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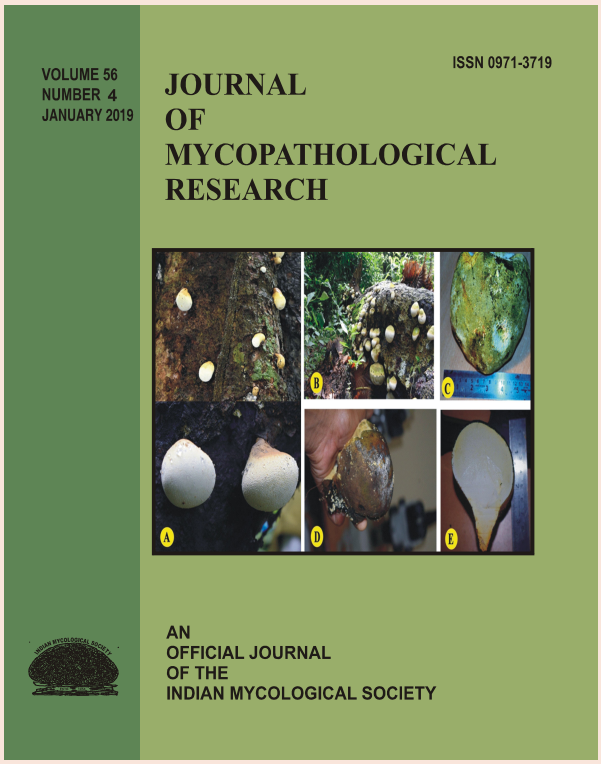

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Diversity of ethnomycologically important wild edible mushrooms from Kerala, India

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An ethnomycological study was conducted during the period 2014- 2017 among selected tribes in Attappadi and Wayanad area of Kerala by semi structured interviews and collection trials. The result revealed diversity in usage of wild edible mushrooms among tribes. Total 35 species of mushrooms were collected during the study which belongs to 6 orders 14families and 18 genera. High-quality digital images of mushrooms with details of morphology, ecology, and spore print colour can be accessed from *http://www.alberts.ac.in/botany/fungus*.

Key words: Diversity, ethnomycology, wild edible mushrooms, herbaria

INTRODUCTION

Western Ghats of Kerala is blessed with rich macro fungal diversity. Moist-deciduous and semi-evergreen forests support a maximum number of macrofungi. A total of more than 166 genera and 550 species of mushroom falling in 51 families belonging to Basidiomycota and Ascomycota have been reported from different forests of Kerala (Farook and Manimohan, 2013) of which almost 85 species are found to be edible (Vrinda, 2014). The taxonomic identification of almost 21 species of mushrooms of tribal importance was earlier reported by Pradeep *et al.* (2010) from Wayanad region.

Conservation of herbarium specimens resulting from biodiversity surveys is extremely important for scientific studies (Verkley *et al.* 2015). The specimens and the accompanying field notes document the existence of a fungus at a given place and time and provide the raw data from which taxonomic concepts are constructed. These specimens also furnish a dependable way to verify or correct the identity of organisms recorded in surveys or used in cytological, ecological, morphological, and molecular studies. Scientific specimens are also a source of DNA and other compounds for phylogenetic, ecological, and other studies (Bebber *et al*., 2010). Many herbaria today have initiated computerised data information systems to record and access the collection information of preserved specimens, as well as to access information from other collections worldwide, these digital herbariums improves availability of specimens to a wider audience (Sreekumar *et al.* 2017). This prevents damage to the invaluable specimens, save time and money of both herbarium management and user.

In order to get a comparative analysis of the usage and diversity of wild edible mushrooms among different tribal communities in the two districts of Kerala we have conducted ethnomycological survey and collection trials in six tribal communities ie. Irula, Muduga, Kurumba from Palakkad and Paniya, Kuruma, Kattunaikka from Wayanad districts and created herbarium of wild edible mushrooms in St.Alberts College Ernakulam, Kerala with its taxonomic details, habitat and ecology.

MATERIALS AND METHODS

Study area and tribes

Wayanad is located in the North east part of Kerala State lies between North latitudes 11°26´ to 12° 00´ and east longitudes 75° 75' to 76° 56´. The altitude varies from 700 to 2100 metres above Mean Sea Level (MSL). The moist deciduous for-

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est is the dominant vegetation type. Southern moist-mixed deciduous forests consists the evergreen families. The district abode socioeconomically and culturally different six tribal communities.The present study is among the three mycophilic communities Paniya, Kattunaikka and Kuruma .

Attappadi is an extension mountain valley of 731 Sq. Km in area lying at Western Ghats ranges located in the mid Eastern part of Kerala on the North east of Palakkad district adjoining Coimbatore and Nilgiri district of Tamil Nadu. The altitude varies between 750to 1664 meters above MSL. The region is drained by the two rivers, namely Bhavani and Siruvani. The forest area includes evergreen/ semi evergreen dense forest, evergreen /semi evergreen open forest and deciduous forest. Attappadi is a tribal area constituted by Agali, Pudur and Sholayar tribal villages. The three major tribal groups in Attapadi are Muduga, Irula and Kurumba. Irula is the largest group in Attappadi tribal area. Mudugas are the second largest group and Kurumbas are a small group in Attappadi tribal area. The Mudugas have the highest literacy. Kurumabas are the most primitive tribal group and they are still residing in the interior forest area (AHADS, 2004).

Survey, collection and identification of wild edible mushrooms

Stratified random surveys and interviews were conducted among selected individuals varying in ethnic group, age and gender. Interview also incorporated free listing of wild edible mushrooms. Transect walk and collection trials were carried out during the monsoon seasons of 2014-2016 through forest regions of Attappadi and Wayanad (Bernard, 2011). The collection of mushrooms and data recording for preparing herbaria were done according to the manual of Queensland herbarium with slight modifications (Leonard, 2010). The collected mushrooms and photographs were verified by cross checking between tribal groups. Collected mushrooms were identified based on spore print, macro and micro morphology. Scientific names were given according to Index Fungorum database (www.indexfungorum.org).

Drying and preserving of wild edible fungi for herbarium

For making macro fungal herbaria removed all the volatile substance (moisture) in suitable way to yield solid product. The temperature ranges from 40-70°C is kept for specimens so that DNA cannot be denatured (Wang et al. 2017). Photographs of the fresh specimen, dried specimens spore prints and field notes were filed on herbarium sheet and stored in big zip lock covers and freeze dried for 48 hours in -15 to - 20°C to remove pests and for additional protection without harming their microscopic features. The zip lock covers were then kept in moisture free racks with silica gel desiccant.

Digitalisation of herbaria

The digitisation of herbarium material involves the process of capturing data and images and storing them in digital form. The digital images were captured using i ball clickscan A3. High resolution images were uploaded on the St. Albert's College online herbarium web site. The website was in use and developed using standard open-source softwares such as Apache (htpp:// www.apache.org/) MySQL (http://www. mysql.com) and PHP (http://www. php.net/). The website provides basic and advanced search facilities. By clicking the links one can easily access the digital images and description of each mushroom.

RESULTS AND DISCUSSION

The survey was conducted among randomly selected 205 individuals in six tribal communities of Attapadi and Wayanad district of Kerala. Included both men and women in four age groups of class interval 15, starting from 10 (Table 1). Consumption of wild edible mushrooms by different tribal communities of Attappadi and Wayanad varies remarkably. All the respondents, regardless of their tribal communities, study site, age and gender knew about the edibility of mushrooms.19 species of wild edible mushrooms were used by Attappadi tribes for food ie. Kurumba (16), Irula (15) and Muduga (12). In Wayanad maximum usage was observed in Kattunaikka (30) followed by Paniya (22) and Kuruma (14).

Taxonomy of collected wild edible mushrooms

Total 35 species of mushrooms were collected during the study which belongs to 6 orders 14families and 18 genera (Table 2). The ecology and habitat of collected mushrooms were found to be varied (Shahina *et al.* 2018). At Attappadi maximum diversity of mushrooms observed in Anawai, Mele

Abbannoor and Manthammutty forest areas. Here the soil is black and with rich humus. The other areas were comparatively dry and either grasslands (Narasimukku, Padawayal) or plantations (Chittoor, Agali). Ponkuzhy, Kuzhimoola and Muthanga area of Wayanad were the main hot spots of wild edible mushrooms from Wayanad. Moisture content of fresh mushrooms varies 70-94% depending upon the species harvest time and environmental conditions.

Table 1: Age and gender wise informations of individuals participated in the ethnomycological survey

Age Class (yrs)	Gender	Attappadi			Wayanad		
		Irula	Muduga	Kurumba	Kuruma	Paniya	Kattunaikka
10-25	Male	7	3	3	3	3	5
	Female	5	4	4	5	4	4
26-41	Male	9	3	6	4	4	5
	Female	6	4	3	5	4	6
42-57	Male	6	4	6	4	4	5
	Female	6	5	3	5	4	5
>58	Male	4	3	3	2	3	5
	Female	5	4	4	2	3	2
Total persons (N= 205)		48	30	32	30	30	35

Mushroom taxonomic data along with high-quality digital images of mushrooms with details of morphology, ecology, spore print colour and ethnomycological uses can be accessed from http://www.alberts.ac.in/botany/fungus at present. This herbarium is registered to Index herborium, published by New York Botanical Garden, and can be accessed with acronym 'SAC'. The predominant families with maximum records represented are Lyophyllaceae (8), Polyporaceae (5), Pleurotaceae, Auriculaceae and Russulaceae (3).

The taxonomic description of fruiting bodies of mushroom collected during survey was as follows.

***Agaricus campestris* Schwein., Schr. naturf. Ges. Leipzig 1: 86 (60 of repr.) (1822)**

Basidiocarp medium sized. Pileus 5.36 - 6.2 cm diameter glabrous, initially globular later become broadly convex. Surface white to ash grey. Partial veil on button stage. Margins entire and slightly inrolled. Context was white and thick. Lamellae were free, closed, initially pink becoming dark brown to black. Stipe 2.00 - 4.00 cm x 0.33 - 0.96 cm in size, central and cylindrical. White ring present near the top which collapse easily. Spores were chocolate brown. Collected from Padawayal paddy fields, Kuzhimoola. Used by Irula, Muduga, Kuruma, Paniya, Kattunaikka

Agaricus species

Small sized basidiocarp. Pileus 3.2 - 4.0 cm diameter with smooth surface. Surface yellowish brown at centre and paler elsewhere. Margins regular and smooth. Lamellae adnate, closed white in colour became grey. Stipe 6-12 cm x 4-8 mm, thick, cylindrical and equal. Surface hairy, yellowish white, paler at apex, turns reddish blue on bruising. Thin white annulus changed to dark. Spore print dark brown /blackish.

Collected from: Kuzhimoola forest, Ponkuzhy. Used by Kattunaikka

***Macrolepiota procera* (Scop.) Singer, Pap. Mich. Acad. Sci. 32: 141 (1948) [1946]**

Basidiocarp was medium-large. Pileus 7.08 - 11.8 cm wide with flat umbo. Initially hemispherical become convex to plano-convex. Surface white often covered with light brown to brown. Small squamules, split and scattered due to the expan-

Table 2 : Order, family, genus and species of wild edible mushrooms used by Irula, Muduga, Kurumba, Paniya,Kuruma and Kattunaikka tribes of Palakkad and Wayanad Districts of Kerala

Order	*Family*	*Genera*	*Species*
Agaricales	Agaricaceae	Agaricus	*Agaricus campestris*
			Agarics species
		Macrolepiota	*Macrolepiota procera*
		Lycoperdon	*Lycoperdon species*
	Psathyrellaceae	Coprinellus	*Coprinellus micaceus*
	Mycenaceae	Favolaschia	*Favolaschia manipularis*
	Tricholomataceae	Lepista	*Lepista sordida*
	Physalacriaceae	Oudemansiella	*Oudemansiella canarii*
	Pleurotaceae	Pleurotus	*Pleurotus ostreatus*
			Pleurotus djamor
			Pleurotus flabellatus
	Schizophyllaceae	Schizophyllum	*Schizophyllum commune*
	Lyophyllaceae	Calocybe	*Calocybe* species
		Termitomyces	*Termitomyces microcarpus*
			Termitomycesmicrocarpus–large
			Termitomyces heimii
			Termitomyces clypeatus
			Termitomyces umkowaan
			Termitomyces eurrhizus
			Termitomyces entolomoides
	Pluteaceae	Volvariella	*Volvariella volvacea*
Auriculariales	Auriculaceae	Auricularia	*Auricularia auricula-judae*
			Auricularia delicata
			Auricularia nigricans
Boletales	Boletinellaceae	Phlebopus	*Phlebopus portentosus*
Chantharellales	Chantharallaceae	Cantherellus	*Cantharellus cibarius*
			Cantharellus minor
Polyporales	Polyporaceae	Lentinus	*Lentinus bambusinus*
			Lentinus sps
			Lentinus sajor-caju
			Lentinus squarrosulus
		Favolus	*Favolus tenuiculus*
Russulales	Russulaceae	Russula	*Russula congoana*
			Russula leelavathyi
			Russula sp

sion of fruit body. Disc smooth and brownish. Lamellae free to remote of various length, broad, densely crowded, thin and white. Stipe 15.37 - 18.59 cm, cylindrical with broadened base, covered with whitish to brownish squamules and hollow with age. Annulus superior white in colour, cottony, and movable on stipe. Easily collapsed due to handling. Spore print white, ellipsoidal with thick walled spores.

Collected from: Muthanga, Kuzhimoola. Used by Kattunaikka

Lycoperdon species

Basidiocarp pear shaped with flattened top, stem

like area at bottom, 1.8 - 2.02 diameter and 2.4 - 2.80 cm tall. Surface smooth, creamish white later yellowish white. Internal contents soft, white and fleshy. Later changed to yellowish or greenish yellow. The central pore ruptures at maturity. It has no stem but string-like attachments to the ground. Spore print olive brown.

Collected from Kuzhimoola. Used byIrula, Kuruma, Paniya, Kattunaikka

***Coprinellus micaceus* (Bull.) Vilgalys, Hopple & Jacq. Johnson, in Redhead, Vilgalys, Moncalvo, Johnson & Hopple, Taxon 50(1): 234 (2001).**

Basidiocarp small. Plieus 2.66 - 3.56 cm high and of similar diameter when open out. At first ovoid, covered with white granules, the remains of veil and then expand to bell shaped with split. Some times rolled back margin that is lined and grooved almost to centre. Cap colour ochre brown with a russet central eye and turns grey brown as it ages. Lamellae are adnate, close, moderately broad, white turning purple browned then blackening. Auto digesting and become a black inky fluid. Stipe 5.35 - 6.31 cm tall and 2.12 - 3.85 mm diameter.White discolouring to brown in lower part. Spore print is dark brown. Spores ellipsoidal to shed shaped.

Collected from: Anawai-Attappdadi. Used by Kurumba, Kattunaikka

***Favolaschia manipularis* (Berk.)Teng, Chung-kuo Ti Chen-chun,[Fungi of China]:760 (1963) Favolus manipularis Berk., Hooker's J. Bot. Kew Gard. Misc. 6: 229 (1854)**
***Filoboletus manipularis* (Berk.) Singer, Lloydia 8(3): 215 (1945).**

Small basidiocarp. Pileus 0.4-1cm diameter broadly convex to conically campanulate, umbonate, pale cinnamon pink at centre fading toward margin. Surface tessellate. Smooth, margin initially curved later straight. Pores white, slightly angular 0.91 ± 0.06 mm up to 3mm depth, radially arranged in rows. Flesh white, thin, and translucent. Stipe 3.95. ±0.84 cm x 12.25± 0.75 mm, cinnamon pink, central, cylindric, solid, hairy, equal and with thickened brown base. Pores luminiescent. Spore print white. Spores globose, thin walled. Hyphae hyaline, thin walled, both narrow and inflated hype present. Basidiomata smaller than chelocystedia. It is clavate with four basidiospore. Cheilocystidida diverticulate or irregularly branched. Clamp connections present.

The present specifies collected was compatible with the morphological features described by Vydrykova Et Al. (2014) And Manimohan And Leelavathy (1989) From Kerala.

Collected From: Arunamalaforest , Manthammutty. Used By Kattunaikka

***Lepista sordida* (Fr.) Sing. Lepista Sordida (schumach.) Singer, Lilloa 22: 193 (1951) [1949].**

Medium sized basidiocarp. Plieus 4.33 - 6 .08 cm in diameter, initially convex, become flattened. A central depression at maturity, slight umbo and a wavy margin. Surface soft, deep lilac in colour, turning brown from the centre. Lamellae crowded, greyish lilac fading to buff with age. Stipe 4.03 - 4.5 cm X 4.85 - 5.22 mm, fibrillose, lilac and white at base. No ring.

Mushroom flavoured. Spore Print creamy white. *Collected From:* Ponkuzhy. Used By Kuruma, Paniya, Kattunaikka

***Oudemansiella canarii* (Jungh.) Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 276 [2 Repr.] (1909)**

Medium sized basidiocarp. pileus 2.7 - 3.04 cm diameter, convex then applanate; surface white, glutinous when moist, smooth to rugulose. margin down-curved. context fleshy, white, partly gelatinized. lamellae adnexed to adnate, white to pale greyish. stipe 1.05 -1.82 cm x 1.25 - 2.49 mm, central, cylindric, attenuated above; surface white, shiny, finely satiate. spore print white.

Collected from :Ponkuzhi, Puthur Wayal, Manga Wayal. used by Kuruma, Paniya, Kattunaikka.

***Pleurotus ostreatus* (Jacq.) p. Kumm., Führ. Pilzk. (zerbst): 104 (1871)**

Basidiocarp were both medium and large. Pileus 5.58 - 9.28 cm in diameter reniform to convex with a shallow depression to infundibuliform; surface ash grey paler at centre, smooth, greasy margin inrolled to wavy. lamellae 3.8 - 7.8 cm, decurrent,

crowded, white. lamellulae present. stipe 1.86 ± 0.90 cm long and 0.5 - 0.75 cm thick. Eccentric to centric stem. flesh white and thick. smell pleasant mushroomy. spore print whitish grey. Spores 6.6 - 7.85 x 3.2 - 4.25 μm. cheilocystidia present, pleurocystidia absent.wide variation in colour, morphology, stalk size were observed in the collected specimens. this may be due to the difference in variety. *P. ostreatus* varied in stalk size, colour and or based on fructification temperature (marino *et al.*, 2003).

Collected from : Padavayal. Irula, Muduga, Kurumba

***Pleurotus djamor* (rumph. Ex Fr.) Boedijn, Rumphius Memorial Volume: 292.(1959)**

Basidiocarp medium sized. Pileus 2-4 cm, pink, at first kidney shaped, convex expanding to broadly convex to plane. margins enrolled at young then flattened and some times upturned at maturity. Lamellae pink, crowded running down, faded to cream colour. rudimentary and lateral stipe. Spore print white. Pleurotus djamor grows on dead wood either solitary or in tufts. The bright red colour differentiates it from other members of the genus pleurotus.

Collected From : Manthammutty, Muthanga. Used by Irula, Muduga, Kurumba, Paniya, Kattunaikka

***Pleurotus flabellatus Sacc.,* Syll. fung. (Abellini) 5: 369 (1887)**

Medium sized basidiocarp. Pileus 2.37 - 3.49 cm long and 3.2 ± 4.9 cm broad. Reniform to irregularly flabelliform with an attenuated base, white becoming yellowish/ivory at age. Surface convex and depressed towards base, smooth and glabrous; incurved margin but turned upward at maturity. Context thin and white. Lamellae decurrent, moderately crowded. Stipe absent or eccentric 0.03 - 0.55cm x 1.75 - 3.25 mm diam., finely tomentose. Spore print white.

Collected from: Athimoola, Puthurwayal. Used by Irula, Muduga, Kurumba, Paniya.

***Schizophyllum commune* Fr. [as 'Schizophyllus communis'], Observ. mycol. (Havniae) 1: 103 (1815)**

Basidiocarp small, fan shaped, or shell shaped. Pileus 2.25 - 3.7 cm diameter white to grey. Surface covered with small hairs, margin irregular. Lamellae folded, split down the middle, grey in colour. Stem absent. The basidiocarp consisting of only generative hyphae which were septate, thin walled, clamped and differentiated into thin basidia. Spore print white.

Collected from: Anawai, Muthanga. Used by Irula, Kurumba, Kuruma, Paniya, Kattunaikka

Calocybe indica Purkay. & A. Chandra, Trans. Br. mycol. Soc. 62(2): 415 (1974)

Large basidiocarp. Pileus 5-12 cm diameter, pure white, smooth and coriaceous. Globose at young, become convex, and plano covex. Margin wavy and incurved. Flesh thick, white and fibrillose. Lamellae free, white and crowded. Stipe 4 -12 cm x 4-8 cm thick. Tapered apex and swollen base. Surface concolourous with pileus. White scales on stipe at young. Spore print white. Spores ovoid. Collected from Attappadi. Used by Irula, Muduga.

Termitomyces microcarpus (Berk. & Broome) R. Heim, Arch. Mus. Hist. Nat. Paris, ser. 6 18: 128 (1942)

Synonym: Termitomyces microcarpus f. elongatus R. Heim, Arch. Mus. Hist. Nat. Paris, ser. 6 18: 132 (1942)

Small fleshy agaric with papillate umbo and pinkish white cap. Pileus 2.05 ± 0.62 cm diameter, at first campanulate later become planoconvex. Surface cream at the disk, whitish elsewhere. Soft,smooth, fleshy, dry, and glabrous. Margin straight entire, some times wavy.Context white. Lamellae free. White when young later pink. Stipe 4.1±1.70 cm x 1.76±0.69 mm, central, cylindric, equal or narrow towards the base. Surface white, fibrous, smooth. Veil absent. Pseudorrhiza absent. Spore print light pink. Cheilocystridia and pleurocystidia present.

Collected from: Manthammutty, Padawayal , Kuzhimoola. Used by Irula, Muduga, Kuruma, Paniya, Kuruma, Kattunaikka

Termitomyces microcarpus-large form (Berk. & Broome) R. Heim, C.r. Acad. Sci. Paris 213:147(1941)

Medium sized fleshy agaric, Pileus 1.3-3.8 cm di-

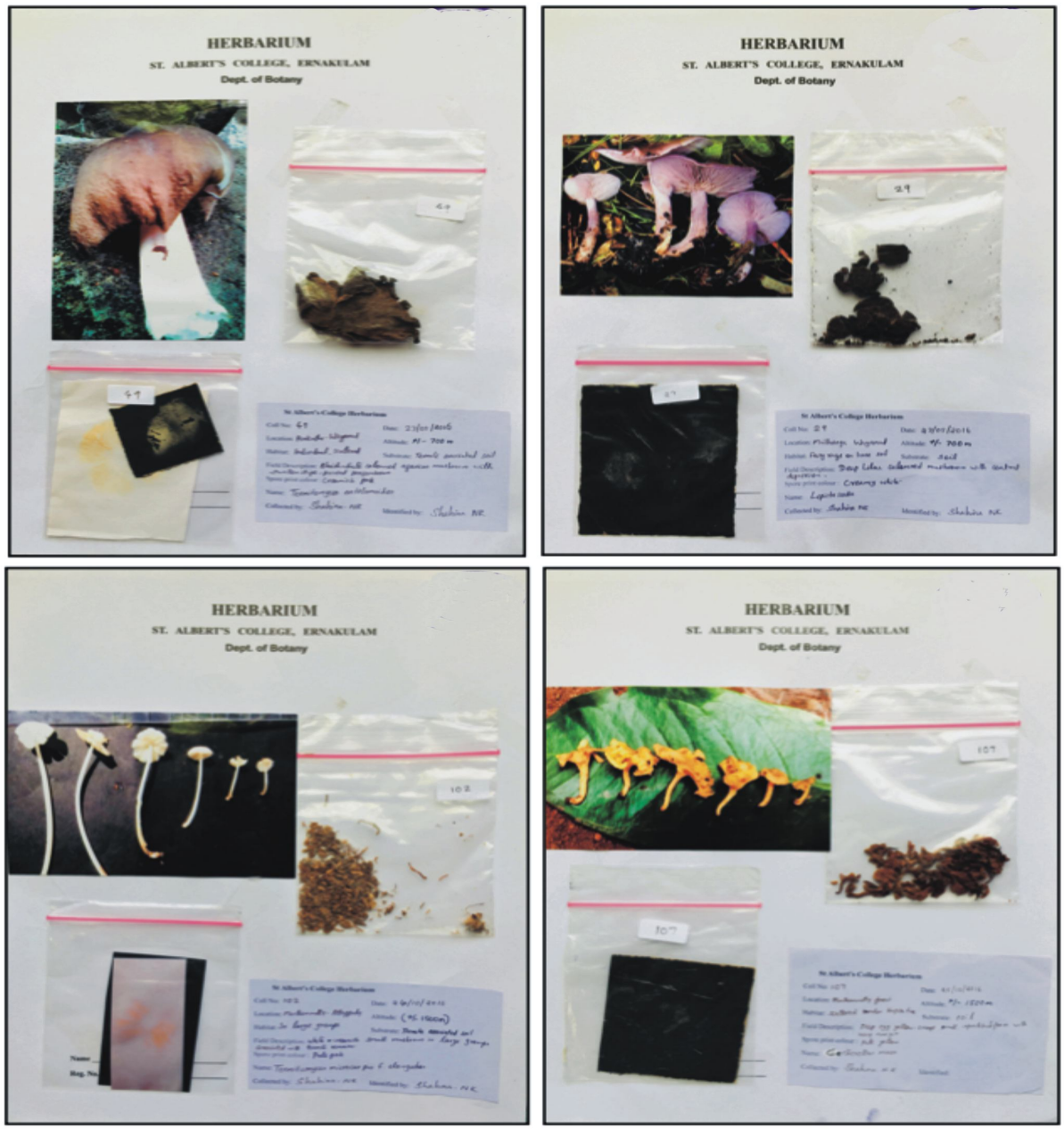

Fig. 1: Wild edible mushroom herbaria with photographs and field description

ameter at first campanulate becoming expanded with irregularly lobed margin. Acute papillate umbo; surface greyish at the disk, whitish elsewhere, streaked with grey. Dry, smooth and glabrous. Margin irregularly lobed and waved. Context white. Lamellae free to annexed, broad and moderately crowded. Initially white then changed to smoky white. Stipe 1.5-5.8 cm x 1.5-4 mm, equal or attenuated towards the base, central, cylindric. Surface white, fibrous, smooth. Veil and pseudorrhiza absent. Spore print light pink. Basidiospores 6.0–6.4 x 3.7–3.6 µm, broadly ellipsoidal and smooth.

Collected from: Kuzhimoola. Used by Irula, Kuruma, Paniya, Kuruma, Kattunaikka.

This mushroom differs from the closely related *T.medius* for being devoid of pseudorhiza. T. badius is another similar species but its pileus surface is buffy brown. The present specimen coincides with the description of Karun *et al.*, 2013.

Termitomyces heimii. **Natarajan, Mycologia 71(4):** 853 (1979)

Large fleshy agaric with whitish cap,broad greyish brown umbo. Plieus 8.87- 10.66 cm diameter, at

first subglobose becoming expanded with convex irregularly lobed margin. Surface smooth, silky, fibrillose and slimy when wet . Split margin and white context. Lamellae free, broad and crowded. White to pale pink with 3.55- 4.91 cm. Stipe 2.12 - 415 cm x 2.25±0.98 mm, central, cylindric long and thick base with long hollow pseudorhiza. Variation in size of pseudorhiza according to soil type. White, thick and persistant annulus. Spore print pink. Cheilocystridia and pleurocystidia present.

Collected from: Chittoor, Ponkuzhy. Used by Irula, Muduga, Kuruma, Paniya, Kuruma, Kattunaikka

Termitomyces clypeatus. **Heim, Bull. Jard. bot. Etat Brut. 21:207(1951)**

Medium sized basidiocarp. Pileus 3.92 - 5.33cm diameter at first pointed, conical and later expands to convex. A prominent pointed, acute umbo. Surface colour slightly varies as dark brown, greyish brown, buff brown or ash brown and fades to margin. Soft, fleshy, dry, silky and smooth cap becoming fibrillose. Margin incurved and irregularly lobed. Context white and firm. Lamellae free 3.7 ± 1.03 cm, slight pinkish. Stipe 2.14 - 5.62 cm x 4.14 - 6.68 mm, white, central, cylindric and solid with bulbous base. Long tapering pseudorrhiza. Spore print pale pink.

Collected from: Manthammutty, Padawayal, Anawai -Attappady, Kuzhimoola-Wayanad . Used by Irula, Muduga, Kuruma, Paniya, Kuruma, Kattunaikka

Widely distributed in the study sites. Observed slight variation in colour, shape of pileus and size of pseudorhiza. But overall the present samples collected were identical with the earlier reports (Sargunam *et al.* 2012).

Termitomyces umkowaan **(Cooke & Massee) D.A. Reid [as 'umkowaani'], Contr. Bolus Herb. 7: 118 (1975)**

Large fleshy agaric with yellowish brown cap. Pileus 5.5–11.2 cm diameter at first campanulate then expanded to shallowly convex to upturned. Spiniform to broadly conical umbo. Straight to incised or split margin. Surface radially wrinkled, smooth and slimy when wet. Context was white to creamy, moderately thick and fleshy. Lamellae white, free, broad, crowded, regular and short. Stipe 6.8–10.4 ×0.7–1.4 cm, central, cylindrical, long; bulbous base near the soil surface, with a long and brown pseudorhiza tapering downwards.Odour pleasant. Annulus absent. Spore print pink.

Collected from : Anawai forest. Used by Irula, Kuruma, Paniya, Kuruma, Kattunaikka

Termitomyces eurrhizus **(Berk.) R. Heim [as 'eurhizus'], Arch. Mus. Hist. Nat. Paris, ser. 6 18: 140 (1942).**

Large basidiocarp.Pileus 6-12 cm in diameter, vivacious brown, broad and greyish brown umbo. At first subglobose later expanded to planoconvex.Broad umbo. Margin crenate later upturned and irregularly lobed. Lamellae free, broad and moderately crowded, white to pale cream with 2-4 cm. Context white and thick. Stipe 5-15.2 cm x 1.6-1.7 mm, central, cylindric and slightly swollen or bulbous near the base with long and blackish pseudorhiza tapering down wards. Annulus absent. Spore print pink.
Collected from: Puthoor wayal, Kuzhimoola. Used by Kuruma, Paniya, Kuruma, Kattunaikka

Termitomyces entolomoides **R. Heim, Termites et Champignons (Paris): 52 (1977).**

Large agaricoid basidiocarp. Pileus 3-5 cm diameter, obtusely conical and finally expand with a reflexed margin. Ridged, pointed perforatorium; surface blackish gray with bluish tints, glabrous, finely striate, and rimose. Lamellae creamish, up to 8 mm wide, crowded, with lamellulae. Stipe 2-5 cm long, 1.5-4 cm thick, cylindrical, abruptly swollen at ground level, solid; surface white, fibrous-scaly, ridged. Pseudorhiza 2-6 cm long, tapering downward, grey. Partial veil absent.Sporeprint pink.

Collected from: Kuzhimoola. Used by Kattunaikka

Volvariella volvacea **(Bull.) Singer, Lilloa 22: 401 (1951) [1949]**

Large basidiocarp. Pileus 5-12 cm diameter. Egg shaped and blackish grey when young, later conical and become flat and brownish grey. Margin pale and irregularly lobed. Lamellae free, crowded and white, later changed to pink. Stipe 4 -12 cm x up to 1.2 cm thick. Tapered apex and swollen base, light brown in colour. Thick brown volva present. Flesh white. Spore print salmon pink.

Collected from: Puthoor wayal, Kuzhimoola . Used by Kuruma, Paniya.

***Auricularia auricula-judae* (Bull.) Quél., Enchir. fung. (Paris): 207 (1886).**

Basiiocarp tough and gelatinous. Surface reddish brown, sessile to substipitate, gathered together and attached at a central or lateral position. Pileus 4 - 4.56 cm diameter by 1.37 - 1.39 mm thick, minutely tomentose with fine hairs. Hymenium smooth. Spore print white.

Collections examined: Ponkuzhy, Manthammutty. Used by Irula, Muduga, Paniya, Kuruma, Kattunaikka

***Auricularia delicata* (Mont. ex Fr.) Henn., Bot. Jb.17: 492 (1893)**

Soft, rubbery and gelatinous basidiocarp. Surface transluscent and pinkish brown. Pileus 6 - 8.6 cm diameter and 1.27 - 1.56 mm thick. It was sessile, reniform to semicircular, glabrous and minutely tomentose. Hymenium conspicuously reticulated with veins. Hymenium surface pale pinkish cream to pale reddish brown. Margin smooth on young. Undulated or lobed when mature. Spore print white.

Collected from: Arunamala. Used by Irula, Muduga, Paniya, Kuruma, Kattunaikka

***Auricularia nigricans* (Sw.) Birkebak, Looney & Sánchez-García, in Looney, Birkebak & Matheny, N. Amer. Fungi.8(6): 12 (2013).**

Synonym: Auricularia auricula-judae var. polytricha (Mont.) Rick, in Rambo (Ed.), Iheringia, Sér. Bot. 2: 22 (1958).

Fruit body resupinate and dark brownish in colour. Surface elastic, gelatinous, hairy, silky, dark yellowish brown to dark brown. Hymenium smooth, or wrinkled, pale brown to dark brown to blackish brown with a whitish boom.Sometimes by a very short stalk. Spore print white.

Collected from: Manthammutty, Padawayal, Puthur. Used by Kurumba, Paniya, Kattunaikka

Phlebopus portentosus (Berk. & Broome) Boedijn, Sydowia 5(3-6): 218 (1951)

Large basidiocarp. Plies 8.37 ±16.69 cm diameter, convex becoming plano convex with a depression. Surface fleshy olive brown, slimy when wet, smooth and glabrous; margin involute. Context butter yellow. Hymenophore tubulate, lemon yellow 7.75 - 9.8 mm wide, bruised on cutting, pores greenish yellow. Stipe 5.1 - 7.25 cm x 3.37 - 4.5cm, central,cylindric with swollen base, solid; surface olive brown, bruised when cut. Spore print olive brown. Spores ovoid, olive brown.

Collected from: Thakarampady- Wayanad. Used by Paniya, Kuruma, Kattunaikka

***Cantharellus cibarius* Fr., Syst. mycol. (Lundae) 1: 318 (1821)**

Medium sized fruit body with distinctive colour and shape. Pileus 3.6 - 5.4cm diam. convex at first flattened with irregular incurved margin, later wavy and depressed at centre and become infundibuliform , surface deep egg yellow fading with age, hygrophanous, and glabrous. Margin incurved and enrolled. Lamellae false, narrow, irregularly forked, decurrent. Flesh yellow and thick. Stipe 4.6 - 5.6 cm x 7.8 - 9.8mm, central,cylindric, solid yellow. Context butter yellow. Spore print pale yellow. Spores ellipsoidal.

Collected from: Manthammutty hairpin, Ponkuzhy. Used by Paniya, Kattunaikka

***Cantharellus minor Peck,* Ann. Rep. Reg. N.Y. St. Mus.23: 122 (1872) [1870]**

Small basidiocarp. Pileus 0.95 - 1.82 cm diameter, convex at first shallowly depressed, later infundibuliform surface deep orange yellow fading with age to yellowish white, dry, and glabrous. Margin recurved. Lamellae false narrow, irregularly forked, decurrent. Flesh yellow and thick. Stipe 2.45 - 3.2 cm x 4.5 - 5.29 mm, central,cylindric, solid orange yellow. Context butter yellow. Spore print yellowish white. Spores broadly ellipsoidal 4.15 - 4.69 x 2.15 - 2.85 µm.

Collected from: Manthammutty hairpin, Ponkuzhy. Used by Kattunaikka.

***Lentinus bambusinus* T.K.A. Kumar & Manim., Mycotaxon 92: 119 (2005).**

Medium to large sized basidiocarp on bamboo stumps. Pileus 4 - 8.04 cm diameter, at first convex with a depression, infundibuliform at maturity, white with reddish tint at young become dull white

to yellowish white, fine squammules on young ones. Margin incurved and smooth at young later irregularly lobed. Lamellae free, close deeply decurrent.Surface yellowish white. Lamellulae present. Stipe 3.57 - 5.24 x 0.24 - 1.98 mm, central, cylindric, solid; surface whitish, become yellow or brown and tapering to the base. Context white. Spore print white, spores 4.78 - 0,71µm. Cheilocystidida 22 -23.4 µm and gloeocystidia 12 - 21.13 µm present.

Collected from: Ponkuzhy. Used by Paniya, Kattunaikka

***Lentinus sajor-caju* (Fr.) Fr., Epicr. syst. mycol. (Upsaliae): 393 (1838) [1836-1838].**

Medium sized basidiocarp. Pileus 4 - 5.8 cm, off-white, soft and leathery become hard at old, convex with a deep depression at centre hold water on rainy season. Pale brownish squammules at centre. Margin straight, entire to uplifted. Gills decurrent, off white, crowded with lamellula. Stipe central, cylindric with 3.33 - 4.5 cm x 1.3 - 1.57 mm diameter. Annulus present at apex. Spore print white.

Collected from: Muthanga. Used by Irula, Muduga, Kurumba, Paniya, Kattunaikka.

***Lentinus cladopus* Lév., Annls Sci. Nat., Bot., sér. 3 2: 174 (1844)**

Pileus 2-7cm in diameter,coriaceous, convex to depressed later infundibuliform; surface white, fine squamules, translucent, margin entire. Lamella short decent, pale cream to yellow. Stipe 2-8 cm long, equal, firm, solid, slender, white with back base. Spore print white, spores ellipsoid, thin walled. Basidiome with 4 stergmata. gill edges sterile. cheilocystedia abundant. Dimicdic hyphae with thick walled skeletal hyphae and generative hyphae. Caulocystedia present.

Collected from: Muthanga. Used by Paniya, Kattunaikka.

***Lentinus squarrosulus* Mont., Annls Sci. Nat., Bot., sér. 2 18: 21 (1842).**

Fruit body medium sized. Plies 11 - 12.56 cm. surface white or cream coloured, convex, become depressed, involute margin later down curved, thin and eventually lobed; lamella deeply decurrent, white. Stipe 1.05 -1.3 cm central or eccentric, solid and cylindric, tapering down wards and sometimes with a subglobose base. Spore print white cream coloured, spores ellipsoid.

Collected from: Padawayal. Used by Muduga, Kurumba.

***Favolus tenuiculus* P. Beauv., Fl. Oware 1(8): 74 [tab. 43, fig. 2] (1806).**

Synonym: Polyporus tenuiculus (Beauv.) Fr. Systema Mycologicum 1: 344 (1821).

Medium to large sized basidiocarp. Pileus 5.5 - 7.38 cm base to margin and 4 cm wide, glabrous, reniform, flabelliform to dimidiate, thin soft fleshy when fresh, brittle, cream coloured .Wavy smooth margin, sometimes lobed,incurved when dry. Reduced stipe with 1-2 mm x 2-3 mm thick, Pores large (2-4mmx1-2mm) radially arranged, hexagonal to radially elongated; soft concolorous with pileus 3-4 mm deep. Context thin white. Spore print white. Spores 20–30 × 6–8.5 µm cylindrical thin walled. Basidia clavate, with four sterigmata. Hyphae dimitic with generative and skeletal-binding hyphae. Clamp connection present.

Collected from: Anawai forest, Arunamala, Ponkuzhy. Used by Kattunaikka.

***Russula congoana* Pat., Bulletin de la Société Mycologique de France 30 (3): 336 (1914).**

Medium sized basidiocarp. Pileus 3.5 - 4.38 cm in diameter, convex with a central depression or slightly infundibuliform. Surface pastel red, smooth and striate. Sticky so soil particle mostly attached. Lamella adnate, gills 5.05 ±5.95 cm wide, entire. Stipe solid become hollow 2.32 ± 4.1 cm x 6 - 7.2 mm, central, cylindric, equal. Surface creamy white with pinkish tint on base. Spore print white.

Collected from: examined: Ponkuzhy. Used by Kattunaikka.

***Russula leelavathyi* K.B. Vrinda, C.K. Pradeep & T.K. Abraham, Mycotaxon 62: 389 (1997).**

Medium sized basidiocarp. Pileus 3.66 -4.15 cm

diameter fleshy, convex then expanded with a central depression; surface white, patches of ivory squamules on centre, entire at the disk; margin radially striate, upturned; gelatinized under wet weather. Lamellae decurrent, white, up to 4 mm wide, crowded. The bifurcated lamellae together with lack of lamellulae. Stipe 3.33 - 4.57 cm diameter. circular and ventriculose. Spore print white.

Collected from: Ponkuzhy. Used by Paniya, Kattunaikka.

***Russula* sp.**

Medium sized basidiocarp. Pileus 4.26 -4.85 cm diameter, fleshy, convex then expanded with a central depression; surface ash with yellowish tint. Entire at the disk; margin radially striate, upturned; gelatinized under wet weather. Lamellae decurrent, white, up to 4.3 mm wide, crowded. The bifurcated lamellae together with lack of lamellulae. Stipe 3.5 - 4.8 cm diameter. circular and ventriculose. Spore print white.
Collected from: Ponkuzhy. Used by Kattunaikka.

This study documents the diversity of usage of wild edible mushrooms among different tribal communities in Kerala. Four wild edible species, *Auricularia delicata, Favolus tenuiculus, Schizophyllum commune* and *Favolaschia manipularis* so far not recorded among the list of edible mushrooms of Kerala (Vrinda, 2014) were collected and studied. The preservation of wild edible mushrooms of tribal importance as herbaria and digitalisation of it act as a reference material for public and useful for people studying ethnomycology, fungal biology and systematics. A regular updating of this database will provide access to data on mushroom diversity of a region(s).

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