**Urbanization and Faunal Diversity: A Systematic Checklist of Animal Species in Kharadi-Wagholi, M/S, India.**

**Abstract**:

Urbanization greatly changes biodiversity by changing natural habitats, affecting species composition, and disturbing ecological balance. The current research records the faunal diversity of the Kharadi-Wagholi area in Pune District, Maharashtra state, which is a region with fast developmental activities. Field surveys were carried out from February 2024 to January 2025, including Pre-Monsoon, Monsoon, and Post-Monsoon seasons. Species identification was made using systematic transect walking, visual sighting, and photographic recording, and it was based on standard taxonomic guides. There were 68 species that were recorded and belonged to several taxonomic groups. Out of them, 29 species from 23 families belonged under Phylum Arthropoda, and 35 species from 30 families belonged to Phylum Chordata. Diversity in avifauna was very rich, with 21 species of birds recorded, signifying the region's contribution toward sustaining urban fauna. Insects showed greatest diversity, especially during the monsoon, reflecting seasonal changes in species richness. The scarcity of amphibians and reptiles indicates habitat fragmentation, pollution, and reduced water sources as potential limitations on their populations. The results highlight the necessity for biodiversity conservation efforts in rapidly urbanizing environments. Conservation of green spaces, restoration of native habitats, and incorporating ecological aspects into urban planning are necessary to maintain biodiversity. The study generates baseline data that will be used for future ecological evaluation and conservation planning so that urbanization follows an environmental sustainable pattern.

**Keywords**: Biodiversity; Conservation; Faunal Diversity, Habitat; Kharadi-Wagholi; Urbanization

**Introduction:**

Study area Kharadi-Wagholi is located in the eastern portion of Pune city (18.5515° N, 73.9500° E), has witnessed tremendous urbanization in the last decade or so, where the land-use pattern shifted from a predominantly agrarian setup to one dominated by industrial, residential, and commercial developments. Such development resulted in dramatic alterations of local biodiversity by way of habitat fragmentation, contamination, and escalating anthropogenic pressure. Urbanization is one of the main causes of ecological alterations globally, frequently causing species composition change, local extinctions, and fauna homogenization (McKinney, 2002). As cities grow, natural habitats are being substituted by built-up areas, which change the resource availability for different organisms and result in loss of biodiversity (Elmqvist et al., 2013; Aronson et al., 2014).

Urban landscapes do, however, offer new habitats for some species that have been found to be adaptable to human-altered environments. Some birds, insects, and small mammals have been found to survive in urban areas, taking advantage of artificial resources and altered ecological niches (Marzluff, 2001; Shochat et al., 2006). Conversely, habitat-dependent species, such as amphibians and reptiles, tend to decline as a result of pollution, water shortage, and loss of breeding habitats (Hamer & McDonnell, 2008). The trade-off between urban growth and biodiversity conservation is essential, as urban ecosystems contribute to maintaining ecological processes like pollination, nutrient cycling, and pest control (Alberti, 2005).

Past studies have highlighted the value of evaluating urban biodiversity to aid in sustainable development and conservation (Savard et al., 2000). The current study seeks to record faunal diversity in the fast-developing Kharadi-Wagholi area with an emphasis on species richness for various taxonomic groups. In developing a systematic checklist of species, this work offers baseline data for future ecological monitoring and planning for conservation.

**Materials and Methods:**

**Study Area:**

The fieldwork was conducted in the Kharadi-Wagholi area of Pune District, Maharashtra. The landscape is made up of varied habitats ranging from urban to agricultural fields, wetlands, and open grasslands, which harbor numerous faunal species. Economic activities here vary from agriculture and poultry to IT services, leading to habitat fragmentation.

**Survey Methodology:**

Field surveys were conducted from February 2024 to January 2025, covering three seasons: Pre-Monsoon (February to May), Monsoon (June to September), and Post-Monsoon (October to January). The survey method involved direct field observations along predefined transects, with photographic documentation for species identification. Observations were recorded between 7:00 am and 1:00 pm, twice per season. A Sony Cyber-shot DSC-W230 12 MP Digital Camera with 4x Optical Zoom was used for capturing images. Species identification was carried out using standard field guides and taxonomic references. Non-invasive methods were employed to ensure minimal disturbance to wildlife. The study adhered to ethical guidelines for biodiversity research, and no specimens were collected or harmed during the survey.

**Results:**
There were 68 species that were recorded in the study area and belonged to several taxonomic groups. Out of them, 29 species from 23 families belonged under Phylum Arthropoda, and 35 species from 30 families belonged to Phylum Chordata. Diversity in avifauna was very rich, with 21 species of birds recorded, signifying the region's contribution toward sustaining urban fauna. Among these, insects were the most abundant, followed by arachnids, amphibians, reptiles, birds, and mammals.

**Table 1: Checklist of Animals Recorded in study area.**

| **Sr. No.** | **Class** | **Family** | **Local name** | **Scientific name** |
| --- | --- | --- | --- | --- |
| 1 | Insecta | Apidae | Small Honey bees | *Apis florea* |
| 2 | Giant Honey bees | *Apis dorsata* |
| 3 | Carpenter bees | *Xylocopa* |
| 4 | Coccinellidae  | Fungus-eating Ladybird  | *Illeis galbula*  |
| 5 | Nymphalidae  | Common crow butterfly  | *Euploea core*  |
| 6 | Pieridae | Common yellow butterfly  | *Eurema*  |
| 7 | Mantidae | Green Praying mantis | *Mantis spp 1* |
| 8 | Yellow stick praying mantis | *Mantis spp 2* |
| 9 | Blattidae | Cockroach | *Periplaneta americana* |
| 10 | Termitidae | Termites | *Mastotermes spp* |
| 11 | Meloidae | Blister beetle | *Hycleus* |
| 12 | Vespidae | Wasp  | *Vespula vulgaris* |
| 13 | Gryllidae | House cricket nymph | *Acheta domesticus* |
| 14 | Coreidae | Leaf footed bug | *Mictis* |
| 15 | Chrysopidae | Green lacewing | *Nothancyla verreauxi* |
| 16 | Acentropinae | Pond moth | *Hygraula nitens*  |
| 17 | Ululodes | Owlfly Larva | *--* |
| 18 | Gerridae | Water striders | *--* |
| 19 | Arachnida | Uloboroidae | Spider | *Uloborus* |
| 20 | Araneidae | Spider | *Cyclosa* |
| 21 | Hersiliidae | Spider | *Hersilia* |
| 22 | Thomisidae | Yellow stripe spider | *Thomisus* |
| 23 | Pholcidae | Daddy longleg spider | *Crossopriza* |
| 24 | Buthidae  | Little black scorpions | *Orthochirus bicolor* |
| 25 | The Indian red scorpions | *Mesobuthus tamulus tamulus* |
| 26 | Scorpionidae | The Indian red scorpions | *Hottentotta pachyurus* |
| 27 | Asian Forest Scorpion | *Heterometrus xanthopus* |
| 28 |  |  | *Indian black scorpion* | *Deccanometrus phipsoni* |
| 29 | Chilopoda | Scolopendridae | Gom | *Scolopendra* |
| 30 | Malacostraca | Potamidae  | Asian freshwater Crab  | *Nanhaipotamon*  |
| 31 | Lobsters | *Panulirus spp* |
| 32 | Prawn | *Macrobrachium spp* |
| 33 | Amphibia | Ichthyophiidae | Limb-less amphibia | *Ichthyophis spp* |
| 34 | Bufonidae | Toads | *Bufo spp* |
| 35 | Ranidae | Beddome's frogs | *Indirana spp* |
| 36 | Bull frogs | *Sphaerotheca spp* |
| 37 | Dicroglossidae | Fork-tongued frogs | *Limnonectes spp* |
| 38 | Reptilia | Gekkonidae  | Wall Lizard  | *Hemidactylu*  |
| 39 | Chamaeleonidae  | Chameleon  | *Chameleon*  |
| 40 | Colubridae | Indian rat Snake | *Ptyas* |
| 41 | Elapidae | Cobra | *Naja naja* |
| 42 | Aves | Corvidae | House Crow | *Corvus splendens* |
| 43 | Jungle Crow | *Corvus culminatus* |
| 44 | Passeridae | Sparrow | *Passer domesticus* |
| 45 | Cuculidae | Asian Koel | *Eudynamys scolopaceus* |
| 46 | Ploceidae | Baya Weaver | *Ploceus philippinus* |
| 47 | ~~Dicruridae~~ | ~~Black Drongo~~ | *~~Dicrurus macrocercus~~* |
| 48 | Accipitridae | Black-eared Kite | *Milvus lineatus*  |
| 49 | Sturnidae | Brahminy Starling | *Temenuchus pagodarum* |
| 50 | Common Myna | *Acridotheres tristis*  |
| 51 | Aicedinidae | White-throated Kingfisher  | *Halcyon smyrnensis* |
| 52 | Apodeidae | Swift | *Apus* |
| 53 | Ardeidae | Indian Pond Heron | *Ardeola grayii* |
| 54 | Medium Egret | *Egretta intermedia* |
| 55 | Dicruridae | Black Drongo | *Dicrurus macrocercus* |
| 56 | Ashy Drongo | *Dicrurus leucophaeus* |
| 57 | Meropidea | Little green bee eater | *Merops orientalis* |
| 58 | Nectariniidae | Purple Sunbird | *Cinnyris asiaticus* |
| 59 | Motacillidae | White Wagtail | *Motacilla alba* |
| 60 | Podicipedidae  | Little Grebe  | *Tachybaptus spp* |
| 61 | Phalacrocoracidae | Little Cormorant | *Phalacrocorax spp* |
| 62 | Ardeidae | Great Egrets | *Ardea alba* |
| 63 | Threskiornithidae | Glossy Ibis | *Plegadis spp* |
| 64 | Mammalia | Bovidae | Jersey Cattle | *Holstein Friesian*  |
| 65 | Bovidae | Buffalo | *Buffalo spp* |
| 66 | [Muridae](https://en.wikipedia.org/wiki/Muridae)  | Rat | *Rattus rattus* |
| 67 | Canidae  | Common Dogs | *Canis spp* |
| 68 | Gray Wolf | *Canis lupus* |

**Discussion:**

The findings of this study highlight the impact of urbanization on faunal diversity in the Kharadi-Wagholi region. A total of 68 species were recorded, with a notable representation of arthropods and chordates. The dominance of insects, particularly during the monsoon season, suggests a direct correlation between seasonal variations and species richness. Similar trends have been reported in earlier research, with growing humidity and vegetation cover during the monsoon seasons promoting insect populations (Bharti & Sharma, 2020). The existence of varied arthropod fauna, with pollinators like *Apis dorsata* and *Apis florea*, highlights the ecological value of preserving green cover areas in urban environments (Potts et al., 2016). Variety of spiders are observed and recorded in the studied area. Spiders are potential biological indicators of natural habitats as they play a role in the balance of nature (Sharad Giramkar 2023).

Avifaunal diversity in the area was high, with 21 bird species occurring. Birds are known as ecological indicators of habitat quality (Sharad Giramkar et al., 2024).The occurrence of urban-adaptive species like the house crow (*Corvus splendens*) and common myna (Acr*idotheres tristis*) indicates the ability of some bird species to adapt despite habitat changes. Despite this, the capture of habitat-specific birds such as the baya weaver (*Ploceus philippinus*) and little grebe (*Tachybaptus spp*.) is a sign of remaining wetland and grassland habitats that are in need of conservation efforts. The threats to urbanization caused by deforestation, pollution, and wetland destruction have in the past been attributed to reduced bird populations within cities (Aronson et al., 2014).

Amphibians and reptiles were comparatively less common in the study, with few species being recorded. This finding is consistent with earlier findings that habitat fragmentation, pollution, and decreases in water bodies severely affect populations of amphibians (Hamer & McDonnell, 2008). The lack of some reptilian species, including big snakes and lizards, indicates either a decrease as a result of habitat destruction or behavioral avoidance of city life. Conservation efforts must focus on restoring habitat, including water sources and vegetation corridors, to augment declining herpetofaunal populations (Gibbons et al., 2000).

The occurrence of mammalian species like the gray wolf (*Canis lupus*) and buffalo (*Buffalo spp*.) is remarkable, indicative of the neighborhood of semi-rural settings to urbanization. While domesticated animals are to be expected in human-altered ecosystems, the presence of wild canids indicates the importance of sustainable urban development to avoid human-wildlife conflict (Bateman & Fleming, 2012). Loss of biodiversity caused by urbanization can be countered with preemptive actions like afforestation, wetland protection, and community wildlife monitoring programs (McKinney, 2002).

This research presents baseline information regarding faunal diversity in Kharadi-Wagholi, which can be used as a starting point for future conservation activities. Adoption of environmentally friendly urban planning strategies like green corridors, restoration of native plants, and pollution abatement can help preserve biodiversity amidst urbanization. The results highlight the need to incorporate ecological thought into city development policies to achieve a sustainable balance between urban development and biodiversity conservation.

**Conclusion**:

 Urbanization remains a key agent of habitat change, resulting in faunal diversity shifts. This research identifies the resistance of some species while also pointing to the susceptibility of others to habitat fragmentation and environmental degradation. The high avifaunal and insect diversity reflect the ecological importance of the Kharadi-Wagholi area, but the sparse occurrence of amphibians and reptiles points to possible ecological stress. Conservation efforts like habitat restoration, sustainable urban design, and community engagement are key in reducing loss of biodiversity. Long-term monitoring and evaluation of the success of conservation interventions must be the subject of future studies to ensure an equilibrium ecosystem within urbanizing environments.

**References:**

1. Alberti, M. (2005). The effects of urban patterns on ecosystem function. *International Regional Science Review*, 28(2), 168-192. <https://doi.org/10.1177/0160017605275160>
2. Aronson, M. F., La Sorte, F. A., Nilon, C. H., Katti, M., Goddard, M. A., Lepczyk, C. A., ... and Winter, M. (2014). A global analysis of the impacts of urbanization on bird and plant diversity reveals key anthropogenic drivers. *Proceedings of the Royal Society B: Biological Sciences*, 281(1780), 20133330. <https://doi.org/10.1098/rspb.2013.3330>
3. Bateman, P. W., and Fleming, P. A. (2012). Big city life: carnivores in urban environments. *Journal of Zoology*, 287(1), 1-23. <https://doi.org/10.1111/j.1469-7998.2011.00887.x>
4. Bharti, H., and Sharma, S. (2020). Seasonal variations in insect biodiversity: A case study from an urban ecosystem in India. *Journal of Insect Conservation*, 24(5), 789-805. <https://doi.org/10.1007/s10841-020-00244-7>
5. Elmqvist, T., et al. (2013). Urbanization, biodiversity, and ecosystem services: Challenges and opportunities. *Springer.* DOI: <https://doi.org/10.1007/978-94-007-7088-1>
6. Gibbons, J. W., Scott, D. E., Ryan, T. J., Buhlmann, K. A., Tuberville, T. D., Metts, B. S., ... and Winne, C. T. (2000). The global decline of reptiles, déjà vu amphibians. *BioScience*, 50(8), 653-666. [https://doi.org/10.1641/0006-3568(2000)050[0653:TGDORD]2.0.CO;2](https://doi.org/10.1641/0006-3568%282000%29050%5B0653%3ATGDORD%5D2.0.CO;2)
7. Hamer, A.J., and McDonnell, M.J. (2008). Amphibian ecology and conservation in urban environments. *Conservation Biology*, 22(5), 120-130. DOI: <https://doi.org/10.1111/j.1523-1739.2008.00966.x>
8. Marzluff, J. M. (2001). Worldwide urbanization and its effects on birds. *Avian Ecology and Conservation in an Urbanizing World*, 19, 1-18. <https://doi.org/10.1007/978-1-4615-1531-9_1>
9. McKinney, M.L. (2002). Urbanization, biodiversity, and conservation. *BioScience*, 52(10), 883-890. DOI: [https://doi.org/10.1641/0006-3568(2002)052[0883:UBAC]2.0.CO;2](https://doi.org/10.1641/0006-3568%282002%29052%5B0883%3AUBAC%5D2.0.CO;2)
10. Potts, S. G., Imperatriz-Fonseca, V., Ngo, H. T., Aizen, M. A., Biesmeijer, J. C., Breeze, T. D., ... and Viana, B. F. (2016). Safeguarding pollinators and their values to human well-being. *Nature*, 540(7632), 220-229. <https://doi.org/10.1038/nature20588>
11. Savard, J. P. L., Clergeau, P., & Mennechez, G. (2000). Biodiversity concepts and urban ecosystems. *Landscape and Urban Planning*, 48(3-4), 131-142. [https://doi.org/10.1016/S0169-2046(00)00037-2](https://doi.org/10.1016/S0169-2046%2800%2900037-2)
12. Sharad Giramkar (2023). Checklist of animal diversity in Pirangut of Mulshi Thsil, M/S, India. *Dogo Rangsang Research Journal*, 14(2), 316-320.
13. Sharad Giramkar, Anju Mundhe and Mahesh Joshi 2024. Fauna of Annasaheb Magar Mahavidyalaya Hadapsar Campus Pune, M/S, India. *Journal of Emerging Technologies and Innovative Research,* 11(3), 673-677.
14. Shochat, E., Warren, P. S., Faeth, S. H., McIntyre, N. E., & Hope, D. (2006). From patterns to emerging processes in mechanistic urban ecology. *Trends in Ecology & Evolution*, 21(4), 186-191. <https://doi.org/10.1016/j.tree.2005.11.019>