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Short Communication: Ethnomycological survey of macrofungi among the Aeta Community of Mt. Arayat, Philippines

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Abstract. *Bustillos RG, Caymo ES, De Guzman KMD. 2026. Short Communication: Ethnomycological survey of macrofungi among the Aeta Community of Mt. Arayat, Philippines. Asian J Ethnobiol 9: y090102. https://doi.org/10.13057/asianjethnobiol/y100102.* This study aimed to collect and identify macrofungal species in Mt. Arayat, Pampanga, Philippines. This also sought to determine the indigenous beliefs, utilization, and practices of Aeta Communities in Sitio Cananaoan towards them. Purposive sampling was employed to select the respondents in the study area, while an adapted survey questionnaire was used to gather relevant data regarding their insights. Most of the 24 respondents were female, aged 17-30. Although they have a local name for mushrooms, *kuwat*, only 12 of them (50%) have indigenous knowledge of mushrooms. Nevertheless, they were aware that mushrooms are found in several substrates during the rainy season. Aetas mostly eat mushrooms, and they identify the edible ones based on their appearance, smell, texture, and substrate. They consume them without any spices, as it may lead to negative effects. Before they collect mushrooms, they say *bari-bari po* or excuse me to honor spirits they believed residing in the place. Of the 14 documented mushroom species in this study, six of them (42.86%) were used as medicine, while six were also used as food (42.86%). As the ethnomycology slowly erodes due to modernization and environmental disturbances, this study contributes to preserving ethnomycology in the country.

Keywords: Aeta Community, edible**,** ethnomycology, indigenous, mushrooms

INTRODUCTION

The Philippines is regarded as one of the countries with the greatest biodiversity in the world. Its extensive variety of ecosystems houses thousands of plants, animals, and even macrofungal species (De Leon et al. 2023). The rich flora and fauna of the country have been widely utilized, making it a significant part of traditional Filipino life. Among biodiversity resources, there are mushrooms, which are valued for their cultural, economic, ecological, dietary, and medicinal importance (Lazo et al. 2015; Tantengco and Ragrario 2018). Macrofungi, found in decaying logs, trunks, or wood, are known for being superior to other food sources as their nutritional contents, including vitamins, minerals, and secondary metabolites, such as acids, alkaloids, lactones, polyphenols, sterols, and terpenoids. They play a huge role in numerous biological processes, such as antioxidant, antimicrobial, and anticancer, among others (Reyes and Nair 2016; Rathore et al. 2017; Dulay et al. 2020; Bustillos et al. 2024, 2025). Given these advantages, macrofungi have been a focus of academic studies throughout the years. Several macrofungal studies regarding its diversity, distribution, and potential uses have been conducted in the country, among which are in Mt. Arayat, Pampanga (Bustillos et al. 2024), Nueva Ecija (Guzman et al. 2018; Dulay et al. 2023; Bustillos et al. 2025), Nueva Vizcaya (De Leon et al. 2022), Misamis Occidental (Despe et al. 2023), Laguna (Soriano et al. 2021), and Northern Samar (Flores Jr. and Chia 2023).

Interestingly, ethnomycology also gained attention beyond those studies. In recent years, people have now recognized the traditional and cultural practices of different indigenous groups towards macrofungi. As traditions slowly fade in a fast-paced, modernized world, ethnomycology is beneficial as this knowledge system is deeply rooted in their beliefs and customs, which may help preserve Filipino culture (Comandini and Rinaldi 2020). In fact, mushrooms play a significant role in the cultural traditions of indigenous groups in the Philippines. These cultures have a close connection to the natural world, and mushrooms are an important part of the country's heritage (Corazon and Licyayo 2018).

Several studies in ethnomycology have revealed diverse practices and the utilization of mushrooms across all tribes in the country. For instance, the Kalanguya tribes in Nueva Ecija used a specific species of mushroom as an insect repellent, regardless of having no indigenous beliefs towards them (De Leon et al. 2022). On the other hand, out of the 45 collected species in the Bugkalot community in Nueva Vizcaya, only 17 were used as food and 7 were used as medicine (Torres et al. 2020). Similarly, several mushrooms were also utilized as food by the Bicolanos, including *Auricularia polytricha*, *Coprinopsis cinerea*, *Pleurotus djamor*, *Schizophyllum commune,* and *Volvariella volvacea* (Undan et. al. 2021). Meanwhile, macrofungal species such as *Trametes* sp. were used by indigenous communities in Ifugao to treat headaches and stomach (De Leon et al. 2018).

The Aetas, one of the indigenous groups in the Philippines, have a rich culture in terms of mushrooms since they are one of the earliest and oldest surviving tribes in the country (Jinam et al. 2017). In the previous decades, they inhabited the base of Mount Pinatubo in Zambales, yet its eruption made them relocate to nearby provinces. They are now situated in remote areas in municipalities in Pampanga such as Angeles, Floridablanca, Guagua, Magalang, and Porac. As they live below the poverty line, they have little to no access to basic mainstream services and other opportunities (Dizon et al. 2021). Contrastingly, they have unrestricted access to natural resources like forests, biomass, wildlife, and macrofungi. The use of macrofungi as a food and medicinal source is recognized in all indigenous cultures. Although several studies on the use of macrofungi as a food source and medicinal source in Aeta Communities were conducted, such as in Bataan (Tantengco and Ragrario 2018), there is still little to no information known about how indigenous people utilize and identify different species of mushrooms and how they are truly beneficial to them. To fill such a gap, this study conducted an ethnomycological survey of macrofungi in the Sitio Cananaoan Aeta Community in Magalang, Pampanga, Philippines. This study focuses on the knowledge and attitudes of the Aeta Community towards mushrooms, aiming to investigate Aeta mushroom use through a survey and interviews to ensure that their knowledge, beliefs, and practices are preserved and will continue to be passed down to future generations despite rapid modernization.

MATERIALS AND METHODS

Study area

This study was conducted at the Cananaoan Church of the Nazarene at Sitio Cananaoan, San Vicente, Magalang, Pampanga, Philippines (Figure 1). They represent an indigenous people resettlement from the Pinatubo area. The site is moderately steep since it is situated in the central plain of Luzon near the foothills of Mt. Arayat. Moreover, it has an average elevation of 41.54 meters above sea level (m asl), and falls under climatic type 1, with an average temperature of 28.19°C, annual precipitation of 89.61 mm, and 78.59% humidity.

Procedures

Permit acquisition

The Gratuitous permit (a permit given to individuals who collect wildlife for non-commercial or educational purposes) No. III-2023-008 was obtained from the Department of Environment and Natural Resources (DENR) through the Protected Area Management Board (PAMB), and requisite research permits have already been secured. The people in charge were provided with a thorough briefing on the objectives and methods of the study.

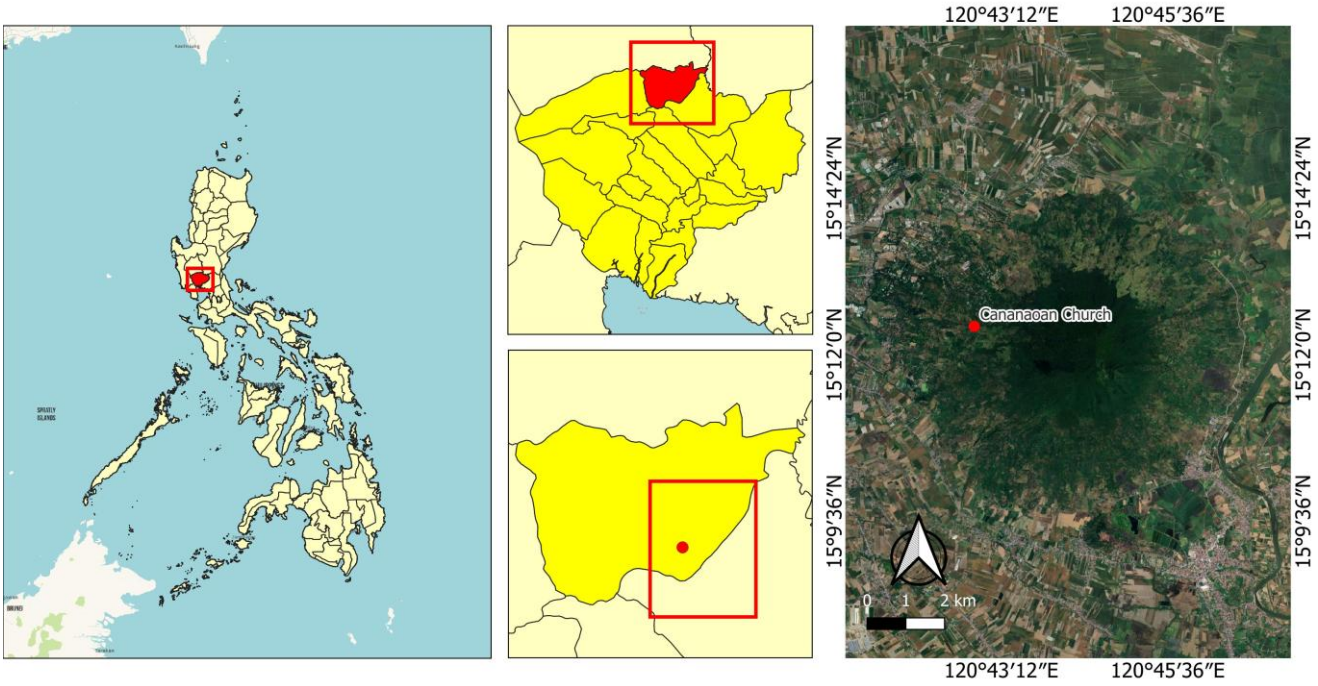

Figure 1. Location of Cananaoan Church of Nazarene in Sitio Cananaoan, San Magalang, near the foothills of Mt Arayat, Pampanga, Philippines (15°12'25.04" N 120°42'48.65" E)

Respondents and ethical requirements

Opportunistic and purposive sampling were employed to choose the 24 respondents from the study area. Their availability, expertise, knowledge, experience, and practices in utilizing mushrooms were considered, as they can give more in-depth insights, which can contribute to attaining study objectives. The researchers strictly followed all requirements and guidelines from authorities to respect the Aeta Community. This comprises the Department of Environment and Natural Resources III (DENR) and the local government unit of Magalang, Pampanga. The respondents were given a thorough explanation of the study and signed an informed consent to indicate their voluntary participation. Their confidentiality and anonymity were strictly maintained.

Survey questionnaire

A survey questionnaire was adapted and modified from the study of De Leon et al. (2012) to acquire the information needed for the study. Some questions utilized in his study were selected and translated into Filipino. A local government leader was also approached for guidance on the questionnaire to respect the community and avoid any misunderstandings. The questionnaire and interview included their socio-demographic profile, as well as their knowledge, beliefs, and practices in mushroom harvesting, consumption, use, and cultivation. These were validated and finalized through deliberation and consultation with the research adviser and other experts in the field for clarity, feasibility, and relevance to the objectives of the study.

Collection and identification of macrofungal specimens

Macrofungi were collected from May 2024, with assistance from the community leader, who possesses in-depth knowledge of local mushroom species. The fruiting bodies were meticulously gathered, accompanied by photographic documentation. An opportunistic sampling method was used in the collection, and three 1,000-meter-long transect lines, one for each peak (North Peak, South Peak, Summit), were utilized as collection sites. All observable sprouting macrofungi found on the substrates along the sides of the transect lines were also taken into consideration. The location and elevation of all collected macrofungi were also documented using Global Positioning System (GPS). Morphological identification of the macrofungi was also recorded, including morphometric data such as the cap, gills, and stalk, as well as other features. The identity of macrofungal species was also compared to several studies of De Leon et al. (2016), Liwanag et al. (2017), Arenas et al. (2018), Dulay et al. (2020), and further validated by a mycologist.

Data analysis

Descriptive analysis, including percentage and frequency, was used to quantify the sociodemographic information for Aeta Communities and the number of identified macrofungi obtained from survey questionnaires. The indigenous knowledge, beliefs, and cultivation practices of the Aetas on macrofungi were summarized in a table. The macrofungi reported from the survey, interview, and collected specimens were compared to previous reports. The list of macrofungal species, including their local names, substrates, traditional uses, and specific locations, was also tabulated.

RESULTS AND DISCUSSION

Socio-demographic profile

Table 1 shows the demographic profile of the respondents, including their age, sex, educational attainment, and civil status. Among 24 respondents, the majority were 17-30 years old (41.67%). Additionally, most respondents were female (70.83%), as the survey was conducted during the morning hours of weekdays, when males were occupied with their work on the farm and others were in the lowlands to sell their goods and harvests. Some women also cultivate crops such as banana, taro, and sweet potato for consumption and occasional sale within the community. Men typically hold blue-collar jobs, such as construction workers or janitors.

In terms of their educational attainment, most of them reached the elementary level (45.83%). This is generally low as they are living in remote locations where educational opportunities are limited. The average weekly income of the community ranges from below 1,000 pesos to between 1,000 and 5,000 pesos, reflecting the economic challenges faced by the community. Furthermore, although most respondents have partners and even children, marriage is still given a little emphasis, as most of them are single (70.83%).

Indigenous knowledge on mushrooms

Table 2 shows that all respondents (n=24) are familiar with mushrooms, which they call *kuwat*, yet half of them (n=12) were not aware of their traditional knowledge. All of them (n=24) believe that mushrooms typically grow during the rainy season, from August to September, and are not found during the summertime. They also have specific local names for each type.

Table 1. The demographic profiles of the respondents of Aeta Community in Sitio Cananaoan (n=24)

Parameter	Categories	Frequency (n=24)	(%)
Age	17-30	10	41.67
	31-45	9	37.5
	46 up	5	20.83
Sex	Female	17	70.83
	Male	7	29.17
Educational attainment	Elementary	11	45.83
	High School	4	16.67
	College	1	4.17
	Vocational	0	0
	None	8	33.33
Civil status	Single	17	70.83
	Married	6	25
	Widowed	1	4.17

Furthermore, all of them (n=24) believe that mushrooms grow in various places, such as decaying logs (n=23), soil (n=19), and leaf litter (n=17). For instance, the *kabuteng saging/kuwat* is found on banana plants, while *kuwat na kuyog/kabuteng kidlat* appears in bamboo plants and mounds. The *sikung kaging* grows on the ground, while *kuwat asin/tenga ng daga* grows on tree trunks.

Wild macrofungi were also identified by the respondents based on their size, appearance, and odor. According to them, it is edible if it has a branched structure, soft texture, and brown or white color. They consume mushrooms by boiling, sautéing, or as an ingredient in noodles. However, adding any spices, including chili, sour, or bitter ingredients, is strictly prohibited, as they believe it may lead to consequences such as experiencing eternal sleep, having a fever, being struck by lightning, or even death. They also perform rituals before collecting as part of their tradition, and most of them sell the collected mushrooms as an additional income. Aetas honor the spirits in their nature by saying phrases like *bari-bari po* or *tabi-tabi po* (excuse me) before picking mushrooms.

As for cultivation, some of them (n=14) were aware of the potential of growing edible mushrooms themselves (Table 3). However, mushroom spawns are limited, which hinders them from seizing the opportunity to do so. They are also facing difficulty as this modernization will make them lose their tradition, beliefs, and values. Although ethnomycology is gaining prominence, continuous training initiatives and scarcity in quality spawns stop the Aeta Community from further mushroom cultivation.

Species diversity, habitat, and uses of macrofungi

Table 4 shows the collected macrofungi, including their local and scientific names, as well as their traditional use by Aeta Community. There are 14 macrofungi species, with most of them traditionally utilized as food and medicines, each with six species (Figure 2). Some of the species, including the *V. volvacea,* were used to treat illnesses such as coughs and common colds. Although other mushrooms are utilized during the rainy season, only the collected samples were identified. This shows that macrofungi are widely consumed and utilized by the community who resettled in the area.

Table 2. General knowledge and beliefs of Aeta Community in Sitio Cananaoan towards mushroom (n=24)

Do you have a local name for a mushroom?		Do you have indigenous knowledge about mushrooms?		Where do mushrooms appear?			When do mushrooms appear?		Do you perform rituals before collecting mushrooms?		Do you sell mushrooms you've collected?		How do you recognize an edible mushroom?		
Yes	**No**	**Yes**	**No**	**decaying logs**	**Leaf litters**	**Soil**	**It's raining**	**It's hot**	**Yes**	**No**	**Yes**	**No**	**Appearance**	**Smell**	**Substrate**
24	0	12	12	23	17	19	24	0	21	3	19	5	24	12	9

Table 3. Cultivation practices of mushrooms by the Aeta Community, Philippines

Do you know that edible mushrooms could be cultivated?		Have you tried cultivating mushrooms?		Can mushroom cultivation be your occupation?		If given a chance, do you want to be trained on proper mushroom cultivation?	
Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
14	10	13	11	24	0	24	0

Table 4. Macrofungal diversity, habitat and uses of by Aeta Community in Sitio Cananaoan, Magalang, Pampanga, Philippines

Local name	Name	Substrate	Traditional uses and preparation method	GPS location	
				Latitude	Longitude
Kuwat anito	*Fomes fomentarius* (L.) Fr.	Dead log	Medicine	15°12'17" N	120°42'55" E
Kuwat papait	*Trametes elegans* (Spreng.) Fr.	Dead log	Medicine	15°12'14" N	120°43'0" E
Kuwat anito	*Trametes* sp. 1	Dead log	None	15°12'13" N	120°43'01" E
Kuwat kawayan	*Schizophyllum commune* Fr.	Dead log	Food	15°12'13" N	120°43'04" E
Kuwat anito	*Trametes versicolor* (L.) Lloyd	Dead log	Medicine	15°10'42" N	120°38'50" E
Kuwat anito	*Trametes pubescens* (Schumach.) Pilát	Dead log	Medicine	15°12'13" N	120°43'01" E
Kuwat papait	*Trametes* sp. 2	Dead log	None	15°12'13" N	120°43'01" E
Kuwat kahoy	*Ganoderma australe* (Fr.) Pat.	Dead log	Medicine	15°12'15" N	120°43'01" E
Tenga ng daga	*Auricularia polytricha* (Mont.) Sacc.	Dead log	Food	15°12'19" N	120°43'07" E
Kuwat saging	*Volvariella volvacea* (Bull.) Singer	Banana leaf	Food	15°12'24" N	120°43'26" E
Kuwat lupa/kuyog	*Termitomyces* sp.	Soil	Food	15°12'22" N	120°43'28" E
Kuwat bola/duldul	*Calvatia* sp.	Sead twig	Food	15°12'20" N	120°43'22" E
Kuwat kawayan	*Stereum* sp.	Sead twig	Medicine	15°12'23" N	120°40'25" E
Balugbog ng dagis	*Auricularia auricula-judae* (Bull.) Quél.	Sead log	Food	15°12'23" N	120°43'22" E

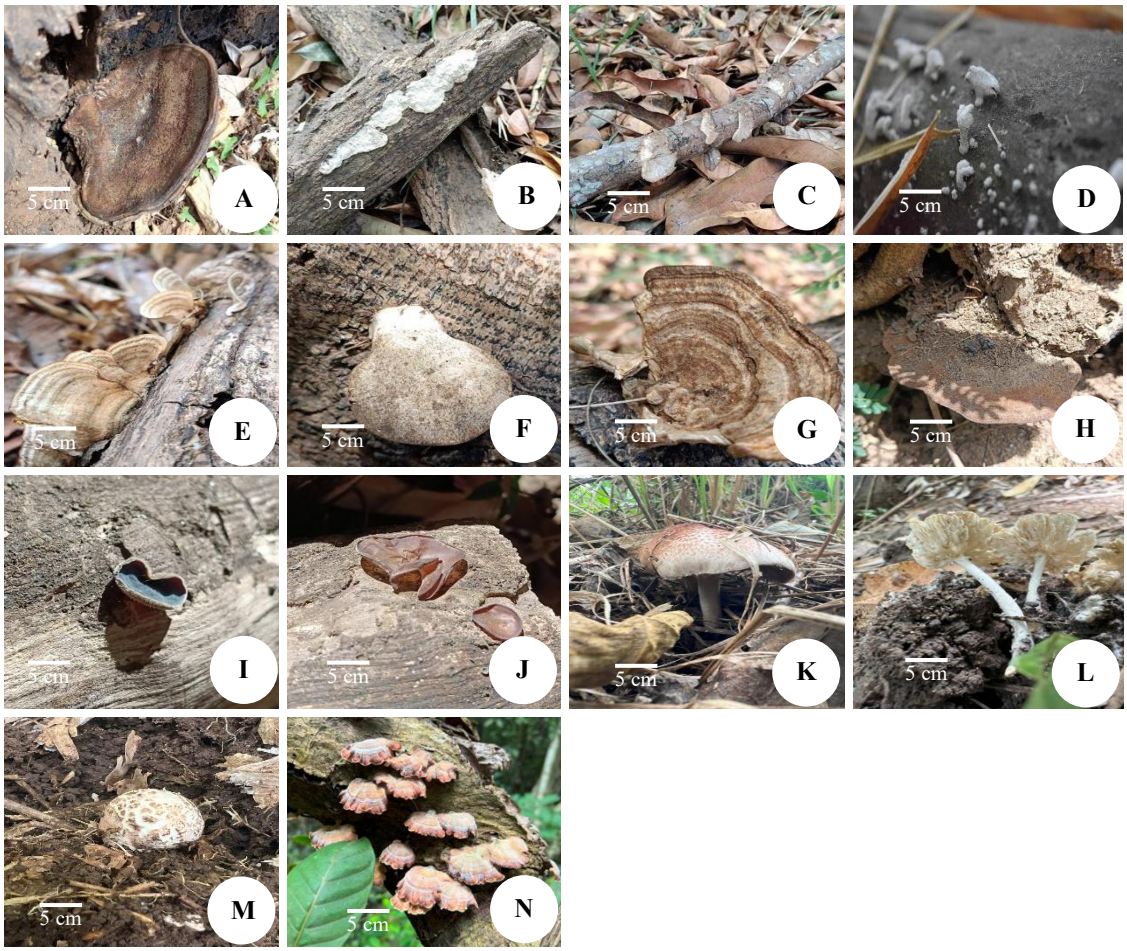

Figure 2. Diversity of mushrooms collected and identified by the Aeta Tribe in Sitio Cananaoan, Philippines: A. *Fomes fomentarius*, B. *Trametes elegans*, C. *Trametes* sp.1, D. *Schizophyllum commune*, E. *Trametes versicolor*, F. *Trametes pubescens*, G. *Trametes* sp. 2, H. *Ganoderma australe*, I. *Auricularia polytricha*, J. *Auricularia auricula-judae*, K. *Volvariella volvacea*, L. *Termitomyces* sp., M. *Calvatia* sp., N. *Stereum* sp.

The result of this study suggests that after being resettled from their ancestral homes, Aeta Community still observes their customs and beliefs on the utilization of mushrooms as they recognize the similarity of species of mushrooms they once used in their ancestral homes. In this regard, their potential use, like medicine or food, can bridge the gap in traditional mycological knowledge.

Discussion

Nowadays, the Aetas, also known as Kulots due to their curly hair, reside in various towns in Pampanga. Their local name for mushrooms, *kuwat* aligns with the native term used by other Aeta Communities in Bataan and Central Luzon (De Leon et al. 2012; Tantengco and Ragrario 2018). This record contributes to the vernacular name of mushrooms, as they are unique among other indigenous groups. For instance, they are called *kabute* and *uong* by Dumagats in Aurora, *bagel* and *buo* in Kalanguya communities in Carranglan, Nueva Ecija, *tubo* by Bicolanos, and *tarulok* and *uong* by Gaddang people in Nueva Vizcaya (Lazo et al. 2015; De Leon et al. 2016; Mallari et al. 2020; Undan 2021).

Their practices also resemble those of other indigenous groups, including Kalanguya communities, Dumagats, and other Aeta Communities in Zambales, other parts of Pampanga, and Tarlac (De Leon et al. 2012, 2016; Mallari et al. 2020). They collect mushrooms on substrates, like decaying logs, leaf litter, and soil, as long as the climate is highly humid. On the other hand, they distinguish edible from poisonous ones based on their color or appearance, substrate, and smell. Although the Ifugao community shares the same knowledge, they also use insects or flies as an indicator of their edibility. When insects fly around a mushroom, it is considered edible (De Leon et al. 2018), a practice not employed by the Aeta Community in Pampanga. This implies that the identification of the edibility of mushrooms varies across cultures.

Meanwhile, one of the most notable practices of the Aetas is the utterance of *bari-bari po* or *tabi-tabi po* (excuse me) before picking mushrooms. Although this is similar to the practices of other indigenous groups from the studies of De Leon et al. (2012), Torres et al. (2020), and Undan et al. (2021), this highlights the undocumented practice of the Aeta Community in Pampanga. Having an animist belief system, they believe in spiritual entities

inhabiting rivers, mountains, valleys, forests, or other places. This makes them chant prayers or phrases or perform dances to either guide them in their future hunt or apologize for catching animals or gathering herbs (Grey 2016). However, using that phrase is very common among Filipinos to acknowledge and avoid disturbing supernatural entities that coexist with them.

Belonging to the marginal group due to racial differences, they sell most of what they have collected in low-lying areas of the mountain as a source of extra income (Grey 2016). Some mushrooms are used for consumption and are cooked without any spices due to several misfortunes. Contrastingly, Bicolanos in Camarines Sur consume it with coconut milk, salt, and pepper, and it is also served as an appetizer for alcoholic beverages (Undan et al. 2021). In other communities, it was sauteéd with fermented fish sauce, vegetables, and meat (De Leon et al. 2012, 2016; Lazo et al. 2015). This indicates the similarities and differences of ethnomycological practices among other indigenous groups, which can largely contribute to the Philippine ethnomycology.

Aside from consumption, several mushrooms are also utilized for their medicinal properties. They are used for curing stomachache, colds, or headaches, which is similar to the practices of the Ifugao people (De Leon et al. 2018). This indigenous knowledge parallel to the previous studies on mushrooms' bioactivities. For instance, *Fomes fomentarius* is widely used as a traditional medicine due to its therapeutic properties. They are widely used as antibacterial, antitumor, analgesic, and antibiotic (Gong et al. 2025). Meanwhile, *Trametes* species, or turkey tail or *yun zhi* in China, are the most abundant in the collected species and were also consumed by the Aetas. This species, particularly the *Trametes versicolor,* is one of the most studied fungi due to its bioactivities, including antimicrobial, antifibrotic, neurotrophic, and anti-inflammatory (Ajibola et al. 2024; Lodi et al. 2025). Meanwhile, the *Auricularia*, also known as wood ear mushrooms due to their shape, are traditionally used as a dietary and medicinal component in East Asia. They are used for treating staphylococcal infections and relieving sore throats (Giri et al. 2025). Moreover, *Auricularia auricula-judae* is found to exhibit antimicrobial and antioxidant properties (Cai et al. 2015). *Ganoderma australe* is also found to have a potential use as an anticancer and antioxidant agent (Muñoz-Castiblanco et al. 2022). Additionally, Nhi et al. (2022) described that the methanolic extract of *Termitomyces* exhibits antimicrobial activity against *Bacillus cereus, Escherichia coli, Pseudomonas aeruginosa*, and *Salmonella typhimurium*.

Despite being known as one of the earliest inhabitants of the country, the ethnomycological knowledge, beliefs, and practices of Aeta Communities may seem to be eroding due to several factors. One of those is because of modernization. Although they are secluded from the mainstream, young Aetas are now more interested in following the latest trends (Grey 2016; Robles-García et al. 2018). This makes them less interested in learning their traditions and customs. Aside from that, environmental disturbances affect fungal diversity. Deforestation, agricultural practices, and other anthropogenic activities may reduce the species richness of mushrooms, as they have a mycorrhizal relationship with plants and trees that are affected by these activities (Robles-García et al. 2018; Shi et al. 2019). Aetas mostly transmit their ethnomycological knowledge orally. The decline of mushroom species may also lead to the decline of practices, as it reduces the opportunities for the Aetas to observe and utilize them. Until such time, the loss of utilization and observation may result in a gradual loss of ethnomycological knowledge, practices, and beliefs about macrofungi.

In summary, the species listing, identification, and documented practices and beliefs of the Aeta Community towards mushrooms highlighted the significance of ethnomycological surveys in conserving forest mycological resources and preserving the indigenous knowledge of different tribes in the Philippines. Thus, this study contributes to the baseline information of ethnomycological knowledge of Aeta Communities in the country. This will help preserve their beliefs, practices, and traditions in utilizing mushrooms. This implies that programs, activities, and initiatives on conservation and ethnomycological knowledge must be integrated into the local curriculum in promoting and conserving the macrofungal diversity and environment for the youth. Moreover, conservation programs for Mt. Arayat must be implemented to increase the diversity of macrofungal species in the area, as this will lead to more opportunities for preserving indigenous and ethnomycological knowledge, beliefs, and practices. Lastly, comparative studies on the ethnomycological knowledge of Aeta Communities residing in different locations around the country are recommended to assess the factors affecting their utilization, beliefs, and practices regarding mushrooms.

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