

Ethno mycological Study of Wild Edible Mushrooms of Jammu and Kashmir

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Abstract

The state of Jammu and Kashmir has the largest concentration of forest dwellers, comprising of about one-fourth of the population of the state. Several tribes and villagers subsist largely on non-traditional and wild food sources especially wild edible mushrooms. Limited information, however, is known about ethno mycology of macrofungi in India, in general, and Jammu and Kashmir, in particular. Therefore, ethnomycological survey was carried out in various locations of Jammu and Kashmir state in order to develop a database on mushroom diversity and their traditional uses. In this study, forty four wild mushrooms which are actually consumed in the state and are distributed in twenty genera have been recorded to have various potentialities. These include *Agaricus* spp., *Boletus* spp., *Clavaria* sp., *Clavulina* spp., *Coprinus* spp., *Geopora* spp., *Gyromitra* spp., *Helvella* spp., *Macrolepiota* sp., *Morchella* spp., *Otidea leporina*, *Peziza* spp., *Pleurotus* spp., *Ramaria* spp., *Rhizopogon* spp., *Russula* sp., *Sepultaria* spp., *Sparassis* spp., *Termitomyces* spp. and *Verpa* sp.. Their descriptive vocabulary and folk taxonomy, edibility status, traditional drying and preservation, culinary potential, common beliefs and traditions etc. have been highlighted in this paper. Overall, richness of ethno-mycological information gathered indicates that the Himalayan state of Jammu and Kashmir represents a mycophilic region where edible mushrooms play an important role in the socio-economic activities of the local populace.

Key words: Wild, Diversity, Mushrooms, Edible, Ethnomycology, Folk taxonomy

Mushrooms represent an imperative group of Kingdom Myceteae, which produce large fruiting bodies especially during the monsoon season from branching mycelium that infiltrates the soil, leaf litter, wood of living and dead trees. They have been commonly categorized into many groups like agarics, morels, truffles, boletes, puffballs, earthstars, stinkhorns and polypores.

Mushrooms are important to humankind and constitute the most relished food commodities amongst the number of non-conventional foodstuffs primarily because of their unique flavor and texture and are consumed either in fresh or processed form. They enjoy dietary supremacy over the rest of the vegetarian menu due to i) structural polysaccharides (glycogen, mannitol, trehalose etc.); ii) proteins comprising of nutritionally favourable proportion of essential amino acids thus capable of substituting meat; iii) negligible cholesterol content; iv) low lipid content; v) chitin

contributing as a source of dietary fibre; vi) high vitamin B content; vii) Generally Recognized As Safe (GRAS) status by the U.S. Food and Drug Administration (FDA). Wild edible mushrooms are an important food source for rural communities during the rainy and winter seasons in many regions of the world. Mushrooms sold in regional markets in various parts all over the globe provide additional income to households (Hobbs, 1995; Rojas and Mansur, 1995; Boa, 2004; FAO, 2004; Sagar, et al., 2005).

The study of fungi in folklore, fiction and rituals from prehistoric times to the modern era is referred to as ethnomycology. It includes the indigenous knowledge, folk taxonomy and valuation of fungi. The field of ethnomycology only began to be realized in the 1950's or 60's (Moerman, 2008). Archaeological evidences reveal edible mushroom species associated with people living 13000 years ago in Chile but it is in China where the eating of wild fungi was first reliably noted several hundred years before birth the of Christ (FAO, 2004).

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Worldover two types of societies namely, mycophilic and mycophobic, emerged over the period of time. The former adopted by many cultures especially in the Orient (throughout Asia, most of Europe including France, Italy, Poland, Romania, Spain), identified that certain mushrooms could have profound health-promoting benefits while in the latter existed a frightening fear of mushrooms which could even approach phobic levels (United Kingdom, Ireland and North America).

India, being a country of varied agro-climatic conditions, supports the existence of diversity of mushrooms in wild. Numerous species of wild growing mushrooms (macrofungi) are recognized and widely consumed as a delicacy across various regions of India since 3000 B.C. The earliest word in Sanskrit for mushrooms is 'Ksumpa' and Khumb' in Hindi while the word 'Chatra' is given to the fleshy-capped fungi.

Several ethnomycological studies have been carried out in various parts of India, (Pandey, and Singh, 1978; Harsh, *et al.*, 1993, 1996; Rai, *et al.*, 1993; Boruah, 1997; Kamat, 1999; Deshmukh, 2004). The local names of mushrooms vary from place to place. *Morchella* species in Himachal Pradesh, Jammu and Kashmir (J&K) and Uttarakhand are referred to as Guchchi'. *Agaricus* species in Uttarakhand as 'Cheun' and 'Khumbi' in Punjab and 'Khumb' in J&K. In Goa, people are mycophagic and consume local wild mushrooms commonly called as 'Oلمي'. The forest dwelling backward community of Goa- the Velips, consumes *Russula* species. The species of boletes are known as 'Bhuifod' (Earth-boil) or 'Fuge' (Baloon mushroom). The termitophillic species abound in Goa are locally known as 'Roem Oلمي' (termite hill mushroom) and their habitat is also venerated as the abode of the most popular goddess of Goa- Santeri. (Kamat, 1999). At least 50 delicious recipes from wild edible mushrooms are cooked in Goa (Kamat, 1999).

The state of Jammu and Kashmir, which lies in the north-west Himalaya, is stretched between 32°17'-37°03' N latitude and 72°03'-80°20' E longitude, and covers a total area of 2,22,235 sq.km., with an

average annual rainfall between 60-80cm. It is bordered to the north and east by the main Himalayan ranges and Punjab plains to the south. The state exhibits varied climatic and topographic conditions and provide pleasant environment for the lavish growth of the dense coniferous and mixed forest of *Cedrus deodara* (Roxb.) G. Don, *Pinus wallichiana* A.B.Jackson, *Picea smithiana* (Wallich.)Boiss. *Abies pindrow* Royle, *Quercus* sp. L., *Juglans regia* L., *Alnus nepalensis* D.Don, *Ulmus wallichiana* Planch. etc. These forests encompass a rich repository of the macrofungal wealth that more or less remain unexplored and presently a little information on the diversity and ethno mycology of wild mushrooms has been highlighted from this northern most state of India (Kaul and Kachroo, 1974; Kaul, 1981; Kumar and Sharma, 2010). Therefore, we carried out an ethnomycological study in various locations of Jammu Province of Jammu and Kashmir state during the period 2005-2010, in order to develop a database on mushroom diversity and ethno mycological aspects.

Materials and Methods

Standard methods of collection, preservation, macro and microscopic studies were followed (Christensen, 1981; Corner, 1972; Purkayastha and Chandra, 1985; Kaul, 1997; Pegler, 1977; Soothill and Fairhurst, 1978; Smith *et al.*, 1981; Arora, 1986; Singer, 1986; Kumar *et al.*, 1990; Atri *et al.*, 2003) and the shape, size, and colour of fresh specimens were recorded before preservation. Ethnomycological information was recorded from reliable sources such as hakims, tribals, and local inhabitants who were considered to have good knowledge of the wild resources of the region. They were taken to the forests as guide cum informants. In order to gain better understanding of the relationship between the fungi, the local people, and the economy, field investigations and interviews were conducted in different local languages *viz.*, Bhadarwahi, Kishtwari, Gadaishi, Dogri and Kashmiri. The interviews were semi-structured having a set of questions which were put forth to the selected locals to ascertain their views on historical background, traditional usage, edibility

status, folk taxonomy, methods of drying and preservation, commercial importance etc. of fleshy fungi. Repeated interviews were conducted to substantiate and authenticate the information. The photography was accomplished using digital camera (Sony DSC-P92). Each specimen was collected and labeled, indicating number, date of collection, locality and uses. All collections have been deposited in the herbarium of Botany Department, University of Jammu, Jammu with accession numbers.

Results and Discussion

While carrying out ethnomycological studies in different localities of the study area, the local inhabitants were randomly interviewed in their native languages (Bhadarwahi, Kishtwari,

Gaddaishi, Dogri and Kashmiri) and the analysis of the total use pattern of the wild edible mushrooms, preservation practices, folk taxonomy and economic potential was made. As many as 250 collections of wild mushrooms were made and worked out for their macro and micro-morphological features and ethnomycological details. Out of these, a total of forty four wild mushrooms distributed in 20 genera were found to be actually consumed in the state and possessed various potentialities. These includes the species of *Agaricus*, *Boletus*, *Clavaria*, *Clavulina*, *Coprinus*, *Geopora*, *Gyromitra*, *Helvella*, *Macrolepiota*, *Morchella*, *Otidea*, *Peziza*, *Pleurotus*, *Ramaria*, *Rhizopogon*, *Russula*, *Sepultaria*, *Sparassis*, *Termitomyces*, and *Verpa* (Table 1, Figure 1 & 2).

Table 1: Record of wild edible mushrooms commonly consumed and sold in the study area with range of palatability

S. No.	Species of fleshy fungi	Vernacular name	Consumed fresh/dried	Market sale price in Rs/kg	Palatability range	
					P	M
1	<i>Agaricus arvensis</i>	Chaitar (2), Chaltee (1,3)	fresh	20-30	1	-
2	<i>Boletus edulis</i>	Bhutoo (1,3), Bhutol (1), Dailoo (1)	fresh	-	2	-
3	<i>Boletus granulatus</i>	Bhutoo (1,3), Dailoo (1)	fresh	-	2	-
4	<i>Boletus luridus</i>	Bhutol (1), Bhutoo (1,3), Dailoo (1)	fresh	-	1	-
5	<i>Clavaria vermicularis</i>	Shairee (1,3)	fresh	-	3	-
6	<i>Clavulina alpina</i> sp. nov.	Shairee (1,3)	fresh	-	3	-
7	<i>Clavulina cristata</i> var. <i>curta</i>	Shairee (1,3)	fresh	-	3	-
8	<i>Coprinus comatus</i>	Chaitar (2)	fresh	30-40	3	-
9	<i>Geopora arenicola</i>	Kundii (1,3), Kutch (2), Gav Padur (4), Khuduz (4), Kann Kutch (2,4)	fresh/dried	40-50	1	-
10	<i>Gyromitra esculenta</i>	Laal Thunthoo (1,3)	fresh	-	1	-
11	<i>Gyromitra gigas</i> var. <i>microspora</i> var. nov.	Cshitoo Thunthoo (1,3)	fresh	-	1	-
12	<i>Helvella atra</i>	Kaloo Thunthoo (1,3)	fresh	-	2	-
13	<i>Helvella crispa</i>	Thunthoo (1,3)	fresh	-	2	-
14	<i>Helvella elastica</i>	Thunthoo (1,3)	fresh	-	2	-
15	<i>Macrolepiota procera</i>	Chaltee (1,3)	fresh	20-30	3	-
16	<i>Morchella conica</i>	Thunthoo (1,3), Thunthoun (3), Pien Loj (2,4)	fresh/dried	5000-7000	1	+
17	<i>Morchella esculenta</i>	Thunthoo (1,3), Thunthoun (3), Batt Kutch (2,4)	fresh/dried	5000-7000	1	+
18	<i>Morchella semilibera</i>	Thunthoo (1,3), Thunthoun (3), Batt Kutch (2,4)	fresh/dried	5000-7000	1	+
19	<i>Morchella crassipes</i>	Thunthoo (1,3), Thunthoun (3),	fresh/dried	5000-7000	1	+

20	<i>Morchella deliciosa</i>	Thunthoo (1,3), Thunthoun (3),	fresh/dried	5000-7000	1	+
21	<i>Otidea leporina</i>	Nikdril Kundii (1,3)	fresh	20-30	3	-
22	<i>Peziza badia</i>	Chaber Kann (1), Kann Kutch (2,4)	fresh	-	3	-
23	<i>Pleurotus squarrosulus</i>	Saroori (2), Shairee (1,3), Srij (2,4), Siree (2)	fresh/dried	40-50	1	-
24	<i>Pleurotus sp.</i>	Saroori (2), Shairee (1,3), Srij (2,4), Siree (2)			1	+
25	<i>Ramaria apiculata</i>	Shairee (1,3)	fresh	30-40	3	-
26	<i>Ramaria aurea</i>	Shairee (1,3)	fresh	30-40	3	-
27	<i>Ramaria flavobrunnescens</i> var. <i>aurea</i>	Shairee (1,3)	fresh	30-40	2	-
28	<i>Ramaria flavobrunnescens</i> var. <i>longisperma</i> var. nov.	Shairee (1,3)	fresh	30-40	2	-
29	<i>Ramaria formosa</i>	Shairee (1,3)	fresh	30-40	3	-
30	<i>Ramaria stricta</i>	Shairee (1,3)	fresh	30-40	2	-
31	<i>Rhizopogon guzmanii</i> var. <i>macrospora</i> var. nov.	Dudh Katt (1,3), Moraii Dudh Katt (1,3),	fresh/uncooked	20-30	1	-
32	<i>Rhizopogon luteolus</i>	Haildu Dudh Katt (1,3), Moraii Dudh Katt (1,3), Matij (2,4)	fresh/uncooked	20-30	1	-
33	<i>Rhizopogon luteolus</i> var. <i>multiguttulata</i> var. nov.	Haildu Dudh Katt (1,3), Moraii Dudh Katt (1,3), Matij (2,4)	fresh/uncooked	20-30	1	-
34	<i>Rhizopogon sublateritus</i>	Haildu Dudh Katt (1,3), Moraii Dudh Katt (1,3), Matij (2,4)	fresh/uncooked	20-30	1	-
35	<i>Russula sp.</i>	Babroo (1,3)	fresh	-	1	-
36	<i>Sepultaria sumneriana</i>	Kundii (1,3), Kutch (2), Gav Padur (4), Khuduz (4), Kann Kutch (2,4)	fresh/dried	40-50	1	-
37	<i>Sparassis crispa</i>	Bhedh Shairee (1), Rao Gaub (2,4), Rao Gabur (2,4)	fresh/dried	40-50	1	-
38	<i>Sparassis radicata</i>	Bhedh Shairee (1), Rao Gaub (2,4), Rao Gabur (2,4)	fresh/dried	40-50	1	-
39	<i>Sparassis cystidiosa</i>	Shairee (1,3)			3	-
40	<i>Termitomyces striatus</i>	Chaltii (1,3), Khumba, Chatree (5), Sootree (6)	fresh	40-50	1	-
41	<i>Termitomyces sp.1</i>	Chaltii (1,3), Khumba, Chatree (5), Sootree (6)	fresh	40-50	1	-
42	<i>Termitomyces sp.2</i>	Chaltii (1,3), Khumba, Chatree (5), Sootree (6)	fresh	40-50	1	-
43	<i>Termitomyces sp.3</i>	Chaltii (1,3), Khumba, Chatree (5), Sootree (6)	fresh	40-50	1	-
44	<i>Verpa conica</i>	Thunthoo (1,3), Thunthoun (3),	fresh/dried	5000-7000	1	-

Dialects:

1) Bhadarwahi, 2) Kishtwari, 3) Gaddaishi, 4) Kashmiri, 5) Dogri, = denotes not sold in the market

Palatability range:

1 = Delicious, 2 = Good, 3 = Just edible, M = Medicinal



Figure 1: a = Fruiting bodies of *Gyromitra esculenta*, b = Carpophores of *Gyromitra gigas* var. *microspora* var. nov., c = Fruiting bodies of *Helvella elastica*, d = Fruiting bodies of *Morchella conica* in natural habitat, e = Carpophore of *Morchella esculenta*, f = Carpophore of *Morchella semilibera*, g = *Morchella deliciosa* in natural habitat, h = Fruiting bodies of *Morchella crassipes*, i = Carpophore of *Verpa conica*, j = *Otidea leporina* in natural habitat, k = Fruiting bodies of *Geopora arenicola* in natural habitat, l = Development stages of *Sepultaria sumneriana*, m-n = *Rhizopogon luteolus* in natural habitat, o, r = Fruiting bodies of *Rhizopogon guzmanii* var. *macrospora* var. nov. in natural habitat, p = Fruiting bodies of *Rhizopogon luteolus* var. *multiguttulata* var. nov., q = Development stages of *Rhizopogon sublateritus*.

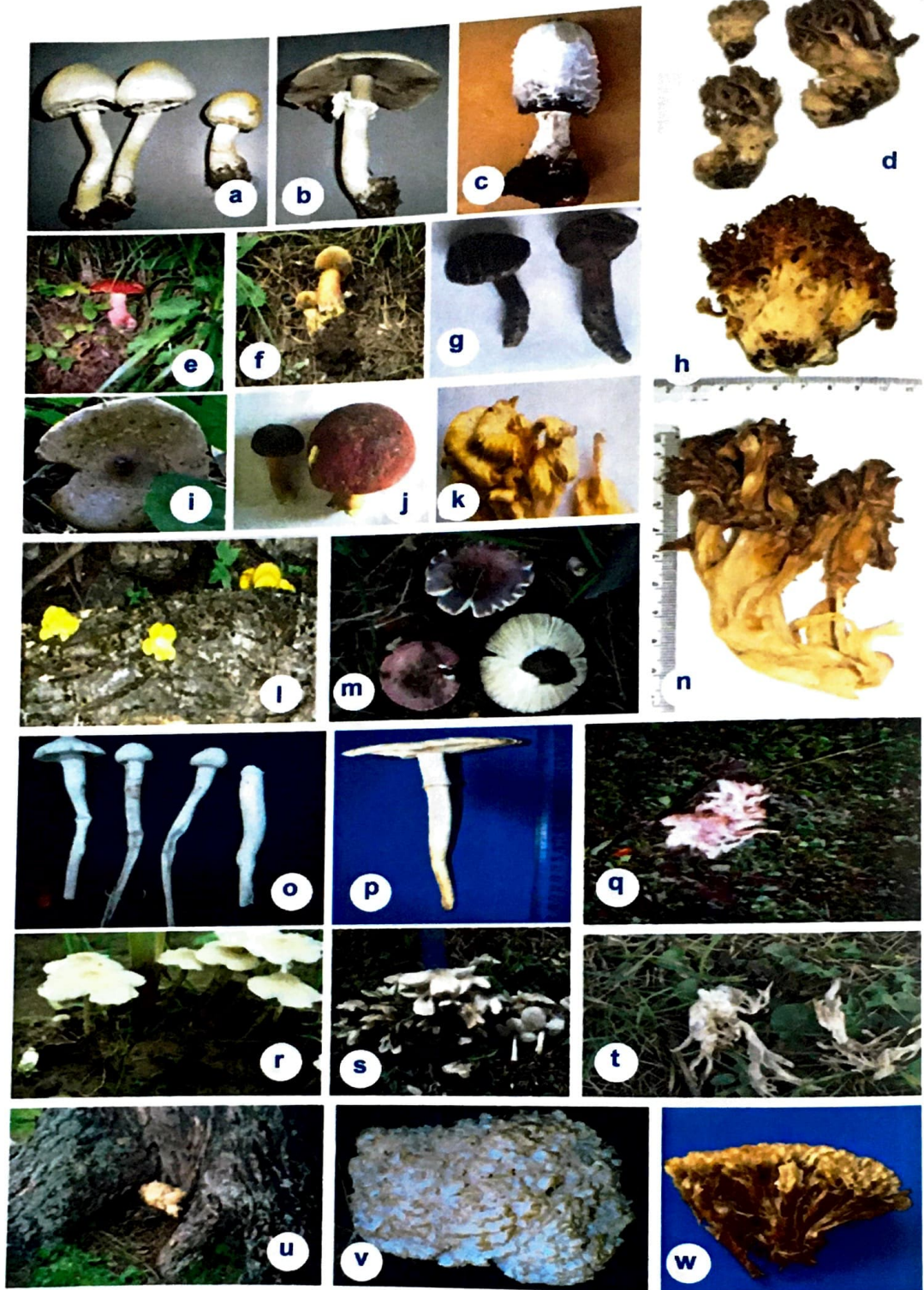


Figure 2: a, b = Fruiting bodies of *Agaricus arvensis*, c = Carpophore of *Coprinus comatus*, d = Fruiting bodies of *Ramaria formosa*, e = Carpophore of *Boletus luridus* in natural habitat, f = Carpophores of *Boletus edulis*, g = Carpophores of *Boletus granulatus*, h = Carpophore of *Ramaria flavobrunnescens* var. *longisperma* var. nov., i = Fruiting body of *Macrolepiota procera*, j = Carpophores of *Boletus* sp., k = Carpophores of *Pleurotus squarrosulus*, l = Fruiting bodies of *Pleurotus* sp. growing on *Juglans regia* in natural habitat, m = *Russula* sp. in natural habitat, n = Carpophore of *Ramaria aurea*, o = Development stages of *Termitomyces striatus*, p = Fruiting body of *Termitomyces* sp.1, q = Fruiting bodies of *Clavulina alpina* sp. nov., r, s = Fruiting bodies of *Termitomyces* spp. 2 & 3 in natural habitat, t = Fruiting bodies of *Clavulina cristata* var. *curta*, u = Carpophore of *Sparassis radicata*, v = Fruiting body of *Sparassis radicata*, w = Carpophore of *Sparassis cystidiosa*.

Collection of wild edible mushrooms

Data gathered during the ethnomycological survey related to collection of wild mushrooms revealed that the collection of wild mushrooms was undertaken early in the morning, as there was intense competition for mushroom gathering, especially for the morels because of their high commercial value. Women and children from 'Gaddi', 'Shippi', 'Gujjar' and 'Pahari' tribes were frequently involved in these activities then men. Children frequently accompany the women, as they were good at locating mushrooms because of their sharp eyes and proximity to the ground and crevices where the occurrence of the mushroom was highest. A special basket called 'Tokri', 'Keed' or 'Chounlee' or a 'Cotton cloth' (Duppatta) was used for collecting mushrooms.

Collection forays were more frequent in March and April and July and August months. However, the best period for wild mushroom collection in the study area started with the onset of rains, the period when the conditions are conducive for the mushroom growth and they were available in plenty. This activity also coincided with the gathering of fallen pine needles used in roof topping of mud houses and firewood to be stored for winter months as the weather conditions during this period are harsh due to snow and fuel shortage.

Edibility Status

The ethnomycological survey related to edibility status of mushrooms was also undertaken and the results have been presented in Table 1. While confirming the edibility status of these mushrooms, the consumer's preference (range of palatability) was obvious (Table 1, Figure 3). Species such as *Agaricus arvensis*, *Boletus luridus*, *Geopora arenicola*, *Gyromitra* spp., *Morchella* spp., *Pleurotus* spp., *Rhizopogon* spp., *Sparassis crispa*, *S. radicata*, *Russula* sp., *Sepultaria sumneriana* and *Verpa conica* were considered highly delicious, while *Boletus edulis*, *B. granulatus*, *Helvella* spp., *Ramaria flavobrunnescens* var. *longisperma* var. nov., *R. aurea*, *R. stricta* had good acceptability for consumption. Remaining species namely, *Clavaria*

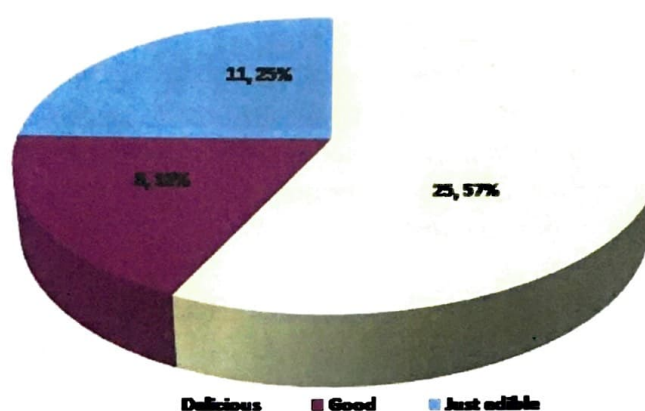


Figure 3: Representation of edible mushrooms with range of palatability in study area

vermicularis, *Clavulina* spp., *Coprinus comatus*, *Macrolepiota procera*, *Ramaria apiculata*, *R. flavobrunnescens* var. *aurea*, *Sparassis cystidiosa* and *R. formosa* were not much sought after mushroom species in the region.

Drying and Preservation

Fresh wild edible mushrooms have a short period during which they can be eaten or consumed. Owing to their perishable nature, they quickly deteriorate, rot, or shrivel up. On questioning local people about this aspect, it was realized that they consumed large number of the mushrooms in fresh form and only a few are preserved after sun-drying, smoke drying or salting. Mushroom species such as *Morchella* spp., *Pleurotus* spp., and *Sparassis* spp. were sun-dried in open and then stored in gunny bags, polythene bags or jars. In addition, a unique method for the preservation of cup fungi especially *Geopora arenicola* and *Sepultaria sumneriana* was followed by the locals. These hypogeous mushrooms were thoroughly washed in water to remove soil debris adhering to the apothecia, sun-dried, salted and then mixed with turmeric powder for enhancing shelf-life in storage and off-season consumption.

Culinary Potential

Outcome of the survey on the culinary potential of the edible mushrooms revealed that mushrooms in the study area represented a longed for culinary innovation and find a remarkable utility in the

culinary traditions of the area. Majority of the people questioned showed deep affection for the taste and preparation of wild mushrooms while only a few respondents showed aversion towards them. It was observed that the larger quantities of mushrooms were being consumed in the area and were regarded by many as wholesome food and in certain cases, an equivalent of meat. The inventory of consumption pattern of wild edible mushrooms extracted from the inhabitants of various regions of Jammu province of Jammu and Kashmir state especially Bhadarwah, Kishtwar, Poonch, Jammu, Ramban, Kathua, Rajouri, Bani, Udhampur etc was prepared. The mushrooms that were consumed as fresh vegetables included *Agaricus arvensis*, *Boletus* spp., *Coprinus comatus*, *Peziza badia*, *Clavaria vermicularis*, *Clavulina* spp. *Geopora arenicola*, *Gyromitra* spp., *Helvella* spp., *Macrolepiota procera*, *Morchella* spp., *Otidea leporina*, *Pleurotus* spp., *Ramaria* spp., *Sparassis* spp., *Sepultaria sumneriana*, *Russula* sp. and *Termitomyces* spp. These were usually cooked with tomatoes and onions while others were dried (*Morchella* spp., *Geopora arenicola*, *Sepultaria sumneriana*, *Sparassis* spp. *Pleurotus* spp., *Verpa conica* etc.) and consumed in off-season particularly during winter months during which the availability of vegetables is scarce in the hilly inhabitations and movement of the local people is restricted due to snowfall and harsh weather.

Several mushrooms (*Rhizopogon* spp) were eaten uncooked after cleaning and washing or while others were consumed after brief roasting on fire (*Boletus luridus* and *Russula* sp.). Likewise, the morels were used in making several traditional recipes prominent amongst which are 'Chaschni' (a local dessert), 'Thunthoo Pulloo' (rice + morels), 'Thunthoo Kheer' (milk + morels), and 'Thunthoo Yakhni' (curd + morels). Therefore, the study indicates that wild mushrooms play an important dietary role as they are considered as a substitute of 'meat', a key ingredient in vegetables, flavouring agent or even as a condiment. Like spices and sauces, they could transform a routine monotonous diet into a feast.

Folk Taxonomy of wild edible mushrooms

Folk biological systems have been in practice throughout the world and they play an important role in local taxonomy. Research was carried out in various locations using five local dialects (Bhadarwahi, Kishtwari, Gaddaishi, Dogri and Kashmiri). Young informants, usually under the age of 25 years were able to recognize on an average 33% of the mushroom species while middle aged people (usually below 50 years and above 25 years) were familiar with nearly 50-60% of mushrooms, while the people in older age categories could distinguish maximum of collected wild mushrooms locally. Overall, women recognized more species as compared to men. This slightly greater recognition of mushrooms may be attributed to their greater involvement in collecting, cleaning and cooking of these mushrooms.

In English vernacular ethnomycology, mushrooms have been grouped as agarics, morels, puffballs, earthstars, truffles, coral fungi and many more based on their general morphology. Consequently, an extensive descriptive vocabulary relating to mushroom morphology, growth and habit was recovered during the interviews. It was inferred that the descriptive vocabulary used in the area was found to be remarkably comparable to the macro-morphological features used in scientific groupings of mushrooms.

As many as 35 vernaculars indigenously used for 44 wild mushrooms were recorded and transcribed. Some of the species were monotypic having only single names while others were polytypic i.e. having more than one vernacular. These vernacular names could be categorized based on gross morphology and life forms into main seven types or 'folk genera'. Most of these categories, inadvertently used though, referred to clearly defined biological groups such as 'Chaltee' or 'Sirer' for agarics; 'Bhutol', 'Bhutoo' or 'Dailoo' for boletes; 'Shairee', 'Gaub' or 'Gabur' for coral fungi. Similarly, puffballs were locally referred to as 'Dudh Katt'; earthstars as 'Sapp Nasvar'; morels as 'Thunthoo' and cup fungi were locally recognized by the folk genus 'Kundii'.

Many such significant contributions in the ethnomycological classification of the macrofungi

world over have been reported recently (Akpaja, et al., 2003; Ellen, 2008; Guissou, et al., 2008; Shepard Jr., 2008).

Common Beliefs and Practices Surrounding WEM Usage

Ethnomycological enquiries also threw light on broader social taboos, beliefs and famous remarks. Elderly men from 'Brahmin' or 'Pandit' community had strong aversion to mushroom consumption because of a 'strong taboo' fostered by folklores, which forbids Brahmins from eating mushrooms. Surprisingly though, it was observed that women and young children did not have any dissent towards mushrooms.

Species of *Sparassis*, *Ramaria* and *Clavulina* were consumed by the tribal (Gaddi, Shippi and Pahari) and poor families especially at dinner. Interestingly, the reason cited for this was that these wild mushrooms usually harboured worms (insect larvae) in the crevices of their branches and during the dark night hours children would not observe these worms (due to improper or no lightning in the remote areas). The elders assumed that these worms would be killed after cooking these mushrooms and thus, considered them safe for consumption. However, if these children, as they believed, spot these worms inside the fruiting bodies during daylight, they might develop strong aversion to these species which otherwise would be the cheapest source of their nutrition owing to their poverty.

Similarly, in several tribal hamlets viz. Chishoti, Hemoti, Kandail, Kansar, Sharaikhi, Patnitop, Bani, Sindra etc. it was commonly believed that those who collect the mushrooms, especially morels, should not eat them because once they do so, they might lose the power to search and locate them and thus would not find magical mushrooms anymore. Though no rationale is known behind this belief, it might be probably due to the fact that since the trade value of morels is very high, the mushroom collectors could reduce their intake so as to earn cash to sustain their other family needs.

One of the myths related to morels was that a single small morel around the neck could ward off the

bad souls.

Traditional Remarks Based on Some Wild Mushrooms

Few common remarks for the presence of some edible species such as morels in the forest locations of the study area also came to our knowledge. For instance:

'Dhouns Bazzay Beinsh Bazzay, Bin Beezzay Rukh Zamaaye'

(Meaning: Drums and flutes are not there, still the music is aloud, Thick cloud and heavy rains sprout the mushrooms (morels) out of the earth).

The love and affection of people for some of the delicious mushrooms is clearly depicted by the personification of the cup fungi (*Geopora arenicola* and *Sepultaria sumneriana*). And the sayings go like:

'Paar Banay Maire Bhabi Bassay, Main Jaoun Tey Khir Khir Hassay'

(Meaning: Across there in forest, my sister-in-law resides, Who, on my visit, greets me with many smiles), and

'Paar Banay Maira Bhaiya Bassay, Main Jaoun Tey Khir Khir Hassay'

(Meaning: Across there in forest, my brother resides, Who, on my visit, greets me with many smiles).

In conclusion, the study indicates the cultural importance and long traditional use of wild mushrooms in Jammu and Kashmir. Further investigations for thorough, careful and comprehensive forays for ethnomycological facets of this important group of organisms existing in various locations of the state are called for. The study also recommends regular surveys over an extended period in order to assess the patterns of abundance of mushrooms in different seasons. From such information, harvesting strategies and management plans can be formulated and implemented to ensure the lasting presence of these socially and economically important species. This becomes even more relevant when Food and Agricultural Organization has recommended the

use of edible mushrooms as food supplement for protein deficient populations of developing and underdeveloped countries.

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