**Ethnomycology of the Mamanwa Tribe in Las Navas, Northern Samar, Philippines**

**Abstract**

The Philippines possesses a rich diversity of macrofungal species, many of which have been utilised for generations by indigenous communities. The Mamanwa Tribe, one of the country’s oldest ethnolinguistic groups, relies on mushrooms for both sustenance and traditional medicine. The best-known examples of macrofungi are the mushrooms. They have a cap and a stalk and are frequently seen in fields and forests. Despite their extensive knowledge, their ethnomycological practices have not been systematically recorded. This study documented the macrofungi species traditionally utilised by the Mamanwa Indigenous People in Las Navas, Northern Samar, Philippines. Fifteen (15) respondents participated in the survey. A total of seven (7) macrofungi species were collected and morphologically identified. Distinguishing the edible from inedible macrofungi species was done through informal interviews with the chieftain/leader, elders, and farmers in the sampling area. Two additional species were reported through interviews but not encountered due to their seasonal occurrence. These findings underscore the depth of Mamanwa ethnomycological knowledge and its cultural relevance. There were five (5) species that were identified as food sources, commonly prepared using traditional methods such as ‘nilangtod' (cooked in coconut milk), ginisa (sauteed), and sinabawan (used in soups). Two (2) species, Ligbos and Uhong, were used for medicinal purposes: *G. rufa* for eye treatment and *D. spathularia* for body pain and infections. These practices not widely documented in existing literature, highlight the importance of preserving indigenous medicinal knowledge and cultural heritage. Mycochemical analysis is recommended to acquire information regarding the bioactive compounds present in these medicinal mushrooms utilised by the Mamanwa, and further studies are recommended.

**Keywords**: ethnolinguistic, indigenous, ligbos, macrofungi, uhong

**Introduction**

“Macrofungi are classified under Phylum Basidiomycota and form a large fruiting body which are spore-bearer and visible to the naked eye” (Mueller et al., 2007). “Macroscopic fungi are a critical component of the ecosystem, besides their use in human life. Ethnomycological studies were used in a holistic analysis between mycology and social science” (Dewi et al., 2022).

“Most fungi cannot produce their food. Thus, they live as saprophytes, parasites or as mycorrhizal symbionts to plants for their survival” (Reyes et al., 2009; Tang et al., 2015). “Most fungi are usually found growing on dead wood, soil, tree branches, coconut husk and decaying banana trunks” (Jusayan et al, 2019), decaying plants and “animals, twigs, leaf litter, animal manure, soil and even inside the body of insects. They play a very important role in the environment in the form of nutrient cycling; they act as decomposers of organic matter and even food for animals, including humans” (Tang et al., 2015; Zotti et al., 2013) and many macrofungi are recognized due to their significant medical and economical importance for they are valuable sources of nutraceutical and food products. “Macrofungal diversity is influenced by biotic and abiotic factors. The change in forests due to natural succession and anthropogenic disturbance affected macrofungal diversity, functional structure, and community composition. So far, there are still many unknown macrofungi species, and there is increasing interest in how to conserve macrofungal diversity” (Huang et al., 2025).

The best-known examples of macrofungi are the mushrooms. They have a cap and a stalk and are frequently seen in fields and forests. “Mushroom is a general term utilised largely for the fruiting body of the macro fungi (Ascomycota and Basidiomycota), and only has a short reproductive phase in their life cycle” (Das, 2010). “They inhabit diverse richness in the natural world, particularly in forest ecosystems” (Pushpa & Purushothama, 2012). “They have numerous impacts on ecology, biology, and the economy” (Das, 2010). “They are popular delicacies around the world that are prominently part of the human diet, including morels, shiitake mushrooms, and chanterelles. Over time, studies revealed that mushrooms contain enormous amounts of nutritional value, utilised mainly as a source of food and medicine. They contain compounds such as protein, carbohydrates, minerals, vitamins, unsaturated fatty acids, phenolic compounds, tocopherols, ascorbic acid, and carotenoids” (Bustillos et al., 2024).

In the Philippines, they frequently occur during the wet season. In countries with four seasons, they take place during spring as soon as the snow melts. As cited by Pushpa and Purushothama (2012), “mushrooms are indeed the ‘fruits’ of the fungal mycelium located underground”.

The majority of the people in rural areas depend on traditional fungi-based medicines to combat different illnesses. This ethnomycological survey was undertaken to document the traditional knowledge of mushrooms among the communities of the Mamanwa tribe in Barangay San Isidro, Las Navas, Northern Samar. Although macrofungi are exploited for food and medicine, their ethnomycological knowledge has not been documented in this community of the Mamanwa tribe community.

In the Philippines, “Indigenous Peoples (IPs) were known to utilise macrofungi species for various purposes” (Tayamen et al., 2004). “The Aetas of Luzon are nomadic people. Their social activities revolve around hunting birds, frogs, and other animals and gathering fruits, insects, and mushrooms” (Shimizu, 1989). “Mushrooms also provide additional income to households if sold in regional markets” (Yongabi et al., 2004). “The Ayta communities reported 15 species of mushrooms (e.g., *V. volvacea*, *Termitomyces* spp., *A. polytricha*, *Auricularia auricula-judae*, *G. lucidum*, *Stereum sp*., *S. commune*) utilised as food and alternative medicine for cough, weakness, common colds, and poor eyesight” (Tantengco et al., 2018). “Mushrooms such as *A. polytricha, Cantharellus cibarius, Inocybe* *rimosa*, and *S. commune* were considered food by the people of Northern Samar and on the Island of San Antonio” (Flores et al., 2014; Jusayan et al, 2019).

According to Lazo et al. (2016), “the Gaddangs in Nueva Vizcaya have several indigenous beliefs during mushroom collection and utilisation. The Gaddangs ask permission from the spirits before collecting mushrooms because they believe that spirits guard mushrooms and cannot be easily collected. They also believed that spontaneous lightning can stimulate mushroom growth. This belief has a scientific basis since lightning induces nitrogen to be converted to nitrite, which is important for the growth of macrofungi”. As proof, “several Japanese researchers are electrocuting a variety of mushrooms in lab-based garden plots with artificially induced lightning to determine whether the electricity can stimulate fungal multiplication” (Ryall, 2010). According to Torres et al. (2020), “all Bugkalot respondents knew about mushrooms, and they believe that they only grow during the rainy season and not so much in the summertime”. “This is parallel with the reports from other indigenous groups that mushrooms are abundant during the wet season of the year” (Lazo et al., 2015; De Leon et al., 2016; De Leon et al., 2018). They also said that “mushrooms can be found in different substrates such as decaying logs, leaf litter, and soil, which is similarly reported by the Ifugaos” (De Leon et al., 2018) and Gaddangs (Lazo et al., 2015). This claim could also be supported by the statement of Kalaw and Albinto (2014) that “many species of macrofungi naturally appear on different substrates, such as leaf litter, decaying plant residues, and decomposing logs of trees, especially during the rainy season” (Kalaw et al., 2014). According to Reyes et al. (2003), “mushrooms could grow at any time of the year in the Philippines as long as moisture is abundant”.

“The Kalanguya community believed that mushrooms grow in soil and decaying logs, which is similar to the beliefs of the Aeta communities in Pampanga, Tarlac and Zambales” (De Leon et al., 2012). “Mushrooms were also mainly collected for food and rarely for medicine and other purposes, such as insect repellent. Since most mushrooms were utilised for food, the cooking method preferred by the Kalanguyas for nearly all edible mushrooms was sautéed with other vegetables, similar to the Aeta indigenous tribe” (De Leon et al., 2012). During the rainy season, the community consumed more than one kilo of mushrooms two to three times a week. They also mentioned that “edible species of mushrooms can be distinguished from inedible ones based on their appearance, smell, and origin. Mushrooms' bright colour, pungent smell, and presence of a ring in the stipe of the fruiting body are some of their basis that mushrooms are poisonous, and the Bugkalots ignore them. A similar 19 technique is also used by the Ifugaos” (De Leon et al., 2018) and Gaddangs (Lazo et al., 2016), the Khasi tribe in Meghalaya, India (Das et al., 2014) and local IPs in Sabah, Malaysia (Fui et al., 2018). Moreover, insects perching on the mushroom fruiting body are an indication that it is edible. A similar observation was reported in another country that mushrooms being eaten by insects and other animals are also safe for human consumption.

On the other hand, Bugkalots emphasise that the names of mushrooms they use are derived depending on their appearance and the substrate where they are found growing. This is in congruence with the study of Teke et al. (2018), wherein “the vernacular names of the local mushrooms were associated with their features or the substrates on which they proliferate” (Teke et al., 2018). According to De Leon et al. (2012), “the different Aeta sub-tribes in Central Luzon are also governed by different indigenous beliefs when it comes to mushroom collection, utilisation, and cultivation. Some of their indigenous knowledge was as follows: (1) They do not cook mushrooms together with yellow or red vegetables or with shrimps, fish, and snails, as eating these cooked foods could cause fatal sickness. (2) One large mushroom species identified only as belonging to the genus Termitomyces is believed to be guarded by supernatural beings. Thus, before collecting this mushroom, the subtribe Mag-Indi performs dancing rituals or asks permission from the spirits and kisses the ground. Sub-tribe Zambal simply thanks their local deity “Apo Namalyari” for the abundance of their collected mushrooms”.

“Sub-tribe Mag-Antsi in Tarlac forbids combing their hair and singing while cooking mushrooms. They believed this could attract lightning to strike the person. Sub-tribe Zambal also mentioned that they should not observe the development of mushrooms on the ground, as the mushroom will not continue to grow. (6) Interestingly, all Aeta sub-tribes believed that spontaneous lightning causes the growth of mushrooms. Such a belief was also known in Japanese farming folklore” (Ryall, 2010). In fact, “researchers in northern Japan bombarded a variety of mushrooms in lab-based garden plots with artificially induced lightning to see if electricity actually makes the fungi multiply” (Ryall, 2010).

The Aeta sub-tribes also believed that mushrooms grow where the water used to wash or clean mushrooms was thrown. This is expected since mushroom spores present in the washed water would germinate and form fruiting bodies.

Considering that the ethnomycological knowledge of various tribes could serve as a tool to assess the fungal diversity in a country, this work is a contribution to the documentation of the edible and medicinal mushroom diversity in Las Navas, Northern Samar, particularly of the communities around the Mamanwa tribe. There is therefore a need for ethnomycological knowledge documentation in the communities around in order to assess species availability as a prelude to conservation and ecological sustainability.

**Methodology**

**Locale of the Study**

Barangay San Isidro in Las Navas, Northern Samar, is situated at approximately 12.2712°N, 125.0633°E on the Island of Samar. It is the source of the Catubig-Las Navas River, near the Pinipisakan Falls, which is a pool-like body of water. It can be reached within 1 hour from the town proper and is accessible through small boats and motorcycles. Its total population consists of 3,392 individuals. Major sources of livelihood are coconut farming, rice farming, and abaca farming. The barangay centre itself has an uneven topography with rolling hills towards the falls and the continuous mountain area (MPDO, 2020).

This barangay is where the “Mamanwa” community resides. The upland location of the Sitio, with its narrow and rocky road from the main barangay, can be reached by the river through small boats to a kilometre (3km), then riding a motorcycle “habal-habal” or by hiking to Sitio kilometre (7 km), the Mamanwa community. They have been living in this place for forty (40) years now and are composed of only twenty-one (21) families. The Mamanwas living in the hinterland of sitio kilometro siete (km7), are descendants of the Mamanwa tribe in Mindanao, one of the oldest and extent tribes in the Philippines and which bear a striking physical resemblance to Negritos. A major source of livelihood is farming, hunting wild animals, planting rice, corn, bananas, and root crops, making abaca fiber, and 33 converting wild vines into “away” or rattan, which they would sell in the main barangay of San Isidro, Las Navas, Northern Samar (Corporal, 2020).

**Research Design**

The descriptive research design was used in this study. The descriptive study desires to obtain information concerning the current status of the phenomena and to describe “what exists” with respect to variables or conditions in a given situation. In this study, the focus was on the collection and identification of the macrofungi in the study area, particularly in the grassland, forests, riverbank, and residential areas. Selected respondents from the Mamanwa community were interviewed informally to supplement the data.

**Research Instrument**

In this study, the researcher used the interview guide to obtain relevant data about distinguishing edible macrofungi from inedible macrofungi, ascertain what macrofungi were used for medicinal purposes, how they were prepared, and for what illness they were applied, and determine anthropogenic factors/activities that will influence the condition of macrofungi species. The interview guide was prepared in English and was translated into the Ninorte Samarnon dialect so that the respondents would have a clear idea about the questions.

**The Respondents**

The researcher purposively chose the respondents. Fifteen (15) respondents were selected for the interview. In the sampling site, selected respondents were purposively identified, especially chieftain leaders and elders who were involved in providing information about the macrofungi species present in the Mamanwa community.

**Data Gathering Procedure**

During the collection, sample specimens were removed from the substrate using the knife, but before picking up the specimen, a camera was used to take a picture of each specimen directly from where it was located. The specimen was handled carefully to avoid damage and destruction of useful identification characteristics. The collected specimen was put in brown paper and placed in closed containers, so that important features would not be lost and they would not dry out. An interview with some of the residents of the study area was conducted in order to gather information on the macrofungi present in the sampling sites.

**Preservation of the Specimen**

The macrofungi were preserved by drying or immersing in liquid preservatives. Drying the macrofungi specimens was done on woody species of fungi. The specimen was air-dried in the room at ordinary temperature. For those fragile and soft macrofungi specimens, they will be preserved by immersing them in 10% formalin solution to make them rigid and firm. After one to two days, they were 37 removed, washed with water and transferred into jars containing 70% denatured alcohol, where they were kept and preserved indefinitely.

**Distinguishing the Edible from Inedible Species of Macrofungi Found in the Sampling Area**

Distinguishing the edible from inedible macrofungi species was done through informal interviews with the chieftain/leader, elders, and farmers in the sampling area. According to the study by Torres et al. (2020), edible species of mushrooms can be distinguished from inedible ones based on their appearance, smell, and origin. Mushrooms' bright colour, pungent smell, and presence of a ring in the stripe of the fruiting body are some of their basis that mushrooms are poisonous, and the Bugkalots ignore them. A similar technique is also used by the Ifugaos (De Leon et al., 2018) and Gaddangs (Lazo et al., 2016), the Khasi tribe in Meghalaya, India (Das et al., 2014) and local IPs in Sabah, Malaysia (Fui et al., 2018). Moreover, insects perching on the mushroom's fruiting body are an indication that it is edible.

**Result and Discussion**

**The Different Macrofungi Species in the Mamanwa Tribe in Las Navas, Northern Samar**. Table 1 shows the macrofungi species among the Mamanwa communities in Las Navas, Northern Samar. The Mamanwa stated nine (9) mushrooms that are used as food and medicine.

During the sampling period, only seven mushrooms were collected and identified based on their morphological characteristics. There were five (5) collected edible mushrooms, namely; Lentinus tigrinus (Banay), *Schizophyllum commune* (Kurakdot), *Favolus tenuiculus* (Kurakdot), *Auricularia auricular-judae* (Tangog), *Volvariella volvacea* (Ulaping), and the two (2) medicinal mushrooms were *Galiella rufa* (Mata-mata), and *Dacryopinax spathularia* (Dulaw nga kurakdot).

Two species of macrofungi were not encountered during the conduct of the study, namely, Ligbos and Uhong. According to the Mamanwa, ligbos and uhong are seasonal mushrooms and can only be found during August, when thunderstorm frequently occurs.

The absence of certain mushroom species during the sampling period can be attributed to their seasonal fruiting patterns, which are strongly influenced by specific environmental conditions. Ethnomycological evidence from various Philippine regions indicates that mushrooms such as *Termitomyces cartilagineus* typically emerge only during the rainy season, particularly following thunderstorms. Studies have demonstrated that electrical and acoustic stimuli associated with lightning and thunder can trigger mushroom fruiting, as observed in species like *Lentinula edodes* (Kawasaki et al., 2010). This suggests that the absence of thunderstorms during the sampling window likely prevented the appearance of these mushrooms in the field. Therefore, the seasonality and weather dependence of these species must be considered in future sampling schedules and ecological assessments.

**Table 1. Mushrooms reported by the Mamanwa community in Las Nava, Northern Samar, based on the interview and collected specimens.**

|  |  |  |
| --- | --- | --- |
| **Scientific name** | **Local name** | **Common name** |
| *Lentinus tigrinus* (Bull.) Fr. | Banay | Tiger sawgill |
| *Schizophyllum commune* Fr. | Kurakdot (1) | Split gill |
| *Favolus tenuiculus* P. Beauv. | Kurakdot (2) | Tropical white polypore |
| *Auricularia auricular-judae* (Bull) J. Schrot | Tangog | Jelly ear fungus, Wood ear |
| *Volvariella volvacea* (Bull. Ex. Fr.) Singer | Ulaping | Paddy straw mushroom |
| np | ligbos | np |
| np | uhong | np |
| *Galiella rufa (*Schwein) Nannf. & Kort | Mata-mata | Rubber cap |
| *Dacryopinax spathularia* (Schwein) G.W. Martin | Dulaw na kurakdot | Fan-shaped jelly fungus |

**np=** mushrooms not present during the sampling

**Edible and Inedible Macrofungi Species Reported by the Mamanwa Community Based on the Interview and Collected Specimens**

Based on the interview conducted, the Mamanwa stated six (6) local name of mushrooms that are used as food, namely: banay, kurakdot, tangog, ulaping, ligbos, and uhong. However, during the collection period, out of six (6) mushrooms, only four (4) locally known mushrooms were encountered, collected, and identified. These were *Lentinus tigrinus* (Banay), *Schizophyllum commune* (Kurakdot), *Favolus tenuiculus* (Kurakdot), *Auricularia auricular-judae* (Tangog), and *Volvariella volvacea* (Ulaping).

*L. tigrinus* (Banay), *S. commune (*Kurakdot), *F. tenuiculus* (Kurakdot), and *A. auricular-judae* (Tangog) are cooked with coconut milk, which is a local delicacy called “nilangtod” or “ginataan”. These mushrooms could also be cooked as “ginisa” or sautéed, and ‘sinabawan/nilaga,” which is a soup dish. V. vovacea (Ulaping) is only cooked as a “sinabawan” or “nilaga”, with calamansi juice sometimes added to enhance its flavour.

*S. commune* and *A. auricula-judae* were also used as food by the Ayta communities (Tantengco et al., 2018; De Leon et al., 2012), Gaddang communities (Lazo et al., 2015), and Bugkalot communities (Torres et al., 2020). However, there is no current record showing that L. tigrinus was utilised as food by the Ayta in Bataan (Tantengco et al., 2018), and V. volvacea has not yet been documented to be used by the Bugkalot (Torres et al., 2020) as food.

This implies that Indigenous people from various groups have similarities and differences in knowledge regarding edible macrofungi species.

**Table 2. Edible and Inedible Macrofungi Species Reported by the Mamanwa Community Based on the Interview and Collected Specimen**

|  |  |  |  |
| --- | --- | --- | --- |
| **Scientific name** | **Local name** | **Common name** | **Edibility** |
| *Lentinus tigrinus* (Bull.) Fr. | Banay | Tiger sawgill | **/** |
| *Schizophyllum commune* Fr. | Kurakdot (1) | Split gill | **/** |
| *Favolus tenuiculus* P. Beauv. | Kurakdot (2) | Tropical white polypore | **/** |
| *Auricularia auricular-judae* (Bull) J. Schrot | Tangog | Jelly ear fungus, Wood ear | **/** |
| *Volvariella volvacea* (Bull. Ex. Fr.) Singer | Ulaping | Paddy straw mushroom | **/** |
| np | ligbos | np | **/** |
| np | uhong | np | **/** |
| Galiella rufa (Schwein) Nannf. & Kort | Mata-mata | Rubber cap | **x** |
| Dacryopinax spathularia (Schwein) G.W. Martin | Dulaw na kurakdot | Fan-shaped jelly fungus | **x** |  |

**Legend:** (/) Edible (x) Inedible (np) Not present during the sampling

**Macrofungi Used for Medicinal Purposes and Illnesses They Are Used for and the Method of Preparation**

Based on the interview conducted in the sampling area, the Mamanwa stated two (2) mushrooms that are used for medicinal purposes, namely *Galiella rufa* (mata-mata) and *Dacryopinax spathularia* (dulaw nga kurakdot).

According to the Mamanwa, *Galiella rufa* (Mata-mata) is a mushroom that has a flat top surface and a watery fruiting body and is abundantly found during the wet season. *Dacryopinax spathularia* (Dulaw nga Kurakdot) is similar to the locally known “kurakdot” mushroom, but its colour and texture differ from the edible one.

*G. rufa* (commonly known as Mata-mata) is traditionally used for treating poor eyesight, blurry vision, and eye irritation. The fruiting body of *G. rufa* is cut and squeezed to extract its liquid, which is then used as an ophthalmic drop ("pang-patak sa mata"). This eye drop is administered until the symptoms subside. *D. spathularia* (Dulaw nga Kurakdot) is utilised for relieving body pain, soreness, and infections. The preparation process involves a traditional method known as “tugmak”. “Pag tugmak” refers to “pag butang san mushroom sa dahon san saging ngan pag-dangdang sa kalayo," which refers to placing the mushroom’s fruiting body between banana leaves and then singeing it over an open flame. This rapid, high-heat exposure is believed to increase the amount of its extract. After "pag tugmak" (singeing), the heated fruiting body is wrapped in a clean cloth and applied to the affected part of the body, a process known as "pag-tapal" (poultice application). An alternative method involves crushing the fruiting body and applying 54 it directly to the affected area without a poultice. The treatment is continued until the ailment is cured.

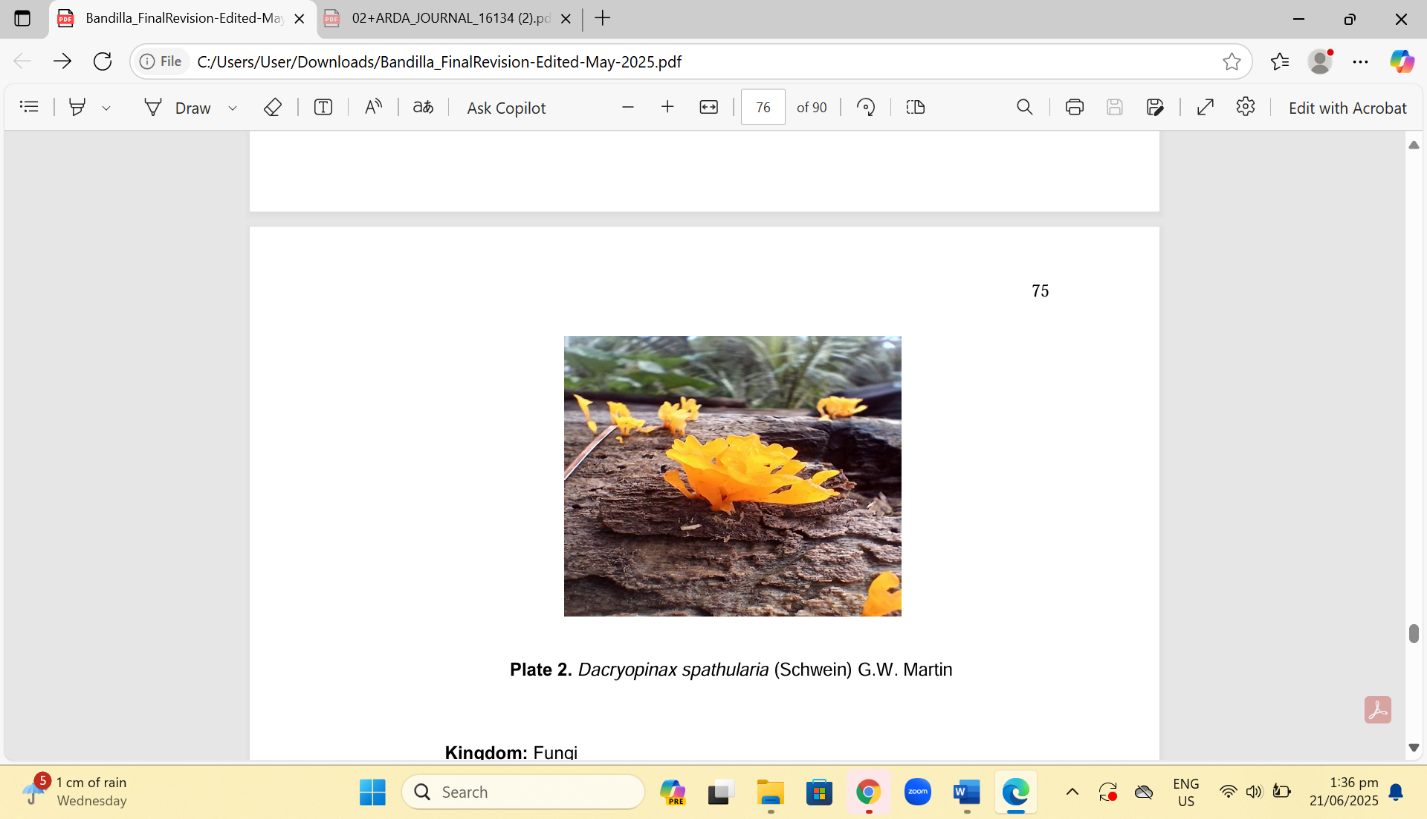
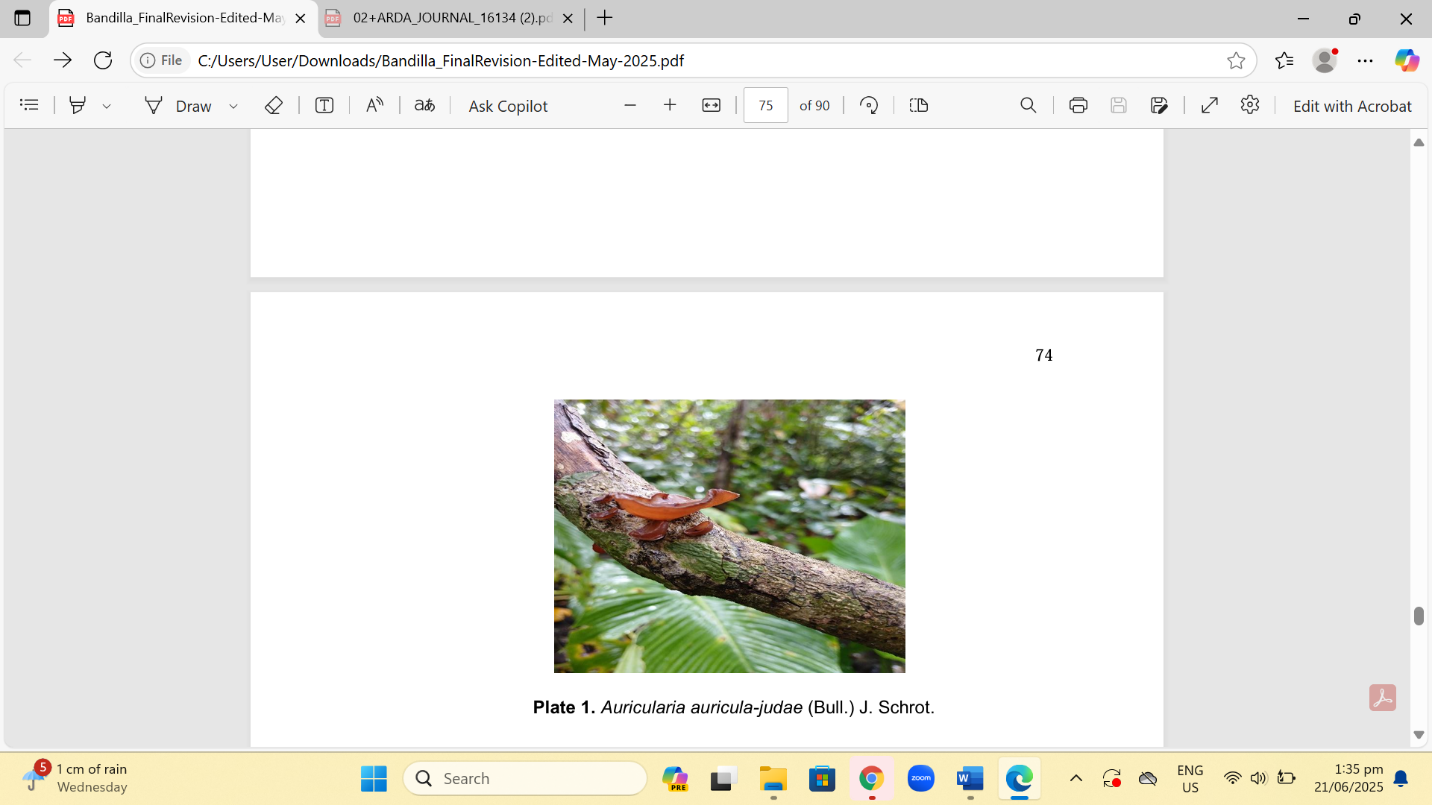
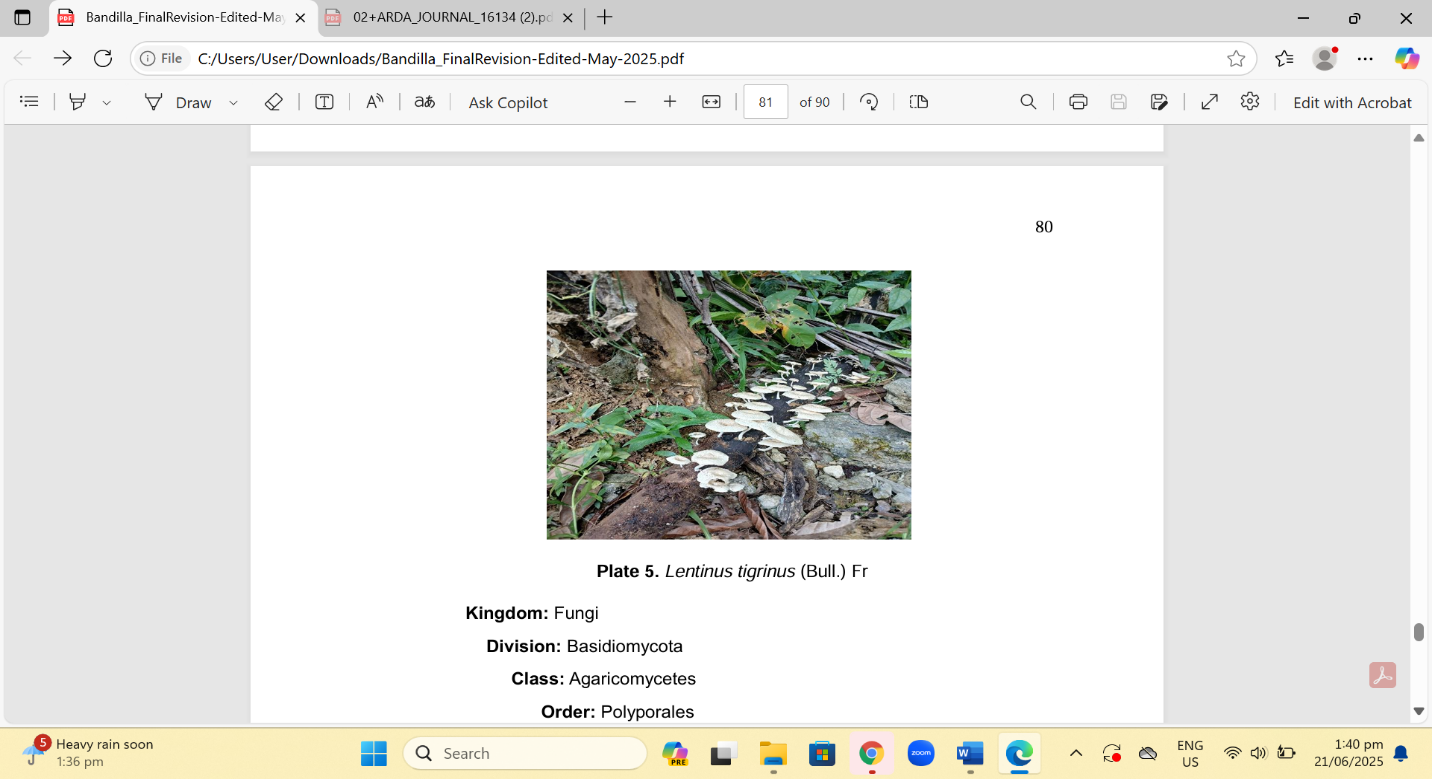
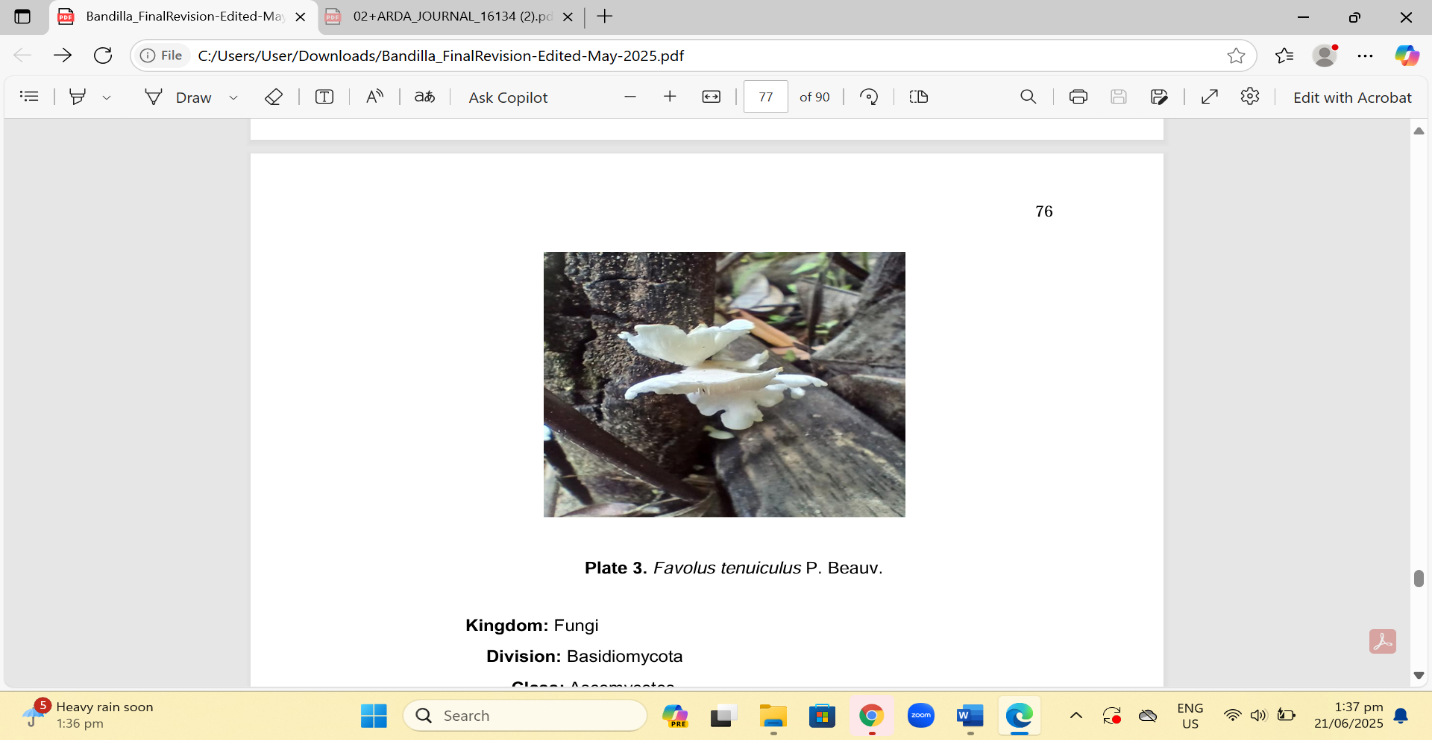
*G. rufa* and *D. spathularia* were utilised by the Mamanwa as medicine; however, based on an ethnomycological survey of Ayta communities (Tantengco et al., 2018; De Leon et al., 2012), Gaddang communities (Lazo et al., 2015), and Bugkalot communities (Torres et al., 2020), there is no record of the utilisation of this mushroom.

*“Fomitopsis sp., Ganoderma applanatum, Ganoderma lucidum, Polyporus picipes*, and *Polyporus sp.* were used by the Bugkalots as a treatment for skin infection” (Torres et al., 2020). However, none of these mushrooms were mentioned by the Mamanwa as medicinal mushrooms.

This implies that the Mamanwa tribe utilises medicinal mushrooms that are not acknowledged by other indigenous tribes as medicinal. Likewise, another indigenous tribe utilises medicinal mushrooms that the Mamanwa do not recognise. Their knowledge regarding medicinal mushrooms greatly differs from one another.

**Table 3. Macrofungi Used for Medicinal Purposes and for What illnesses They Are Used for and the Method of Preparation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Scientific name** | **Local name** | **Parts Used** | **Method of Preparation** | **Used for treating** |
| *Galiella rufa* (Schwein) Nannf. & Kort | Mata-mata | Fruiting body | Extracting and Topical Ophthalmic Administration of Extract | Blurry Vision, Poor eyesight, Eye irritation |
| *Dacryopinax spathularia* (Schwein) | Dulaw nga Kurakdot | Fruiting body | Pag tugmak” or placing the mushroom between banana leaves and singeing it over an open flame. “Tapal/pag tapal” or making and applying a poultice | Body pain, soreness, and Infection |

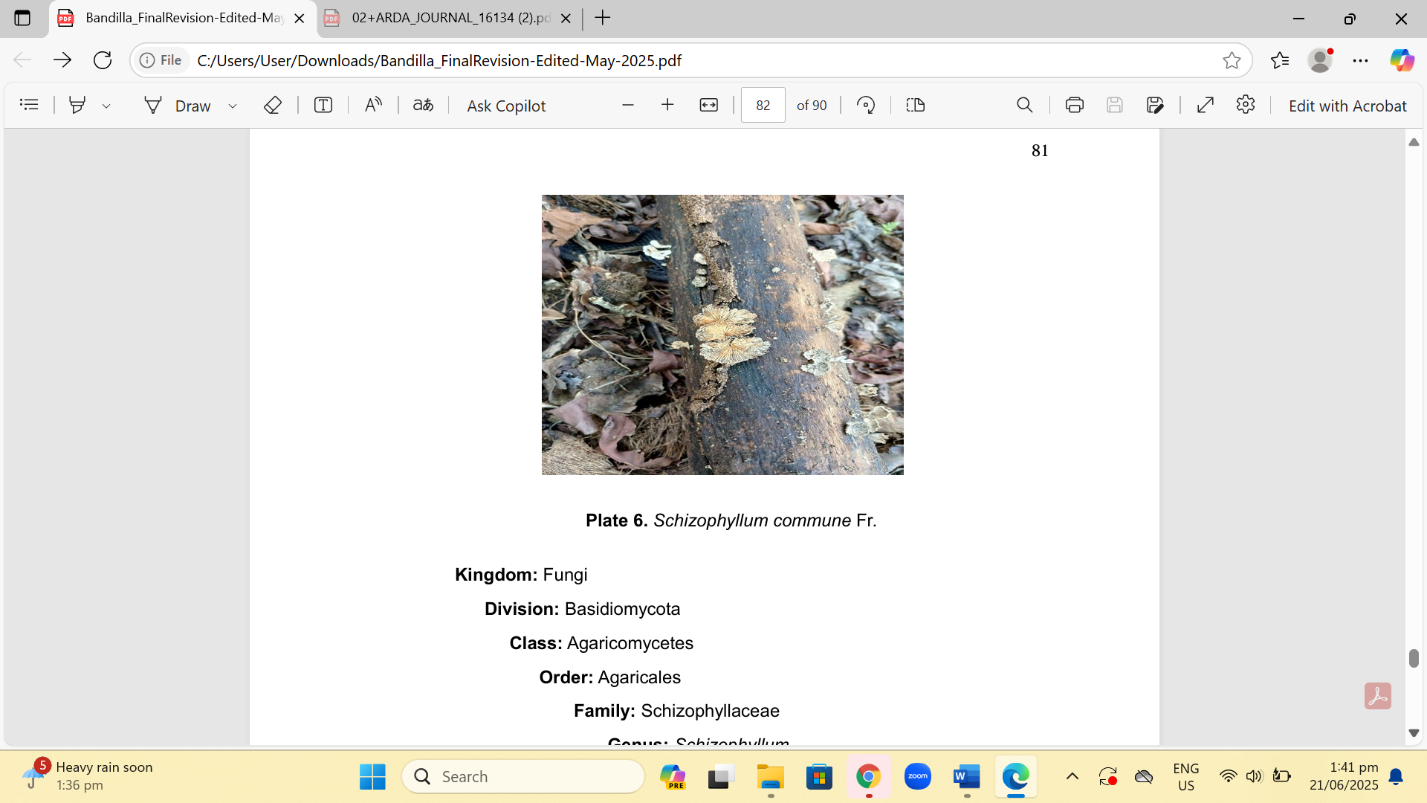
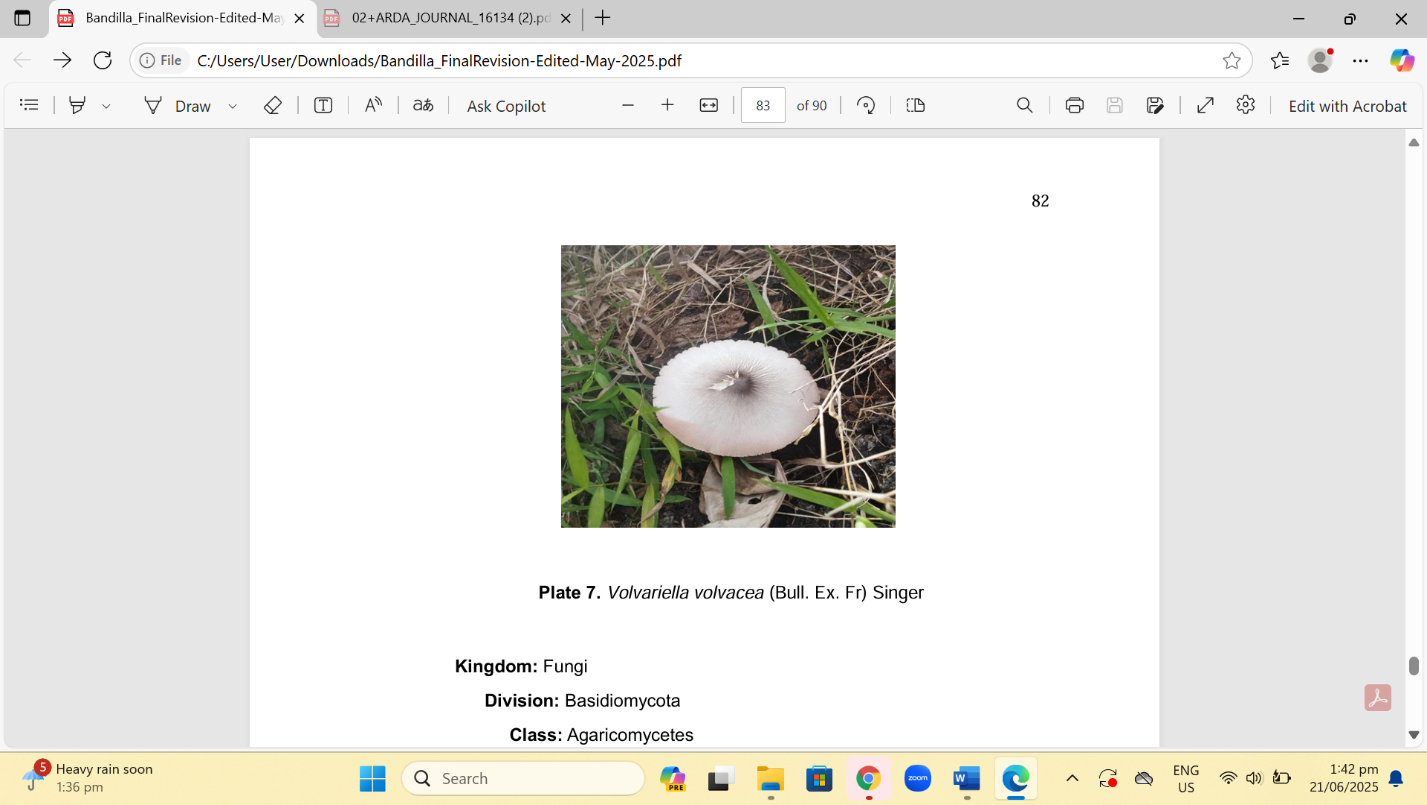
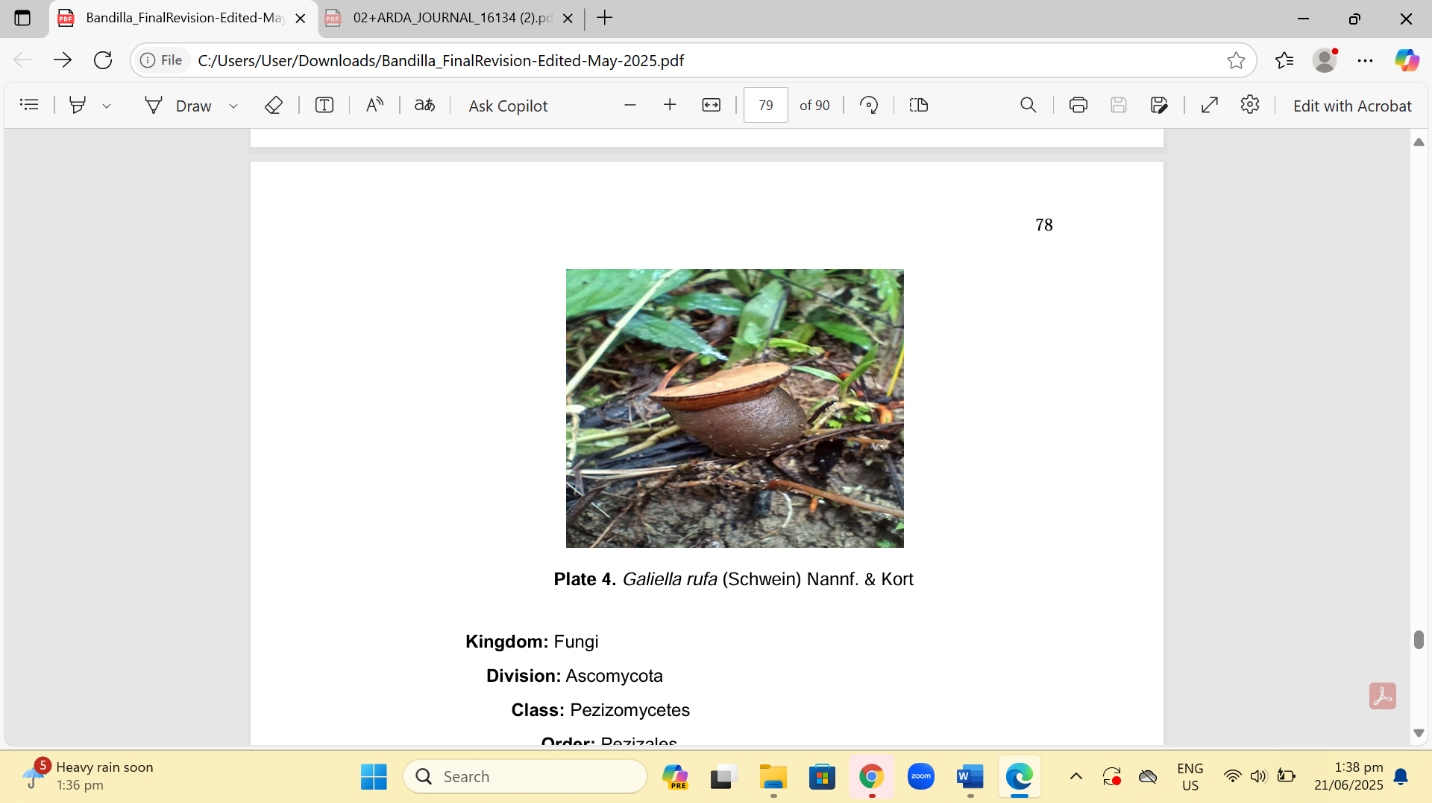


a

b

d

c1



e1

f

g

**Figure 1.** Macrofungi species utilized by the Mamanwa tribe in Las Navas, Nrthern Samar. **a.** *Dacryopinax spathularia* (Schwein) G.W. Martin; **b**. *Auricularia auricula-judae* (Bull.) J. Schrot.; **c.** *Favolus tenuiculus* P. Beauv.; **d.** Lentinus tigrinus (Bull.) Fr.; **e.** *Galiella rufa* (Schwein) Nannf. & Kort; **f.** *Volvariella volvacea* (Bull. Ex. Fr) Singer; g. Schizophyllum commune Fr.

**Conclusions**

Although, Mamanwa tribe have good traditional knowledge and practice, the attempt to document, utilise, and conserve these valuable wild resources was very poor. Lack of concern in mushroom research in the Mamanwa tribe and also in the province of Northern Samar has negatively affected the integration of this knowledge as an input in food security and mycological studies. In addition, the very low concern for supporting and funding mushroom-related research in the province has also contributed to the decline of indigenous knowledge on mushrooms in the area.

**Recommendations**

Mycochemical analysis is recommended to acquire information regarding the bioactive compounds present in these medicinal mushrooms utilised by the Mamanwa, and further studies are recommended for developing protocols of cultivation of these macrofungi so that their future availability is ascertained, along with creating income resources for the Mamanwa tribe.

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1.

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