A Study of Avian Diversity and Student Conservation Mindset at V.H.N.S.N. College

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Abstract- This study investigates the faunal diversity and climate adaptation strategies within the V.H.N.S.N. College campus in Virudhunagar, Tamil Nadu. The study was conducted from December 2022 to December 2023, the survey identified 42 bird species spanning 26 families, highlighting the campus's significance as a diverse avian habitat. Temperature fluctuations substantially impacted bird behaviour, with cooler temperatures promoting increased activity and attracting migratory species. Site-D emerged as a critical biodiversity hotspot, accounting for 51.2% of observed species. The Shannon Diversity Index and species richness metrics indicated a well-balanced ecosystem. A student survey revealed substantial engagement with local wildlife, emphasizing the importance of practical, hands-on learning experiences for enhancing biodiversity awareness. The study underscores the need for climate adaptation measures, habitat protection, and restoration to preserve campus biodiversity. Recommendations include establishing biodiversity corridors, minimizing human interference, and implementing continuous surveillance. Integrating fieldwork and conservation activities into educational curricula will promote environmental stewardship and position the campus as a model for sustainable practices. This research contributes to the understanding of urban ecosystem dynamics and informs strategies for mitigating environmental impacts on biodiversity. The findings have implications for campus planning, conservation, and education, highlighting the potential for urban green spaces to serve as vital habitats for faunal diversity.

Key words: *Avian Biodiversity, Conservation Education, Ecosystem Balance, Species Richness and Ecological Roles*

I. INTRODUCTION

Biodiversity, encompassing ecosystem, genetic, and species diversity, is crucial for maintaining ecological balance [7,11]. India, renowned for its geomorphological diversity, harbours rich biodiversity, which is, however, declining due to rapid urbanization [9]. Understanding diversity across habitats is vital for grasping community structures, niche relationships, and identifying significant landscapes for biological preservation [13]. The global erosion of biodiversity primarily results from human activities [7,11]. Avian diversity plays a pivotal role in maintaining ecological balance, serving as a crucial component of food chains [15]. Birds are fascinating, attractive, and environmentally significant, indicating the overall health of nature and estimating natural surroundings' quality [4]. As exterminators, birds regulate insect and rodent populations, maintaining trophic levels and acting as excellent bio-indicators Urbanization, human disturbance, and habitat destruction have disrupted and reduced avian diversity [18]. However, birds continue to thrive in urban areas, performing diverse functional roles, such as seed dispersal, scavenging, ecosystem engineering, nutrient deposition, and predation. This study aims to assess and review the faunal diversity within the V.H.N.S.N. College campus in Virudhunagar, Tamil Nadu, examining animal species in relation to climate conditions and sparking student interest in fauna classification and conservation.

II.METHODOLOGY

The survey was conducted within the V.H.N.S.N. College campus in Virudhunagar from December 2022 to December 2023. The campus was divided into five sites (A-E) for data collection. Site-A comprised the Pyramid, Girls Rest Room, Staff Quarters, Administrative Block, Cage for Birds, and IT & Department of English Blocks. Site-B included the Department of Zoology, Administrative Office, Placement Cell, Canteen, Commerce, Auditorium, Girls hostel, Department of Economics, and Physics. Site-C consisted of the Department of Chemistry, Microbiology, Botany, Commerce, Library, Swimming pool, Boys Cycle shed, and Playground. Site-D housed the Department of MBA, Boys hostel, NCC, Controller office, RRC, and NSS. Site-E included the Voc Department and Gym. Virudhunagar experiences four distinct seasons: Winter (December-February), Pre-monsoon/Summer (March-May), Monsoon/Rainy (June-September), and Autumn (October-November). Winter temperatures range from 18°C to 28°C, ideal for outdoor activities. Pre-monsoon temperatures fluctuate between 35°C-40°C, reducing faunal activity. The monsoon season brings relief, with temperatures between 25°C-35°C, and increased humidity revitalizes plant and animal life. Autumn temperatures vary from 25°C-32°C, with

occasional post-monsoon showers maintaining a moist environment. Data was collected twice daily (6:00 am-9:00 am and 4:30 pm-6:30 pm) using a Samsung Galaxy F23 with a 2 MP Macro lens, Redmi Note Pro 6, and Canon PowerShot SX20. High-resolution images were taken from various angles for identification purposes. Species identification relied on online resources, including Indian Biodiversity Portal, Butterflies and Moths of India, I Naturalist, Bug Guide, Project Noah, and eBird. Diversity studies examine species richness, evenness, and ecological functions. The Shannon-Wiener Index measures community diversity, evaluating species richness and evenness [14]. The index is calculated using:

$$H' = -\sum(P_i \times \ln P_i)$$

P_i = Proportion of Individuals of species

i= Total number of species

Species evenness reflects the distribution of individuals among species. A ratio approaching 1 indicates even distribution. This concept is represented by [16].

$$c = H'/\log S$$

H'=Shannon Wiener Index

S= Number of species

N= Number of individuals in community

Species richness is the simplest measure of biodiversity, representing the total count of distinct species in a location. Complex ecosystems tend to have higher species richness due to multiple niches and interactions. Species richness is calculated using:

$$\text{Species Richness} = (S-1)/\log N$$

S= Number of species present in the community

N=number of Individuals in community

A quantitative survey (N=114) was conducted among Zoology students using Google Forms to explore their perceptions and interests regarding faunal diversity.

III.RESULT AND DISCUSSION

A biodiversity survey conducted on our campus from December 2022 to December 2023 identified 42 bird species spanning 26 families. This finding aligns with similar research in green urban or semi-urban settings [6]. The importance of preserving campus green spaces is increasingly evident as human impact on natural environments grows. The species inventory provides valuable baseline data for future biodiversity monitoring and conservation efforts. Our campus hosts a diverse array of bird species, ranging from common to rare, and serves as an important stopover point for migratory species. Temperature fluctuations significantly impact bird behaviour, with cooler temperatures (31°C to 33°C) promoting increased activity and attracting migratory species [8,19]. In contrast, high temperatures (up to 40°C) during summer compel birds to limit their activities, reducing foraging time and increasing dependence on shaded areas or water sources [19]. However, the monsoon season brings increased water availability and vegetation growth, supporting breeding and foraging activities for numerous species. Research findings reveal considerable spatial differences in biodiversity across the investigated region. Site-D stands out as the main biodiversity centre, accounting for 51.2% of the total observed faunal species. This location's exceptional species richness may be attributed to its diverse habitats, including various vegetation types, aquatic environments, and shaded areas [17]. The Shannon Diversity Index, species richness, and species evenness metrics were employed to assess species diversity on campus. The class Aves displayed significant diversity (Index: 2.194) and moderate species richness (8.08), indicating a well-balanced ecosystem [3]. However, Aves showed lower evenness scores (0.708), suggesting population disparities among species. Student interactions with local wildlife were surveyed, revealing substantial engagement, with 25.1% encountering over 10 species near campus. Practical, hands-on learning experiences, such as fieldwork, are essential for enhancing student engagement and biodiversity awareness [12,1]. To preserve and enhance campus biodiversity, habitat protection and restoration should be prioritized. Conservation strategies should incorporate climate adaptation measures and minimize human interference in ecologically sensitive zones [2]. Establishing biodiversity corridors and continuous surveillance programs are crucial for evaluating preservation initiatives and monitoring species variety [17]. Educational curricula should integrate fieldwork and practical conservation activities to improve students' understanding of classification, species recognition, and conservation methods [10]. Community science projects with student involvement can enhance data gathering while promoting awareness [5].

IV.CONCLUSION

In conclusion, our campus biodiversity survey (2022-2023) highlights the importance of preserving urban green spaces. The identification of 42 bird species across 26 families underscores the campus's significance as a diverse avian habitat. Temperature fluctuations substantially impact bird behaviour, emphasizing the need for climate adaptation measures. Site-D emerged as a critical biodiversity hotspot, accounting for 51.2% of observed species. The Shannon Diversity Index and species richness metrics indicate a well-balanced ecosystem. Fieldwork and practical conservation experiences enhance student engagement and biodiversity awareness. To preserve campus biodiversity, we recommend prioritizing habitat protection, restoration, and climate adaptation measures, as well as establishing biodiversity corridors, minimizing human interference, and implementing continuous surveillance. Integrating fieldwork and conservation activities into educational curricula will promote environmental stewardship and position our campus as a model for sustainable practices. To conserve campus biodiversity, we recommend prioritizing habitat protection and restoration in Site-D, incorporating climate adaptation measures, establishing biodiversity corridors, minimizing human interference, and implementing continuous surveillance. These strategies will mitigate environmental impacts, promote species mobility, and inform adaptive management practices, ultimately ensuring long-term biodiversity preservation.

V.SUPPLEMENTARY MATERIALS

A comprehensive dataset, including photographs, common and scientific names, families, identification keys, ecological roles, species counts, and graphic representations (bar charts, line diagrams, and pie charts), has been compiled in a doc and excel format and made available as supplementary material in a Google Drive folder:

https://drive.google.com/drive/folders/1JEQL5HinBv8NMAsYMTtvyc33OxZ5b7XV

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