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Edible mushrooms gathered by the Asháninka people in Peruvian Amazonia: the dominance of lignicolous taxa

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Abstract: Information on edible mushrooms among the indigenous societies of South America's lowlands is scarce. Recent studies suggest that indigenous Amazonian groups exhibit a spectrum ranging from intense mycophobia to mild mycophilia. The Asháninka people, who belong to the Arawak language family, are the largest group in the Peruvian Amazonia. They have inhabited the tributaries of the Ucayali River for centuries, mainly dedicating themselves to horticulture and fishing, with a lesser emphasis on foraging. This is the first study of edible mushroom gathering and consumption among the Asháninka people and the second among Arawakan groups in the Peruvian Amazonia. Field research was conducted in the Asháninka communities of Upper Peruvian Amazonia in 2022 and 2024. Taxonomic identification was based on DNA barcoding. The Asháninka collect and consume over ten species of edible lignicolous fungi. This is the first recorded instance of *Cookeina* spp. consumption in the Peruvian Amazonia. The mushrooms are primarily consumed in soups, baked in leaf wraps over embers, or fried with eggs during the wet season (December–May). Our findings contradict previous assumptions of Amazonian indigenous mycophobia. We hypothesise that the absence of ectomycorrhizal mushrooms in this society and other Amazonian groups is due to the scarcity of ectomycorrhysis in the Neotropics rather than mycophobia among the local human populations.

Keywords: ethnomycology, indigenous Amazonia, edible lignicolous fungi, Macromycetes, saprotrophic fungi

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Introduction

Mushrooms are eaten world-wide (Boa; 2004; Kaliyaperumal et al., 2018), but their use is patchy. While in some areas and cultures numerous species of wild mushrooms are gathered and eaten, in others they are avoided. These two contrasting patterns are called mycophilia and mycophobia (Wasson & Wasson, 1957; Yamin-Pasternak, 2011; Ruan-Soto et al., 2013; Mapes, 2002). In Central America, particularly Mexico, mushrooms are widely consumed (Garibay-Orijel et al., 2007; Shepard et al., 2008), although some socio-ecological differences exist, especially between lowlands and highlands (Ruan-Soto et al., 2025). Within the Neotropics, the Mesoamerican lowlands have been best studied, with 37 ethnomycological publications to date (Ruan-Soto et al., 2025). The Lacandon Maya people in southeastern Mexico name and distinguish over 160 taxa (Ruan-Soto et al., 2021).There is some evidence on the use of edible fungi in Guatemala, El Salvador and Honduras as well (Escobar & Toledo, 1977; Bran et al., 2003; Sánchez, 2013).

In the Neotropics of South America, we have much less evidence of gathering and culinary use of mushrooms. For decades, Amazonia has been considered a mycophobic region in which indigenous cultures avoid mushroom consumption (Fidalgo, 1968; da Silva et al., 2024). This may be due to larger ethnobotanical research interest as compared to ethnomycological interest, coupled with a relatively small number of mycologists working with indigenous societies. Moreover, the lack of interest in the study of mushrooms is in line with the avoidance of this class of organism for consumption by the natives of the Amazonian region (Zent et al., 2004). For instance, anthropologists noticed that mushrooms were considered a food of malevolent forest spirits, who predated humans in the animistic scope of relations between humans and non-humans (Wilbert, 1992; Zent et al., 2004). This approach may show cultural reluctance, expressed in food proscriptions, towards these groups of organisms in the native Amazonia. However, since the 21st century, there has been growing ethnomycological interest not only in the lowlands of South America, but in the Neotropics as a whole (Cifuentes Castillo et al., 2024; Ruan-Soto et al., 2025). Studies have confirmed the aforementioned contrastive gathering and consumption patterns of wild fungi among indigenous societies in this region of the world. For instance, in the Venezuelan parts of Amazonia, the Piaroa people eat only one species of mushroom – wood ears *Auricularia delicata* (Berk.) Ryvarden – and avoid other mushrooms, while the Hoti (Joti) gather at least 13 different mushroom species for culinary use (Zent et al., 2004; Zent, 2008). Both groups were traditionally hunters and gatherers. The Hoti and the Yanomami are probably the most mycophilous Amazonian tribes (Fidalgo & Prance, 1976; Prance, 1972, 1984; Zent et al., 2004). In Peruvian Amazonia, our study area, three ethnomycological studies have been published amongst the Machiguenga from the Manu Biosphere Reserve (southern Peruvian Amazonia) and Aguaruna-Huambisa from the northern parts of Peruvian Amazonia (Rodríguez & Rodríguez, 1998; Dávila-Arenas et al., 2013; Roca Alcázar, 2013). Between 35 and 40 edible and medicinal fungi species have been recorded in Peru (Holgado-Rojas et al., 2025), which may be an underestimation. A recent list of edible mushrooms gathered in Ecuador (Cifuentes Castillo et al., 2024) emphasised the poor existing knowledge on the ethnomycology of lowland South America.

Some researchers (Fidalgo, 1965, 1968; Prance, 1984; Iturriaga et al., 1991) have encouraged ethnomycological studies in the Neotropics, suggesting that fungi may provide an important resource during food shortages in these parts of the world. Recently, Ruan-Soto et al. (2025) published an overview of the use of edible fungi in the Neotropics, showing several examples of communities utilizing edible mushrooms. They concluded that all or nearly all of the species used are lignicolous mushrooms (i.e. grow on wood). The authors explained this as an adaptation to the presence of large amounts of decaying wood in humid tropical forests.

In 2016–2018, 2022 and 2024 one of the authors (M.K) conducted extensive fieldwork among the Asháninka people in Peru (Kujawska, 2019; Kujawska et al., 2020; Kujawska et al., 2023; Kujawska & Albán-Castillo, 2025). During forest walks to collect medicinal and wild edible plants, the author observed that the Asháninka people would also gather mushrooms, which they wrapped in large leaves tangled in thin lianas and took home for later consumption. With this contribution, we aim to expand scientific understanding of ethnomycological knowledge by exploring the case of the Asháninka people, the largest indigenous Peruvian Amazonian society. The aim was therefore to document, identify and analyse the mushroom species known, gathered and used for culinary purposes by the Asháninka people from the central Upper Peruvian Amazonia, and discuss the findings in relation to other ethnomycological studies performed in the Neotropics.

Material and methods

Study area and its people

Amazonia covers 61% of the Peruvian territory (IBC, 2006). This region is populated by 51 different

indigenous groups speaking 44 different languages. These groups account for 213 000 people altogether (INEI, 2017). According to the latest census, the Asháninka account for 118,000 members (INEI, 2017), and are the most numerous Peruvian Amazonian society. The Asháninka inhabit Upper Amazonia in Peru (*Selva Central*), particularly the navigable tributaries of the Upper Ucayali River (Veber, 2003; Varese, 2006). The Tambo River, our study area, is dominated by tropical forest, ecologically ranging from premontane very humid forests (Span. *bosque muy humedo premontano*) up to Amazonian humid forests (Span. *bosques húmedos amazónicos*) (Britto, 2017). The mean annual precipitation is 1500 mm, and the average monthly temperature is between 25 °C and 27 °C, with min. 18 °C and max. 36 °C (Rodríguez, 2008). Wet and dry seasons are distinguished, and they influence agricultural, fishing and foraging activities.

The Asháninka have inhabited the Tambo River for centuries, practicing horticulture as their main form of subsistence, and cultivating sweet cassava (*Manihot esculenta* Crantz) as their staple plant (Weiss, 2005; Rojas Zolezzi, 2014). Nowadays they live distributed across 52 native communities affiliated with the Central Asháninka del Río Tambo (CART). The Tambo river area is a buffer zone of the Otishi National Park (Caruso, 2011). The communities are relatively large, numbering between 200 and 3000 inhabitants. In every community there is at least a primary school, basic ambulatory healthcare and a medicine dispensary. While each community has a collectively governed population centre and community forest reserve, agriculture on farms is developed individually (Araujo, 2022). Nowadays, the Asháninka move on a scale between self-subsistence and market economy. Since 2006 the local economy has been driven by cocoa (*Theobroma cacao* L.) cash crop cultivation, but the Asháninka still partly rely on self-subsistence (Araujo, 2022; Peralta & Kainer, 2008). Second to agricultural occupation is fishing practised during the dry season. Hunting particularly persists in small communities, where the forest is better preserved than around larger settlements. Foraging for edible larvae, palm hearts, wild honey, fruits and mushrooms in the forest is also seasonal, and grows in importance when fishing ceases in the wet season. The Asháninka, similarly to other Amazonian groups, are an animistic society, which means that they extend social relations to non-human organisms within their ontological scheme of relations (Descola, 2005; Santos-Granero, 2012). Two prevailing modes of relation with non-humans are predation (e.g. with malevolent forest spirits, forest animals) and reciprocity (e.g. with all domesticated and cultivated plants, some forest plants). Asháninka myths dedicate practically no space to mushrooms, their origins, powers or uses. In this context, it is worth mentioning that, when analysing the uses and properties of plants and mushrooms in animist societies such as the Asháninka, researchers should consider not only environmental adaptive mechanisms, but also ontology and native cosmology, as these influence food taboos and concepts of edibility (Descola, 2005; Rojas Zolezzi, 2014). This may partly explain why we find both mycophobic and mildly mycophilic indigenous groups living next to each other with access to similar resources in the Amazonian biome.

Data collection

The research on edible mushrooms was embedded in a larger project dedicated to edible and medicinal plants of the Asháninka people along the Tambo River, Department Junín, Upper Peruvian Amazonia. The data on mushrooms and voucher specimens were collected in the final stage of the project in 2022 and 2024 within three fieldworks: April–May and September–October 2022 and May 2024, which corresponds with the end of the wet season (April–May) and the dry season (June–October). The information, photographs and specimens were obtained during guided walks in the forest with the Asháninka collaborators. The specimens were collected during 15 walks in the forest in nine Asháninka communities along the Tambo River (Anapate, Capitiri, Charahuaja, Oviri, Marankiari, Poyeni, Sabareni, Selva Verde, Shevoja) with 16 study participants, mainly in April and May 2022 and in 2024 (Fig. 1). These were joint walks to collect information and specimens of forest plants and mushrooms. There was no particular selection scheme for participants, but rather we relied on volunteers who could dedicate their time and had knowledge of plants and mushrooms. Additionally, we consulted the mushrooms' names, their occurrence and forms of preparation with people in the communities by showing them fresh specimens. Moreover, we conducted participant observation by documenting mushroom preparation in Asháninka homes and taking part in their consumption during meals (Fig. 2).

The specimens were dried without using alcohol. They were deposited in the Herbario USM del Museo de Historia Natural, la Universidad Nacional Mayor de San Marcos in Lima (USM). The names used in the text follow https://www.mycobank.org/.

All the necessary permits for conducting the fieldwork and collecting herbarium and fungus specimens were obtained from SERFOR in the Peruvian Ministry of Agriculture (RD N° D000163-2022-MIDAGRI-SERFOR-DGGSPFFS-DGSPF). Prior to commencement of the study, written informed consents were obtained from Central Asháninka del Río Tambo (CART), and from the authorities of each native

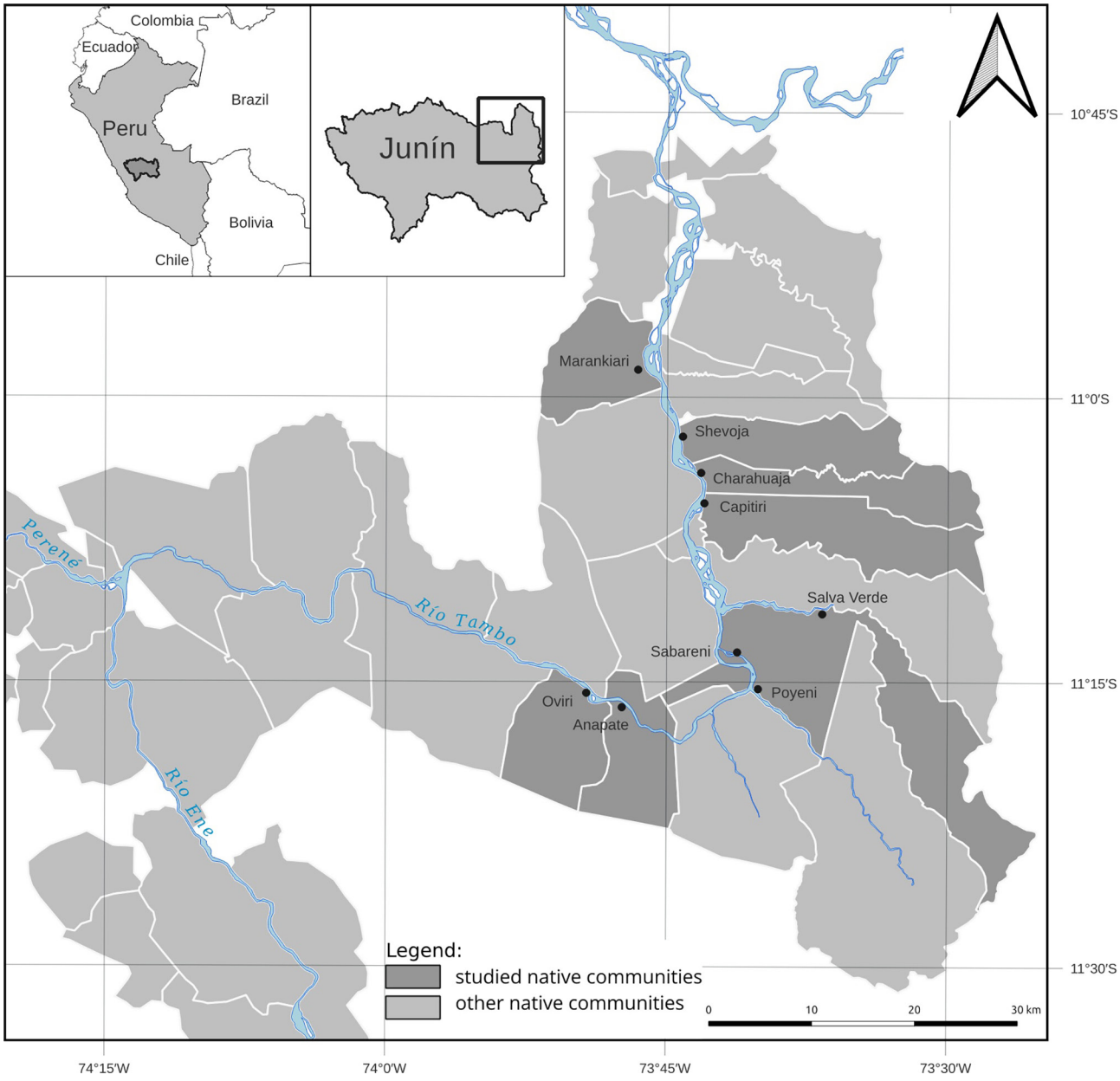

Fig. 1. Map of the study area: Tambo River, Upper Amazonia (*Selva Central*), Peru

Fig. 2. Collecting mushroom specimens during guided walks to the forest. Left: *tsorero* (cf. *Lentinula raphanica*) and *choyempitoki* (*Cookeina* spp.). Right: collecting *tontari* (*Favolus tenuiculus*)

community. Prior oral informed consents were obtained from each adult Asháninka person who volunteered to participate in the study.

Data analysis

Fungi vouchers were identified with DNA barcoding (Schoch et al., 2012; Schindel & Miller, 2005), following the guidelines of widely accepted methods for the DNA barcoding of fungi (Eberhardt, 2012). The DNA was extracted from a small part of the sporocarp using a Plant and Fungi DNA Purification Kit (Eurx), following standard protocol. The PCR cocktail consisted of a 4 µl DNA extract, 0.5 µl of each of the primers (ITS5/ITS1f and ITS4 in 10 nmol concentration) and a 5 µl Type-it Microsatellite PCR Kit (Qiagen). PCR was carried out using the following thermocycling conditions: an initial 15 min at 95 °C, followed by 35 cycles at 95 °C for 30 s, 55 °C for 30 s, 72 °C for 1 min, and a final cycle of 10 min at 72 °C. The PCR products were estimated by running a 2 µl DNA amplicon on 1.5% agarose gel for 30 min. The PCR products were sequenced using ITS4 or ITS5 primers. We compared the obtained sequences with published sequences in BOLD Systems databases (BOLD Systems v5). The analysis was performed by selecting the fungi database and the rapid species search option, using the default settings (Search Depth: 94% similarity, Max Hits: 25 per sequence, Min Overlap: 100, Max Submission: 1000 sequences, average analysis time: 1s/sequence).

The use of identified mushroom species was searched in the available literature from the Neotropics, and especially Amazonia, as well as from other tropical areas, particularly south-east Asia.

Results

The Asháninka people gather and consume at least ten different species of mushrooms (Table 1). As some ethnotaxa may comprise more species from the same genus, the total list could be longer (Fig. 3). The Asháninka umbrella names for edible mushrooms are *cajebi* and *shitobi*, which are used as synonyms. Apart from these generic names, each mushroom also has a specific name that usually has a one-to-one correspondence to a scientific genus. There is a large consensus on mushroom names between villages and communities, especially for the most appreciated and consumed mushrooms, such as *tsorero*, *tontari*, *choyempitoki*, but some degree of intercommunity polysemy also exists. The names of the best known and used mushrooms, such as *tsorero*, *tontari, tsorompi*, *tsebiki* and *choyempitoki* are non-analyzable lexemes. Other names, such as *kontsarojebi*

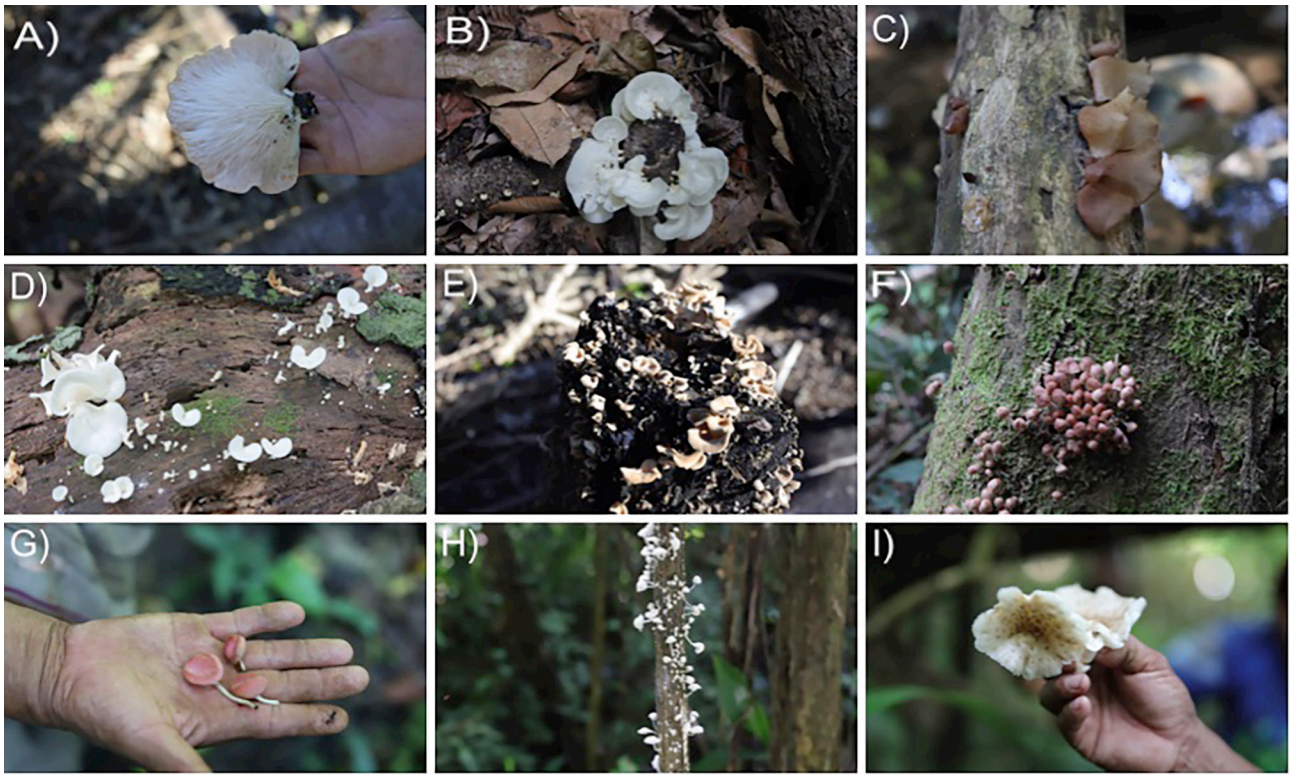

Fig. 3. Photographs of the collected mushroom species: A) shintipa (*Pleurotus djamor*), B) tontari (*Favolus tenuiculus*), C) tsorompi (*Auricularia fuscosuccinea*), D) chokempi (*Favolus brasilensis*), E) meshiapi (*Panus* sp,), F) shintijebi (*Candolleomyces candolleanus*), G) choyempitoki (*Cookeina* sp.), H) tsebiki (*Paramarasmius palmivorus*), I) tsorero (cf. *Lentinula raphanica*)

Table 1. Edible mushroom species used by the Asháninka people in the Tambo River region, Upper Peruvian Amazoni

Scientific name and voucher number	Asháninka name	Description and use	Community	DNA identification, level of confidence	Process ID (Boldsystems)	Other data on the species' culinary use
Auricularia fuscosuccinea (Mont.) Henn. and possibly other species from the genus Auriculariales, Auriculariaceae, USM 363667	tsorompi, ibanki pijirikempita	This light or dark brown phlegmy mushroom grows large, but is preferably collected when small or medium-sized (up to 5 cm). It grows on rotten trunks in primary and secondary growth forests. It can be wrapped in leaves and baked in embers, or cooked by placing the mushrooms on a nearby trunk over a fire.	Oviri, Shevoja, Capitiri	99.4%	ASHM001-26	The genus is widely eaten in Asia and locally also in Africa (Boa, 2004)
Candolleomyces cf *candolleanus* (Fr.) D. Wächt. & A. Melzer (syn. *Psathyrella candolleana* (Fr.) Maire, Agaricales, Psathyrellaceae, USM363672	shantijebi	This small, brown mushroom grows on tree trunks in primary forests. It has only been indicated as edible by one person.	Capitiri	97.0 %	ASHM002-26	Hong Kong (Chang & Mao, 1995); Mozambique (Wilson et al., 1989); Malawi (Rammeloo & Waleyn, 1993)
Cookeina speciosa (Fr.) Dennis,, Pezizales, Sarcoscyphaceae, USM 363675	choyempitoki	This orange or pink fungus grows on dead trunks or directly from the ground. Its caps are up to 3.5 cm in diameter. It can be wrapped in leaves and baked in embers or fried with vegetables.	Marankiari	100%	ASHM003-26	Andes-Amazon piedmont in Ecuador, Kichwa communities (Vicente-Pérez et al., 2024)
Cookeina cf *tricholoma* (Mont.) Kuntze, Pezizales, Sarcoscyphaceae, USM 363664	choyempitoki	These relatively small mushrooms have a cap diameter of 1–3 cm when collected, and are orange or pink. They grow directly from the ground in the forest or on rotten trunks. The Asháninka distinguish two different varieties, both of which have the same vernacular name. This variety has tiny hairs on the rim of the cap and is very commonly used by the Asháninka, who wrap it in leaves and bake it in embers or fry it in a pan.	Poyeni, Oviri, Capitiri, Shevoja, Selva Verde	80.0%*	ASHM004-26	Cameroon (van Dijk et al., 2003)
Favolus brasilensis (Fr.) Fr., Polyporales, Polyporaceae, USM 363676	chokempi, shokempi	This is a relatively small to medium-sized (4 cm diameter) white, fleshy mushroom that grows on rotten trunks in primary and secondary old-growth forests. It can be wrapped in leaves and baked on embers or fried in a pan.	Selva Verde	99.2%	ASHM005-26	Eaten in other parts of the Peruvian Amazonia (Dávila-Arenas et al., 2013); and in Brazilian Amazonia (de Melo e Silva-Neto et al., 2021)
Favolus tenuiculus P. Beauv. (syn. *Polyporus brasiliensis* (Fr.) Corner,), Polyporales, Polyporaceae, USM 363666	tontari	This relatively small mushroom grows on rotten tree trunks in both primary and secondary forests. It can be collected in both the wet and dry seasons. It is wrapped in leaves and baked on embers or fried in a pan.	Oviri, Selva Verde	100%	ASHM006-26	

Scientific name and voucher number	Asháninka name	Description and use	Community	DNA identification, level of confidence	Process ID (Boldsystems)	Other data on the species' culinary use
Panus sp, Polyporales, Panaceae, USM 363673	meshiapi	A light brown, medium-sized mushroom (collected when from 2 to 5 cm in diameter) that grows on tree trunks in open spaces, agricultural fields and second-growth forests (no data from primary forests). It is wrapped in leaves and baked on embers.	Shevoja	98.3%	ASHM007-26	Peruvian Amazonia (Dávila-Arenas et al., 2013; Mexico (Villarreal-Ruiz & Perez-Moreno, 1989)
Paramarasmius palmivorus (Sharples) Antonín & Kolařík (*Marasmius palmivorus* Sharples), Agaricales, Marasmiacae, USM 363671	tsebiki	This white edible fungus is the tiniest of all the mushrooms collected and consumed by the Asháninka. It is only collected when found in abundance on one or several dead trunks. It is wrapped in leaves and baked on embers.		100%	ASHM008-26	Not reported as eaten anywhere but the related *Marasmius* spp. are widely eaten throughout the world (Boa, 2004).
Pleurotus djamor (Rumph. ex Fr.) Boedijn, Agaricales, Pleurotaceae, USM 363663, USM 363665, USM 363674	shintipa, shintijebi, kontsarojebi	This relatively large, creamy mushroom grows on trunks in disturbed areas of forest regrowth. One of the largest mushrooms consumed by the Asháninka, who wrap the collected mushrooms in leaves and bake them on embers or fry them. A soup is prepared when they are found in abundance.	Sabareni, Shevoja	100%	ASHM009-26	Peruvian Amazonia (Holgado-Rojas et al., 2025; Dávila-Arenas et al., 2013); Andes-Amazon piedmont in Ecuador, Kichwa communities (Vicente-Pérez et al., 2024); India (Das et al., 2017); Mexico (Haro-Luna et al., 2022).
cf. *Lentinula raphanica* (Murrill) Mata & R.H. Petersen, Agaricales, Omphalotaceae, USM 363669, USM 363677	tsorero	This aromatic, creamy-white mushroom with brown spots is the Asháninka people's favourite. Edible, with a pleasant taste and aroma. It can be prepared in various ways: baked on embers, fried or cooked in soups.	Oviri, Selva Verde, Marankiari	DNA barcoding failed	–	The species is eaten by the Yanomami in Brazil (Sanuma et al. 2016).

* Low similarity due to incomplete sequences. The species was identified mainly using non-genetic features.

and *shintijebi,* are secondary lexemes composed of non-analyzable constituents and a suffix derived from *cajebi,* which marks edible mushrooms. Two people provided an alternative name for tsorompi – *ibanki pijirikempita,* 'bat's ear', which is a descriptive lexeme with morphological reference to the mushroom's texture and colouration.

The Asháninka people consider mushrooms to be a minor non-timber forest product. We have never heard of anyone going into the forest specifically to collect edible mushrooms. Instead, they are collected while travelling through the forest to reach remote agricultural fields, or while foraging for medicinal plants, edible fruits and larvae. Larger mushrooms, such as *shintipa* (*Pleurotus djamor* (Rumph. ex Fr.) Boedijn) are picked even if only a few are found, and tiny mushrooms, such as *tsebiki* (*Paramarasmius palmivorus* (Sharples) Antonín & Kolařík), whenever they are abundant in a given spot. They are always placed on large leaves of *bihao* (Ash. *tsipana*) *Calathea lutea* (Aubl.) E.Mey. ex Schult. or alternatively *mayoncona* (*Curcuma* sp.) and wrapped with a thin vine. This kind of wrap is usually placed on embers for baking, and the salt added when opened after cooking. Some types of mushrooms are considered tastier than others. The most predilected for all our interlocutors from the Tambo River was *tsorero* (cf. *Lentinula raphanica* (Murrill) Mata & R.H.), highly appreciated for its pleasant aroma and taste.

Mushrooms are not considered a staple food for this society, but an addition to cassava (*Manihot esculenta* Crantz), plantains (*Musa* spp.), palm hearts (different Arecaceae species) and/or meat dishes during the wet season, when there is a shortage of fish, the Asháninka's preferred food and main source of protein. When there is abundance of one or several species, a soup is prepared: mushrooms are boiled with the addition of grated plantains. This kind of preparation is called *chupispa*. In any case, mushrooms are a seasonal or opportunistic food rather than a highly appreciated festive food.

According to the Asháninka people and other Amazonian groups, humanity is a quality which can be mastered or lost, i.e. it is always in becoming. One may lose humanity through antisocial behaviour, breaking taboos, or consuming food inadequate for humans and thus transforming towards other classes of beings. From this perspective, non-edible mushrooms are considered the food of malevolent forest spirits called *kamari*. However, we heard a commentary from three women that some edible species, for example *tsorompi* (*Auricularia fuscosuccinea* (Mont.) Henn), were food for these evil forest spirits, and they did not eat them. This situation may be compared to the contested edibility of some game animals, such as deer (Ash. *maniro*) or agouti (Span. *añuje*, Ash. *sharoni*), due to cosmological cannibalistic implications. Traditionally the Asháninka avoided eating these animals, and some elderly people follow this proscription. However, the first author saw deer or agouti meat being eaten in Asháninka homes on many occasions. This may suggest that with population pressure on forest resources caused by rise of large sedentary communities, food proscriptions may have changed among the Asháninka people, and animals and mushrooms previously considered inedible are now treated as edible. Nonetheless, the cultural feature of mushrooms as the food of evil spirits has been described in various Amazonian ethnographies (e.g. Wilbert, 1992; Zent et al., 2004). Most probably, these ontological and cosmological premises are part of the reason behind cultural reservations towards eating mushrooms in several Amazonian societies.

Discussion

One of the striking features of the mycobiota utilised by the Asháninka people is that all the fungi either grow on dead wood or are saprotrophs. According to a comprehensive overview of edible mushrooms in Peru, there are 35 to 40 edible and medicinal mushrooms in Peru, of which *Pleurotus djamor* and *Auricularia fuscosuccinea* are characteristic for Amazonia (Holgado-Rojas et al., 2025). Both of these species are consumed by the Asháninka people. The richness of mushroom species gathered and consumed by the Asháninka people comprises 20% of the total richness of edible mushrooms reported for Peru (Holgado-Rojas et al., 2025). The list of fungi is similar in length to those provided by other studies from the western and north-western Amazonia region (Zent et al., 2004; Dávila-Arenas et al., 2013; Cifuentes Castillo et al., 2024; Vasco-Palacios et al., 2008; Vicente-Pérez et al., 2024). However, when compared in detail, there are large differences in the taxa gathered and consumed between different indigenous societies, even closely related ones, such as the Machiguenga and Asháninka groups (both are Arawak groups). The former gather and consume a similar number of edible species of mushrooms, and just one species is shared between them: *Favolus brasiliensis*. Compared on the genus level, both of these groups collect species from the genera *Panus* and *Pleurotus*. However, the abundantly growing and widely gathered species from *Cookeina* and *Auricularia* genera reported among the Asháninka have not been mentioned for the Machiguenga (Dávila-Arenas et al., 2013).

No records of the consumption of ectomycorrhizal mushrooms are known from Amazonia. All the reported species are lignicolous or, if found on the ground, feed on decaying plant matter. Zent (2004) identified the use of the following mushroom species by the Hoti (Joti), probably the most mycophilous indigenous group of Amazonia: *Agaricus* sp. *Amauroderma* cfr. o*mphalodes* (Berk.) Torrend, *Amauroderma* sp., *Auricularia delicata* (Fr.) Henn., *Auricularia polytricha* (Mont.) Farl., *Datronia caperata* (Berk.) Ryvarden, *Lentinus erinitus* (L.: Fr.) Ft., *Lenzites* sp., *Lenzites acuta* Berk., *Mycena* sp., *Pleurotus* sp., *Polyporus* sp., *Polyporus tenuicolu*s Beauv.: Fr., *Pycnoporus sanguineus* (Fr.) Murril, *Xylaria* sp., *Thamnomyces chordalis* Fr., *Macrocybe titans* (H. E. Bigelow & Kimbr.) Pegler, Lodge & Nakasone. Fidalgo and Hirata (1979) reported that the Txicão people eat *Lentinus crinitus* (L. ex Fr.). The Txucarramãe eat the following mushrooms, only when starving: *Trametes cubensis* (Mont.) Sacc., *Pycnoporus sanguineus* (L. ex Fr.) Murr., *Trichaptum trochomallum* (Berr. & Mont.) Murr. and *Auricularia fuscosuccinea* (Mont.) Farlow. All the above-mentioned taxa are also saprotrophic (Fidalgo & Hirata, 1979).

Lignicolous mushrooms, including the aforementioned *Auricularia, Lentinus, Pleurotus* (Chang & Lee, 2004; Bao & Kiet, 2011; Fui et al., 2018; Łuczaj et al., 2021) are also used in south-east Asia, where a wide range of ectomycorrhizal species is eaten, e.g. Boletaceae, *Russula* and *Cantharellus* (Bao & Kiet, 2011; Mortimer & Karunarathna, 2014; Łuczaj et al., 2021). The lack of utilisation of this group of mushrooms in Amazonia may be due to the tree families that support ectomycorrhysis being less represented in lowland South America than in South-East Asia. In South Asia, Dipterocarpaceae trees (lacking in the lowland South America) often dominate in rain forests, and support ectomycorrhizal fungi (Tedersoo et al., 2010). Similarly, in Mexico, the richness and abundance of *Quercus* and *Pinus* species enables the abundance of edible ectomycorrhizal fungi, even in the southern parts of the country (Ruan-Soto et al., 2013).

Conclusions

Asháninka people know and use a relatively long list of edible fungi species. All of them are lignicolous species, mainly associated with dead wood. The mushrooms consumed are not a staple or festive food, but rather a side dish that can be prepared in a variety of ways. Some differences in species richness and composition have been observed between the Asháninka people and other indigenous groups in the Peruvian Amazonia, suggesting that the topic of edible mushrooms in this region has not been sufficiently studied. Nevertheless, almost all the genera and species documented in this study have been reported in other regions of Amazonia and the tropics. The absence of ectomycorrhizal fungi from the human diet in the Amazonian region may be due to the rarity of ectomycorrhysis in this biome rather than the cultural choices of the indigenous population. This confirms the statement by Ruan-Soto et al. (2025): "While fewer species are used in the Neotropical lowlands, this rather suggests a specialization in the use and management of fungal resources based on rainforests conditions, namely, specific fungal richness, higher availability of lignicolous and saprophytic species, and the high temperatures and humidity, which require more energetically efficient collecting strategies". More studies are needed to determine the largely overlooked edible fungi use in indigenous societies of Western Amazonia.

Declarations

Consent for publication

Not applicable

Availability of data and materials

The article includes an extensive table and photos – the results of field research among the studied society in Peruvian Amazonia as well as the outcomes of mushroom barcoding. Other data are available on the request: the field data from the Institute of Ethnology and Cultural Anthropology, University of Łódź, Poland; and voucher specimens from the herbarium of Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima (USM) (https://museohn.unmsm.edu.pe/herbario.html). The DNA barcode data generated in this study have been deposited in the Barcode of Life Data Systems (BOLD) under the project code ASHM. The data are publicly accessible via the BOLD Public Data Portal (https://portal.boldsystems.org/). Details of the voucher collection, such country, province, town, locality, coordinates, substrate, date of collection, collector and herbarium number were enclose the supplementary file. We did not provide the detailed geographical coordinates of the collected samples in order to protect the Ashaninka tribal resources.

Ethics approval and consent to participate

The research adhered to the Code of Ethics of the International Society of Ethnobiology (International Society of Ethnobiology, 2016). The Asháninka authorities as well as the authorities of each community gave their written approval for the implementation of the project, and the corresponding permissions from the Peruvian state for collecting herbarium and fungi specimens and their identification were granted by SERFOR: RD N° D000163-2022-MIDAGRI-SERFOR-DGGSPFFS-DGSPF.

Competing interests

The authors declare that they have no competing interests.

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Authors' contribution

Fieldwork including interviewing the participants and collecting the voucher specimens, obtaining research permits – M. Kujawska; DNA barcoding – M. Karbarz; Visual identification of specimens – Ł.Ł. All the authors took part in writing the final draft of the paper.

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