



Ethnomycological survey of macrofungi utilized by Ayta communities in Bataan, Philippines

Tantengco OAG¹ and Ragraio EM²

¹ College of Medicine, University of the Philippines Manila, Pedro Gil Street, Ermita, Manila, Philippines

² Department of Biology, College of Arts and Sciences, University of the Philippines Manila, Padre Faura Street, Ermita, Manila, Philippines

Tantengco OAG, Ragraio EM 2018 – Ethnomycological survey of macrofungi utilized by Ayta communities in Bataan, Philippines. *Current Research in Environmental & Applied Mycology (Journal of Fungal Biology)* 8(1), 104–108, Doi 10.5943/cream/8/1/9

Abstract

The Philippines is home to rich and diverse macrofungal species. Indigenous peoples are knowledgeable on macrofungi since they utilize these as food and medicine. However, ethnomycological knowledge has scarcely been documented in the Philippines. Thus, this study documented the macrofungal species utilized by Ayta communities as food and medicine in Bataan, Philippines. A total of 30 informants from the three Ayta communities participated in the survey. Most of the respondents belong the 26-45 year old age group. There were 15 species of macrofungi used by the three Ayta communities as food and medicines. However, only seven species of macrofungi were collected and identified. These edible species include *Volvariella volvacea*, *Termitomyces* sp., *Auricularia polytricha*, *A. auricula-judae*, *Stereum* sp., *Schizophyllum commune* and *Ganoderma lucidum*. *Volvariella volvacea* was the most important macrofungus in the three Ayta communities with the use value of 0.83. Ayta elders who reported the use of macrofungi as remedy for weakness, cough, common colds and poor eyesight. This documentation of ethnomycological knowledge provided a catalog of useful macrofungi of the Ayta. This can also serve as a physical record of their culture for the education of the future Ayta generation.

Key words – ethnomycology – Ayta – indigenous community – macrofungi – mushroom

Introduction

The Philippines is home to rich and diverse macrofungal species (Biadnes & Tangonan 2003, Sibounnavong et al. 2008). This immense diversity has provided sustenance to the Ayta communities in the Philippines over generations. Indigenous peoples are knowledgeable on macrofungi since they utilize macrofungal species for various purposes (Tayamen et al. 2004). People in northern Samar utilize *Auricularia polytricha*, *Cantharellus cibarius*, *Inocybe rimosa* and *Schizophyllum commune* as food (Flores et al. 2014). Ayta communities in Central Luzon utilize twelve species of macrofungi as food and *Mycena* sp. as traditional medicine (de Leon et al. 2012). Macrofungi are appealing to indigenous people because it tastes good and is a good substitute for meat. Most edible fungi are used for food and traditional medicines (Ayodele et al. 2011).

Ethnomycological knowledge has scarcely been documented in the Philippines. Furthermore, the potential benefit of this important knowledge in the field of medicine has been scarcely explored. There are only few recent ethnomycological studies conducted in the Philippines. A study

by De Leon et al. (2012) in the Ayta communities in Central Luzon reported that indigenous peoples utilize macrofungi as food, medicines and decorations. Twelve macrofungal species were used for food consumption, *Ganoderma lucidum* was used as house decoration. In Pampanga, a species of *Mycena sp.* was used as medicine by the subtribe Mag-Indi. Another study with the Gaddang communities in Nueva Vizcaya, Philippines revealed ten species of macrofungi being utilized as food (Lazo et al. 2015). Kalanguya tribe from Nueva Ecija claimed 36 species of edible macrofungi, however, only ten species were obtained during the collection. One species of macrofungus is used by the Kalanguya tribe as an insect repellent (De Leon et al. 2016)

There is a need to document indigenous knowledge from other ethnic tribes in the Philippines. Thus, this study documented the macrofungal species utilized by Ayta communities as food and medicine in Bataan, Philippines.

Materials & Methods

Study sites

Interview and sample collection were conducted in three sites in Dinalupihan and Hermosa, Bataan namely Sitio Pastolan, Barangay Payangan and Barangay Tubo-tubo. A free, prior and informed consent form was secured from the elders, tribal leaders, and barangay captain and individual informants.

Data collection and interview

Data was collected through a semi-structured interview (Cakilcioglu & Turkoglu 2010) from October to December 2016. This semi-structured interview was composed of questions regarding their knowledge on macrofungi, its utilization as traditional medicine, the diseases treated by the macrofungi, the parts that are used, how the parts are prepared and the frequency of use of these macrofungi.

Collection and identification of specimens

All available macrofungi utilized by the Ayta as food and medicines were collected right after the interview with the local informants. Specimens were photographed in their habitat, collected and placed in bags. It was brought to the laboratory for processing and taxonomic identification. Specimens were oven-dried and prepared as herbarium specimens. Identification was done by comparing morphologies with published literatures and authentication by the Botanical Division of the National Museum of the Philippines.

Data analysis

Sociodemographic profile of the informants and data about the edible macrofungi based on the interview were tabulated. The Use Value (UV), defined as the ratio of the number citations per species (U) to the number of informants (N), was calculated using the formula: $UV = U/N$ (Polat et al. 2015). Higher use values indicate that there are many use-reports for macrofungi implying its relative importance to the local community. Lower use values few indicate reports related to its use.

Results and Discussion

Sociodemographic profile

A total of 30 informants from the three Ayta communities participated in the survey. The sociodemographic profile is summarized in Table 1. Most of the respondents belong to the 26-45 year age group. There were more women respondents compared to men and they also cited more mushroom species used as food. Most of the respondents only reached high school and elementary. Catholicism was the major religion in the three communities. The average number of mushrooms cited by the participants from the three Ayta communities was five. Differences in educational

background as well as profession of informants did not have significant impact on the knowledge on indigenous mushrooms used as food and medicines.

Table 1 Sociodemographic profile of the informants from the three Ayta communities in Bataan, Philippines

Site	No. of Respondents	Age			Gender		Educational Attainment			Religion	
		16-25	26-45	>46	M	F	C	HS	E	C	NC
Pastolan	9	1	4	4	2	7	0	7	2	8	1
Payangan	11	4	4	3	2	9	0	5	6	10	1
Tubo-tubo	10	2	6	2	3	7	0	3	7	6	4
Total	30	7	14	9	7	23	0	15	15	24	6

M-Male, F-Female, C-College, HS-High school, E-Elementary, C-Catholic, NC-Non-Catholic

Listing of macrofungi utilized by the Aytas

There were 15 species of macrofungi used by the three Ayta communities as food and medicines. However, only seven species of macrofungi were collected from July 2016 to January 2017. These edible species include *Volvariella volvacea*, *Termitomyces sp.*, *Auricularia polytricha*, *A. auricula-judae*, *Stereum sp.*, *Schizophyllum commune* and *Ganoderma lucidum*. Some of the edible macrofungi was not available during the time of collection. According to the Ayta informants, macrofungi are very seasonal and only appear during the rainy months of August to September.

Volvariella volvacea, *Termitomyces sp.*, *Auricularia polytricha* and *A. auricula-judae* were used as food in all three Ayta communities. This means that these macrofungal species are not location-specific and they are more popular to the Ayta communities while *Schizophyllum commune* and *Ganoderma lucidum* were only used in two Ayta communities.

Use Values

The use value of the macrofungi were computed to quantify the importance of a specific macrofungus based on how often it is cited by a specific number of people. The use values of macrofungi is shown in Table 2. Macrofungi that are present in all three communities have high use values. *Volvariella volvacea* was the most important macrofungus in the three Ayta communities with the use value of 0.83. It is the most popular edible macrofungus for Filipinos because it is the first mushroom species introduced in the Philippines.

Volvariella volvacea was found to be nutritious containing crude protein, crude fiber, carbohydrates, ascorbic acid and minerals like potassium, phosphorus, magnesium, calcium, zinc, iron, manganese and copper. It was also found in previous studies that it contains bioactive compounds with several functional activities such as antimicrobial, anticancer, antioxidant, anti-coagulation, anti-inflammatory and anti-hypertension (Eguchi et al. 2015).

Some edible macrofungi were not identified due to the unavailability during the time of sampling. These mushrooms include kwat-balete, kwat-tadyang-biklat, kwat-karton/basura, kabuteng-uong, kwat-mangga, kwat-bayukan and itim na kwat. The low use values of these macrofungi based on this study may be explained by the seasonality of their growth in the forest and presence in only one or two communities.

Use of macrofungi as food and medicines

There were several Ayta elders who reported the use of macrofungi as remedy for weakness, cough, common colds and poor eyesight. However, these macrofungi were not available during the time of sampling so the species of these macrofungi were not identified. It was also interesting to note that one species of macrofungi, *Ganoderma lucidum*, was used by Ayta in Pastolan and Payangan as coffee. They dry the macrofungi, pound it and drink it as their coffee. There are actually several brands of commercially available coffee made from *Ganoderma lucidum*. Some

macrofungi such as *Auricularia auricula-judae* and *Volvariella volvacea* are usually sautéed with garlic and onion or boiled and eaten with rice.

Aside from edible mushrooms, the Ayta informants also mentioned macrofungi that are known to be toxic. They reported that poisonous mushrooms usually have rings in their stipe and some are glowing during the night. Effects of ingestion of these poisonous mushrooms include headache and dizziness. They reported that the remedy for the poisoning was eating sugar.

The Ayta communities usually name the mushrooms based on the substrates where the mushrooms were actually found. An examples is *Volvariella volvacea* which is locally known as “kwat-saging” because it grows in decomposing banana pseudostem and leaves. Ayta used similar common names for different species of macrofungi since naming was based on their substrates. Kwat kawayan was the local names of *Schizophyllum commune* and *Stereum sp.* Other macrofungi were named based on their morphological characteristics such as the *Auricularia auricula-judae* and *Auricularia polytricha* which is locally known as “tengang-daga” because of its similarity in the ears of rodents.

This documentation of ethnomycological knowledge provided a catalog of useful macrofungi of the Ayta. This can also serve as a physical record of their culture for the education of the future Ayta generation. Ayta communities in Bataan have different macrofungi used as food and medicines. These resources should be further studied to determine their species richness, distribution pattern and species diversity index.

Table 2 Macrofungi reported by the Ayta communities in Bataan, Philippines based on the survey-questionnaires, interviews, and collected specimens.

Local Name	Scientific Name	Citation Frequency (U)	Use Value (UV)	Use		
				Pastolan	Payangan	Tubo-tubo
Kwat-saging	<i>Volvariella volvacea</i>	25	0.83	+	+	+
Kwat-kuyog/kidlat/Susong-buyok	<i>Termitomyces sp.</i>	18	0.60	+	+	+
Taingang-daga	<i>Auricularia polytricha</i> , <i>A. auricula-judae</i>	10	0.33	+	+	+
Kabuteng-kahoy/tibig	<i>Ganoderma lucidum</i>	9	0.30	+	+	-
Kwat-kulog	nc	7	0.23	+	+	-
Kwat-anglap	nc	7	0.23	-	+	+
Kwat-kawayan	<i>Stereum sp./Schizophyllum commune</i>	6	0.20	-	-	+
Kwat-balete	nc	6	0.20	+	+	+
Kwat-tadyang-biklat	nc	6	0.20	+	-	+
Kwat-karton/basura	nc	5	0.17	+	+	-
Kabuteng-uong	nc	4	0.13	-	-	+
Kwat-mangga	nc	4	0.13	+	-	-
Kwat-bayukan	nc	3	0.10	-	+	-
Itim na kwat	nc	2	0.07	+	-	-
Kabuteng-mamarang	<i>Termitomyces sp.</i>	1	0.03	+	-	-

nc – macrofungi not present during the sampling period

Acknowledgements

This study was supported by the UP Manila National Institutes of Health Faculty Research Grant (Project Code: NIH 2015-007). We would like to thank the Ayta communities in Hermosa

and Dinalupihan, Bataan for participating in this study and BS Biology graduates of UP Manila: JCA Estebal, CMDR Gaylan, JJN Romero and MRRE Ramos for helping in the interview and field sample collection.

References

- Ayodele SM, Akpaja EO, Adamu Y. 2011 – Some Edible and Medicinal Mushrooms of Igala Land in Nigeria, Their Sociocultural and Ethnomycological Uses. *International Journal of Science and Nature* 2, 473–476.
- Biadnes GCQ, Tangonan NG. 2003 – Assessment of the biodiversity of basidiomycetous fungi, insects and orchids in midmontane forest of Mt. Apo, Mindanao. *PSSN Nature News* 2, 59
- Cakilcioglu U, Turkoglu I. 2010 – An ethnobotanical survey of medicinal plants in Sivrice (Elazig-Turkey). *Journal of Ethnopharmacology* 132, 165–175.
- De Leon AM, Reyes RG, dela Cruz TEE. 2012 – An ethnomycological survey of macrofungi utilized by Aeta communities in Central Luzon, Philippines. *Mycosphere* 3, 251–259.
- De Leon A, Kalaw S, Dulay R, Undan J et al. 2016 – Ethnomycological survey of the Kalanguya indigenous community in Caranglan, Nueva Ecija, Philippines. *Current Research in Environmental & Applied Mycology* 6, 61–66.
- Eguchi F, Kalaw S, Dulay R. 2015 – Nutrient composition and functional activity of different stages in the fruiting body development of Philippine paddy straw mushroom, *Volvariella volvacea*. *Advances in Environmental Biology* 9, 54–65.
- Flores AAU Jr, Alvarez MLC, Cortez FE, Perez BE et al. 2014 – Inventory and Utilization of Macrofungi Species for Food and Medicine. *International Conference on Biological, Chemical and Environmental Sciences (BCES-2014) Penang (Malaysia)*.
- Lazo C, Kalaw SP, De Leon A. 2015 – Ethnomycological Survey of Macrofungi Communities in Nueva Vizcaya, Philippines Utilized by Gaddang. *Current Research in Environmental & Applied Mycology* 5, 256–62.
- Polat R, Cakilcioglu U, Kaltaliolu K, Ulsan MD, Türkmen Z. 2015 – An ethnobotanical study on medicinal plants in Espiye and its surrounding (Giresun-Turkey). *Journal of Ethnopharmacology* 15, 163:1–11.
- Sibounnavong P, Divina CC, Kalaw SP, Reyes RG, Soyong K. 2008 – Some species of macrofungi at Puncan, Carranglan, Nueva Ecija in the Philippines. *Journal of Agricultural Technology* 4, 105–115.
- Tayamen MJ, Reyes RG, Floresca EJ, Abella EA. 2004 – Domestication of wild edible mushrooms as non-timber forest products resources among the Aetas of Mt. Nagpale, Abucay, Bataan: *Ganoderma sp.* and *Auricularia polytricha*. *The Journal of Tropical Biology* 3, 49–51.