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Assessment of Wild Mushroom Presence in Urban Roadside Habitats of Ghazipur Across Two Surveys at Varying Disturbance Levels

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Abstract: ***With rapid urban expansion, pressure, and anthropogenic activities, it is crucial to understand their impact on the presence and sustainability of wild mushrooms. So, this study was to investigate how seasonal variation, levels of anthropogenic activity and disturbance affect wild mushrooms. The present study focused on roadside sites located in the urban landscape of Ghazipur district in Uttar Pradesh. In this study, two surveys were conducted, the first in October 2024 and the second in March 2025, across six sites. There was considerable variation in human activity and disturbance across locations, with some sites experiencing high levels, some low, and some moderate. The results obtained during both surveys were noted systematically. The results showed that, out of a total of six sites, mushrooms were not present at two sites during the second survey, while they were present at four. Findings suggest that wild mushrooms maintain their presence despite disturbances and anthropogenic activities. Further research is needed to understand how pollution influences the growth and viability of wild mushrooms.***

Keywords: wild mushrooms, urban disturbance, seasonal variation, anthropogenic activity, roadside habitats

1.Introduction

Mushrooms show great diversity in their structure, colour, and texture along with their Physical aspects and chemical composition. About 10,000 mushroom types have been identified in the past hundreds of years [2]. Mushrooms are not only food with health benefits beyond basic nutrition for humans but also an excellent means of income and valuable active ingredients [3]. These wild mushrooms, which are a fungal group, thrive in different types of environments, such as grasslands, forests, and urban areas. Without negatively impacting the environment, they can be used as a superfood even in adverse conditions [4]. If we take a cursory look at the world, we find that the consumption of mushrooms is high in India, Japan, and China. At the same time, mushrooms are being traded all over the world, and their demand is increasing in Africa, the Middle East, and the Americas as well [5]. Wild mushrooms are beneficial because they are rich in carbs, amino acids, and minerals [6]. Tribal people engage with wild mushrooms both as a source of food and as a means of financial support, reflecting a beautiful and meaningful relationship between themselves and the wild mushrooms [7].

Soni *et al*. (2024), in their study on wild mushrooms of Mizoram, concluded that, despite the existence of many types of wild mushrooms, there is a significant lack of indigenous knowledge among the locals. Additionally, due to reported cases of poisoning from wild mushrooms, people are afraid to consume them [8].

Ghazipur district has a much larger rural area compared to its urban area, although some urban areas also exist in the district. There are three Nagar Palika Parishads in the Ghazipur district, which are Nagar Palika Parishad Muhammadabad, Nagar Palika Parishad Zamania and Nagar Palika Parishad Ghazipur, respectively. Additionally, there are also 5 Nagar Panchayats in the district [1]. This study was conducted in Nagar Palika Parishad Ghazipur. One of the main objectives of the study was to assess the presence of wild mushrooms across different seasons and varying levels of human activity and disturbance.

2.Materials and Methods

2.1. Study area

This study was conducted in the Nagar Palika Parishad, Ghazipur region of Ghazipur district, which is a key urban region of Ghazipur district. The region comprised both urban and semi-urban areas. There were different types of vegetation, dead organic matter, and varying levels of anthropogenic disturbance along the roadsides. A total of six roadside locations were selected for this study: one was a public garden, one a busy intersection, two were near a historical building, and two were quiet areas with low human activity and disturbance where wild mushrooms were present. All six sites were classified into three categories based on observed levels of human activity and disturbance: high, moderate, and low.

2.2. Survey Period

Two systematic surveys were conducted at these six selected roadside locations. The first survey was conducted in October 2024, during the post-monsoon season in this region. The second survey was conducted in March 2025, during the transition from late winter to early spring in this region.

There was an interval of approximately five months between the two roadside surveys. The primary objective was to assess whether mushrooms were still present at the

selected locations after this period. For each species found, photographs were taken, and their location and date were recorded in a notebook on the spot.

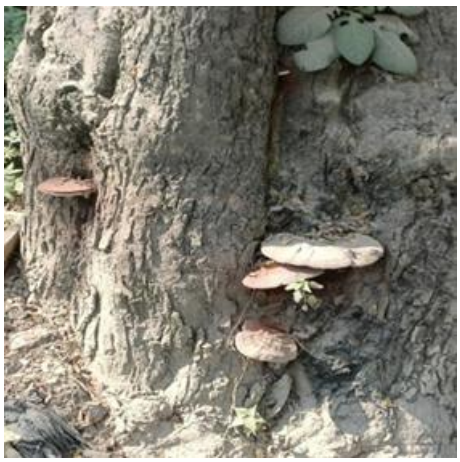
Table 1: Presence or Absence of Wild Mushrooms Across Different Sites During Two Surveys

Location	Description of Site	Specific Description	Level of Human Activity	Level of Disturbance	Presence of Wild Mushrooms in Survey 1 (Oct 2024)	Presence of Wild Mushrooms in Survey 2 (Mar 2025)
Site 1	A busy intersection, Peernagar	Heavy traffic	High	High	Yes	Yes
Site 2	A public park, Gorabazar	Managed public park	High	High	Yes	Yes
Site 3	Near a historical building	Tomb of Lord Cornwallis.	Moderate	Moderate	Yes	Yes
Site 4	Near a historical building, Lord Cornwallis Tomb.	Tomb of Lord Cornwallis.	Moderate	Moderate	Yes	No
Site 5	Quiet area near Police line.	Roadside habitat with minimal human disturbance	Low	Low	Yes	No
Site 6	Quiet area, Mohanpurwa	Roadside habitat with obscured mushroom presence	Low	Low	Yes	Yes

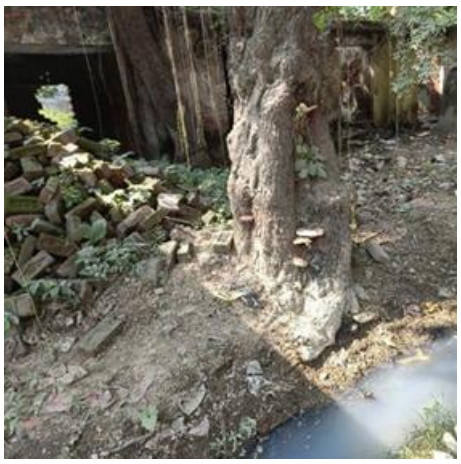
3.Results

3.1. Site 1: A busy intersection, Peernagar

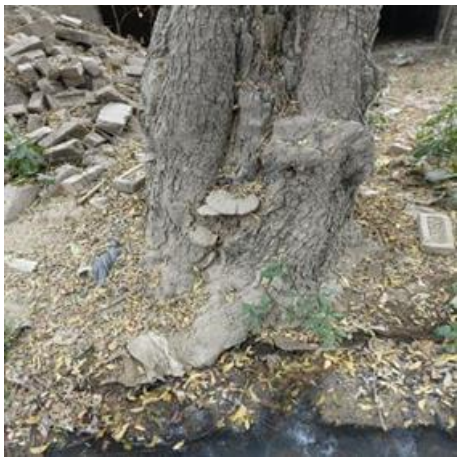
Mushrooms were recorded during both surveys: the first survey conducted in October 2024 and the second survey conducted in March 2025. However, the site was located near one of the busiest intersections in the municipal area, and there was also a college nearby. This location experienced heavy daily traffic and high human activity. The persistence of mushrooms for such a long time in a typically disturbed area is an interesting finding. The evidence shows that wild mushrooms can grow even in highly disturbed and polluted environments. Photographs 1a and 1b were taken in October 2024, while photographs 2a and 2b were taken in March 2025.



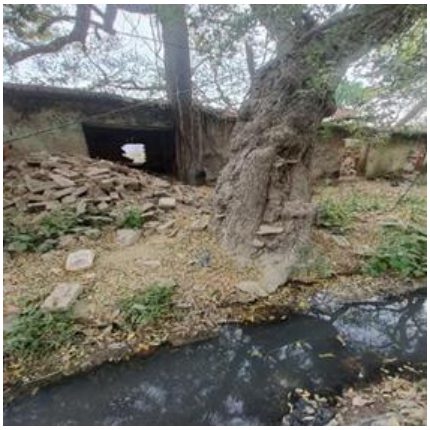
Photograph 1a: October 2024-View 1



Photograph 1b: October 2024-View 2



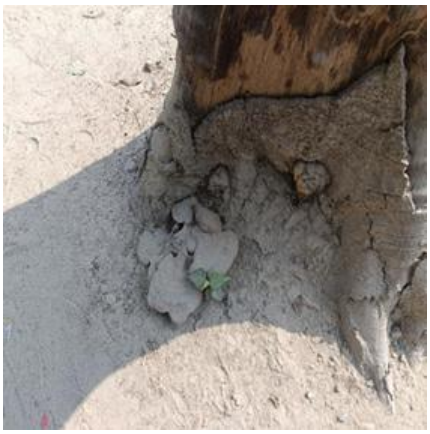
Photograph 2a: March 2025-View 1



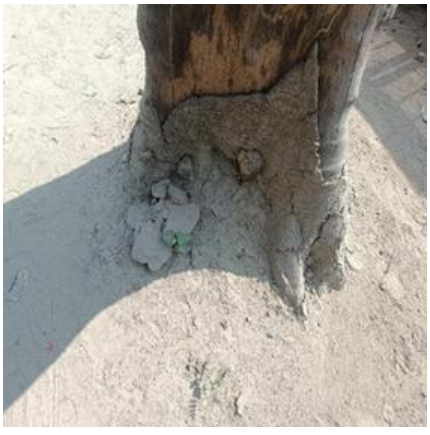
Photograph 2b: March 2025-View 2

3.2. Site 2: A Public Park, Gorabazar

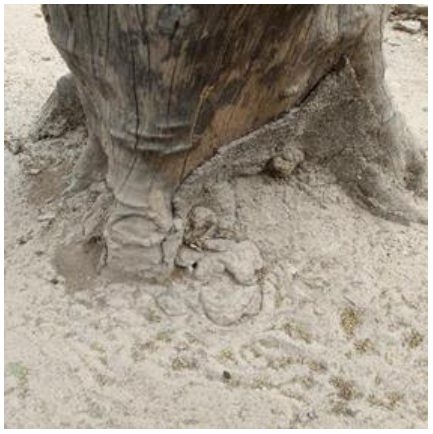
The presence of mushrooms was recorded in both surveys, the first in October 2024 and the second in March 2025. The location of this site is very close to a public park and road, resulting in constant human activity and other types of disturbances like maintenance work, dust, and garbage, which may affect the growth of wild mushrooms. Despite all these pressures, mushrooms were still making their presence felt even after five months. Findings also indicate that, since it is near a public garden, children, young people, and the elderly would have been spending time there. No one harmed it, which shows that the local people are aware of these natural resources and the environment and actively protect them. Photographs labelled 3a and 3b were shot in October 2024, while photographs 4a and 4b were shot in March 2025.



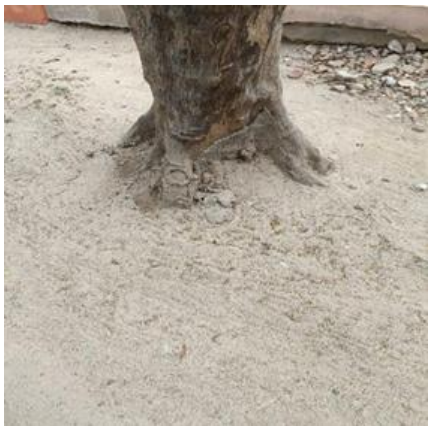
Photograph 3a: October 2024-View 1



Photograph 3b: October 2024-View 2



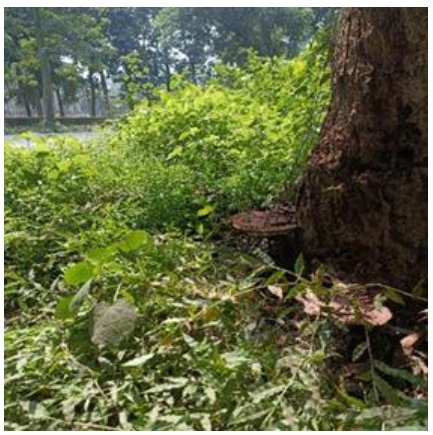
Photograph 4a: March 2025-View 1



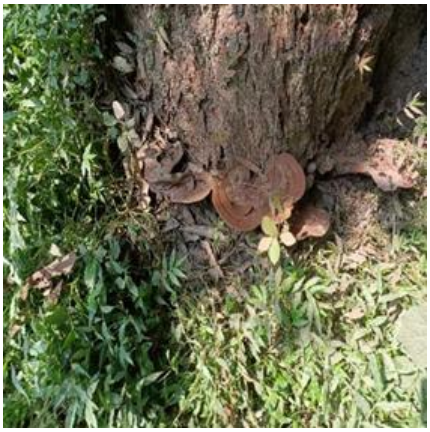
Photograph 4b: March 2025-View 2

3.3. Site 3: Near a historical building i.e., Lord Cornwallis Tomb.

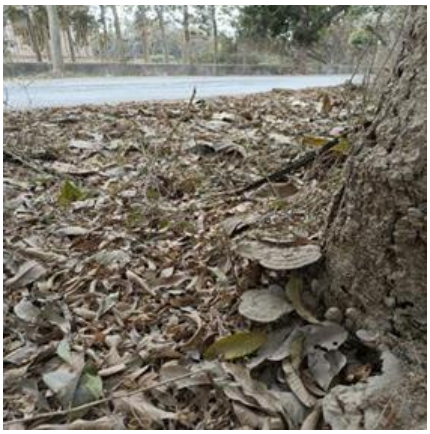
The survey confirmed the presence of mushrooms at Site 3 during both the initial survey in October 2024 and the subsequent survey in March 2025. Site 3 was near the historical Tomb of Lord Cornwallis. The presence of mushrooms in both surveys highlights that the habitat at this site was capable of supporting mushroom growth, despite moderate levels of human activity and disturbance. The findings also indicate that moderate levels of human activity and disturbance do not significantly impact the presence of mushrooms. Photographs labelled 5a & 5b correspond to the first survey, October 2024, while images 6a & 6b were captured in March 2025.



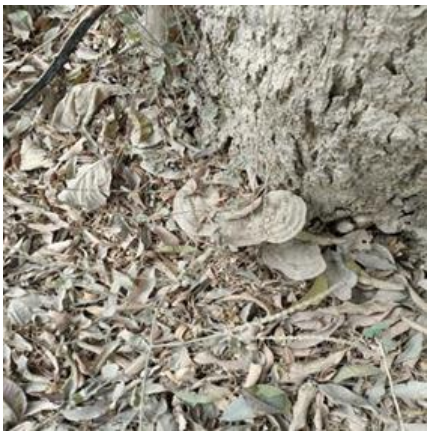
Photograph 5a: October 2024-View 1



Photograph 5b: October 2024-View 2



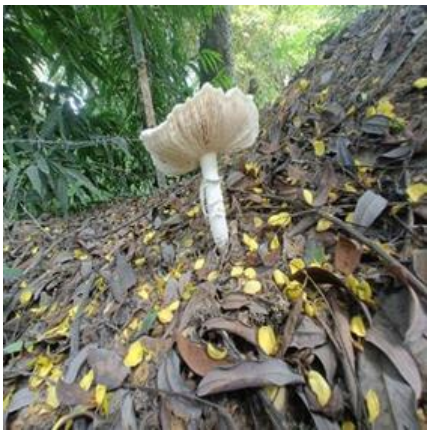
Photograph 6a: March 2025-View 1



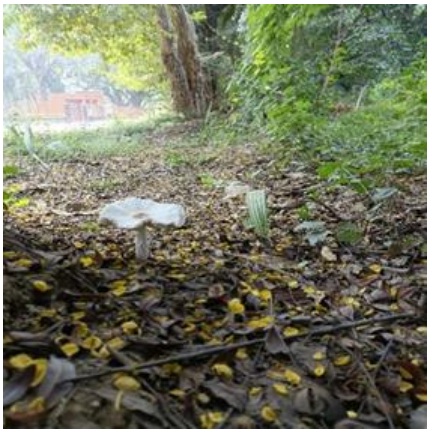
Photograph 6b: March 2025-View 2

3.4. Site 4: Close to the historic Lord Cornwallis Tomb.

Site 4, which is adjacent to Site 3, had a gilled mushroom present during the first survey (October 2024), but it was absent during the second survey (March 2025). This site also experienced moderate levels of human activity and moderate levels of disturbance. The presence of gilled mushrooms in the month of October suggests that post-monsoon conditions are favorable for their growth, while their absence in March also indicates that dry and less humid environments are not suitable for this type of gilled mushroom. However, there was moderate human activity and a moderate level of disturbance, which may also be responsible for the absence of these gilled mushrooms. The photographs marked 7a-View 1 and 7b-View 2 were taken during the October 2024 survey.



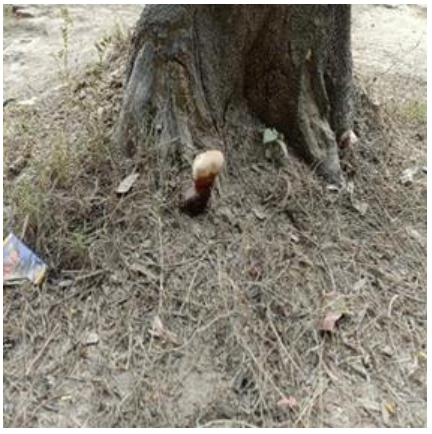
Photograph 7a: October 2024-View 1



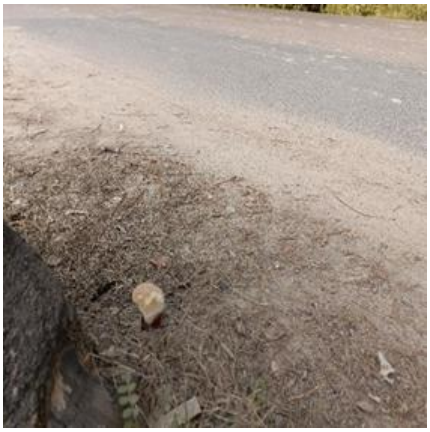
Photograph 7b: October 2024-View 2

3.5. Site 5: Quiet area, Police line.

At site 5, during the first survey, which was conducted in October 2024, the mushroom was present, but it was absent during the second survey, which was conducted in March 2025. Here, both the level of human activity and disturbance were low, yet the presence of the mushroom was not recorded in the second survey, which could be due to some factors. As the mushroom was easily visible and close to the road, it may have been mechanically damaged by free-ranging animals and vehicles passing close to the road. Photographs labelled 8a and 8b were captured in October 2024.



Photograph 8a: October 2024-View 1

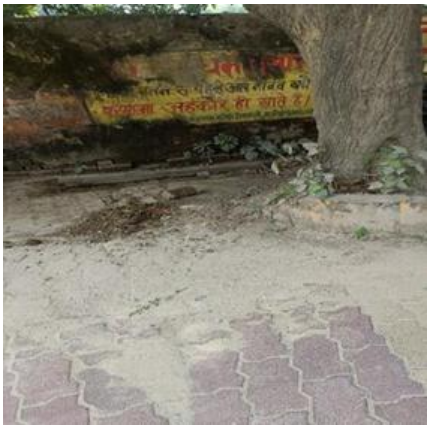


Photograph 8b: October 2024-View 2

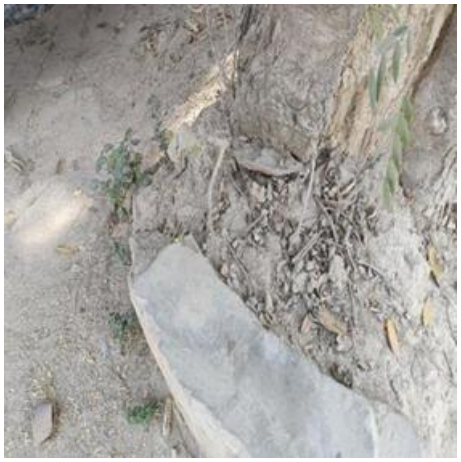
3.6. Site 6: Quiet area, Mohanpurwa

Site 6 was in Mohanpurwa, a quiet area with low levels of disturbance and human activity. The presence of a mushroom was recorded during both surveys conducted in October 2024 and March 2025. Due to the low human activity, low levels of disturbance, and obscured visibility, the mushroom was growing well without any problems. This suggests that even in a roadside habitat, wild mushrooms can thrive in quiet areas with limited disturbance, human activity, and visibility, providing a safe and favorable environment for them. Photographs labeled 9a and 9b were taken during the first survey in October 2024, whereas images 10a and 10b were taken in March 2025.

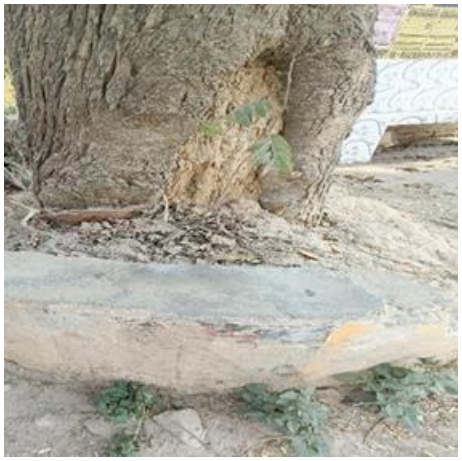
Photograph 9a: October 2024-View 1



Photograph 9b: October 2024-View 2



Photograph 10a: March 2025-View 1



Photograph 10b: March 2025-View 2

4.Conclusion

Wild mushrooms were found at a variety of sites, ranging from busy intersection to quiet areas, their presence in environments with a range of disturbance and human activity shows their adaptability. Only two out of six sites failed to record the presence of mushrooms in the second survey: Site 4, with moderate levels of human activity and disturbance, and Site 5, with low levels of human activity and disturbance. Roadside habitats can serve as a great refuge for wild mushrooms in this region. Future research should focus on the assessment of the impact of pollution on the growth and survival of wild mushrooms.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgment

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