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Variation in ethnomycological knowledge across age groups and length of residency in Benin (West Africa)

Olyvia Gwladys Fadeyi[1*], Boris Armel Olou[1], Apollon Dossou Migan Tadagbé Hegbe[1], Meike Piepenbring[2], and Nourou Soulemane Yorou[1]

ABSTRACT

The variation of ethnomycological knowledge between age, sex, and ethnic groups has been extensively documented in tropical Africa. However, little is known about the relationship between migration events and ethnomycological knowledge, as well as the depreciation or gain across successive age groups. This study aims to (1) determine the relationship between the length of residence within an area and some aspects of ethnomycological variables, particularly the number of edible species known by respondents, local nomenclature, and the proportion of species whose substrate is known, and (2) assess the difference in each of these variables across successive age groups. A total of 2,233 respondents were randomly selected for face-to-face semi-structured interviews in nine villages across three community forest zones in central and southeastern Benin. Analyses of variance and covariance were used to assess the relationship between people's length of residence and ethnomycological knowledge. Differences in knowledge across successive age groups were analyzed using generalized linear regression with Poisson error for the number of known species and binomial regression for the proportion of named species and species whose substrate is known. The findings revealed that a longer residency correlates with greater ethnomycological knowledge. Significant differences ($p < 0.05$) were observed in all three variables across age groups. Knowledge levels varied significantly, with younger generations demonstrating less indigenous knowledge than adults. This decline highlights the need to integrate indigenous knowledge into education programs and combine indigenous knowledge with modern scientific approaches to achieve better social and ecological outcomes, such as sustainable resource management and improved biodiversity conservation.

Keywords: Ethnomycology, indigenous knowledge , age groups, length of residency conservation.

1 Research Unit Tropical Mycology and Plants-Soil Fungi Interactions (MyTIPS), Faculty of Agronomy, University of Parakou, Benin 2 Department of Mycology, Goethe University Frankfurt am Main, Biologicum, Max-von-Laue-Str. 13, 60438 Frankfurt am Main, Germany.

* Corresponding author ✉. E-mail address: OFG (olyviafadeyi@gmail.com)

SIGNIFICANCE STATEMENT

This research is of paramount importance as it explores the complex links between the age of individuals and the duration of their residence in a given environment on ethnomycological knowledge. By highlighting the relationship between the length of residence and knowledge of edible fungal species, as well as the evolution of this knowledge across generations, the study reveals significant trends in the transmission of indigenous knowledge. It notably emphasizes that younger generations have a less command of local knowledge compared to adults, an alarming finding that calls for tailored educational strategies. Integrating indigenous knowledge with modern scientific approaches could promote sustainable ecological management and enhanced cultural resilience. These findings are therefore essential for informing conservation policies and supporting local communities in their efforts to preserve knowledge.

INTRODUCTION

Traditional Ecological Knowledge has been a subject of growing international interest for decades. It represents knowledge acquired by local people through the accumulation of numerous experiences and the interpretation of the environment within a given culture (UNESCO 2018; IPCC 2019; Khiri 2022). This knowledge includes ideas, experiences, practices, and information that were either locally generated and/or produced outside the community but transformed by the local people and gradually integrated into local agro-ecological and socio-economic conditions (Warren 1993; Löfmarck and Lidskog 2017; Mustonen et al. 2022). Ethnomycology, the study of the relationships between people and fungi, has revealed how cultural practices, subsistence strategies, and ecological knowledge shape human interactions with fungi. Among various indigenous peoples, fungi often play vital roles not only as sources of food and medicine, but are also used in traditional practices and socio-ecological systems (Shepard et al. 2008; Garibay-Orijel et al. 2012). The interactions between humans and fungi are often deeply embedded in indigenous knowledge systems that have been passed down from generation to generation (Matsui 2015; McGregor et al. 2020).

Ethnomycological knowledge is not homogeneous within people and is often influenced by socio-economic and cultural factors such as age, sex, level of formal education, degree of poverty, professional occupation, ethnicity, etc. (Anderson 2004; Guissou et al. 2008; Yorou 2010; Hounsode et al. 2016; Fadeyi et al. 2020). Several studies show that the older people hold most of the ethnomycological knowledge compared to young people and children, particularly knowledge about edible and medicinal fungi. In Pakistan, Hussein et al. (2023) found that older people possess more reliable knowledge of mushroom identification, ethnomedicinal uses as well as ecological knowledge, reflecting a high level of experience passed down through several generations. This trend is also found in Estonia (Sõukand and Kalle 2016), where older people living in rural areas exhibit significantly higher skills in mushroom identification. Younger generations are often influenced by urbanization and formal education, and gradually move away from this knowledge. Studies from various parts of the world, including Albania (Pieroni et al. 2005), Zambia (de Roman et al. 2006), the Caribbean (Quinlan and Quinlan 2007), and India (Brodt 2001; Panghal et al. 2010), have highlighted similar patterns, pointing to rural exodus and modernization as key drivers behind the erosion of indigenous knowledge. The loss of ethnomycological knowledge has been also reported among West African communities (Yorou and De Kesel 2001; Guissou et al. 2008). Yet, while this is clearly known, less is known about the extent to which this knowledge differs between age groups. The quantification of knowledge has been shown to be useful in predicting intra-group variability, the stability of cultural traits over time, and cultural evolution (Albuquerque et al. 2009; Koy and Ngonga 2017). Knowing the extent of difference in ethnomycological knowledge can help to understand this loss among younger people and perhaps predict what would likely be the situation within future generations. This would help identify appropriate measures to safeguard this knowledge which represents a form of intangible heritage (UNESCO 2007; Aswani et al. 2018). This is essential for solving challenges such as the preservation of culture heritage, biodiversity conservation and food security.

This study seeks to investigate the distribution of some aspects of ethnomycological knowledge across different age groups in three forest reserves of Benin. Specifically, it aims (i) to determine the relationship between the duration of residency in the area (seniority) and the number of known edible species, the proportion of those species for which the vernacular name is known and the proportion of those species for which the substrate is known, and (ii) to assess the difference in this knowledge across different age groups.

MATERIAL AND METHODS

Study Area

This study was carried out in three forests, namely the Tchaourou-Touï-Kilibo forest reserve (FR-TTK), the Ouémé Supérieur-N'Dali forest reserve (FR-OSN) and the Trois Rivières forest reserve (FR-TR FR-TTK is located between latitudes 8°25' and 8°53' North and longitudes 2°36' and 2°47' East. It is characterized by a tropical climate (Djogbenou et al. 2008). It contains fragments of open forest with tree species such as *Daniellia oliveri, Isoberlinia doka*, *Pseudocedrela kotschyi*, *Pterocarpus erinaceus,* and *Vitellaria paradoxa*.

FR-OSN is located between latitudes 9°11' and 9°47' North and longitudes 1°58' and 2°28' East. It lies in the Guineo-Sudanian zone within the phytogeographic district of South-Borgou, characterized by a dry tropical climate with merged rainfall peaks and an annual rainfall of approximately 1,200 mm (Adomou 2011). This ecosystem is characterized by the absence of semi-deciduous dense humid forests and an enrichment of open forests and savannas with Sudanian plants.

FR-TR is located between 10°18' and 10°48' north latitudes and between 2°45' and 3°35' longitudes. It is located in the phytogeographic district of North-Borgou (Adomou et al. 2006; Zakari et al. 2018). The reserve is dominated by gallery forests, open forests and wooded savannas, tree and shrub savannas, and mosaics of fields and fallows. The average rainfall is 1,100 mm (ASECNA 2013). The soils are tropical ferruginous with very rugged relief (Dubroeucq 1977; Faure and Volkoff 1996). Figure 1 shows the location of the three forests with the selected villages.

Legal and ethical aspects

The project was submitted on February 2, 2021, and approved by the Forest Management Technical Unit of Ouémé Supérieur-N'Dali (CTAF-OSN) for the villages of Yébessi, Kpéssou-Samari, and Onklou under number 010/2021/CTAF-OSN/IF-B on March 3, 2021. It was also submitted and approved by the Forest Management Technical Unit of the Trois Rivières Forest Reserve (CTAF-TR) for the villages of Kidaroukpérou, Bessassi, and Mani under permit number 43/2021/CTAF-TR/IF-B on March 2, 2021; and by the Forest Management Technical Unit of the Tchaourou-Touï-Kilibo Forest Reserve (CTAF-TTK) for the villages of Touï-gare, Kilibo-gare, and Yaoui under number 016/2021/CTAF-TTK/IF-C on March 2, 2021. All these units are under the direction of the Ministry of the Living Environment and Transport, responsible for sustainable development in Benin.

Authorization was also obtained from the representatives of the local communities for the three zones on May 5, 2021 (OSN), May 10, 2021 (TR), and May 1, 2021 (TTK), respectively. Residents who agreed to participate in the research were invited to read and sign the Prior Informed Consent Form (ICF) before responding to the specific research questions. For minors, the consent of both the parents, as well as the consent of the minors, was also taken into account.

Village selection

As the villages bordering the forests are diverse, we initially selected preselected the most easily accessible ones. Thus, five villages were considered for Tchaourou-Touï-Kilibo forest reserve; five villages for Ouémé Supérieur-N'Dali forest reserve and four villages for Trois Rivières forest reserve. The selection of the 14 villages was based on two criteria: (1) the distance of the villages from the forest reserve and (2) the level of mushroom consumption. We then randomly selected 30 respondents in each of the 14 villages. These respondents were given a questionnaire (see Additional File 1). The three highest-scoring villages from each forest reserve, totaling nine target villages, were selected based on highest point scores calculated per village. Those villages are: (i) Touï-Gare, Kilibo-gare and Yaoui (for FR-TTK); (ii) Onklou, Kpéssou-samari and Yébessi (for FR-OSN) and (iii) Bessassi, Kidaroukpérou and Mani (for FR-TR).

Population sampling

A stratified sampling method was applied across the nine target villages using their population size from the fourth national population census data (INSAE 2013). The sample size in each village was obtained using the following formula adopted from Anderson et al. (2005):

$$n = \frac{(Z_{\alpha/2})^2 \cdot p(1-p) \cdot N}{(Z_{\alpha/2})^2 \cdot p(1-p) + (N-1) \cdot E^2}$$

With: n = sample size; p = proportion (generally p = 0.50 and 95% confidence level); E = selected margin of error; $Z_{\alpha/2}$ = values corresponding to the confidence thresholds often used (95%) = 1.96; N = population size.

A total of 2,233 respondents whose average age was 10 years old, representing different age groups, were surveyed across nine villages (see Additional File 2_Table 1). From the youngest to the oldest, the age groups considered are: Young, Adult, and Elderly. These age groups consist of age categories of a consistent range, which is equivalent to the average age at which women give birth to their first child. According to the global database 'Atlasocio' (`https://atlasocio.com/classements/demographie/fecondite/classement-etats-par-age-moyen-femmes-naissance-premier-enfant-afrique.php#notes`), the average age at first childbirth for women in Benin is 20.5 years, considering data up to 2020. To avoid age categories with decimal ranges, a 20-year range was

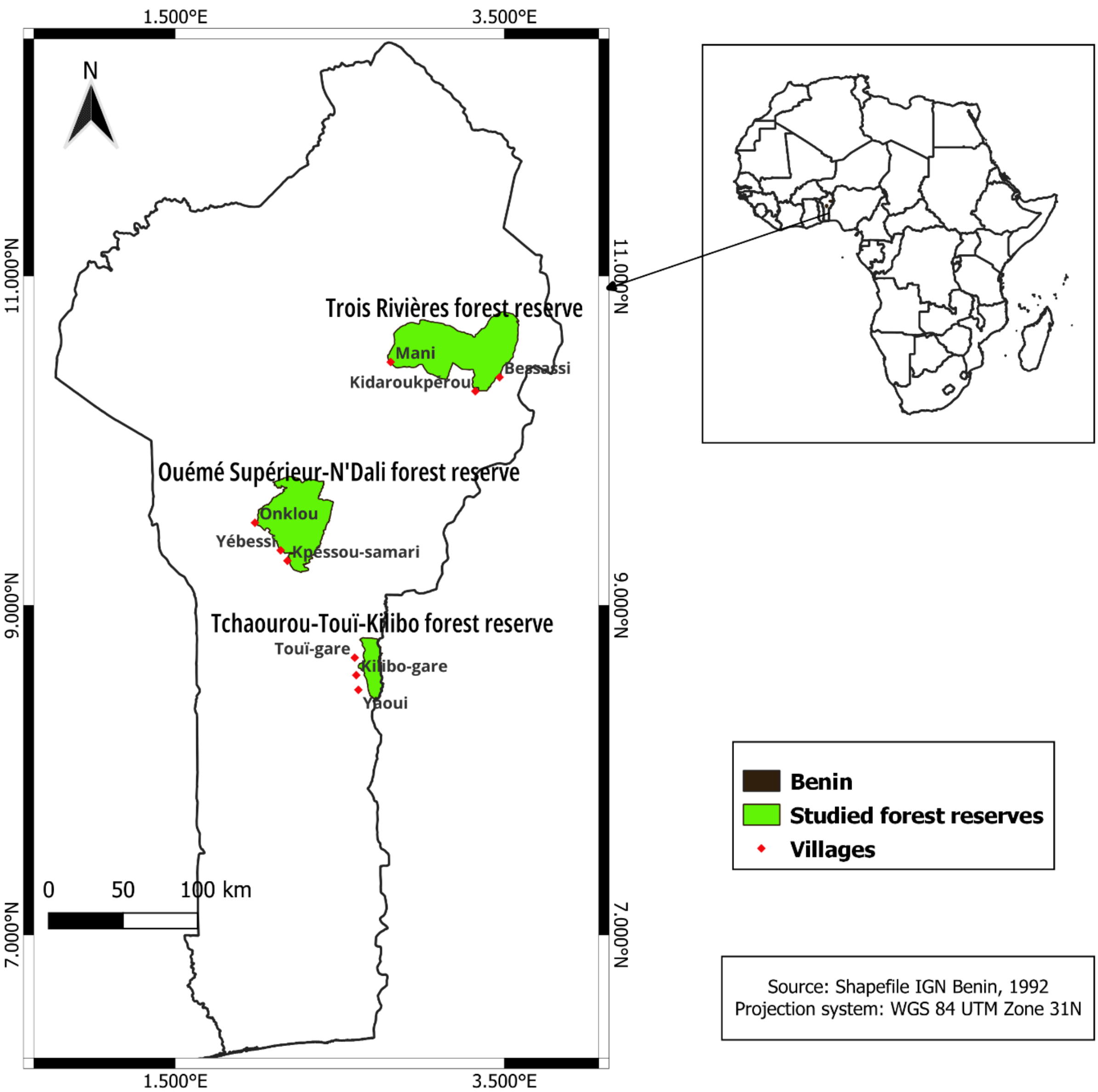

Figure 1. Map of Benin showing the location of the three forest reserves where the research was conducted and the target villages marked with red dots.

applied. Subsequently, respondents were randomly selected following established guidelines (Atakpama et al. 2012; Uprety et al. 2012). The life expectancy is very low in Benin, about 59,8 years. During the ethnomycological interviews, we also surveyed individuals over 60 years old. However, this group was very small, representing only 3% of the total sample, and significantly lower compared to other age groups. Therefore, they were not included in the statistical analyses to ensure a meaningful comparison based on a well-represented sample across all considered age groups. The relative frequencies of the three age groups investigated over the sample are presented in Table 1.

Data collection

Fungal specimens sampling, identification and preservation

Fresh specimens of wild mushrooms were harvested early in the morning in the target forest together with 2 guides. Preliminary identification of the specimens was performed by comparing specimens with illustrated guides of edible fungi (De Kesel et al. 2022; De Kesel et al. 2017; De Kesel et al. 2024, Yorou et al. 2014) and through a large collection of over 2500 pictures of macromycetes compiled by mycologists from the Research Unit in Tropical Mycology and Plant-Soil Fungi Interactions (MyTIPS), University of Parakou.

Table 1. Number of respondents per age groups from the overall population sample (N=2,233).

Age groups (years)	Category	Number of individuals
10-20	Young	817
21-40	Adult	925
41-60	Elderly	491

The preliminary identification based on field guides was cross-checked through microscopic examination of the specimens by a light microscope type Leica DM2700 equipped with a drawing tube, at MyTIPS. A total of 187 fresh wild species (see Additional File 3), both edible and non-edible, were collected, labeled, and dried at 40°C by means of an electric dryer type Dorrex Stockli. Scientific names were checked in Index Fungorum (www.mycology.net). All samples were then deposited at the mycological herbarium of the University of Parakou (UNIPAR,Thiers 2024).

Ethnomycological data

Ethnomycological data were collected from June to October 2021 through semi-structured individual interviews and focus group discussions. The period from June to October coincides with the rainy season (fruiting period of wild fungi) in central to northern Benin where this study was carried out. As part of our ethnomycological surveys, we first established initial contact with village chiefs, who then scheduled awareness sessions in their respective villages to explain the objectives of the study. Subsequently, focus group meetings were organized per village (in public places) with the assistance of local interpreters. Triangulation individual meeting was also accomplished after group meeting, to test the consistency of the information. We were able to ask questions about the species consumed in each village using the fresh specimens we collected during forest visits. Whenever needed, interviews were supported by the color atlas of macromycetes as explained in the previous section. The key questions were related to their edibility status, knowledge of the natural substrate of species and the local names of the species. Following this phase, individual household surveys were conducted in different local dialects with local interpreters for translation. Participants were selected from the different age groups and each underwent a structured interview based on a pre-established questionnaire. The recorded data included sociolinguistic characteristics of the respondents, the number of years spent in the village, the local names of edible species and the natural substrate of these species (Additional File 4). For illiterate respondents who are unable to accurately give their length of residency in the locality, the moment they settled in the area was determined from the political regime during which they had come to the area. The length of residency in the area was obtained by subtracting the year of settlement from the year 2021 when the interviews were conducted.

Data processing and analysis

This study focuses on three ethnomycological variables which are (1) the number of cited edible species of mushroom, (2) the proportion of edible species for which the name is known by the respondent and (3) the proportion of edible species whose substrate (e.g., mycorrhizal, saprotrophic, parasite, symbiont of termite) is known by the respondent. All the statistical analyses were conducted using R 4.1.2 (R Core Team 2021) within the RStudio integrated development environment (RStudio Team 2021).

In order to assess the relationship between the length of time spent in the area and the ethnomycological knowledge of the respondents, an analysis of variance and covariance was performed using the lavaan package (Rosseel 2012). Kruskal-Wallis rank test was used to compare each of the three ethnomycological variables between age groups. In order to estimate the loss or gain (r) in ethnomycological knowledge from one age group to the next, a logistic model (Eq.1) was used. Generalized linear regressions with Poisson error structure were performed when dealing with the number of edible species cited but binomial logistic regression was used on one hand for the proportion of species for which the name is known by the respondent, and on the other hand for the proportion of species whose substrate is known by the respondent.

The only independent variable in these models was the age group. For each of these variables in ethnomycological knowledge, the model was fitted two times, changing the reference age group for the comparison of each pair of successive age groups. The model 1 (first fit) considers the “Elderly” group as reference in order to compare the “Adult” group to that of the “Elderly” group. As the model 2 (second fit) considers the “Adult” group as reference in order to compare the “Young” group to that of the “Adult” group. Knowledge difference for each variable was deduced from the regression estimates using Eq.2.

$$Eq.1 : coef(level_{control}) = log\frac{Y_{mean}(level_i)}{Y_{mean}(level_{control})}$$

$$Eq.2 : r = 1 - e^{(coef[level_i - level_{control}])}$$

with Y= a given ethnomycological variable; r = difference (loss or gain); leveli = age group i; 1<i<4; levelcontrol = the age group set as reference for the comparison.

RESULTS

Link between the length of residency and ethnomycological knowledge

There is a significant and positive relationship between the length of residency in the respective area in Benin and the number of known edible species of mushrooms (Table 2). The covariance value of 2.55 suggests that there is a positive interrelation between a longer residency and an increased knowledge of edible species ($p < 0.0001$). A positive correlation also exists between the length of residency and the proportion of species whose local names are known. A value of 0.269 indicates a slight increase in this knowledge with longer residency ($p = 0.016$). The proportion of species whose substrate is known shows a strong positive correlation with residency length, with a covariance value of 0.618 ($p < 0.0001$), indicating that by staying longer in a region the person's knowledge about the ecology of the local wild edible mushrooms increases.

Distribution of ethnomycological knowledge across age groups Independently of the age group, people mentioned at least one edible species and the median number of species cited is four for each age group (Figure 2). The highest number of edible species cited was 13 recorded by an elderly person. However, the number of edible species mentioned differs significantly between age groups ($p<0.05$). Considering people's ability to name species in the local language, 50% of the respondents cited at least one species no matter what age group. Regarding the proportion of species for which the growth substrate is mentioned, it ranged from zero to one (100%). The proportion of species whose substrate is known significantly differs between age groups ($p<0.0001$). Fifty percent (50%) of the young and adult know the substrate at least for 33% of the cited species whereas 50% of the elderly mention substrate for 80% of the species they cited.

Knowledge loss and/or gain across age groups

The pairwise comparison of successive generations where the baseline is the older in each case. This comparison shows in Table 3 illustrates intergenerational differences in ethnomycological knowledge by comparing younger groups to their immediate predecessors, focusing on three metrics: edible species cited, local name knowledge, and substrate knowledge. Between the elderly and adults, the most striking decline occurs in substrate knowledge, with adults showing a significant 24.02% loss ($p < 0.001$), while edible species recognition decreases modestly by 5.45% ($p > 0.05$) and local name retention remains stable (-1.09%, $p > 0.05$). When comparing adults to youngers, a notable 6.37% improvement in local name knowledge emerges, suggesting cultural revitalization in this domain. However, substrate knowledge continues to erode (-7.34%, nonsignificant), and edible species cited decline slightly (-1.46%, $p > 0.05$). Cumulatively, from elderly to younger groups, substrate expertise collapses by 31.36%, driven largely by the elderly-to-adult decline, while edible species recognition diminishes by 6.91%.

DISCUSSION

Relation between the length of residency and ethnomycological knowledge

The results revealed that the longer an individual stays in a locality in Benin, the better is his/her knowledge of wild edible mushrooms and their ecological and nomenclatural aspects. These results could be explained by the fact that local people become familiar with the natural resources in their immediate environment. Indeed, in our study areas, agriculture is the primary subsistence activity of local communities. During the rainy season, locals people engage in the collection of edible wild mushrooms while going to or returning from the fields, as well as during the collection of firewood, shea nuts, other wild fruits, or after hunting. The long-standing familiarity of these communities with their environment, combined with the oral transmission of knowledge from generation to generation, promotes the accumulation of traditional knowledge. Our results, therefore, reinforce the idea that time spent in an area promotes the accumulation of indigenous knowledge. Yorou and De Kesel (2001) found a similar pattern when studying ethnomycological knowledge of local communities around Wari-Maro Forest. The authors found that lkpa people, who settled more recently in neighboring villages, possess less developed ethnomycological knowledge than cab people, who have settled in the same area since the 15th century. The positive but weak covariance of length of residency with the recognition of mushroom substrates means that the longer an individual lives in the environment, the better he knows the substrates of the species. Indeed, in villages, most people de-

Table 2. Covariance values for relationships between the length of residency and ethnomycological knowledge.

Variable	Covariance	Std.Err	z-value	p(>|z|)
Number of edible species	2.55	0.724	3.524	$p < 0.0001$
Proportion of species whose local name is known	0.269	0.111	2.42	0.016
Proportion of species whose substrate is known	0.618	0.148	4.165	$p < 0.0001$

Legend: Std.Err= standard error

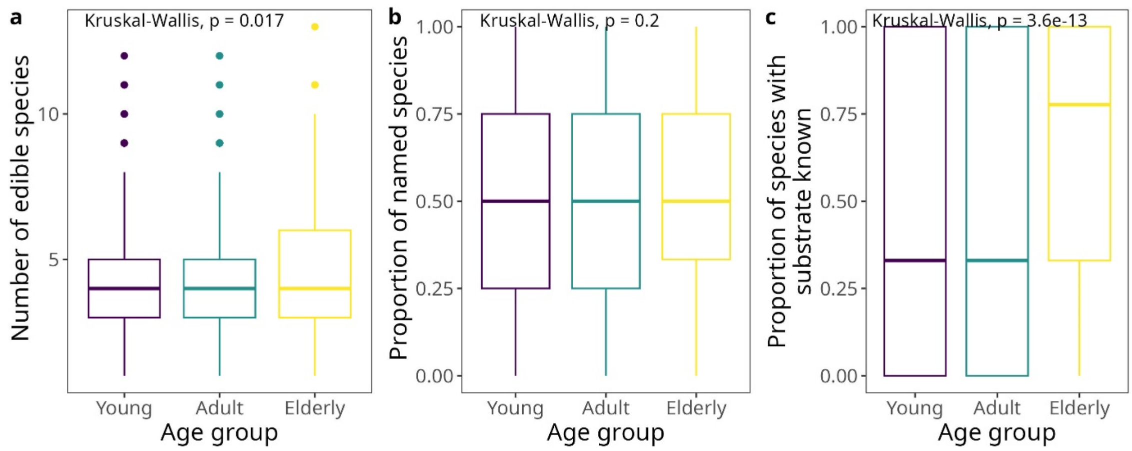

Figure 2. Relationship between age group and (a) number of edible mushroom species recognized and cited, (b) proportion of named species and (c) proportion of species whose growth substrate is known.

Table 3. Losses and gains in ethnomycological knowledge across age groups.

Ethnomycological knowledge	Younger vs. Adults		Adults vs. Elderly	
	Change	Significance	Change	P-value
Number of Edible species cited	-1.46%	0.3484	-5.45%	0.0385
Proportion of species whose local name was known	6.37%	0.82	-1.09%	0.222
Proportion of species whose substrate was known	-7.34%	0.30673	-24.02%	0.00021

pend on agriculture and the exploitation of non-timber forest products (NTFPs) including wild edible mushrooms, so living longer in the villages supposes more opportunities to come into contact with mushrooms in the forests and, therefore, to know their substrates. However, it may happen that once established, the new coming people will develop more knowledge acquired from the autochthonous. It has been proven that forms of social integration (common agricultural activities by rotation in various fields, group contributions, group celebrations, common professions, weddings, friendships etc.) promote cultural intermingling and sometimes lead to assimilation and adoption of knowledge and practices of the autochthonous by new coming people (Mapongmetsem 2007; Raounguedam 2007). This cultural intermingling fosters knowledge exchanges among sociocultural groups through permanent contact in the same geographic area (Bada Amouzoun et al. 2016).

Age group incidence on ethnomycological knowledge

The analysis revealed variations in ethnomycological knowledge across different age groups. The number of edible species mentioned differs significantly between age groups (p<0.05). Our results show that regardless of life stage, the elderly possess more knowledge than both adults and younger generations. These findings can be explained by the fact that adults and younger individuals have fewer years of experience compared to the elderly and still have much to learn from their elders. The increasing rates of natural habitat degradation for mushrooms over the years have likely led to the gradual transformation of forests into cultivated fields. As a result, elderly generations had greater opportunities to become familiar with wild edible mushroom species, whereas habitat degradation has limited such knowledge among adults and younger generations. Previous studies have shown that older people often have more information than younger people due to the accumulation of experience over time, as observed in Mexico (Beltrán-Rodríguez et al. 2014), Ethiopia (Abdela et al. 2022), and Nigeria (Olanipekun 2023). Our findings also align with prior ethnobiological studies that demonstrated more elaborate knowledge within older individuals than the youth (Phillips and Gentry 1993; Voeks and Leony 2004; Koster et al. 2016; Corroto et al. 2022). Previous studies in tropical Africa have shown that local people easily preserve ethnomycological knowledge through endogenous knowledge passed down from generation to generation (Yorou and De Kesel 2001; De Kesel et al. 2002; Guissou et al. 2008; Fadeyi et al. 2017, 2019). Existing literature (Boni and Yorou 2015) emphasizes the retention of detailed ethnomycological knowledge within old people of the same ethnic groups. These elders often serve as key figures in the transmission of this knowledge to younger generations, ensuring that vital ecological practices and species-specific information are not lost. This generational transmission is crucial for the survival of ethnomycological knowledge, particularly in societies where fungi are integral to food security, medicinal practices, and environmental stewardship. Regarding the depreciation rate, ethnomycological knowledge is at great risk of disappearing, especially due to population growth, youth migration to cities for easier income, and schooling that distances them from their cultures. In our context where the villages are populated by various ethnic groups, the horizontal transmission of know-how, favored by social networking, can help preserve indigenous knowledge (Mapongmetsem 2007; Raounguedam 2007).

The difference in indigenous knowledge on edible fungi can also be explained by the lower availability of fungal resources nowadays compared with decades ago, linked to deforestation, the progressive degradation of natural substrates, and the subsequent erosion of wild edible mushroom diversity, climate disruptions (rainfall patterns), trampling of mycelium by livestock, urbanization and rural exodus of young people to larger cities, formal education (which often disconnects them from cultural realities), as well as culinary habits centered on more processed and imported products. Apart from that, formal education alters young students' schedules, leading to a gradual rejection of indigenous knowledge and a lower level of local expertise (Reyes-García et al. 2010; McCarter et al. 2014). Other factors contributing to the loss of indigenous knowledge include the increasing use of modern medicine, political systems that do not promote local food, religion, and technology (Benz et al. 2000; Speranza et al. 2010; Beltrán-Rodríguez et al. 2014; Haselmair et al. 2014). Similarly, the United Nations Environment Program (UNEP 2006) identified 23 key obstacles to improving indigenous knowledge in Africa, including ecosystem loss or radical modification, poverty, climate change, immigration and emigration, urbanization, and many others (Cristancho and Vining 2009).

Several studies have explained that age is a determining factor influencing traditional knowledge, especially among the elderly, who hold more sophisticated knowledge than younger groups. Yorou and De Kesel (2001) argued that older people, particularly women aged 40 and above, can correctly identify edible mushrooms and are capable of sorting and systematically identifying them by assigning local names. Similar observations have been made in other African countries, such as Burundi, Zimbabwe, Tanzania, Côte d'Ivoire, Togo, and Burkina Faso (Buyck 1994; Härkönen et al. 1994; Buyck and Nzigidahera 1995; Piearce and Sharp 2000). For all variables considered, younger individuals are at the lower end of the scale and have less knowledge of the number of edible species, the proportion of species whose local name is known, and the substrate for edible fungi compared to the elderly and adults. The assumption that older individuals hold more detailed knowledge compared to younger people may oversimplify the complexities of knowledge transmission and retention. For instance, it is demonstrated that children, while often introduced to basic ethnomycological knowledge early in life, are sometimes more likely to lose this knowledge as they age, particularly if they move away from traditional lifestyles or are exposed to formal education systems that prioritize scientific knowledge over local ecological practices (Turner and Turner 2008). Indeed, previous studies have shown that children acquire traditional biological knowledge through practical experiences, play, and direct observation (Ruddle and Chesterfield 1977; Zarger 2002), rather than through organized and verbal instruction. Additionally, parents and other elders tend not to see their role toward children as primarily educational, although interactions with parents, siblings, and other adults are important in sharing traditional biological knowledge (Zarger 2002).

On the other side, the modernization and globalization of rural societies often contribute to the erosion of traditional knowledge systems, including ethnomycology. As younger generations migrate to urban centers, where traditional ecological knowledge may be undervalued, there is a risk of cultural disconnection. This may lead to the gradual loss of intricate knowledge regarding mushroom species, habitats, and their roles in local ecosystems (Pérez-Moreno 2021). Consequently, understanding how traditional knowledge is preserved or modified across age groups becomes critical for conservation efforts, both of cultural heritage and biodiversity, especially when it comes to forest resources of high economic potential. In Benin, younger generations are more attracted to non-timber forest products with high market value or other more lucrative activities than mushroom collecting and harvesting. Compared to other countries like Congo Republic (Ebika et al. 2024) or Côte d'Ivoire (Koné et al. 2013), selling mushroom is not common in Benin. Income generated through roadside selling is not high enough to motivate young people to devote much time to fungi collecting in order to develop deep ethnomycological knowledge.

Prior to this study, little knowledge had been developed regarding the dynamics of ethnomycological knowledge between age groups of local people. This lack of documentation represents a major gap in achieving a better understanding of the knowledge transmission, a crucial element of cultural and ecological heritage. Our data provide strong evidence of the incidence of indigenous knowledge according to life stages. Learning and sharing knowledge between elders and young people are often facilitated by the family environment as well as stories deeply rooted in cultural traditions. Young people easily learn through direct observation of practices carried out by elders, such as mushroom foraging in forests, traditional methods for distinguishing edible and toxic species, recognizing habitats of different species, identifying vernacular mushroom names, cooking and detoxification procedures, and more. It is therefore necessary to consider the heritage revealed by this study to improve future research. The integration of participatory approaches, such as organizing training sessions during which elders explain to the youth how to identify and use mushrooms, or even harvest them, would be essential. It would also be necessary to create illustrated manuals with the local names of mushrooms and their specific uses, developed through collaboration between researchers and local communities. The steep, statistically robust loss in substrate knowledge ($p < 0.001$) underscores a critical erosion of ecological understanding, essential for sustainable foraging practices. Conversely, the resilience of local names in younger generations hints at targeted cultural preservation efforts. These emphasises urgent risks to ethnomycological heritage, particularly in ecological stewardship, necessitating immediate interventions to safeguard this knowledge.

CONCLUSION

The present study highlights the significant relationship between the length of residency and the high level of ethnomycological knowledge. Individuals with longer residency demonstrate better knowledge of wild edible mushrooms, their local nomenclature, and their substrate types. Furthermore, variations in knowledge across age groups reveal a concerning decline in local ethnomycological knowledge among younger generations compared to adults. These findings underscore the urgent need to preserve and enhance indigenous knowledge by integrating it into educational programs and combining it with modern scientific approaches. Such integration could improve sustainable resource management, strengthen biodiversity conservation efforts, and ensure the intergenerational transmission of valuable ethnomycological knowledge. By addressing these gaps, this approach can contribute to fostering more socially and ecologically resilient communities.

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DATA AVAILABILITY

Research data collected for this study will be made available if requested by contacting the corresponding author.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

CONTRIBUTION STATEMENT

Conception of the study: OGF, NSY, MP. Data acquisition: OGF, BAO, NSY.
Data analyses: OGF, ADMTH.
First draft generation: OGF.
Editing and proof reading: OGF, BAO, ADMTH, MP, NSY.
Fund acquisition: MP, NSY.
Supervision: NSY, MP.

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Additional Files

Add File 1. Interview Questionnary

Ethical consent of respondants

Hello Mr./Ms., My name is Olyvia Gwladys Fadeyi. I am a student at the Graduate School of Agronomic and Water Sciences (EDSAE), Faculty of Agronomy (FA), University of Parakou (UP). I am conducting research as part of my doctoral studies, one of the objectives of which focuses on 'Ethnomycological knowledge variation across age groups and length of residency in Benin (West Africa).' This purely academic study is being carried out as part of multiple doctoral thesis projects on the edible mushroom value chain.

As part of this study, you have been selected to answer certain questions. We kindly encourage you to be sincere and precise in your responses. All the information you provide will be treated confidentially.

Do you agree to participate in this interview? Yes ( ) No ( )

Dear parent, do you agree to allow us to question your child? Yes ( ) No ( )

Section 1 : Personal Information

Respondent's Number:
Age:
Village:
Ethnicity:

Section 2: Edibility of Mushrooms, Local Name, and Substrate

- Do you consume mushrooms? Yes ( ) No ( )
- If yes, please provide the information in the table below.

Edible Species mentioned	Local Name of the Species	Meaning of the Local name	Species with Local Name unknown	Provide the Habitat of the Species (Substrate)

Section 3: Village Origin and Settlement Period

- Were you born in the village? Yes ( ) No ( ) If yes, in what year?
- If you were not born in the village, in what year did you settle in the village?
- In what year did you settle in the village ?

If you are unsure about the exact year, please help us situate it based on political events in Benin corresponding to the specific periods below:

( ) Before Independence
( ) After Independence
( ) During the Revolution
( ) Term of late Mathieu Kérékou
( ) Term of SOGLO President
( ) Term of former President Yayi

( ) Term of Talon President

If you are unsure about the exact year, what other social events prompted your settlement here?

( ) Since the existence of the train
( ) Search for a source of income
( ) Others (please specify)?

If you are a foreigner in the village, what type of settlement have you established?
- Duration of stay

( ) One year
( ) Two years
( ) Three years
( ) Four years or more
( ) Other, please specify

Add File 2. Number of respondents per target village in each forest reserve

Forest reserve	Village	Population size	Number of respondents
Tchaourou-Touï-Kilibo forest reserve	Toui-gare	4,614	354
	Kilibo-station	1,196	92
	Yaoui	3,823	292
Ouémé Supérieur-N'Dali forest reserve	Onklou	5,631	342
	Kpassou-Samari	5,724	204
	Yebessi	9,474	208
Trois Rivières forest reserve	Besassi	3,171	220
	Kidaroukperou	5,341	371
	Mani	2,144	150
Total			2,233

Add File 3. List of species.

Voucher	Species	Associated plant species	Family	Country	Habitat	Collector
OGF0001	*Piptoporellus baudonii*	Isoberlinia doka	Fomitopsidaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0002	*Russula congoana*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0003	*Lentinus* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0004	*Lactifluus tenellus*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0005	*Russula congoana*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0006	*Candelleomyces tuberculatus*	Isoberlinia doka	Psathyrellaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0007	*Cantharellus densifolius*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0008	*Cantharellus congolensis*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0009	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0010	*Amanita* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0011	*Russula* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0012	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0013	*Cantharellus addaiensis*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0014	*Volvariella earlei*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0015	*Boletus* sp.	Isoberlinia doka	Boletaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0016	*Phallus industiatus*	Isoberlinia doka	Phallaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0017	*Cantharellus guineensis*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0018	*Russula congoana*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0019	*Amanita* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0020	*Lactifluus* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0021	*Lactifluus* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0022	*Amanita craseoderma*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0023	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0024	*Lentinus squarrosulus*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0025	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0026	*Amanita masasiensis*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0027	*Lactifluus* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0028	*Russula oleifera*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0029	*Amanita craseoderma*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0030	*Russula oleifera*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0031	*Volvariella earlei*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0032	*Russula congoana*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0033	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0034	*Lactiflus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI

Continued...

Voucher	Species	Associated plant species	Family	Country	Habitat	Collector
OGF0035	*Russula oleifera*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0036	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0037	*Lentinus squarrosulus*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0038	*Lentinus squarrosulus*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0039	*Amanita masasiensis*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0040	*Lentinus squarrosulus*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0041	*Trametes* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0042	*Volvariella earlei*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0043	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0044	*Volvariella earlei*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0045	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0046	*Russula oleifera*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0047	*Russula congoana*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0048	*Russula* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0049	*Agaricus* sp.	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0050	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0051	*Russula* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0052	*Russula congoana*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0053	*Volvariella earlei*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0054	*Inocibe* sp.	Isoberlinia doka	Inocibaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0055	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0056	*Volvariella earlei*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0057	*Agaricus* sp.	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0058	*Agaricus* sp.	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0059	*Agaricus* sp.	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0060	*Volvariella earlei*	Isoberlinia doka	Pluteaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0061	*Agaricus* sp.	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0062	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0063	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0064	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0065	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0066	*Agaricus* sp.	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0067	*Agaricus* sp.	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0068	*Agaricus* sp.	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0069	*Scléroderma* sp.	Isoberlinia doka	Sclérodermataceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0070	*Trametes* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0071	*Trametes* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0072	*Agaricus* sp.	Isoberlinia doka	Agaricaceaea	Benin	Forest	Olyvia Gwladys FADEYI

Continued...

Voucher	Species	Associated plant species	Family	Country	Habitat	Collector
OGF0073	*Volvariella earlei*	Isoberlinia doka	Pluteaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0074	*Scléroderma* sp.	Isoberlinia doka	Sclérodermataceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0075	*Amanita stubbasa*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0076	*Amanita* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0077	*Trametes* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0078	*Piptoporellus baudonii*	Isoberlinia doka	Fomitopsidaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0079	*Termitomyces microcarpus*	Isoberlinia doka	Lyophyllaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0080	*Scléroderma* sp.	Isoberlinia doka	Sclérodermataceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0081	*Lactifluus gymnocarpoides*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0082	*Lentinus* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0083	*Cantharellus conspicuous*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0084	*Scléroderma* sp.	Isoberlinia doka	Sclérodermataceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0085	*Scléroderma* sp.	Isoberlinia doka	Sclérodermataceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0086	*Volvariella earlei*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0087	*Russula oleifera*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0088	*Marasmius* sp.	Isoberlinia doka	Marasmiaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0089	*Amanita masasiensis*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0090	*Russula* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0091	*Trametes polyzotii*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0092	*Russula* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0093	*Russula* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0094	*Trametes* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0095	*Lentinus* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0096	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0097	*Amanita masasiensis*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0098	*Amanita masasiensis*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0099	*Lentinus* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0100	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0101	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0102	*Trametes* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0103	*Agaricus* sp.	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0104	*Agaricus* sp.	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0105	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0106	*Xylaria* sp.	Isoberlinia doka	Xylariaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0107	*Amanita* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0108	*Amanita* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0109	*Amanita stubbasa*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0110	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI

Continued...

Voucher	Species	Associated plant species	Family	Country	Habitat	Collector
OGF0111	*Ganoderma lucidum*	Isoberlinia doka	Ganodermataceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0112	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0113	*Amanita loosii*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0114	*Russula oleifera*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0115	*Russula oleifera*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0116	*Amanita loosii*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0117	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0118	*Amanita congolensis*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0119	*Amanita pulverulenta*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0120	*Boletus* sp.	Isoberlinia doka	Boletaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0121	*Amanita craseoderma*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0122	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0123	*Volvariella earlei*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0124	*Amanita craseoderma*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0125	*Volvariella earlei*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0126	*Trametes* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0127	*Amanita* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0128	*Trametes polyzotii*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0129	*Amanita loosii*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0130	*Amanita* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0131	*Volvariella earlei*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0132	*Amanita loosii*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0133	*Cortinarius* sp.	Isoberlinia doka	Cortinariaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0134	*Cortinarius* sp.	Isoberlinia doka	Cortinariaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0135	*Marasmius* sp.	Isoberlinia doka	Marasmiaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0136	*Marasmius* sp.	Isoberlinia doka	Marasmiaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0137	*Amanita craseoderma*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0138	*Russula congoana*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0139	*Amanita xanthogala*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0140	*Amanita masasiensis*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0141	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0142	*Lentinus* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0143	*Lactifluus gymnocarpoides*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0144	*Marasmius* sp.	Isoberlinia doka	Marasmiaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0145	*Trametes* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0146	*Trametes* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0147	*Ganoderma lucidum*	Isoberlinia doka	Ganodermataceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0148	*Trametes* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI

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Voucher	Species	Associated plant species	Family	Country	Habitat	Collector
OGF0149	*Lentinus squarrosulus*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0150	*Marasmius* sp.	Isoberlinia doka	Marasmiaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0151	*Trametes* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0152	*Amanita afrospinosa*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0153	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0154	*Amanita* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0155	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0156	*Boletus* sp.	Isoberlinia doka	Boletaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0157	*Scléroderma cingulata*	Isoberlinia doka	Sclérodermataceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0158	*Russula* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0159	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0160	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0161	*Chlorophyllum palaeotropicum*	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0162	*Amanita* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0163	*Amanita* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0164	*Lentinus squarrosulus*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0165	*Russula* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0166	*Boletus* sp.	Isoberlinia doka	Boletaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0167	*Inocibe* sp.	Isoberlinia doka	Inocibaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0168	*Russula* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0169	*Lentinus* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0170	*Russula* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0171	*Amanita masasiensis*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0172	*Scléroderma* sp.	Isoberlinia doka	Sclerodermataceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0173	*Ganoderma lucidum*	Isoberlinia doka	Ganodermataceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0174	*Lactifluus gymnocarpoides*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0175	*Lentinus squarrosulus*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0176	*Clavulina albiramea*	Isoberlinia doka	Clavulinaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0177	*Agaricus* sp.	Isoberlinia doka	Agaricaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0178	*Russula oleifera*	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0179	*Lentinus squarrosulus*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0180	*Octaviania ivoriana*	Isoberlinia doka	Boletaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0182	*Ganoderma lucidum*	Isoberlinia doka	Ganodermataceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0183	*Amanita* sp.	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0184	*Ganoderma lucidum*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0185	*Lactifluus* sp.	Isoberlinia doka	Russulaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0186	*Lactifluus gymnocarpoides*	Isoberlinia doka	Amanitaceae	Benin	Forest	Olyvia Gwladys FADEYI
OGF0187	*Lentinus squarrosulus*	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI

Continued...

Voucher	Species	Associated plant species	Family	Country	Habitat	Collector
OGF0188	*Trametes* sp.	Isoberlinia doka	Polyporaceae	Benin	Forest	Olyvia Gwladys FADEYI

Add File 4. Ta Diversity of useful species, local names, and life habits.

https://ethnobioconservation.com/index.php/ebc/article/view/1012/497