

## Fungivory assessment of wild edible mushrooms in Bicol Natural Park, Philippines

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### Abstract

Mushrooms are known as one of the decomposers in the ecosystem since they commonly thrive in plant debris which is highly abundant in Bicol Natural Park. In addition, these macrofungi were identified to be consumed by the locals due to its palatability and nutritional attributes. However, these edible mushrooms are not locally cultivated and the major area under the jurisdiction of the National Park was still untouched. Thus, a survey of one hundred respondents was carried out to assess the consumption of the wild edible mushrooms of Bicol Natural Park, having the two areas of Camarines Sur province situated at BNP, that is Barangay Bahi, Lupi and Barangay Tible, Sipocot served as sources of data. The study aimed to determine the wild edible mushrooms being consumed by the locals, identify their local terminologies and determine the various cooking methods of the indigenous edible mushrooms by the residents. Findings revealed that thirteen mushroom species were reported to be edible and are known to be practically consumed. On the other hand, the identified edible mushrooms have a native term in the area, and likewise these wild macrofungi were noted to be prepared and served as soup, fried and spice for different dishes. The mushroom species collected need to be further explored to establish its cultivation protocol in a farm setting.

## 1. Introduction

Mushrooms have been consumed as a nutritional diet and medicine from the earliest times. Considering that mushrooms are fungi, their consumption is thereby termed to as “fungivory”. Generally, they are macroscopic fungi which have a unique fruiting body that can be viewed by an unaided eye. For many years, these macrofungi are identified as nutritional foods throughout the world since they contain vitamins, minerals, proteins, chitin, essential amino acids, and likewise it has a low fat and calories to which their nutritional value is comparable to corn and soybeans (Valverde *et al.*, 2015). For instance, *Ganoderma* spp. possess antioxidant properties, stimulate the immune system, and likewise has an ability to reduce heart diseases and cancer (Russel and Paterson, 2006; Huerta *et al.*, 2016), and according to Ferreira *et al.* (2010), it also contains bioactive components such as triterpenes, sterols, polysaccharides and lectins. The *Schizophyllum* obtained from Split-gill fungus is being produced

commercially as therapies for cancer and bioactive cosmetic ingredients.

These mushrooms are known to grow naturally on the decomposing lignocellulosic materials, and according to Dulay and Maglasang (2017), it is also known as one of the decomposers of vast plant residues in the natural ecosystem. One of the country’s protected areas that is rich in various plant species and organic debris is the Bicol Natural Park. It is one of the secured areas in the Philippines located in the Bicol region with a total land area of 5,201 hectares (12,850 acres) through amendments made in Proclamation No. 655 signed by President Manuel Luis Quezon on the 23<sup>rd</sup> of December 1940 (Vargas, 1940). The Natural Park’s area is an ideal community for mushrooms due to its cold to moderate temperature and its large amount of forest debris that supports their nutritional requirements. On the other hand, mushrooms are considered as high-end commodity in the market due to its price that can generate work

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opportunities and livelihood to the locals. However, due to limited technology and experts in the field of mushroom science, this biological potential is ignored in the wilderness of the vicinity. Thus, this study aimed to evaluate the wild edible mushroom found in Bicol Natural Park which were consumed by local folks in Bahi, and Tible, Sipocot, Camarines Sur. Specifically, this research paper aimed to determine the different indigenous edible mushrooms consumed by the locals, identify the local term of wild edible mushrooms in Bicol Natural Park and determine the local consumption processes of the wild edible mushroom in Bicol Natural Park.

## 2. Materials and methods

### 2.1. Research design, instrument and data gathering

The study used the descriptive method to determine the different edible mushrooms consumed by the residents of Bicol Natural Park, its different local terminologies and various cooking methods.

Fungivory assessment of wild edible mushroom was done by conducting an interview to the local individuals residing in the areas within the perimeter of Bicol Natural Park (Figure 1). Survey on the mushroom species being consumed by the local folks were recorded on Identification Guide Survey Form Assessment. Components of assessment form includes matrix title, list of possible mushroom species available on the area and note section intended for naming and describing mushroom species which were not presented on the given option but available on their community. Data gathered were then tabulated using spreadsheet application and analyzed the result through computer generated graphical representation.

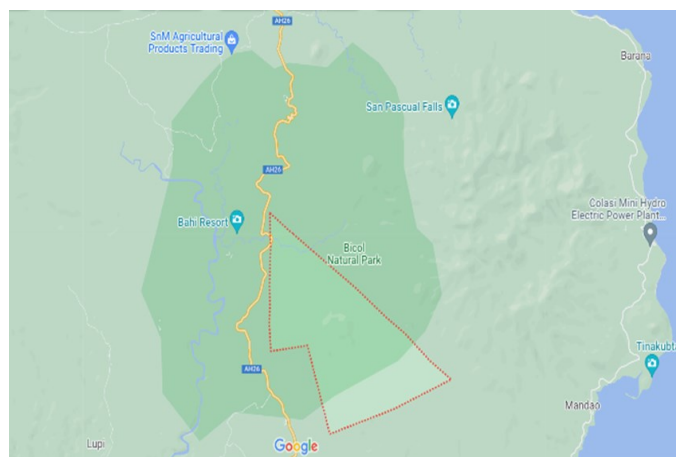


Figure 1. Map of Bicol Natural Park's area.

### 2.2 Research setting and respondents

Two study areas in the province of Camarines Sur served as the sampling sites in data gathering. These are in the municipalities of Sipocot and Lupi, Camarines Sur. The study sites are in the coordinates of 13.89" N,

122.97 E for Barangay Tible, Sipocot while 13.8990" N, 122.9323 E for Barangay Bahi, Lupi (Figure 2).

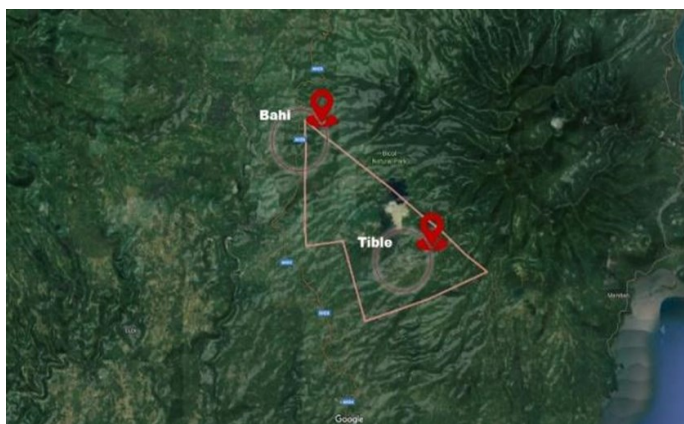


Figure 2. Study site for data gathering at Barangay Bahi, Lupi, and Barangay Tible, Sipocot, Camarines Sur.

A total of 100 respondents of randomly selected individuals from Bahi, Lupi and Tible, Sipocot were interviewed regarding the edible mushrooms available and being served as food in their locality.

## 3. Results and discussion

### 3.1 Different indigenous edible mushrooms consumed by the locals of Bicol Natural Park



Figure 3. Identified edible mushrooms commonly consumed by the locals of BNP. A.) *P. ostreatus*; B.) *P. sajor-caju*; C.) *P. florida*; D.) *P. pulmonarius*; E.) *P. cystidiosus*; F.) *S. commune*; G.) *A. auricula-judae*; H.) *A. polytricha*; I.) *A. cornea* (Australian Fungi, 2010); J.) *V. volvacea*; K.) *C. indica*; L.) *C. reinakeana*; and M.) *T. eurhizus* (Ye et al., 2019).

Fungivory assessment of wild edible mushroom was done by conducting an interview to the individuals residing within the premises of Bicol Natural Park (BNP) to determine the different indigenous edible mushrooms consumed by the locals. Results showed that there are

thirteen mushroom species known to be edible and consumed by the residents, and these are *Pleurotus ostreatus*, *Pleurotus sajor-caju*, *Pleurotus florida*, *Pleurotus pulmonarius*, *Pleurotus cytidiosus*, *Schizophyllum commune*, *Auricularia auricula-judae*, *Auricularia polytricha*, *Auricularia cornea*, *Volvariella volvacea*, *Calocybe indica*, *Collybia reinakeana* and *Termitomyces eurhizus* (Figure 3).

Based on the data obtained from the survey conducted to the randomly selected residents of Brgy. Bahi, Lupi, Camarines Sur, it has been revealed that the most commonly consumed wild mushrooms in the locality are *Schizophyllum commune* and *Volvariella volvacea* which were identified by the 44(88%) and 34 (64%) locals, respectively (Figure 4). Followed by *Pleurotus cystidiosus* and *Auricularia auricularia-judae* with 12(6%) respondents that positively identified its edibility, which is higher than the responses obtained by *Pleurotus sajor-caju* and *T. eurhizus* with 10(5%); *P. ostreatus*, *P. florida*, and *A. cornea* with 8(4%); and *P. pulmonarius* and *C. indica* having 7(3.5%) respondents stating that they have consumed these macrofungi. While, *C. reinakeana* with (6 or 3%) and *A. polytricha* (4 or 2%) were recorded to be the rarest edible mushroom to be part of the respondents' diet.

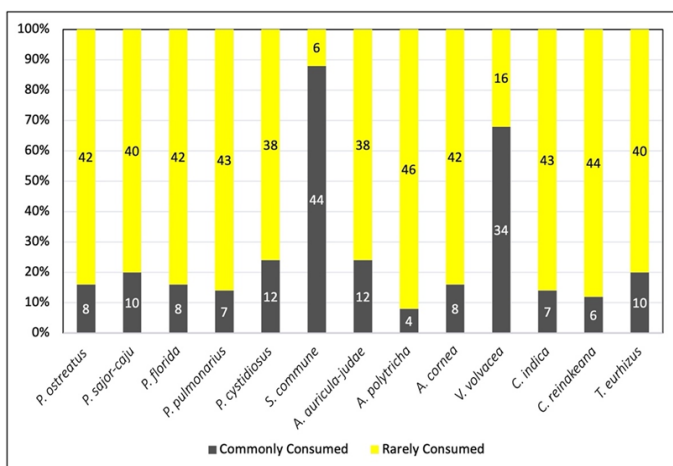


Figure 4. Wild edible mushroom consumption on Bahi, Lupi, Camarines Sur.

Moreover, in the assessment conducted in Brgy. Tible, Sipocot, Camarines Sur it has been recorded that *S. commune* (48 or 96% responses) is the most commonly consumed wild edible macrofungi which has the same findings to the locals residing at Brgy. Bahi, Lupi, Camarines Sur (Figure 5). Followed by the 34 (68%), 29(14.5%), and 21(10.5%) of the respondents that have identified correspondingly the *V. volvacea*, *T. eurhizus*, and *P. florida*, as common edible mushrooms in the area, which is higher than *A. auricula-judae* with 14(7%) and *P. sajor-caju* with 9(4.5%) responses. Subsequently, the macrofungi which were found to be

edible but not well known to the local residents were *P. ostreatus*, *P. pulmonarius* and *A. cornea* which all noted to have 3(1.5%) responses, followed by the 2(1%) responses both for *C. indica* and *C. reinakeana*. While, in contrast to the data obtained in the locality of Brgy. Bahi, Lupi, Camarines Sur, the *P. cystidiosus* was the least recognized to be edible in Brgy. Tible, Sipocot, Camarines Sur similar with the *A. polytricha*.

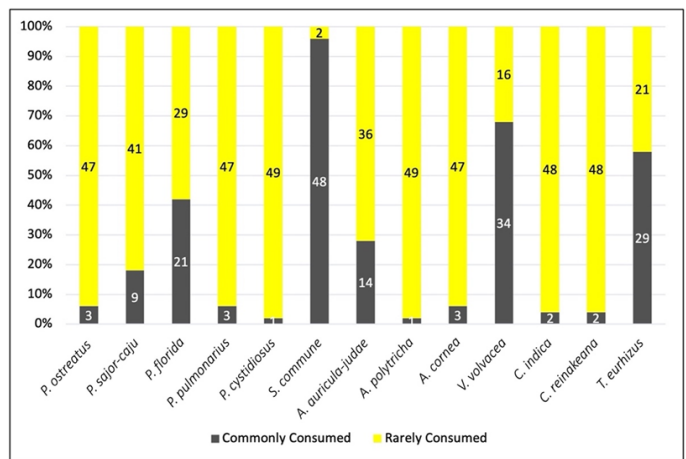


Figure 5. Wild edible mushroom consumption in Tible, Sipocot, Camarines Sur.

With the results gathered from Brgy Bahi, Lupi, and Brgy. Tible, Sipocot, Camarines Sur, it has been revealed that there are still a lot of different edible mushroom species that were not identified and recognized for consumption and domestication. It was also noted that the local residents of Bicol Natural Park are in need of technical research-based technology to domesticate the naturally occurring edible mushroom in their locality. However, these identified problems could be solved since the National Park has a large range of indigenous materials that can be used as substrates and media to be utilized in the cultivation process. Since, according to (Bellere, 2018; Cañal et al., 2020; Aldave et al., 2021) there are locally available alternative media such as those from the decocted parts of Banana, common kitchen wastes like Rice Wash, and Matured Coconut Water that can be utilized as a media which are less costly, locally abundant, and were proven to elucidate a luxuriant growth of macrofungi like *P. ostreatus*, *V. volvacea*, and *Ganoderma curtissii*.

### 3.2 Local terms of wild edible mushrooms consumed by the local folks of Bicol Natural Park

Bicol Natural Park (BNP) has a wide range of macrofungi and some of them were edible and consumed by the locals residing within its premises.

It has been unveiled in the survey for that *P. pulmonarius* is known to be locally termed as “Umoy-umoy”, while, *P. cystidiosus* is known as “Tipon-tipon”, “Kurakding” for *S. commune*, Tungong-tungong/

Talingang Kino/ or Perkalaw for *A. auricula-judae*; likewise, *A. polytricha* is termed as “Talungog”, Kabuteng-tubo/ Talingang paling for “*V. volvacea*”, and “Ligbos” for *T. eurhizus*. On the other hand, *P. ostreatus*, *P. sajor-caju*, *A. cornea*, *C. indica*, and *C. reinakeana* have no local terminologies, thus we proposed its local name as kabuteng Arbe, kabuteng Jaca, kabuteng Joab, kabuteng Kede and kabuteng Shaal, respectively.

### 3.3 Different cooking methods of the wild edible mushroom

In the earliest history, mushrooms have been known to be consumed globally because of its various nutritional and medicinal attributes, in fact, these macrofungi were believed to provide strength for the Greek soldiers in war battles; while, the Romans have termed this as “Food of the Gods” and an “Elixir of Life” for the Chinese (Valverde *et al.*, 2015). Currently, there are various mushroom species that were reported to be edible and are consumed throughout the world; three of the most widely cultivated among those are button (*Agaricus bisporus*), oyster (*Pleurotus* spp.), and paddy straw (*Volvariella volvacea*) mushrooms.

Results showed that all the evaluated responses for edible mushrooms such as *S. commune*, *V. volvacea*, *T. eurhizus*, *A. auricular judae*, *P. sajor-caju*, *P. pulmonarius*, *A. cornea*, *P. ostreatus*, *C. indica*, *C. reinakeana*, *A. polytricha*, and *P. cystidiosus* were being consumed as food and some have been observed as part of the diet of the local residents of Bicol Natural Park. In terms of consumption processes, it has been identified that the community have commonly prepared it as soup, fried, and spices for different dishes.

## 4. Conclusion

It was disclosed that the common mushroom species being consumed by the local folks within the vicinity of Bicol Natural Park, specifically at Tible, Sipocot and Bahi, Lupi were *S. commune*, *V. volvacea*, *T. eurhins* and *P. ostreatus*. In addition, *A. Auricularia-judae*, *P. sajor-caju*, *P. pulmonarius*, *A. cornea*, *C. indica*, *P. ostreatus* var. *florida*, *C. reinakeana*, *A. polytricha* and *P. cystidiosus* were also noted to be an edible macrofungi that has been served as food in the area. Subsequently, this study revealed that the locals have their native terms for these mushroom species such as Umoy-umoy (*P. pulmonarius*), Tipon-tipon (*P. cystidiosus*), Kurakding (*S. commune*), Tungong-tungong/ Talingang Kino/ or Perkalaw (*A. auricula-judae*), Talungog (*A. polytricha*), Kabuteng-tubo/ Talingang paling (*V. volvacea*), and Ligbos (*T. eurhizus*). While, in terms of their ways of consumption, the residents generally prepared and served these mushrooms as soup, fried, and spices. Furthermore, this research study had identified that in order to fully

utilized the full biotic potential of naturally occurring edible mushroom in locality a technology transfer is an ideal strategy.

## Conflict of interest

The authors declare no conflict of interest.

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