

## Species

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# Diversity of macro-fungi reported from selected region of parner tehsil (m.s), India

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## ABSTRACT

Before this study nobody reported the diversity of macro-fungi from Parner tehsil. The present study report the variety of fungi (mycoflora) present in the selected study area of the Parner tehsil. For the correct identification, substratum habit diversity was examined. All species were collected from different locations and different substratum like decayed wood, dead wood, trees, soil, debris, etc. In the selected study area, 28 species of macro-fungi collected from 16 different families and 22 different genera. Seven species reported from family Agaricaceae. Three species were found in found in study area from both families Psathyrellaceae and Hymenochaetaceae. All the fungi belonged to the division Basidiomycota. The present study concluded that the Parner tehsil have great diversity of macro-fungi. Highest diversity of mushrooms was found in monsoon season. In this article, live photographs of macro-fungi collected from study area was provided for avoiding confusion in identification.

**Keywords:** Fungal diversity, Mushrooms, Morphological identification, Parner, Hanga River.

## 1. INTRODUCTION

Fungi play an essential function in forest ecosystems, they have unique diversity but they received less attention than animal and plants. Fungi have a significant impact on human and their environment (Corbu et al., 2023). Fungi have been applied in various sectors like agriculture, pharmaceutical, food and beverage industries, bioremediation, natural recycling, and biofertilizers (Seb & Ajungla, 2018). Mushrooms belongs from the phyla Basidiomycota and Ascomycota which produce large fruiting bodies and have large structures that can see without the aid of a microscope (Patel & Patel, 2022), While Ascomycota are mostly small fungi, some large fungi include cap mushrooms, morels, and truffles. Basidiomycota is a larger group that includes mushrooms, toadstools, scaffold mushrooms, polypores, and wormballs, although about 30% of its species are microscopic (Razaq et al., 2014).

Mushrooms are rich sources of essential mineral nutrients, potassium, phosphorus, magnesium, calcium, iron, zinc, copper, selenium, and manganese, and

their carbohydrate content includes polysaccharides like chitin,  $\beta$ -glucans, glycogen, trehalose, mannitol, as well as dietary fiber (Apostilia et al., 2025). Mushrooms are rich in bioactive compounds such as Psilocin, Baeocystin, Fomannosane, Lactarane, Cuparene, Ergostane, Gallic acid, chalcone and flavanone, etc. which are used in standard drugs for the treatment of various diseases and maintained human health (Inamdar et al., 2023). Chang and Buswell (1996) reported that mushrooms are used as anti-inflammatory, anti-cholesterol, and anti-hemorrhagic agent (Chang & Buswell, 1996).

Fungus has utilized as food and medicines, just like other living organisms. The natural beauty of macro-fungi attracted human beings (Tripathi, et al., 2017 & Zhao et al., 2023). Umbrella-shaped mushrooms, and toadstools growing on soils forming 'fairy rings' has always attraction of human beings (Kane, 2023).

Macro-fungi like puffballs, mushrooms, and bracket fungi, play a crucial role in nutrient cycling, decomposition, and symbiotic associations. With its diverse geography and climate zones, Maharashtra provides a rich habitat for macro-fungi. Some studies conducted between 2015 and 2025 have recorded the diversity, ecological functions, and regional characteristics of macro-fungal species throughout Maharashtra (Panwar & Gehlot 2020). The survey carried out by Panwar & Gehlot 2020 are reported as one of the earliest systematic surveys during this period, in the forests of North Maharashtra. Their study stated a rich assemblage of macro-fungi dominated by saprophytic, and wood-decaying species, suggesting their important role in forest floor nutrient turnover. Sridhar & Karun recorded the economic, and ecological value of macro-fungi in the Deccan Plateau region. They recorded a variety of edible, medicinal, and wood-decomposing fungi. They also highlighting the specific habitats where these fungi can be found, and focusing the region's largely underexplored potential for mycological and bioprospecting (Sridhar & Karun, 2019). The significant contributions to the knowledge of macro-fungi in the Western Ghats region of Maharashtra. Through their field surveys, they are documented numerous species of mushrooms, bracket fungi, and puffballs. Several taxa were recorded for the first time in these areas, broadening the known biogeographical distribution of various genera (Ranadive et al., 2011). The ecological Role, and variety of macro-fungi in North Maharashtra (Kshirsagar & Borde et al, 2025).

The chapter named "Ecology of Macro-fungi in Southwest India" discusses the extensive diversity of macro-fungi found in the Western Ghats, particularly in Maharashtra, highlighting termitomycetes, coprophilous, ectomycorrhizal, and fungi associated with mangroves (Sridhar, 2023).

During the Roman ancient era, people are familiar with edible, non-edible or poisonous mushroom. Ommen 2009 described many edible and poisonous mushrooms from Europe. India, with its diverse climatic, and ecological regions shows highest fungal diversity. In India is approximately 14,000 species of fungi are found in India, including around 2,000 species are recognized as edible and medicinal mushrooms (Manoharachary et al., 2005). Due to diverse climatic and ecological zones in India, hosts a rich variety of fungi.

Mushroom diversity in India has explored in different agro-climatic zones. Studies from Kerala, Maharashtra, and Uttarakhand reveal that many local species, including *Termitomyces*, *Amanita*, *Boletus*, and *Ganoderma*, have both ecological and economic value (Sarma, 2021; Manna & Roy, 2012). In Maharashtra, numerous wild edible mushrooms such as *Astraeus hygrometricus*, *Termitomyces clypeatus*, and *Schizophyllum commune* have been documented in tribal forest areas like Melghat, and Satpuda (Hande & Shelke, 2024).

Large region of mushroom diversity in India remains unexplored, especially in the region that not thoroughly surveyed including central India, North-eastern states, and the Andaman and Nicobar Islands. There is an increasing necessity for integrative strategies that merge field surveys, molecular identification, and ecological modeling to record the mushroom diversity found in India thoroughly. This study aimed to discover and report diversity of macro-fungi from selected study area. This research will be helpful for the identification, collection, and planning strategies regarding macro-fungi.

## 2. MATERIALS AND METHODS

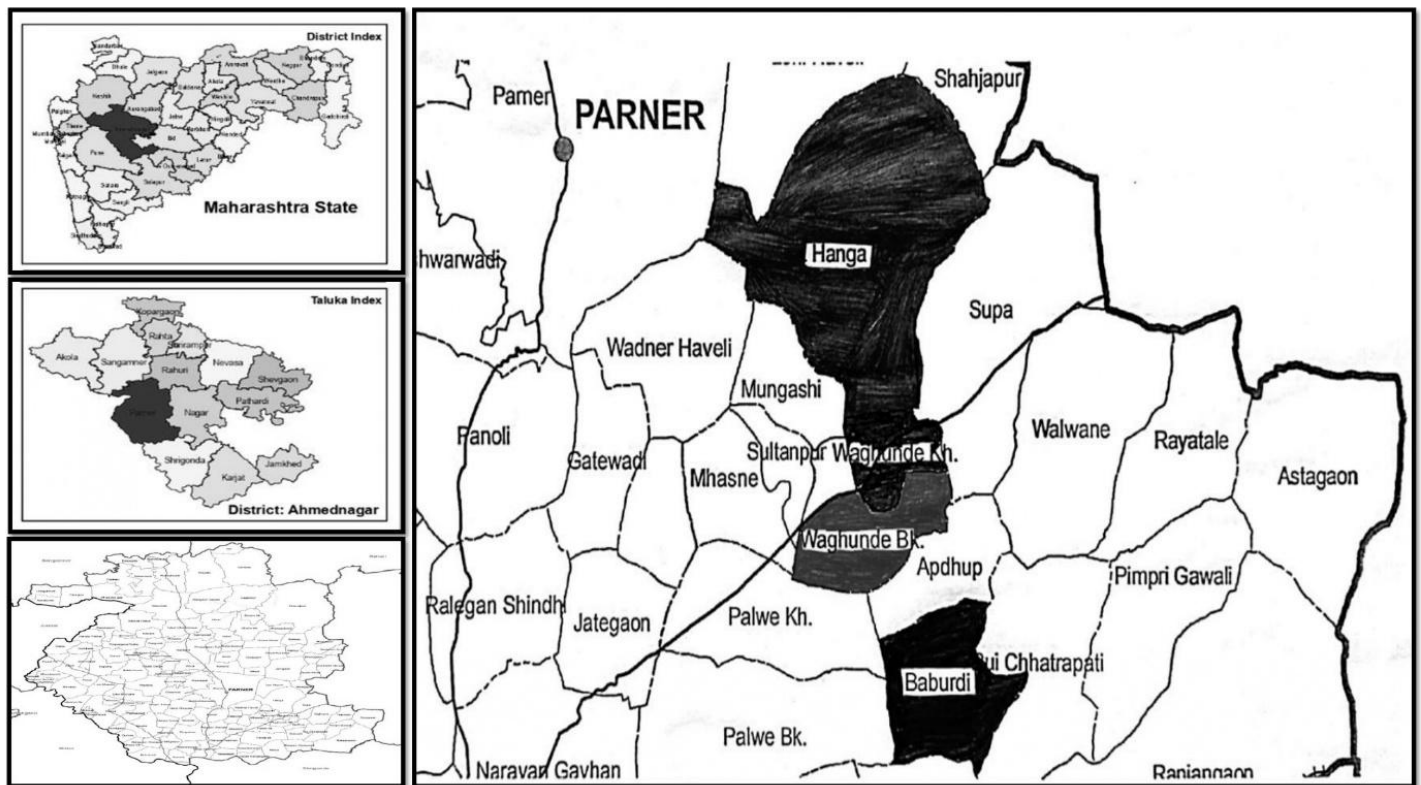
### 2.1. Selection of Study Area

For the further study, the study area was selected near to the region of Hanga River, Parner Tehsil, Dist. Ahilyanagar (M.S.), India. Hanga (18.979391°N 74.500773°E), Waghunde Bk (19.003° N 74.438° E), Waghunde Kh. (18.9529° N and 74.5142° E) and Baburdi (18.638°N 74.637°E) (Fig. 1) locations were selected for collection.

### 2.2. Data Collection

The data collection was done from selected study area. The survey of selected study area was carried out between June to December 2024. During the survey live specimen as well as photographs of observed specimen was collected. The highest species were observed

during June to August 2024. The fungal specimen was collected from 46 different locations of four different villages in Parner tehsil. Due to Hanga River, the highest biodiversity of living organisms was observed in the selected study area (fig.1).



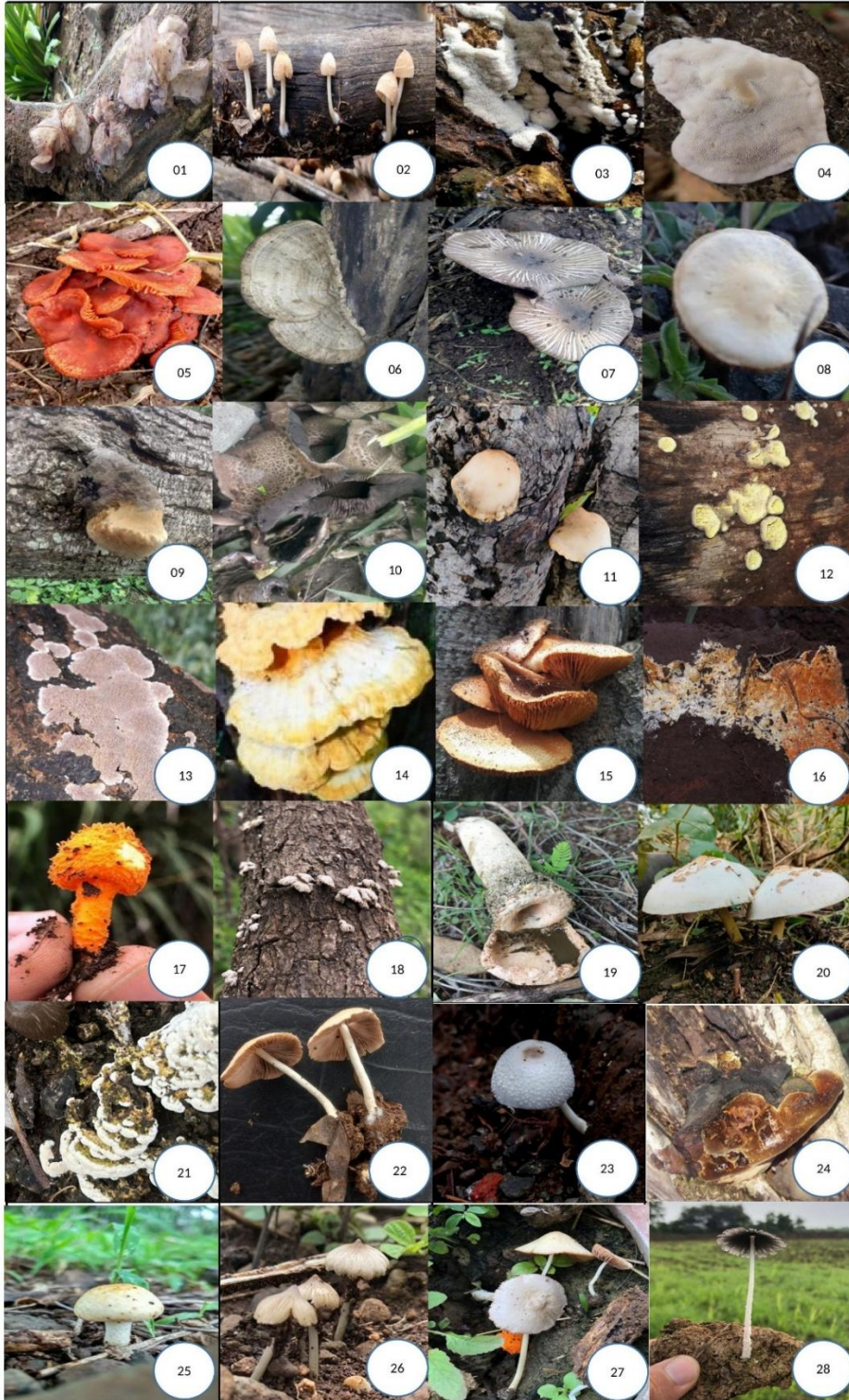
**Figure 1.** The study area (four different villages in Parner tehsil)

### 2.3. Identification of Collected Specimen:

For correct identification, standard morphological characteristics were carefully observed and recorded. Mushrooms are easily identified with the help of their morphological characteristics like habit, habitats, shape, structure, color, cap shape, gills, stipe, sporocarp, and fruiting body, etc., after observe all characteristics, matched with previously published research articles, monographs, Index Fungorum database (<https://www.indexfungorum.org>).

## 3. RESULTS AND DISCUSSION

In this study, 28 macro-fungi species collected from study area and morphological identified (Fig. 2) with the help of their visible characteristics like colour of fruiting bodies, Cap structure, Cap size, habitat, gills shape, gills colour, Stipe and ring presence or absent, shape and size of stipe. Due to cosmopolitan nature of fungi, the occurrence of mushrooms are everywhere. Among all of the observed species, genus *Agaricus* were show the highest species frequency is 14.28 while Genus *Phellinus* and *Coprinopsis* shows 7.14 species frequency (Table 1). Remaining other genus shows 3.57 respectively. Outcomes of this study is to help in the collection and morphological identification of mushrooms in the region of Hanga, Waghunde Bk., Waghunde Kh., and Baburdi (Fig. 1). This research helpful for designing innovative strategies to maintain richness and ecological importance of macro-fungi. Similar study was conducted by Powar et al.,2021 in Karjat Tehsil Ahmadnagar district, where 36 species of macro-fungi reported from selected study area, in his observations, Agaricales is most dominant order.



**Figure 02:** 01: *A. auricular-judae*; 02: *M. galericulata*; 03: *T. mollusca*, 04: *P. stiptica*; 05: *O. olearius*; 06: *F. ellipsoidea*; 07: *Agaricus moelleri*; 08: *A. endoxanthus*; 09: *P. pomaceus*; 10: *A. perobscurus*; 11: *C. volvatus*; 12: *P. aureus*; 13: *S. fimbriatum*; 14: *L. sulphurous*; 15: *F. velutipes*; 16: *P. flavidoalba*; 17: *A. crocopleus*; 18: *S. commune*; 19: *P. impudicus*; 20: *M. procera*; 21: *O. populinus*; 22: *C. asiaticus*; 23: *L. cepistipes*; 24: *P. robustus*; 25: *C. indica*; 26: *M. albuminosa*; 27: *C. mycasius*; 28: *C. lagopus*.

Table 1: List of Macro-fungi found in the study area

Sr. No	Image id	Specimen name	Common name	Family	Substratum
1.	17	<i>Agaricus crocopeplus</i> Berk. & Broome.	Golden Fleece Mushroom	Agaricaceae	soil
2.	08	<i>Agaricus endoxanthus</i> Berk. & Broome	Kaschampignon	Agaricaceae	Soil
3.	07	<i>Agaricus moelleri</i> . Wasser	Inky Mushroom	Agaricaceae	Soil
4.	10	<i>Agaricus perobscurus</i> Kerrigan	Princess	Agaricaceae	soil
5.	01	<i>Auricularia auricula-judae</i>	Jew's ear, Jelly ear	Auriculariaceae	Trees
6.	25	<i>Calocybe indica</i> Purkay. & A. Chandra	Milky mushroom	Lyophyllaceae	soil
7.	22	<i>Candolleomyces asiaticus</i> M.Asif, A.Izhar, Niazi & Khalid sp. nov.	-	Psathyrellaceae	Soil
8.	28	<i>Coprinopsis lagopus</i> (Fries) Redhead, Vilgalys & Moncalvo	Hare's foot Inkcap	Psathyrellaceae	soil
9.	27	<i>Coprinopsis mycasius</i> (Bull.:Fr.) Vilgalys, Hopple & Jacq. Johnson	gray shag	Psathyrellaceae	soil
10.	11	<i>Cryptoporus volvatus</i> (Peck) Shear	Veiled polypore	Polyporaceae	trees
11.	15	<i>Flammulina velutipes</i> (Curtis) Singer	Velvet foot; Winter mushroom	Physalacriaceae	Trees
12.	06	<i>Fomitiporia ellipsoidea</i> B.K. Cui & Y.C. Dai	Shelf fungi	Hymenochaetaceae	dead woods
13.	14	<i>Laetiporus sulphureus</i> (Bull.) Murrill	sulphur shelf	Fomitopsidaceae	Trees
14.	23	<i>Leucocoprinus cepistipes</i> (Sowerby) Pat.	onion-stalk parasol	Agaricaceae	Trees
15.	26	<i>Macrolepiota albuminosa</i> (Berk.) Pegler	termite mushroom	Agaricaceae	soil
16.	20	<i>Macrolepiota procera</i> (Scop.) Singer	parasol mushroom	Agaricaceae	soil
17.	02	<i>Mycena galericulata</i> (Scop.) Grey	rosy-gill fairy helmet	Mycenaceae	Trees
18.	05	<i>Omphalotus olearius</i> (DC.) Singer	jack-o'-lantern mushroom	Omphalotaceae	dead woods
19.	21	<i>Oxyporus populinus</i> (Schumach.) Donk	mossy maple polypore; poplar bracket	Schizoporaceae	Trees
20.	19	<i>Phallus impudicus</i> L.	Stinkhorn	Phallaceae	Soil
21.	09	<i>Phellinus pomaceus</i> (Baumg.) Niemelä	Heart rot of plum	Hymenochaetaceae	Trees
22.	24	<i>Phellinus robustus</i> (P.Karst.) Bourdot &	Polypore robuste	Hymenochaetaceae	Trees

		Galzin			
23.	16	<i>Phlebiopsis flavidoalba</i> (Cooke) Hjortstam	Phanero- chaete	Phanerochaetacea e.	dead woods
24.	04	<i>Postia stiptica</i> (Pers.) Julich	Bitter Bracket	Fomitopsidaceae	dead woods
25.	12	<i>Pseudomerulius aureus</i> (Fr.) Jülich	Gulden Plooiivlies	Tapinellaceae	dead woods
26.	18	<i>Schizophyllum commune</i> Fr.	split-gill mushroom	Schizophllaceae	Trees
27.	13	<i>Steccherinum</i> <i>fimbriatum</i> (Pers.) J.Erikss.	geveerde raspzwam	Steccherinaceae	dead woods
28.	03	<i>Trechispora mollusca</i> (Pers.)Liberta	Pyramide-vathinde	Sistotremataceae	dead woods

#### 4. CONCLUSION

During the field visit of the selected study area, 28 species of macro-fungi were collected and recorded from 46 locations. The rich fungal biodiversity was first time recorded from Parner tehsil. From the observed species in this study, some are bio-indicators for the different diversity zones. Some of them found rarely, and some of them found in abundant population. Mushrooms are most neglected natural resource that help to improve human health. Macfro-fungi have medicinal as well as ecological importance but lack of knowledge macro-fungi avoided by local people. This study will be helpful to create awareness about mushrooms to the local peoples belongs from selected study area.

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#### Authors contributions

Survey, field visit, photographs and data collection was done by Pratiksha, Jadhav.

Data analysis, specimen identification, Manuscript writing was done by Riyaj, Inamdar.

Manuscript writing and final revision was done by Narayan, Ghangaonkar, Ravindra, Deshmukh.

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#### Conflict of Interest

The authors declare that there are no conflicts of interests.

#### Informed consent

Not applicable.

#### Ethical approval & declaration

All ethical guidelines recommended by Maharashtra State Biodiversity Board Government of Maharashtra for plant and plant material collection are followed in the study for sample collection and identification.

#### Data and materials availability

All data associated with this study are present in the paper. All represented data in current research was real and authenticated.

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