

Faunal Diversity in Nhavare and Surrounding Villages of Shirur Tehsil, M/S, India

*Sharad Giramkar, Sunita Khedekar, Mahesh Joshi, Prachi Amrale, Sanika Tilekar, Rutuja Korhale, Sanskruti Oval and Yogita jagtap

Department of Zoology, Annasaheb Magar Mahavidyala, Hadpasar Pune-411028 (MS), India

*Corresponding Author

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Abstract: Nhavare village in Shirur tehsil of Pune district, Maharashtra, India, is known to its rich faunal assemblage. Biodiversity was surveyed during the rainy season in Nhavare using a standardized walking survey technique. The photographed animals were identified with taxonomic keys. There were 24 species that were observed, out of which six species belonging to the Phylum Arthropoda while 18 species belong to the Phylum Chordata. Six resident birds species were found namely: *Corvus splendens*, *Corvus culminates*, *Passer domesticus*, *Ardeola grayii*, *Milvus lineatus*, *Dicrurus macrocercus*. The ecological importance of Nhavare as an essential habitat for bird and other faunal diversity. Also diverse species of insects, arachnids, and reptiles to birds and mammals were identified such as *Apis dorsata*, *Ptyas mucosa*, and *Milvus lineatus* signifies the ecological diversity of the area. The research also emphasizes the contribution of agriculture to local biodiversity. The record of faunal diversity in Nhavare provides a baseline for future ecological monitoring and conservation management planning. The knowledge of species composition and spatial distribution can inform biodiversity conservation and management strategies. This work highlights the importance of ongoing monitoring of biodiversity, especially in rural environments that are increasingly subject to anthropogenic pressures. It is recommended to carry out further long-term studies in different seasons to compare fluctuations in species abundance and habitat choice.

Keywords: Biodiversity; Faunal Survey; Invertebrates; Nhavare; Vertebrates

I. Introduction

Biodiversity is responsible for ecological stability and sustaining ecosystems. Faunal diversity is also a critical factor as it reflects habitat quality, ecosystem health, and anthropogenic modification of the landscape [9]. Estimating species composition and distribution helps to inform ecological interactions, conservation efforts, and the implementation of sustainable management strategies [7 and 8].

Nhavare village in the Shirur taluka of Pune district, Maharashtra, is situated in the Desh area of the Western Maharashtra plateau. The region has a semi-arid climate with clear seasonal variations that affect the abundance and distribution of fauna. The land use in Nhavare is characterized by agricultural activity with scattered natural vegetation patches, resulting in a heterogeneous landscape supporting diverse taxa, such as arthropods, reptiles, birds, and mammals. Agroecosystems can play a major role in conserving biodiversity by offering foraging opportunities, nesting habitats, and shelter for a wide variety of species [3].

Research has highlighted the importance of rural landscapes in maintaining biodiversity in those regions that experience land-use change due to agricultural expansion and urbanization [5]. Little is documented, however, about faunal diversity in Nhavare. This research aims to methodically document faunal species in Nhavare village and provide insights into species richness and ecological roles. Examination of distribution patterns among various taxa will contribute to conservation efforts in biodiversity and inform sustainable land management practices in semi-arid areas.

II. Materials and Methods

Study Area: The fieldwork was conducted in the Nhavare Village of Shirur Tehsil. This area is located in Pune District of Maharashtra state. The landscape is made up of varied habitats ranging from urban to agricultural fields, wetlands, and open grasslands, which harbor numerous faunal species.

Survey Methodology: Surveys were made from February 2024 to January 2025, across three seasons: Pre-Monsoon (February to May), Monsoon (June to September), and Post-Monsoon (October to January). The survey was done by direct field observation in pre-defined transects with photographic records for identification of species. Data were collected between 7:00 am and 1:00 pm, twice during each season. A Sony Cyber-shot DSC-W230 12 MP Digital Camera with 4x Optical Zoom was utilized for photography. Identification of species was done based on standard field guides and taxonomic sources. To assess species diversity quantitatively, two ecological indices were applied: the Shannon-Wiener Diversity Index (H') and the Simpson's Diversity Index ($1 - D$). Non-invasive techniques were applied to avoid any disturbance to the wildlife. The research followed guidelines of ethics for biodiversity studies, and no specimen was collected or injured during the survey.

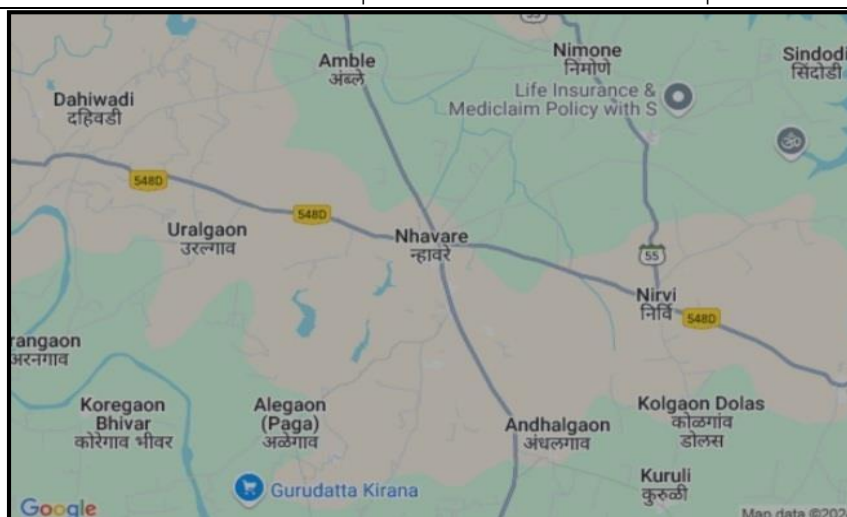


Figure 1: Google map showing Nhavare and surrounding villages

III. Result and Discussion

In the present study, a total of 24 animal species were recorded from the study area (Table 1), representing a wide range of taxa including Insecta, Arachnida, Diplopoda, Malacostraca, Reptilia, Mammalia, and Aves.

Table 1: Checklist of Animals Recorded in study area.

S/N	Class	Family	Local name	Scientific name
1	Insecta	Apidae	Small Honey bees	<i>Apis florea</i>
2			Indian Honey bees	<i>Apis cerena indica</i>
3			Rock bee	<i>Apis dorsata</i>
4		Aeshnidae	Dragon Fly	Dragon fly sp
5		Muscidae	House Fly	<i>Musca domestica</i>
6		Dolichopodidae	Long-legged Fly	<i>Condylostylus</i> sp
7		Acrididae	Grasshopper	<i>Diabolocatantops pinguis</i>
8		Curculionidae	White Broad-nosed Weevil	<i>Compsus auricephalus</i>
9	Arachnida	Uloboridae	Spider	<i>Uloborus</i>
10		Scorpionidae	Scorpion	<i>Heterometrus xanthopus</i>
11	Diplopoda	Xystodesmidae	Yellow spotted millipede	<i>Harpaphe hardening</i> sp.
12	Malacostraca	Gecarcinucidae	Freshwater Crab	<i>Barytelphusa cunicularis</i>
13	Reptile	Gekkonidae	Wall lizard	<i>Hemidactylu</i>
14		Chamaeleonidae	Chameleon	<i>Chameleon</i>
15		Elapidae	Nag	<i>Naja naja</i>
16		Colubridae	Indian rat snake	<i>Ptyas</i>
17	Mammal	Bovidae	Jersey Cattle	<i>Holstein Friesian</i>
18		Muridae	Rat	<i>Rattus rattus</i>
19	Aves	Corvidae	House crow	<i>Corvus splendens</i>
20			Jungle Crow	<i>Corvus culminatus</i>
21		Passeridae	Sparrow	<i>Passer domesticus</i>
22		Ardeidae	Indian pond heron	<i>Ardeola grayii</i>

23		Accipitridae	Black eared kite	<i>Milvus lineatus</i>
24		Dicruridae	Black drongo	<i>Dicrurus macrocercus</i>

Interpretation of Results:

Index	Value	Interpretation
Shannon-Wiener Index (H')	3.178	High diversity and evenness
Simpson's Index (1 - D)	0.958	Very high diversity, indicating low dominance by any single species

IV. Discussion

The results of the present study reveal a multi-varied collection of faunal species in Nhavare village, including members from Arthropoda, Reptilia, Aves, and Mammalia. The reported biodiversity is indicative of the ecological importance of agricultural ecosystems in maintaining diverse taxa. Other reports have indicated that semi-arid agro-ecosystems harbor important insect, bird, and small mammal microhabitats, lending stability to the ecosystem [4].

Existence of diverse insects, specifically honeybees (*Apis sp.*), dragonflies (*Dragonfly sp.*), and grasshoppers (*Diabolocatantops pinguis*), emphasizes the pollinators and primary consumers as key maintainers of trophic dynamics [11]. Diversity in the pollinator, which is an essential element to crop production as well as sustainable ecosystems, is associated with losses due to fragmentation of habitat as well as exposure to pesticides (Potts et al., 2010). The arthropod diversity seen in Nhavare implies that local farming practices sustain pollinator communities to a certain degree, although more studies are required to determine the effect of agrochemicals on insect populations.

Reptilian diversity within the study region, such as the Indian rat snake (*Ptyas mucosa*) and the Indian cobra (*Naja naja*), reflects a balanced predator-prey relationship within the ecosystem. Snakes are also important in controlling rodent populations, hence natural pest control (Whitaker & Captain, 2004). The existence of bird predators like the black-eared kite (*Milvus lineatus*) and the black drongo (*Dicrurus macrocercus*) further supports the significance of biodiversity in ensuring ecological balance (Ali & Ripley, 1983).

The research also documented six resident bird species, highlighting the ecological significance of Nhavare as a bird habitat. Birds are known as ecological indicators of habitat quality [10]. Bird species like the house sparrow (*Passer domesticus*) and jungle crow (*Corvus culminatus*) have been observed to adjust to anthropogenic alterations, but long-term observation is required to identify the impact of land-use conversion on bird populations [9]. Agricultural intensification and habitat changes have been found to result in declines in farmland bird populations worldwide, requiring biodiversity-friendly farming practices [2]. The values of Shannon-Wiener and Simpson's Diversity Index indicate a high level of species diversity and evenness within the study area. A high Shannon index suggests that the species are distributed fairly evenly, with no particular species dominating the ecosystem. Similarly, the Simpson's index value close to 1 further supports the presence of rich and balanced faunal diversity. Such a diversity profile implies a healthy and relatively undisturbed environment, supporting ecological stability and resilience. This biodiversity may be attributed to the heterogeneity of microhabitats available in the area.

V. Conclusion

The current research points towards the high faunal diversity at Nhavare and neighboring villages, which confirms the ecological value of agricultural land in supporting numerous taxa. Arthropods, reptiles, birds, and mammals are a testament to an evened ecosystem with varied ecological interactions. The research underlines the value of pollinators in maintaining agriculture productivity and that predatory species have an important role to play in the maintenance of trophic balance. With the growing anthropogenic pressures on rural ecosystems, there is an immediate need to adopt conservation-driven agricultural practices supporting habitat heterogeneity and sustainability of biodiversity. Monitoring of ecosystems in the long term is a necessity to evaluate the effects of environmental changes on fauna populations and evolve effective conservation mechanisms. Seasonal dynamics of species composition and examination of the effects of land use changes on dynamics of biodiversity must be the focal areas of research in the coming years. The results of this research can provide useful inputs for biodiversity conservation practices in the semi-arid regions and bring attention to applying combined land management methods balancing crop production with ecosystem protection.

Ethical Approval Statement

This study did not require ethical approval as it did not involve human participants or animal experimentation. The research was conducted following all applicable ethical guidelines and regulations.

Conflict of Interest

The authors declare that there are no conflicts of interest.

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