Traditional knowledge and use of wild mushrooms in Simbhanjyang, Makwanpur district, Central Nepal

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Khadka B, Aryal HP 2020 – Traditional knowledge and use of wild mushrooms in Simbhanjyang, Makwanpur district, Central Nepal. Studies in Fungi 5(1), 406–419, Doi 10.5943/sif/5/1/22

Abstract

Mushrooms are an important source of food among different ethnic communities in Nepal and are widely collected during rainy season. This paper includes documentation of wild mushrooms in the vicinities of Simbhanjyang, Makwanpur district, central Nepal. Semi-structured open ended questionnaire and Rapid Rural Appraisal were followed to get information about edibility of wild mushrooms from local harvesters. Forty-three species of mushrooms were documented. The collected species are saprophytic, parasitic, and mycorrhizal. Ethnic communities identify edible and other useful mushroom species based on traditional knowledge transferred from their ancestors orally which was in practice and tested through generations. Edible Boletus edulis, Russula virescens and medicinal Ganoderma tsugae are some potential non-timber forest products from the study area.

Key words – Agaricomycetes – edible mushroom – ethnomycology – macrofungi – mushroom diversity

Introduction

Wild edible mushrooms are important high valued Non-Timber Forest Products (NTFPs) collected as food resource by Nepalese ethnic groups since time immemorial (Devkota 2008) and it represents an important income source for livelihoods in rural areas (Adhikari 2000, Christensen & Larsen 2005, Devkota 2006, 2008). In different areas of Nepal and India, mushrooms are commonly regarded as “poor man’s meat” (Harsh et al. 1993, Christensen et al. 2008a) whereas in the Nepalese high mountains they are considered as an important and prestigious part of the culture (Christensen et al. 2008a). Wild edible mushrooms are widely collected from lower plains to the highlands (Devkota 2017) across different parts of Nepal during rainy season (June to September) for their food value. Mushrooms are an important major source of protein that substitutes the meat in developing countries (Pandey & Bhudathoki 2007, Giri & Rana 2008).

The studies on Nepalese fungi began in the 19th century with the works of Lloyd (1808) and Berkeley (1838), with the taxonomic studies on Ganoderma and Polystictus species, respectively. Further, the collection and survey on mycoflora of East Nepal was done by Hooker (1848-1854) and published by Berkeley (1854 a, b, c). Other major studies on diversity of wild mushrooms of Nepal were carried out by Pandey (1976), Waraitch & Thind (1977), Bhandary (1980), Hijortsam & Ryvarden (1984), Adhikari (1990, 2000), Balfour-Browne (1995), Adhikari & Manandhar (1996), Rana & Giri (2006), Adhikari & Devkota (2007), Giri & Rana (2007), Aryal et al. (2012), Jha & Tripathi (2012) and Baral et al (2015).
The last fungal diversity update was made by Adhikari (2018) who estimated around 2,467 fungal species in Nepal. From this number 1,271 are macrofungal species belonging to Ascomycota and Basidiomycota (Adhikari 2014). Christensen et al. (2008a) recorded 228 as edible and Adhikari (2014) recorded 100 species as poisonous and 89 as medicinal. Misidentification of wild mushrooms during harvesting season is the main cause for mushroom poisoning. The similar morphological features that some species displays creates confusion among local collectors (as genus Amanita and Russula similar in appearance, poisonous Inocybe rimosa similar in appearance with edible Russula sp); which is also a cause along with the lack of traditional techniques to identify edible mushroom to increase in the mushroom poisoning casualties during harvesting season.

One of the first ethnomycological studies in Nepal was conducted by Joshi & Joshi (1999) in the Kathmandu and Pokhara Valley who recorded the uses of some mushrooms by the Tamang and Newar communities documenting as edibles, some species of Amanita, Boletus, Cantharellus, Hydnum, Pleurotus, Polyporus and Russula, and some species of Lycoperdon as medicinal. Adhikari et al. (2005) documented the edibility of some species of Laccaria, Lactarius, Laetiporus, Ramaria and Russula, the medical uses of species Coriolus, Daldinia, Lycoperdon, and Schizophyllum and the uses in the ignition of cigarettes with sporocarps of species of Coriolus, Ganoderma and Trametes by Newars, Tamangs and Chhetris from Lumle, Kaski district and different areas of Kathmandu district; Giri et al. (2005) recorded the edibility of some species of Boletus, Naematoloma, Russula and Tylophus by the Sherpa community in the Khumbu region in eastern Nepal; Devkota (2006) reported medicinal uses for Ophiocordyceps sinensis by Amchis and local community of Dolpa, west Nepal; Pandey et al. (2006) reported species of Grifola, Laccaria, Lactarius, Laetiporus, Ramaria and Russula as edibles, the medical use of some species of Grifola, Laetiporus, Pleurotus, Pycnoporus, Ramaria and Trametes and the ornamental uses of species of Ganoderma and Schizophyllum by Tamangs of Nepal.

The latest ethnomycological studies were carried by Christensen et al. (2008b) who documented some species of Boletus, Cantharellus, Gomphus, Helvella, Hydnum, Lactarius, Laetiporus, Lentinus, Morchella, Pleurotus, Polyporus, Ramaria, Russula and Suillus used as food by the indigenous local peoples and different ethnic communities within Annapurna Conservation Area, Nepal; Giri & Rana (2008) reported some species of Amanita, Boletus, Chroogomphus, Glomopsis, Hydnum, Hygrophorus, Leccinum, Paxillus and Ramaria as edible mushrooms, the medicinal uses of species of Lycoperdon and species of Ganoderma in decorative purpose by Sherpa community of East Nepal and Aryal & Bhudathoki (2013) reported species of Amanita, Armellaria, Flammulina, Lentinus, Macrolepiota, Russula, Schizophyllum and Scleroterderma, the use of some species of Ganoderma, Termitocyes and Volvarella in decorative purposes and species of Pycnoporus and Scleroterderma as medicinal mushrooms from Rupandehi district, Nepal.

This study aims to explore the uses of mushrooms, its diversity and associated traditional knowledge among different ethnic groups inhabiting in Simbhanjyang, central Nepal.

Materials & Methods

Study Area

The study site is in Simbhanjyang and its adjoining areas of Thaha Rural Municipality (RM) ward 3 and 4 and Bhimphedi RM ward 9. Simbhanjyang situated in Bhimphedi RM, Makwanpur district, is located in southern Nepal as in Fig. 1, 26 km away from Kathmandu city between the coordinates 27.5933°N and 85.0818°E with an elevation of 2488 m a.s.l. The vegetation is a temperate cloud forest (Miehe et al. 2015) represented by Quercus-Rhododendron forest (Quercus lanata, Q. lamellosa, Rhododendron arboreum) and pine mixed forest (Pinus wallichiana, Alnus nepalensis) with high canopy cover and litter cover. These two factors are good for mycorrhizal, saprophytic or parasitic fungus (Baral et al. 2015). The annual precipitation of about 1154.7 mm falls mostly from May to September. Temperatures vary from -1.8°C to 11.9°C during the winter season, rising 18°C to 20.3°C during the summer season (Source: www.climate-data.org/).
Simbhanjiyang, Makwanpur district is inhabited by different ethnic groups as Tamang, Brahmin, Chhetri, Newar and others as Dalits. All of them are totally depended on either agriculture or livestock rearing. Some Newars and Dalits are involved in tourism and other business sectors at small scale.

**Fig. 1 – Map of study area**

**Sampling and morphological study**

The specimens were collected in rainy season from 2017 to 2019. The mushrooms were photographed in their natural habitat and the colour, shape, elevation, ecology, and habitats of each specimen were recorded. Delicate specimens were preserved in a liquid preservative as per Hawksworth et al. (1995) (25:5:70 ml of Rectified alcohol + formalin + distilled water), hard and woody specimens were air dried. The samples were identified using previous descriptions in taxonomical works as Singer (1952), Imazeki et al. (1988), Dickinson & Lucas (1979), Arora (1996), and Adhikari (2000, 2014). All the names and authors follow Index Fungorum (www.indexfungorum.org). The specimens were deposited in pathology laboratory at Central Department of Botany, Tribhuvan University, Kathmandu, Nepal.

**Ethnomycological study**

Prior consent of information (PIC) and required field permission were taken orally from the elder leader of ethnic community and forest users group. Five random individual interviews, a participatory discussions and a forest walk were done in each ethnic groups (Tamang, Chhetri and Newar) about the purpose of collecting mushrooms, cooking methods of raw mushrooms and how to identify edible and poisonous mushrooms. Rapid Rural Appraisal (RRA) and semi-structured open ended questionnaires (Martin 1995) were used. Respondents represented three ethnic groups (Tamang, Chhetri and Newar) and most ages between 20 and 50 years. Species recognition by local respondents was based on fresh samples and author’s photograph. All the ethics of traditional ethnic communities and ethnomycology were followed.
Results

Diversity of wild mushrooms

Forty-three species of mushroom were documented representing 22 families and 30 genera (Annex 2). *Amanita fulva*, *Boletus edulis*, *Calocybe chrysenteron*, *Helvellaatra*, *Leccinum rugosiceps*, *Lycoperdon perlatum*, *Russula cyanoxantha*, *Russula nigricans*, and *Russula rosea* were some common (Fig. 2) species meanwhile *Ganoderma tsugae* and *Ramaria aurea* were rare in distribution. Among forty-three species of mushroom, based on habitat fifteen species were saprophytes, eleven were mycorrhizal and two were parasitic as well as four species were either saprophytic or parasitic and eleven species were either saprophytic or mycorrhizal.

![Mushrooms](image)

**Fig. 2** – Some representative mushrooms from the study area: A) *Amanitafulva* Fr., B) *Amanita longistriata* S. Imai, C) *Rugosomyces chrysenteron* (Bull.) Bon., D) *Amanita pantheriana* (DC.) Krombh., E) *Ganoderma tsugae* Murrill, F) *Hygrocybe russocoriacea* (Berk. & T. K. Mill.) P. D. Orton & Watling., G) *Leccinum rugosiceps* (Peck) Singer, H) *Boletus edulis* Bull., I) *Lycoperdon perlatum* Pers., J) *Ramaria aurea* (Schaeff.) Quél., K) *Russula nigricans* Fr. and L) *Russula virescens* (Schaeff.) Fr.

Edible, medicinal and poisonous wild mushrooms

The results of the questionnaires and the bibliographic research showed that twenty-five species are edible, four are medicinal and four are poisonous wild mushroom. *Amanita fulva*, *Boletus edulis*, *Hydnum repandum*, *Laetiporus sulphureus*, *Marasmius oreades*, *Russula nigricans* and *Russula virescens* were recorded as edible among ethnic peoples of Simbhanjyang. *Amanita longistriata*, *Amanita pantherina*, *Helvellaatra* and *Inocybe rimosa* are poisonous mushrooms. *Fomes fomentarius* and *Trametes gibbosa* are non-poisonous mushroom but inedible due to its woody texture.
Indigenous knowledge on using wild mushrooms

A total of 15 random interviews were done following the questionnaire model (Annex 1) to people from the 3 different ethnic groups within the study area. Only 9 individual collects mushroom from the wild for their own use and remaining 6 collects for selling in the local markets. The purpose of mushroom harvesting was mostly as food which they eat as curry and soup. Women and men collect mushrooms along with firewood, cattle beddings gathering, tree shoots looping and herding activities. Ethnic people were totally dependent on traditional knowledge to identify edible and poisonous mushrooms. Ethnic communities of Simbhanjyang did not collect bright colour mushrooms. Mushroom pickers and ethnic people were well aware about the presence of poisonous mushrooms. Mostly Tamang and Newar ethnic group collect mushrooms than Chhetri whose knowledges were not so different from each other. Differences were found on the preferred edible species and mushroom picking practices. *Amanita fulva, Helvella elastica, Lycoperdon perlatum* and *L. pyriforme* young buds were consumed by Tamangs only whereas *Hydnum repandum* and *Marasmius oreades* were collected by Tamangs and Newars. *Boletus edulis, Laetiporus sulphureus, Russula nigricans* and *Russula virescens* were preferred by all three ethnic communities. Collection of mushrooms were either done in Awushii (no moon day) or Poornima (full moon day) based on their traditional beliefs among Tamangs and chhetris. There was no any document about the traditional knowledge and practices as this type of knowledge were transferred orally.

Chhetri and Newar communities boil it in water either with salt or ash from firewood before consuming most of the edible mushrooms to avoid possible poisoning risks. But Tamang people wash the raw mushrooms in clean water and avoid pre-boiling the raw mushroom before cooking as it decreases the natural taste of mushroom. According to some respondents from Tamang and Chhetri communities, the transfer of spores dust from poisonous mushroom to edible mushrooms naturally, the presence of poisonous small mushroom within the colony of edible mushroom and misidentification of edible mushrooms might be the cause for mushroom poisoning. So, they suggest proper identification and cleaning of collected raw mushroom before cooking is essential. Though people were dependent on their own knowledge to identify mushrooms, but this type of knowledge is not applicable for every mushroom species.

Discussion

Diversity of wild mushrooms

Forests of Simbhanjyang are rich in diversity of mushrooms as other forests within Nepal. We found twenty-five species as edible among forty-three species documented in Simbhanjyang, Makwanpur district whereas Christensen et al. (2008a) reported 228 edible mushrooms species and Adhikari (2012) reported 140 species within Nepal. *Boletus edulis* and *Laetiporus sulphureus* were commonly collected species in Symbhanjyang as in 14 districts within Nepal (Christensen et al. 2008a). *Helvella elastica* is not highly preferred but edible as in throughout the Himalaya (Lakhanpal 2000, Christensen et al. 2008b). *Boletus edulis, Hydnum repandum, Lactarius porinus*, *Laetiporus sulphureus, Leccinum rugosiceps, Marasmius oreades, Russula nigricans, Russula virescens* and *Suillellus queletii* were commonly used in Simbhanjyang are species that are commonly used all over the world (Imazeki et al. 1988, Kuo 2007, Christensen et al. 2008a).

Uses of the common mushrooms and ethnomycological knowledge

Ethnic communities depending on forest for their livelihoods and community forest users group are the wild mushroom collectors and consumers. We recorded *Amanita fulva, Boletus edulis, Hydnum repandum, Laetiporus sulphureus, Lycoperdon perlatum, L. pyriforme, Russula nigricans* and *Russula virescens* as edible species as reported by Pandey et al. (2006) and Christensen et al. (2008a). We did not record any uses for *Fomes fomentarius* which was recorded for making masks by the peoples in western and eastern region of Nepal by Adhikari (2014). Immature fruiting bodies of *Lycoperdon perlatum, L. pyriforme* and *Ramaria aurea* are popular
edible mushrooms only by Tamangs. This latter species is used by Tamangs as in other parts of the country (Joshi & Joshi 1999) but has been reported as poisonous in Japanese literature (Imazeki et al. 1988, Adhikari 2014). Young buds of *Ganoderma tsugae* were edible. Ethnic peoples of Simbhanjyang were unaware about medicinal uses of *Ganoderma tsugae* but they found it to be a medicinal mushroom as it was collected few years ago by traders. *Laetiporus sulphureus* is consumed by all three ethnic groups as previously by Adhikari et al. (2005) but ethnic peoples of Simbhanjyang did not recognize as medicinal mushrooms as reported by Pandey et al. (2006). Ethnic inhabitants did not consume *Exobasidium butleri* which was reported edible by Adhikari et al. (2005) and Adhikari (2014) who also recorded that some people squeezed the fruiting bodies to consume the watery content. *Laetiporus sulphureus*, *Lycoperdon perlatum* and *L. pyriforme* are edible species and were recorded with medicinal properties by Joshi & Joshi (1999), Adhikari et al. (2005) and Giri & Joshi (2008). Species of *Ramaria* were used as food and medicine in other parts of Nepal (Adhikari et al. 2005) but it has no such uses among ethnic communities of Simbhanjyang.

Ethnic people in Simbhanjyang did not consume *Lactarius porninsis*, *Leccinum rugosiceps* and *Pluteus salicinus* even though these mushrooms are considered edible in different parts of the world (Wang 2000, Kuo 2007, Konuk et al. 2006). *Amanita longistriata* and *Amanita pantherina* are considered as deadly poisonous species. *Amanita fulva* is edible after cooking properly as it belongs to poisonous genus *Amanita*. Mushroom harvesting and their use have become a part of rural culture without knowing their dietary importance (Giri & Rana 2008), anticaner, antioxidative and hypercholesterolic properties (Wong & Cheung 2001). Ethnic communities of Simbhanjyang follow their ancestral beliefs and use *Allium sativum* (Lasun), *Xanthoxylum armatum* (Aankhe Timur) and *Paris polyphylla* (Satuwa) to minimize possible mushroom poisoning as reported in different earlier findings (Adhikari et al. 2005, Devkota 2008). Until now they have not any fast and strong rule to differentiate the edible and poisonous mushroom.

**Conclusion**

Identification of mushroom in Simbhanjyang, Makwanpur district, central Nepal is based upon their ancestral knowledge and their own experiences. Local people and indigenous communities are unaware about the presence of other edible and highly medicinal species such as *Ramaria aurea* and *Ganoderma tsugae*. Proper study, documentation, identification, sustainable harvesting awareness and cultivation of common wild species of mushrooms can support the local economy as well as conservation of wild varieties. So, proper survey based in important species of fungi and their market is important. Involvement of both the ethnic communities and mycologist with their own level of knowledge can play pivotal role for the utilization and conservation of this valuable mushrooms as resources.

**Acknowledgements**

We are thankful to Central Department of Botany, Tribhuvan University for their administrative support. We are cordially thankful to Mr. S.R. Bista for his help and suggestions to preserve the collected specimens. The anonymous referees are also thanked for their constructive suggestions.

**References**

Adhikari MK. 1990 – The genus Russula from Nepal (II). In: Cryptograms of the Himalayas, Central and Eastern Nepal. M Watanabe and SB Malla (eds.). National Science Museum, Tsukuba. Japan, pp. 101–112.

Adhikari MK. 2000 – Mushrooms of Nepal. (G Durrieu, eds.) P.U Printers. Battisputali, Kathmandu, Nepal, pp. 236.

Adhikari MK. 2012 – Researches on the Nepalese Mycoflora – 2: Checklist of macrofungi (mushrooms). Kathmandu, Nepal: KS Adhikari.
Hijortsam K, Ryvarden L. 1984 – Some new and noteworthy Basidiomycetes (Aphyllophorales) from Nepal. Mycotaxon 20, 133–151.
Imazeki R, Otani Y, Hongo T. 1988 – Fungi of Japan. Yama-Kei Publisher, Tokyo.
Jha SN, Tripathi NN. 2012 – Diversity of macrofungi in Shivapuri National Park of Kathmandu valley, Nepal. Biological Forum: An International Journal 4(1), 27–34.
Joshi K, Joshi AR. 1999 – Ethnobotanical study of some mushrooms of two valleys (Kathmandu and Pokhara) of Nepal. Ethnobotany 11, 47–56.
Konuk M, Afyon A, Yağız D. 2006 – Chemical composition of some naturally growing and edible mushrooms. Pakistan Journal of Botany 38 (3), 799–804.
Kuo M. 2007 – 100 Edible Mushrooms. The University of Michigan Press.
Lakhanpal TN. 2000 – Wild and Cultivated mushrooms in Natural Resources and Development in Himalaya (ed.) Verma, LR Malhotra Publishing House, New Delhi (India).
Lloyd CG. 1808 – Mycological notes. Mycology.
Martin GJ. 1995 – Ethnobotany: A Methods manual. Chapman and Hall, London.
Miehe G, Miehe S, Bohner J, Baumler R et al. 2015 – Vegetation Ecology. In: Nepal: An introduction to the natural history, ecology and human environment of the Himalayas, A companion to the Flora of Nepal, (G. Miehe, C.A. Pendry and R.P. Chaudhary, eds.), Royal Botanic Garden Edinburgh, Edinburgh, UK, pp. 385–472.
Pandey BD.1976 – Survey collection preservation and identification of the mushrooms in Nepal. Nep. Jour. Agri 6,115–129.
Pandey N, Budhathoki U. 2007 – Status of ethnomycology in Nepal. Mycological research and mushroom production in Nepal, Mycol. Phytopath. Soc, pp. 51–60.
Pandey N, Devkota S, Christensen M, Budathoki U. 2006 – Use of Wild Mushrooms among the Tamangs of Nepal. Nepal Journal of Science and Technology 7, 96–104.
Rana P, Giri A. 2006 – Mushroom diversity in the Sagarmatha National Park and its buffer zone area. Banko Jankari 16(2), 17–24.
Singer R. 1952 – The Agaricales in modern taxonomy. Lilloa 22, 1–832.
Wang X. 2000 – A taxonomic study on some commercial species in the genus Lactarius (Agaricales) from Yunnan Province, China. Acta Botanica Yunnanica (in Chinese) 22(4), 419–27.
Waraitch KS, Thind KS. 1977 – Fungi of Nepal (Pezizales). Jour. Nat. Hist. Mus. 1, 21–34.
Wong WC, Cheung PCK. 2001 – Food and nutritional sciences programme. The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong, China.
Annex 1

Questionnaires for documenting ethnomycological information

Date……………………                  Locality………………
Name of Respondents…………………………………………………………
Age………………                                      Sex:   a) Male             b) Female
Occupations………………………       Cast/ Ethnicity………………
Education …………………………………..  

1. Do you collect the mushroom?
2. For what purpose you collect the mushroom?
3. In which season of the year collection is done?
4. Are there any rules to follow while collecting mushrooms?
5. Where do you collect the mushrooms from?
6. Which forest is good for mushroom collection?
7. Is every mushroom are edible?
8. Which mushrooms are highly preferred for collection?
9. Which mushroom is this as shown in the photograph or sample specimen?
10. Which one is edible, poisonous and inedible?
11. Which wood is better for mushrooms to thrive well in the wild?
12. Are there any mushroom having cultural belief and importance?
13. Do you collect the mushroom to sell in the market?
14. Who collects the mushroom?
15. Is there any medicinal use of these mushrooms and for what purpose do you use it?
16. When do you collect the mushroom?
17. How do you differentiate between edible and poisonous mushroom?
18. From whom did you get this type of knowledge about mushroom?
19. How to you collect and prepare mushrooms before eating?
20. Have you ever hear about mushroom poisoning?
21. How do you treat mushroom poisoning?
22. Is there any other use of the mushrooms?
23. Which colour mushrooms are edible?
24. Is it easy to find mushroom nowadays?
25. What is the status of mushroom in the forest?

Further questions can be raised based on the answers of the participants, their interest and knowledge level.
# Annex 2 Mushrooms reported from Simbhanjyang in wild.

| S.N. | Collection Number | Name                        | Family              | Common Name                                  | Ecology and Habitat substratum                              | Edibility         | Distribution in World                                      |
|------|-------------------|-----------------------------|---------------------|----------------------------------------------|------------------------------------------------------------|-------------------|-----------------------------------------------------------|
| 1    | BKS–5             | *Aleuria aurantia*          | Pyronemataceae      | Orange peel fungus (English)                 | Saprobic, on moist soil                                   | Edible            | North and South America, Europe, Japan, China, India and Nepal |
| 2    | BKS–2             | *Amanita fulva* Fr., 1815   | Amanitaceae         | Twany grisette, orange-brown ringless amanita (English), Gadha khaire chayu (Nepali) and Tahar shyamo (Tamang) | Mycorrhizal, growing on moist soil, in shady places, in Oak forest | Edible with proper care | North America, Europe, Japan and Nepal                      |
| 3    | BKS–9             | *Amanita longistriata* S. Imai, 1938 | Amanitaceae | Imai’s Slender Caesar (English), Khairo bhoot chayu (Nepali) | Mycorrhizal, growing on soil, in shady place under canopy of mixed forest | Poisonous         | Europe, Japan, China and Nepal                              |
| 4    | BKS–31            | *Amanita pantherina* (DC.) Krombh., 1846 | Amanitaceae | Panther cap and false blusher (English), Bhut chayu (Nepali) and Manga shyamo (Tamang) | Mycorrhizal, on moist soil in shady place, Oak and Pine forest | Poisonous         | North and South America, Europe, South Africa, Japan, North Asia and Nepal |
| 5    | BKS–5             | *Boletus edulis* Bull., 1782 | Boletaceae          | Dark cap, Tanned cep, Penny bun, cep, porcino or porcini (English) and Pho shyamo (Tamang) | Mycorrhizal, growing on soil, under the canopy of mixed forest | Edible            | Cosmopolitan                                               |
| 6    | BKS–37            | *Coltricia cinnamomea* (Jacq.) Murrill, 1904 | Hymenochaetaceae   | Coltricie, Shiny cinnamon polypore (English) and Imai’s Slender Caesar (English), Khairo bhoot chayu (Nepali) | Saprobic or mycorrhizal, on soil in moist oak forest | Unknown           | Worldwide                                                  |
| 7    | BKS–4             | *Coprinellus disseminates* (Pers.) J. E. Lange, 1938 | Psathyrellaceae    | Fairy ink cap, Little helmet, Fairy bonnet, Trooping crumble cap (English); Bagale setokalo chayu (Nepali). | Saprobic, on soil                                           | Unknown           | Worldwide                                                  |
| 8    | BKS–32            | *Crepidotus mollis* (Schaeff.) Staude, 1857 | Inocybaceae        | Peeling oysterling, Jelly cap, Flebby crepidotus and soft slipper (English). | Saprobic, on the dead trunk of oak tree                    | Unknown           | North America, Europe, Japan, China and Nepal              |
| 9    | BKS–43            | *Exobasidium butleri* Syd. & P. Syd., 1912 | Exobasidiaceae     | Pani pokey chayu (Nepali)                     | Parasitic on *Rhododendron* leaves                          | Edible            | India, Nepal                                               |

*(Note: Some common names are translations from Nepali or Tamang to English.)*
## Annex 2 Continued.

| S.N. | Collection Number | Name | Family | Common Name | Ecology and Habitat | Edibility | Distribution in World |
|------|-------------------|------|--------|--------------|---------------------|-----------|----------------------|
| 10   | BKS–8             | *Fomes fomentarius* (L.) Fr., 1849 | Polyporaceae | Hoof fungus, Timber bracket (English); Ghodatape chyau (Nepali). | Parasitic and saprobic, on the trunk of oak tree | Inedible | Worldwide |
| 11   | BKS–3             | *Ganoderma tsugae* Murrill, 1902 | Ganodermataceae | Hemlock varnish shelf (English) | Saprobic and parasitic, on *Pinus roxburghii* trunk and decaying woods | Edible at young stage | Europe, North-eastern North America, Japan and Nepal |
| 12   | BKS–34            | *Gomphidius maculatus* (Scop.) Fr., 1838 | Gomphidiaceae | Dark elfin saddle (English) | Saprobic or mycorrhizal, on moist soil, in oak forest | Edible | North America, Europe, Nepal |
| 13   | BKS–39            | *Helvella atrata* J. König, 1770 | Helvellaceae | Flexible *Helvella*, elastic saddlem, brown elfin saddle, elastic brain fungus (English) | Saprobic or mycorrhizal, on the mossy rocks, in canopy of mixed forest | Poisonous | North America, Europe, Japan, China, India and Nepal |
| 14   | BKS–36            | *Helvella elastica* Bull., 1785 | Helvellaceae | Saprobic or mycorrhizal, on moist soil among bryophytes under canopy of oak forest | Edible | North America, Europe, Japan, China, India and Nepal |
| 15   | BKS–10            | *Helvella* sp | Helvellaceae | Saprobic or mycorrhizal, on moist soil among mosses | Unknown | Europe, Asia, Nepal |
| 16   | BKS–20            | *Humaria hemisphaerica* (F. H. Wigg.) Fückel, 1870 | Pyronemataceae | Hairy fairy cup, Brown-haired fairy cup or Glazed cup (English) | Saprobic and mycorrhizal, on soil | Unknown | Europe, North America, Japan, India and Nepal |
| 17   | BKS–33            | *Hydnum repandum* L., 1753 | Hydnaceae | Sweet tooth, wood hedgehog or hedgehog mushroom (English), Chwali Ura shyamo (Tamang) | Mycorrhizal, in Oak forest, on soil | Edible | Europe, North America, South Australia, Japan and Nepal |
| 18   | BKS–13            | *Hygrocybe conica* (Schaeff.) P. Kumm., 1871 | Hygrophoraceae | Witch's hat, conical wax cap or conical slimy cap (English), Chuche rato kalo chyau (Nepali) | Mycorrhizal or saprobic, on soil in moist oak forest | Unknown | Europe, North and South America, Australia New Zealand, Japan, China, India and Nepal |
| S.N. | Collection Number | Name | Family | Common Name | Ecology and Habitat | Edibility | Distribution in World |
|------|-------------------|------|--------|-------------|---------------------|-----------|-----------------------|
| 19   | BKS–14            | *Hygrocybe miniata* (Fr.) P. Kumm., 1871 | Hygrophoraceae | Vermilion waxcap, Fading scarlet wax cap (English) and Wala shyamo (Tamang). | Saprobic, on soil in moist oak forest | Edible | Europe, North America, Japan, China, India and Nepal |
| 20   | BKS–12            | *Hygrocybe punicea* (Fr.) P. Kumm., 1871 | Hygrophoraceae | Crimson or Scarlet Waxy Cap (English) | Saprobic, on soil in moist oak forest | Edible | Europe, North America, Japan, China, India and Nepal |
| 21   | BKS–42            | *Hygrocybe russocoriacea* (Berk. & T. K. Mill.) P. D. Orton & Watling, 1969 | Hygrophoraceae | Cedarwood Waxcap (English) | Saprobic, on soil in oak forest | Unknown | Europe and Nepal |
| 22   | BKS–26            | *Inocybe rimosa* (Bull.) P. Kumm., 1871 | Inocybaceae | Silken haired (English) | Mycorrhizal, on moist soil under canopy of oaks | Poisonous | Europe and Nepal |
| 23   | BKS–27            | *Inonotus hispidus* (Bull.) P. Karst., 1879 | Hymenochaetaceae | Shaggy bracket (English) | Parasitic, on oak tree stump | Unknown | North America, Europe, Japan, India and Nepal |
| 24   | BKS–38            | *Lactarius pornisins* Rolland, 1890 | Russulaceae | Larch milkcap (English) | Mycorrhizal, on moist forest under the canopy of mixed forest | Edible | Europe, Japan, China and Nepal |
| 25   | BKS–41            | *Laetiporus sulphureus* (Bull.) Murrill, 1920 | Fomitopsidaceae | Chicken of the wood, Sulphur shelf (English), Rato khashru chyau, Bhalu chyau, Rato chayu (Nepali) and Phenji thanga shyamo (Tamang) | Saprobic and parasitic, on oak tree trunk | Edible | Worldwide |
| 26   | BKS–15            | *Leccinum rugosiceps* (Peck) Singer, 1945 | Boletaceae | Wrinkled *Leccinum* (English) | Mycorrhizal, on soil in moist dark Oak forest | Edible | Europe, North and South America, Japan and Nepal |
| 27   | BKS–30            | *Lepista nuda* (Bull.) Cooke, 1871 | Tricholomataceae | Wood blewit (English). | Saprobic, on moist soil | Unknown | North America, Europe, Australia and Nepal |
| 28   | BKS–16            | *Lycoperdon perlatum* Pers., 1796 | Agaricaceae | Warted puffball, gem-studded puffball or | Saprobic, growing among mosses on moist soil | Edible when young | North America, Europe, Tasmania, Africa, Australia, |
### Annex 2 Continued.

| S.N. | Collection Number | Name                          | Family            | Common Name                                                                 | Ecology and Habitat Substratum            | Edibility       | Distribution in World                                                                 |
|------|-------------------|-------------------------------|-------------------|-----------------------------------------------------------------------------|-------------------------------------------|-----------------|---------------------------------------------------------------------------------------|
| 29   | BKS–21            | *Lycoperdon pyriforme* Schaeff., 1774 | Agaricae          | the devil’s snuff-box (English), Patkey and Phusphusey Chyau (Nepali)       | under canopy of oak trees                | Edible when young | Japan, China, India, and Nepal                                                      |
| 30   | BKS–18            | *Marasmius oreades* (Bolton) Fr., 1836 | Marasmiaceae      | Pear-shaped puffball or stump puffball (English), Patkey and Phusphusey Chyau (Nepali) | Saprobic, on moist soil among mosses     | Edible          | Europe, Sino-Japan, Central and South East Asia, North America, Australia, Africa, Tasmania, New Zealand, Japan, Australia, China, India and Nepal |
| 31   | BKS–24            | *Mycena galericulata* (Scop.) Gray, 1821 | Mycenaceae        | Fairy ring champignon, Fairy ring mushroom, Scotch bonnet (English), Boody chyau (Nepali) | Saprobic, on soil                       | Edible          | North temperate region including Nepal                                               |
| 32   | BKS–25            | *Phylloporus bellus* (Massee) Corner, 1971 | Boletaceae        | Bonnet *Mycena*, common bonnet, the toque *Mycena*, or the rosy-gill fairy helmet (English) | Saprobic, growing on moist soil and decaying wooden logs | Edible          | North America, Europe, Japan, China, India and Nepal                                |
| 33   | BKS–28            | *Pluteus salicinus* (Pers.) P. Kumm., 1871 | Pluteaceae        | Knackers Crumpet (English)                                                  | Mycorrhizal, on soil in moist oak forest | Unknown         | Europe, Singapore, Japan, Malaysia, India, Bhutan and Nepal                           |
| 34   | BKS–19            | *Ramaria aurea* (Schaeff.) Quél., 1888 | Gomphaceae        | Golden Coral, Yellow Coral, Coral mushroom (English), Thakre chyau (Nepali) | Saprobic or mycorrhizal, on soil with high litter in Oak forest | Edible          | Europe, North America, Japan, India and Nepal                                       |
| 35   | BKS–7             | *Rugosomyces chrysenteron* (Bull.) Bon, 1991 | Lyophyllaceae     | Yellow domecap (English)                                                    | Mycorrhizal, on moist soil, under canopy of Oak forest | Edible          | Europe, North America and Northern Asia including Nepal                             |
### Annex 2 Continued.

| S.N. | Collection Number | Name | Family | Common Name | Ecology and Habitat substratum | Edibility | Distribution in World |
|------|-------------------|------|--------|-------------|--------------------------------|-----------|------------------------|
| 36   | BKS–35            | *Russula amoena* Quél., 1881 | Russulaceae | *Russula agreeable* (English) | Saprophytic, on soil in moist shady place, in mixed forest | Unknown   | North America, Europe, Japan, China and Nepal |
| 37   | BKS–11            | *Russula cyanoxantha* (Schaeff.) Fr., 1863 | Russulaceae | Variable *Russula*, Charcoal burner or Forked gill *Russula* (English) | Saprobic or mycorrhizal, on soil in moist shady place, in mixed forest | Edible    | Growing on soil in moist shady place, in mixed forest |
| 38   | BKS–40            | *Russula fragilis* Fr., 1838 | Russulaceae | Fragile brittle gill, Fragile *Russula* (English) | Saprobic, on moist soil in oak forest | Inedible  | North America, Europe, Japan, China, India and Nepal |
| 39   | BKS–21            | *Russula nigricans* Fr., 1838 | Russulaceae | Blackening brittle gill or blackening *Russula* (English), Haandi chyau(Nepali) | Mycorrhizal or saprophytic, on moist shady place | Edible    | Europe, North America, Japan and Nepal |
| 40   | BKS–17            | *Russula rosea* Pers., 1796 | Russulaceae | Beautiful *Russula*, Rosy *Russula*, Rosy brittle gill (English), Raktey shyamo (Nepali) | Saprobic, on soil in shady place | Edible    | Europe, North America, Japan, China and Nepal |
| 41   | BKS–23            | *Russula virescens* (Schaeff.) Fr., 1836 | Russulaceae | Green-cracking *Russula*, quilted green *Russula*, or green brittle gill (English), Maili shyamo (Tamang) | Mycorrhizal or saprobic, on soil in moist shady place in Oak forest | Edible    | Europe, North America, Japan, China and Nepal |
| 42   | BKS–6             | *Suillellus queletii* (Schulzer) Vizzini, Simonini & Gelardi, 2014 | Boletaceae | Deceiving bolete (English) | Mycorrhizal, growing on moist soil under the canopy of mixed forest | Edible    | Europe, North America, North Asia and Nepal |
| 43   | BKS–29            | *Trametes gibbosa* (Pers.) Fr., 1838 | Polyporaceae | Lumpy bracket, Gibbous polypore (English). | Saprobic and parasitic, on the trunk of oak tree | Unknown   | North America, Europe, Japan, China, India and Nepal |