The Pharma Innovation Journal 2022; 11(6): 1847-1850

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(6): 1847-1850

www.thepharmajournal.com
Received: 22-03-2022
Accepted: 28-04-2022

Jitender Sharma
Division of Plant Pathology, Sher-e- Kashmir University of Agricultural Sciences and Technology of Jammu, Chatha, Jammu and Kashmir, India

Sachin Gupta
Division of Plant Pathology, Sher-e- Kashmir University of Agricultural Sciences and Technology of Jammu, Chatha, Jammu and Kashmir, India

Amrish Vaid
Division of Plant Pathology, Sher-e- Kashmir University of Agricultural Sciences and Technology of Jammu, Chatha, Jammu and Kashmir, India

Ranbir Singh
Division of Plant Pathology, Sher-e- Kashmir University of Agricultural Sciences and Technology of Jammu, Chatha, Jammu and Kashmir, India

Moni Gupta
Division of Biochemistry, Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu, Chatha, Jammu and Kashmir, India

Corresponding Author:
Jitender Sharma
Division of Plant Pathology, Sher-e- Kashmir University of Agricultural Sciences and Technology of Jammu, Chatha, Jammu and Kashmir, India

Morphological characterization of wild edible fungi collected from district Kathua of Jammu region

Jitender Sharma, Sachin Gupta, Amrish Vaid, Ranbir Singh and Moni Gupta

Abstract
Regular field trips were conducted during the years 2018 to 2021 for the collection of wild edible fungi from Jammu region. Collection forays were more frequent during the months of July-August. Three wild edible fungi were identified after morphological characterization as *Laccaria* sp., *Ganoderma lucidum*, *Agaricus* sp. Collected wild edible fungi were observed morphologically and other phenotypic parameter noted in fresh form. During present investigation their habit, habitat, texture, colour and various morphological features such as pileus, stipe, ring, volva and veil were observed. The collected fruit bodies were found to be of different colours like light brown in *Laccaria* sp., brown to reddish brown in *Ganoderma lucidum*, yellowish white in *Agaricus* sp. The ring was only present in *Agaricus* sp. However, veil and volva was lacking in all three wild edible fungi.

Keywords: Morphological characterization, wild edible fungi

Introduction
In the earlier times, mushrooms were collected from their natural growing habitats, but with the passage of time, several attempts have been made to domesticate mushrooms under controlled conditions. The number of mushroom species on the Earth is estimated at 150,000 and of which only 10 per cent have been identified. Wild edible mushrooms are the special product of the forest. The diversity of mushroom and their natural beauty are facing a major threat in the biological world and India has been a frame for these fungi. Describing the number of fungi on earth has been a position of conversation and several studies have focused on enumerating the world's fungal diversity (Crous, 2006) [1]. Only a part of total fungal wealth has been subjected to scientific study and mycologists continue to untangle the unknown and hidden wealth. One third of fungal diversity of the globe exists in India and of this merely 50 percent are characterized (Manoharachary *et al*., 2005) [2]. Wild edible mushrooms are commonly found in different habitat such as grasslands, forests, mountains, agricultural lands, soil, manure of domesticated animals, decomposing leaves and rotting logs of trees during the onset and middle part of rainy season. The best way to preserve these high demand edible macrofungi is through understanding the ecology of mushroom, identifying cultivation parameters, domesticating and exploring the importance of each species through research. Most species are saprobic and hence have the potential to be cultivated. The diversity of climatic conditions prevalent in Jammu region makes it a natural habitat of a large number of mushroom species. Therefore, the aim of present work is to explore the diversity of wild edible mushrooms from this region and morphological characterization of collected mushrooms.

Material and Methods
Regular field trips were conducted during the years 2018 to 2021 for the collection of wild edible fungi from the selected sites. Collection forays were more frequent during the months of July-August. During the survey, healthy and fresh sporocarps were removed carefully from the ground with the help of digging knife. Field photographs of the specimens were taken in their natural habitat and their habit, habitat, texture, colour and various morphological features *viz*. shape and dimensions of pileus and stipe were recorded. For colour terminology, Ridgeway (1912) [3] was followed. Thereafter, the samples were carefully placed in brown paper bags and each sample was labeled with specific code in order to avoid any confusion and mixing of samples. In the laboratory, these samples were dried at 60°C in hot air oven and preserved at 4 °C (Yesil *et al*., 2004) [4].

Table 1: Collection of wild edible fungi from Jammu region

Sample No.	Genus and species	Locality	GPS Data			Single/ groups	Habitat
			Longitude	Latitude	Altitude		
J-19-20-50	*Laccaria* sp.	Mangyar (Kathua)	75°47'52.6"E	32°41'39.2"N	2000 m	Single	Scattered in grasses
J-19-20-51	*Ganoderma lucidum*	Mangyar (Kathua)	75°48'09.5"E	32°41'37.7"N	2000 m	Single and in groups	Wooden stumps
J-19-20-54	*Agaricus* sp.	Mangyar (Kathua)	75°47'56.6"E	32°41'39.3"N	2000 m	Single	Humicolous soil

Macro-morphological details

Following important macroscopic characters and features of wild edible fungi (Atri *et al.*, 2005) [5] were carefully noted at the time of collection which proved helpful in the identification of mushroom species:

- Habit: Solitary, Scattered, Gregarious, Caespitose
- Pileus: Size, Shape, Colour, Scaly, Powdery, Dry, Wet, Sticky, Marginal characters (enrolled, plicate, uplifted) etc.
- Hymenium: Gills, Pores, Teeth
- Stipe: Size, Shape, Colour, Position, Smooth/Scaly, Striated/Fibrillose, Dry/Viscid, Solid/Hollow
- Lamellae: Attachment (free, adnexed, decurrent, sub-decurrent), Spacing (crowded, distant, sub-distant), Colour, Equal/Unequal, Colour changes, etc., if any
- Context: Colour, Consistency, Colour change on cutting and bruising, etc., if any
- Presence or absence of annulus or volva
- Other important taxonomic characters noted in the field were:
- Taste and odour
- Presence and absence of latex

Results

In present study, wild edible fungi were collected from their natural habitats during March-April and July-August. Three wild edible fungi were identified after morphological characterization *viz*; *Laccaria* sp., *Ganoderma lucidum*, *Agaricus* sp. Detailed morphological characters of collected mushrooms are presented in Table 1 and Table 2 and described below:

Table 2: Morphological characters of wild edible fungi collected from Jammu region

Genus and species	Pileus				Stipe			Ring Present/ absent	Volva present/ absent	Veil present/ Absent
	Colour	Diameter (cm)	Shape	Scales	Central/ lateral	Colour	Diameter and length (cm)			
Laccaria sp.	Light brown	3-4	Depressed with a umbo	Nos	Central	Light brown	0.4 and 3.5-5	Absent	Absent	Absent
Ganoderma lucidum	Brown to reddish brown	4.5-6	Reniform	No	Lateral	Brown to reddish brown	0.5-1and 9-12	Absent	Absent	Absent
Agaricus sp.	Yellowish white	5	Convex	Light brown	Central	White	0.4 and 8	Present	Absent	Absent

1. Sample No: J-19-20-50
Scientific Name: *Laccaria sp.*

Taxonomic Observations

Carpophore 6 cm in height. Pileus up to 3.5 cm in diameter, surface dry, depressed with a broad umbo; margin irregular; cuticle half peeling; flesh light brown to brown, unchanging on exposure, up to 0.2 cm thick; odor mild. Lamellae free, subdistant to crowded, narrow; gill edges smooth. Stipe central, 3.5 to 5 cm long, 0.4 cm broad, concolorous with pileus; latex not exuded and no colour change on bruising, equal in diameter throughout, soild, surface smooth; annulus absent; volva absent.

Growth Habit: Collected during July-August Season from coniferous forest, habit agaricoid, growing solitary or scattered in grasses receiving ample sunlight.

Collection Examined: Jammu and Kashmir, Kathua, Banni, Mangyar (2000 m), GPS co-ordinates (75°47'52.6"E; 32°41'39.2"N), Date of collection: August 23, 2019.

2. Sample No: J-19-20-51
Scientific Name: *Ganoderma lucidum*

Taxonomic Observations

Carpophore 10 to15 cm in height. Pileus 4.5 to 6 cm in diameter, reniform; surface dry, brown to reddish brown; margin regular; cuticle not peeling; flesh white to creamish, unchanging on exposure, up to 1 cm thick; no odor. Lamellae absent, lower surface covered with dense pores. Stipe lateral, 9 to 12 cm long, 0.5 to 1 cm broad, concolorous with pileus; latex not exuded and no colour change on bruising, distinctly bulbous, soild, surface smooth; annulus absent; volva absent.

Growth Habit: Collected during July-August Season from coniferous forest, habit polyporoid, growing in groups of 2 to 5 on tree stumps or decaying wood in shady areas.

Collection Examined: Jammu and Kashmir, Kathua, Banni, Mangyar (2000 m), GPS co-ordinates (75°48'09.5"E; 32°41'37.7"N), August 23, 2019.

3. Sample No: J-19-20-54
Scientific Name: *Agaricus* sp**.**

Taxonomic Observations

Carpophore up to 9 cm in height. Pileus up to 5 cm in diameter, surface dry; convex with a pale patch over umbo; scales light brown and appressed over the yellowish white background, scales more dense towards the center; margin irregular, splitting at maturity; cuticle half peeling; flesh white, unchanging on exposure, up to 0.4 cm thick; taste and odor mild. Lamellae free, crowded, narrow, smooth, light brown.

Fig 1: Morphological and microscopic features of *Laccaria* sp., *Ganoderma lucidum*, *Agaricus* sp. A,D and G: Dorsal side of basidiocarp; B,E and H: : Ventral side of basidiocarp; C,F and I: Basidiospores

Stipe central, 8 cm long, 0.4 cm broad, white, no colour change on bruising, equal in diameter throughout, solid; annulus simple; volva absent.

Growth Habit: Collected during July-August Season from coniferous forest, habit agricoid, growing solitary on humicolous soil in shady and moist places.

Collection Examined: Jammu and Kashmir, Kathua, Banni, Mangyar (2000 m), GPS co-ordinates (75°47'56.6"E; 32°41'39.3"N), August 23, 2019.

Discussion

The results are in accordance with the findings of Kumar *et al*. (2013) [6], they studied 15 wild edible mushroom species from Nagaland. The macroscopic characters like shape, size, color, texture, attachment of stipe, smell, spore print, habit, and habitat was documented for *Pleurotus pulmonarius*, *Schizophyllum commune*, *Hypsizygus tessulatus*, *Agaricus arvensis*, *Agaricus langei*, *Auricularia auricula-judae*, *Lepista irina*, *Cantharellus cibarius Lactarius hygrophoroides*, *Lepiota magnispora*, *Cookeina sulcipes*, *Lepiota lilacea*, *Panus fulvus*, *Melanoleuca grammopodia* and *Boletus aestivalis.* Semwal *et al.* (2014) [8] also described in detail the morphological characteristics of 23 species of mushrooms. The characterized species spread over in following genera *Amanita*, *Agaricus*, *Astraeus*, *Hericium*, *Macrolepiota*, *Morchella*, *Pleurotus*, *Termitomyces Auricularia*, *Cantharellus*, *Sparassis*, *Lactarius*, *Ramaria* and *Russula.* Rahaman *et al.* (2016) [7] also recorded morphological observations such as cap, gills, stalk, veil, spores, growth of 16 species of mushrooms belong to 10 genera under 8 families. The predominant genera were *Volvariella*, *Coprinus*, *Hypholoma* and *Coprinellus*. Furthermore, one species of each of *Gymnopilus purpuratus*, *Agaricus silvicola*, *Lepiota cristata*, *Marasmius oreades*, *Mycena californiensis* and *Termitomyces heimii* were recorded.

Conclusion

In present study, wild edible fungi were collected from their natural habitats during March-April and July-August. Three wild edible fungi were identified after morphological characterization *viz*; *Laccaria* sp., *Ganoderma lucidum*, *Agaricus* sp., The collected fruit bodies were found to be of different colours like light brown in *Laccaria* sp., brown to reddish brown in *Ganoderma lucidum*, yellowish white in *Agaricus* sp. The ring was only present in *Agaricus* sp. However, veil and volva was lacking in all three wild edible fungi. These wild edible fungi are under serious threat as their natural habitat has been disturbed. Hence, it has become necessary to scientifically document and characterize the wild edible fungi that are slowly vanishing. Further investigations are required to unveil the macrofungal diversity that may provide better understanding on the species diversity of these wild edible fungi.

References

1. Crous PW. How many species of Fungi are there in tip of Africa? Studies in Mycology. 2006;55:13.
2. Manoharachary C, Sridhar K, Singh R, Adholeya A, Suryanarayanan TS, Rawat S, *et al*. Fungal biodiversity: Distribution, conservation and prospecting of fungi from India. Current Science. 2005;89(1):58-71.
3. Ridgeway R. Color Standards and Color Nomen-clature

(Washington). Ridgeway Color Standards and Color Nomenclature, 1912.
4. Yeşil OF, Yıldız A. Contributions to the macrofungi flora of Batman Province. Fırat Üniversitesi Fen ve Mühendislik Bilimleri Dergisi. 2004;16(1):11-16.
5. Atri NS, Kaur A, Kour H. Wild mushrooms - Collection and Identification. National Research Centre for Mushrooms (ICAR) NRCM, Chambaghat, Solan, 2005.
6. Kumar R, Tapwal A, Pandey S, Borah, RK, Borah D, Borgohain J. Macro-fungal diversity and nutrient content of some edible mushrooms of Nagaland, India. Nusantara Bioscience. 2013;5(1):1-7.
7. Rahaman M, Aminuzzaman FM, Hossain MB, Rashid SN, Rumainul MI. Biodiversity, Distribution and Morphological Characterization of Mushrooms in the South Western Region of Bangladesh. International Journal of Advanced Research. 2016;4(3):60-79.
8. Semwal KC, Stephenson SL, Bhatt VK, Bhatt RP. Edible mushrooms of the Northwestern Himalaya, India: a study of indigenous knowledge, distribution and diversity. Mycosphere. 2014;5(3):440-461.