AN ETHNOBOTANICAL SURVEY OF WILD EDIBLE MUSHROOMS - A POTENTIAL RESOURCE OF FOOD AND INCOME GENERATION IN PABBAR VALLEY, HIMACHAL PRADESH, INDIA

P.P. Chauhan
LBS Govt. Degree College, Saraswati Nagar, Distt. Shimla, HP. India.
Email: ppchauhan321@gmail.com
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ABSTRACT

The Western Himalayan region is rich in wild mushrooms. The people living in this area have extensive traditional mycological knowledge. The wild edible mushrooms have been consumed from the earliest history and also possess medicinal properties. The seasonal collections of wild edible mushrooms constitute a food with nutritional value and a source of income for the rural local inhabitants. In the present day, mushrooms are valued as popular food because of their low in fat, carbohydrate, and cholesterol-free, and rich in vitamins. The lifestyle change is now responsible for a severe reduction in the collection of these mushrooms. The knowledge in the local environment gets lost when it is not gathered. The study aimed to investigate the knowledge and use of wild edible mushrooms in Pabbar Valley, Himachal Pradesh. A total of 13 species of mushrooms belonging to 11 families were identified as edible from the area. *Morchella* spp. are collected mainly for trade purposes.

**Keywords:** Ethnobotany, Mushrooms, Wild edible, Pabbar Valley, Himachal Pradesh.

INTRODUCTION

The Fungi are distinct groups of organisms that include species with large and visible fruiting bodies (macrofungi). The best-known example of macrofungi is mushrooms. Mushrooms are fruiting bodies of certain types of fungi and they play a key role in the forest ecosystem due to their unique abilities to break down wood, leaves, and other organic matter and recycle nutrients back to nature (Brown et al., 2006). Various indigenous strategies are followed to locate wild mushrooms suitable for human consumption. People belonging to ancient Greece, China, India, and Iran used mushrooms in ritualistic performances. The use of mushrooms as food and medicine is also documented in India in the ancient treatise Charaka Samhita (Singha et al., 2020).

Wild edible mushrooms are collected for food and to earn money in more than 80 countries of the world. The wider significance of these wild edible fungi and their extensive subsistence use in developing countries are valued as valuable food supplements. The mushrooms have been used as an ingredient of many cuisines for their particular flavour. Several studies have indicated that wild edible mushrooms are not only important sources of food but also income generating sources for both developing and developed countries (FAO, 2004). The diverse climatic conditions in India lead to a rich mushroom diversity and form an alternative resource of food for indigenous people. The different type of wild mushrooms consumed by indigenous people as food or medicine purposes varies with locality and tribe. There are about 2000 species of mushrooms in nature but around 25 species are widely accepted as edible (Valverde et al., 2014).

It is evident from several research studies that mushrooms are a rich source of proteins, vitamins, minerals, fiber, antioxidants, and have cholesterol-lowering properties (Wani et al., 2010). The nutritional analysis of different species of mushrooms are reported to be rich in Protein (30-48%), carbohydrates (125-40%), fat (1-4%), ash (7-17%) and fiber (16-20%) (Pushpa and Purushothama, 2010; Ao et al., 2016). Edible mushrooms contain a high amount of ash 80-120 g/kg of dry matter mainly potassium, phosphorus, magnesium, calcium, copper, iron, and zinc. The wild mushrooms have been prescribed as nutraceuticals and have anti-oxidative, antiviral, antimicrobial, and anticancerous properties (Barros et al., 2008; Valverde et al., 2014.).

Due to unscientific collection of wild mushrooms in forest area, deforestation and climate change the diversity of wild mushrooms are depleting very fast. Indian Himalayan region consists of the diverse agro-climatic condition is also rich in wild mushrooms. The Pabbar valley lies in the eastern part of the Shimla district in Himachal Pradesh, located in the North Western Himalayas. The valley is undergoing a socio-economic transition phase due to the introduction of horticultural cash crops. The dependence on wild food plants and the use of traditional meals appears to have reduced considerably in recent years. The systematic research works in the Western Himalayas to document wild edible mushrooms have been carried out by (Atri and Saini, 1989; Gautam et al., 2009; Chauhan et al., 2014; Semwal et al., 2014; Chaudhary, 2015; Bhatt et al., 2016; Chaudhary and Tripathy, 2016; Malik et al., 2017). Very few systematic works have been carried out in this region. The present study was undertaken to survey the Pabbar Valley in different
seasons for the collection of wild mushrooms, identification, documentation, etymology, and possible income potential.

MATERIAL AND METHODS

Study area

The study was conducted in Pabbar Valley of District Shimla, Himachal Pradesh. The valley is known for its ethnic identity having rugged mountains, naturally long and open pastures at the high area, with elevation ranging from 1200m to 5200m. The area is located between 77° 29'40" to 78° 18'42" and 30° 57'0" to 31° 25' 20" North in Rohru Sub-division consisting of three different blocks Jubbal, Rohru, and Chirgaon. The study area shares its border with the tribal district of Kinnaur and Uttarakhand State. The climate of the region ranges from Sub-tropical to Alpine.

Field data collection

The present study was conducted to explore and identify wild edible mushrooms and record the indigenous knowledge of utilization of these resources. The survey was conducted from 2017 and 2018 and the information was collected through semi-structured questionnaires, group discussion, and field observations. The questionnaire consists of questions on the local knowledge of identification of habitat, local name, edible mushrooms, mode of consumption, availability, and season of collection. The informants were also asked to share knowledge about the market transaction of mushrooms. The photographs of edible mushrooms were also taken in natural settings. The collected specimens were identified from manuals and standard literature (Purkayastha and Chandra, 1985; Roy & De, 1996, Kirk, et al., 2001; Lakhanpal et al., 2010) and other publications from the area.

RESULTS

Generally, the wild fungi in Pabbar Valley grow in coniferous and Oak forests composed mainly of Pinus wallichiana, Cedrus deodara, Picea smithiana and Abies spp. In general, most edible wild mushrooms are saprophytic or ectomycorrhizal in nature. In this present study, a total of 13 wild edible mushroom species belonging to 11 genera and 11 families were collected and identified from the area (Table-1). 9 genera were represented by single species each and 2 genera with 2 species each. The habitat wise 10 species were saprophytic and 3 were found mycorrhizal. The highest numbers of mushrooms were available for collection during the monsoon season. One species was rare, 6 common and 6 were found abundantly in the area.

The wild mushroom species are most often boiled, fried, or eaten raw. Most of the wild edible mushrooms in the present study are cooked fried similar to a vegetable. Traditionally, the precautionary steps taken while consuming wild mushrooms is that they are boiled first, decanted and then cooked. Only one species Rhizopogon vulgaris (Vittad.) M. Lange can be eaten raw or cooked. The most appreciated species being Morchella spp. followed by Sparassis crispa (Wulf) Fr. and Cantharellus lateritius (Berk.) Singer.

The local people have a belief that after rain and lightning in March, the Morchella (Gucchi) will suddenly erupt and this is time for the collection of this highly prized gift of nature. Morchella spp. are one of the most valued edible fungi in local as well as in national and international markets. The dried mushrooms fetch a very high value of Rs.6600/- to Rs.12,000/- per kg which is even more in international markets. This species provides off-season income to poor rural people. Due to high market value, this species is overexploited in nature and becoming scarce. The unscientific collection of Morchella, where they are picked from the soil along with mycelium has led to a decrease in the population of this species in a natural setting. It is thus essential to protect this valuable species in the natural environment. However, interestingly one species Morchella deliciosa Fries of this mushroom nowadays is found growing in apple orchards.

The incidents of food poisoning due to wild mushrooms are rare. Aminata spp. may be misjudged by an inexperienced collector. However, besides other features, the easy way to identify edible species as per local knowledge is that those growing on tree stump are safer than growing on soil.

Different wild mushrooms grow easily in a healthy forest ecosystem, can be a chief source of nutritious food for local people often regarded as “poor man’s meat” (Ao, et al., 2016). There is a need of promoting the cultivation and more use of these mushrooms. Wild mushrooms as not only a good source of food supplements but also have medicinal properties. For example, most of Auricularia species are grown in China. The Auricularia spp. has potential medicinal properties and is effective to reduce LDL, Cholesterol, and

DISCUSSIONS

The present study reveals that the local people of Pabbar valley have good traditional knowledge of wild edible mushrooms. The edibility status of these mushrooms reported from the area was also confirmed from the literature and has been found widely consumed in North-western Himalaya (Chauhan et al., 2014, Malik et al., 2017). Most edible mushrooms are collected while visiting forests for day to day work. The indigenous knowledge is used by local people to identify wild edible mushrooms. The information is learned by the new generation while working with elders in the forest. This tradition of passing knowledge from generation to generation is carried on, however, the change in lifestyle and fewer visits to the forest with elders are causing depletion in the transfer of this ethnomycology knowledge.

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aortic atherosclerotic plaque (Yu et al., 2014; Valverde et al., 2015).

The present study might provide useful information for further research on wild mushrooms in this area. More such investigations are needed which may yield numerous other edible spp. from the area. Moreover, there is immense scope for using wild edible mushrooms as a potential source of dietary supplements and for medicinal purposes and can be a source of income generation for rural people.

Glossary of ethnic names

The vernacular names have been provided and documented here. Indigenous people have their methods of identification and naming of mushrooms. The local people identify the mushrooms based on phonological characters. The following are common vernacular terms used for different mushrooms in Pabbar Valley:

Chhatri = Umbrella like, all mushrooms having umbrella-like caps are commonly called chhatri. They are further classified based on growing substrate. For example= Maran kee chhatri (Mushrooms growing on the Ulmus – (Maran local dialect) tree logs).

Chhattr= Big covering on head mainly of deities (Shape), Shuntu= Similar to broom (A small broom used indoor, in & around the chulla). All Romaria species having branching patterns similar to broom are called Shuntu.

Table 1 : Wild Edible Mushrooms of Pabbar Valley

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Name of Mushroom</th>
<th>Common Name</th>
<th>Family</th>
<th>Habitat</th>
<th>Season of Collection</th>
<th>Occurrence</th>
<th>Edibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alloclavaria purpurea (Fr.)</td>
<td>Baktu</td>
<td>Clavariaceae</td>
<td>On soil</td>
<td>July-September</td>
<td>Abundant</td>
<td>Fruiting body cooked</td>
</tr>
<tr>
<td>2</td>
<td>Amanita bisporigera G.F. Atk.</td>
<td>Chhatar</td>
<td>Amanitaceae</td>
<td>On dead stumps of Pinus etc.</td>
<td>June-August</td>
<td>Common</td>
<td>Fruiting body cooked</td>
</tr>
<tr>
<td>3</td>
<td>Auracularia Spp.</td>
<td>Kan</td>
<td>Auriculariaceae</td>
<td>On soil</td>
<td>July-August</td>
<td>Common</td>
<td>Fruiting body cooked</td>
</tr>
<tr>
<td>4</td>
<td>Cantharellus lateritius (Berk.) Singer</td>
<td>Maran kee Chhatri</td>
<td>Cantherellaceae</td>
<td>On rotten logs of Ulmus trees</td>
<td>July-September</td>
<td>Common</td>
<td>Fruiting body cooked</td>
</tr>
<tr>
<td>5</td>
<td>Helvella crispa (Scop.) Fr.</td>
<td>Bakra</td>
<td>Helvellaceae</td>
<td>On soil</td>
<td>July-August</td>
<td>Abundant</td>
<td>Fruiting body cooked</td>
</tr>
<tr>
<td>6</td>
<td>Helvella compressa (Synder) N. S. Weber</td>
<td>Baktu</td>
<td>Helvellaceae</td>
<td>On soil</td>
<td>July-August</td>
<td>Abundant</td>
<td>Fruiting body cooked</td>
</tr>
<tr>
<td>7</td>
<td>Hydnum repandum (L.) Fr.</td>
<td>Chhatri</td>
<td>Hydnaceae</td>
<td>On soil</td>
<td>July-September</td>
<td>Abundant</td>
<td>Fruiting body cooked</td>
</tr>
<tr>
<td>8</td>
<td>Lacterius deliciosus (Fries) S.F. Grey</td>
<td>Chhatri</td>
<td>Russulaceae</td>
<td>Saprophytic on soil</td>
<td>Monsoon season</td>
<td>Abundant</td>
<td>Fruiting body cooked</td>
</tr>
<tr>
<td>9</td>
<td>Morchella esculenta (L.) Pers</td>
<td>Cheyaun,</td>
<td>Morchellaceae</td>
<td>Saprophytic on soil &amp; litter</td>
<td>March-August</td>
<td>Common</td>
<td>Fruiting body cooked</td>
</tr>
<tr>
<td>10</td>
<td>Morchella delicosa Fries</td>
<td>Cheyaun,</td>
<td>Morchellaceae</td>
<td>Saprophytic on soil &amp; litter</td>
<td>April-November</td>
<td>Common</td>
<td>Fruiting body cooked</td>
</tr>
<tr>
<td>11</td>
<td>Ramaria botrytis (Pers.) Ricken</td>
<td>Shoontu</td>
<td>Gomphaceae</td>
<td>Saprophytic on soil</td>
<td>Monsoon season</td>
<td>Abundant</td>
<td>Fruiting body cooked</td>
</tr>
<tr>
<td>12</td>
<td>Rhizopogon vulgaris (Vittad.) M. Lange</td>
<td>Zanda</td>
<td>Rhizopogonaceae</td>
<td>Saprophytic on soil</td>
<td>September-November</td>
<td>Common</td>
<td>Edible Raw or cooked</td>
</tr>
<tr>
<td>13</td>
<td>Sparassis crispa (Wulf.) Fr.</td>
<td>Chinchadoo</td>
<td>Sparasidaceae</td>
<td>Conifer roots</td>
<td>July-August</td>
<td>Rare</td>
<td>Fruiting body is boiled first and then cooked</td>
</tr>
</tbody>
</table>
Figure 1


7. *Hydnum repandum* (L.) Fr. 8. *Lactarius deliciosus* (Fries) S.F. Grey
REFERENCES


