts can play a crucial role in preserving insect diversity in Raipur. Additionally, the influence of vegetation composition on insect diversity emphasizes the need for maintaining diverse and suitable plant communities in different habitats (Tripathi et al., 2005)(Steffan‐Dewenter & Tscharntke, 2002). Therefore, conservation efforts should focus on preserving and restoring natural habitats, promoting native plant species, and ensuring the availability of diverse food sources, shelter, and breeding sites for insects.

Furthermore, the findings underscore the importance of involving local communities in conservation efforts(Yang & Chen, 2021).By raising awareness and educating communities about the value of insects and their role in ecosystem functioning, local residents can become active participants in habitat conservation efforts(Prakhar et al., 2021)(Ryan, 2018). Furthermore, implementing sustainable agricultural practices that minimize the use of pesticides and provide habitat for beneficial insects can also contribute to maintaining insect diversity in Raipur. Mushroom cultivation in low- and middle-income settings faces challenges such as spore production and post-harvest transportation and storage (Steffan‐Dewenter & Tscharntke, 2002)(Shrestha et al., n.d).These challenges need to be addressed through innovative solutions and technology transfer from high-resource settings. To increase mushroom cultivation success in resource-constrained environments, it is crucial to develop low-cost and accessible methods for spore production and invest in appropriate transportation and storage infrastructure (Maheshwari, 2023)(Balan et al., 2022).Overall, this assessment of insect diversity in different habitats of Raipur highlights the importance of conservation efforts to protect and preserve these habitats. This highlights the need for conservation efforts to protect and preserve these habitats, as they play a crucial role in maintaining insect diversity in Raipur. Future research should focus on the specific factors influencing insect diversity in different habitats, such as vegetation structure, microclimate conditions, and the presence of host plants and predators (Baluchamy, 2023)(Sharma et al., 2020).

**5. CONCLUSION & RECOMMENDATIONS**

**5.1 Conclusion of Insect Biodiversity Survey**

The earlier study on the insect biodiversity survey in different habitats of Raipur, Chhattisgarh revealed significant variations across habitats and seasons. In terms of habitat, the study found that butterfly abundance was higher in Plains Riparian sites compared to Montane Woodland or Grassland sites(Lodh & Agarwala, 2015)(Paria et al., 2018).

Additionally, butterfly species richness was higher in Foothills Riparian sites compared to most other habitats (Paria et al., 2018)(GUPTA & Jain, 2021). These findings suggest that Plains Riparian and Foothills Riparian areas are highly suitable for butterflies in the ecosystem of Raipur, regardless of weather conditions such as rainfall and temperature. Furthermore, the study identified climate as a key factor influencing butterfly abundance and species richness (Countryside Biogeography of Moths in a Fragmented Landscape Biodiversity in Native and Agricultural Habitats, 2023)(R.Kulkarni & Zade, 2020).

During the year of least rainfall and highest temperatures, butterfly abundance and species richness were lower, indicating the substantial impact of hot and dry conditions on butterfly populations in Raipur. In addition to habitat and climate, the study found that vegetation composition also played a role in insect diversity (Koli, 2014).Different types and densities of plants in a habitat can provide food sources, shelter, and breeding sites for insects, which can influence their diversity. The study also examined the potential impact of environmental pollutants on insect populations in Raipur. However, this aspect of the research is still ongoing and the results are yet to be analyzed (Roy et al., 2013).

**5.2 Recommendations for Biodiversity Preservation in Urban Landscapes**

Based on the findings of this study, the following recommendations can be made for preserving biodiversity in urban landscapes in Raipur, Chhattisgarh:

1. Implement green infrastructure measures, such as creating green spaces, wildlife corridors, and pollinator-friendly gardens to provide habitat for insects(Kamble et al., 2022)(Chowdhury et al., 2014).

2. Implement sustainable landscaping practices that prioritize native plant species, as they provide food and shelter for native insects (Eggleton, 2020)(Arnold et al., 2019).

3. Promote the use of organic and sustainable agricultural practices in urban farming to minimize the use of pesticides and conserve insect diversity.

4. Engage local communities in educational programs and awareness campaigns to highlight the importance of insect diversity and their role in ecosystem functioning(Ibrahim & Mugiasih, 2020)(Arnold et al., 2019).

5. Encourage citizen science initiatives to involve the public in monitoring insect diversity and creating a database for further research and conservation efforts(Why We Need Insects, 2023)(Chung, 2023)(Protecting the Web of Life ESA Position Statement on Insects and Biodiversity, n.d).

Overall, it is important to recognize the value of insect diversity and its role in maintaining ecological balance in urban landscapes. By implementing these recommendations, we can ensure the preservation of insect diversity in Raipur and contribute to the overall ecological health of the region(Tuhin et al., 2023)(Khan et al., 2022)(Prakhar et al., 2021)(Riaz, 2020).

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