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# A Preliminary Study of Macrofungi in Universiti Teknologi MARA Pahang, Jengka Campus

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## ABSTRACT

*Fungi are among the most important organisms because of their vital roles in ecosystem functions. Different kinds of macrofungi have been recognized for thousands of years, but no study on macrofungi has been recorded in Universiti Teknologi MARA (UiTM) Pahang. The objectives of this preliminary study are to identify and to document the macrofungi collected around UiTM Pahang, Jengka Campus. Studies were conducted during rainy season (October 2008 and September 2009) and during dry season (Julai 2009 and January 2010). The researchers collected as many specimens as they could find and recorded the morphology and ecology of the specimens. The classification of species was done based on their reproductive structures or the fruitbody. This study recorded a total of 55 genera of macrofungi from the study area. The largest group was bracket fungi (25 genera), followed by agaric mushrooms (18 genera), boletes (4 genera), ball fungi (3 genera), jelly fungi (2 genera), club fungi (1 genera), coral fungi (1 genera) and cup fungi (1 genera).*

**Keywords:** *macrofungi, fruitbody, classification, genera*

## Introduction

The Kingdom Fungi contain a big number of species. The total number is unknown, but those have been estimated so far the range from 100 000 to 250 000 existing species (Mueller et al., 2004). This group includes both saprophytic and parasitic species. The fungi range from minute (microscopic) to massive (macroscopic) in size. They have great varieties of form, structure, and physiology (McKnight & McKnight, 1987; Smith et al., 1979). Many fungi play a significant role in decomposing the dead organic materials and returning it to the soil. They live in moist, decaying wood, under the bark of rotten logs, dung, wet dead leaves or humus of the soil.

The entire body of fungus is a mass of branched hyphae called mycelium, which grows and performs several functions such as nutrition, respiration and reproduction. In response to environmental stimuli, the ends of actively growing mycelium reproduces sexually by producing elaborate fruitbodies, which is known as "mushrooms" (Pegler, 1997). The fruitbody is a reproductive organ, sources structure of sexual spores to continue their life. Its functions include development, protection and dispersal of spores. The spores are produced in a very large numbers. From a single fruitbody of common mushroom, about 16 000 million of spores released and carried away by air currents (Rayner, 1979). Only a few of it will land on suitable spot and germinates to continue the life cycle.

A macrofungus refer to any fungus that produced a relatively large fruitbody, whose details are readily visible to the naked eye (Salmiah & Thillainathan, 1998). The macrofungi are unique living organisms which are characterized by their form and structure. Therefore, this research on macrofungi conducted in Universiti Teknologi MARA (UiTM) Pahang, Jengka Campus aimed to identify species and extract information on their characteristics.

## **Materials and Methods**

Studies were conducted during rainy season (October 2008 and September 2009) and during dry season (Julai 2009 and January 2010) at UiTM Pahang, Jengka Campus, including UiTM Pahang Forest Reserve, sharefarms and plantation areas. Collections of macrofungi were carried out by active researchers and by chance observations. The researchers collected as many specimens as they could find and recorded the morphology and ecology of the specimens. Photograph of fresh specimen were also done to show their features in different position. To ensure correct identification, the whole specimen were collected and carefully kept in tight plastic container.

Sorting of specimens and determination of fungi species were crucial and these were done on fresh specimen. All collected macrofungi were sorted according to their external features for identification of species and this was done with the aid of two mycologists from Forest Research Institute of Malaysia (FRIM). The specimens were preserved by drying them in an oven at 45°C for 24 hours and desiccated using silica gel.

Macrofungi specimens were later deposited to a herbarium at FRIM for further species study.

## Results and Discussion

A total of 55 genera for macrofungi were recorded during this study (Table 1) and they can be further divided into eight groups based on their reproductive structures or the fruitbody (Figure 1). Main characteristics of the groups are given below.

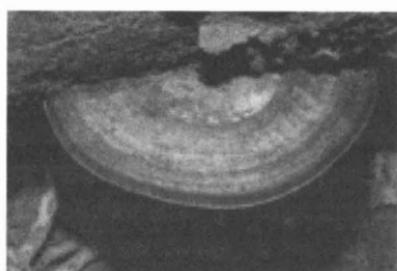
*Agaric mushrooms:* Agarics or gill fungi were the most common group of macrofungi found in the study area. This study recorded 18 genera of agaric mushrooms. Most of the specimens found grew on soil or the

Table 1: List of Macrofungi Genera Found in UiTM Pahang, Jengka Campus

(1) Polypore fungi	(2) Gill fungi	(3) Fleshy pore fungi
<i>Amauroderma</i>	<i>Amanita</i>	<i>Boletellus</i>
<i>Daedalia</i>	<i>Cantharellus</i>	<i>Heimioporus</i>
<i>Daldinia</i>	<i>Entoloma</i>	<i>Tylopilus</i>
<i>Fomitopsis</i>	<i>Gloeocantharellus</i>	<i>Xerocomus</i>
<i>Ganoderma</i>	<i>Gymnopus</i>	
<i>Microporus</i>	<i>Hydnnum</i>	(4) Jelly fungi
<i>Nigroporus vinosus</i>	<i>Laccaria</i>	<i>Auricularia</i>
<i>Phellinus</i>	<i>Lentinus</i>	<i>Dacryopinax</i>
<i>Polyporus</i>	<i>Lepiota</i>	
<i>Pycnoporus</i>	<i>Leucocoprinus</i>	(5) Ball fungi
<i>Trametes</i>	<i>Marasmius</i>	<i>Clavatia</i>
<i>Trichaptum</i>	<i>Mucidula</i>	<i>Cyathus</i>
<i>Bracket</i>	<i>Mycena</i>	<i>Scleroderma</i>
<i>Amauroderma</i>	<i>Pleurotus</i>	
<i>Daedalia</i>	<i>Pterygellus</i>	(6) Coral fungi
<i>Daldinia</i>	<i>Pulverolepiota</i>	<i>Lentaria</i>
<i>Fomitopsis</i>	<i>Russula</i>	
<i>Ganoderma</i>	<i>Termitomyces</i>	(7) Cup fungi
<i>Microporus</i>	<i>Cookeina</i>	
<i>Nigroporus vinosus</i>		
<i>Phellinus</i>		(8) Club fungi
<i>Polyporus</i>		<i>Xylaria</i>
<i>Pycnoporus</i>		
<i>Trametes</i>		
<i>Trichaptum</i>		



(a)



(b)



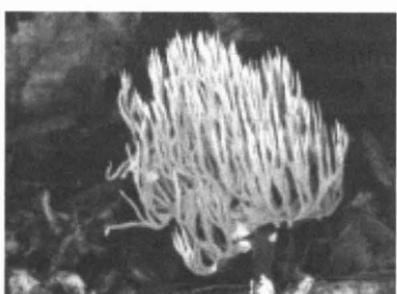
(c)



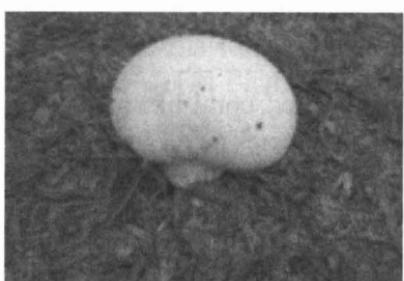
(d)



(e)



(f)



(g)



(h)

Figure 1: Fruitbodies of Macrofungi: (a) Agaric Mushroom, (b) Bracket Fungus, (c) Boletes, (d) Jelly fungus, (e) Club Fungus, (f) Coral Fungus, (g) Puffball and (h) Cup Fungus

fallen, dead leaves on the forest floor. They had a thin-fleshed fruitbody made up of a stalk and cap, with sheet-like gills hung from the undersurface of the cap.

*Bracket fungi*: This group also known as polypores. They have a layer of tubes on the undersurface that looked like tiny pores or holes when seen from below. These groups were common to all because they can be found throughout the year. They grew slowly and resulting the fruitbody to have long-lived. The brackets have hard, leathery or woody fruitbodies which vary in size and form. Most of the brackets were found on dead wood, laterally attached with a short stem or without stem. Some of them are parasites, growing on wood and may cause disease or death of valuable trees. This study recorded 25 genera of bracket fungi with most of them were found in the forest.

*Boletes*: Boletes or fleshy-pore fungi produced spores on the inner surfaces of the tubes. Boletes are macrofungi with soft and fleshy fruitbodies, grow in the forest humus. Only 4 genera of boletes were found. Interestingly, all were collected inside the forest.

*Jelly fungi*: This species can be recognized by their gelatinous consistency of their fruitbodies. They grew on dead and rotting wood and can be easily observed when the conditions are wet. The fruitbodies swell up by absorbing water to become thick and fleshy. In dry condition, they will dry down to a fine film which is scarcely visible. The jelly fungi are classified in 2 genera.

*Club fungi*: Matured club mushrooms produce spores on the outer surface of the fruitbodies. The fruitbodies is only a simple form and unbranched and relatively classified as primitive fungi. Only 1 genera were recorded from this study area.

*Coral fungi*: The fruitbodies intricately branched, coral-like mass, which may be simple or forming small tufts. This species never forming a cap but it has a stalk, and the entire surface was covered by a layer of spore producing tissue. Only 1 genera was recorded and it was found growing on the soil and among the forest humus, but it is less common in the plantation area where the soil has been disturbed.

*Ball fungi*: This species can be recognized through its ball-shaped fruitbody, and the common species are earthball and puffball. The collected specimens classified them in 3 genera. The main characteristic

is the spores were produced inside a spore case. At maturity, the whole fruitbody wall may break up to disperse the spores. Earthball and puffball are short-lived macrofungi, found growing on the ground in forest and also on lawn.

*Cup fungi:* The cup fungi can be easily identified by their cup-shaped fruitbody. The spore producing units form a defined layer which lines the upper surface of the cup. A stem may be formed to support the cup. From this study, only 1 genera was recorded from the forest. They were usually found on dead leaves and twigs, and sometimes found growing in the forest humus.

## Conclusion

The study has shown that there were significant numbers of macrofungi collected around UiTM Pahang, Jengka Campus, especially from UiTM Pahang Forest Reserve. This study recorded 18 genera of agaric mushrooms, 25 genera of bracket fungi, 4 genera of boletes, 3 genera of ball fungi, 2 genera of jelly fungi and 1 genera of club fungi, coral fungi and cup fungi, respectively.

Macrofungi was one of the most magnificent creatures of UiTM Pahang, Jengka Campus and an asset to our rich natural heritage. Therefore, further comprehensive study should be done to document the detail characteristics of macrofungi in this study area.

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## References

McKnight, K.H., & McKnight, V.B. (1987). *Peterson field guides – mushrooms*. USA: Houghton Mifflin Company.

Mueller, G.M., Bills, G.F., & Foster, M.S. (2004). *Biodiversity of Fungi: Inventory and monitoring methods*. United Kingdom: Elsevier Inc.

Pegler, D.N. (1997). *The larger Fungi of Borneo*. Sabah: Natural History Publications (Borneo) Sdn. Bhd.

Rayner, R. (1979). *Hamlyn nature guides – mushrooms and toadstools*. London: The Hamlyn Publishing Group Limited.

Salmiah, U., & Thillainathan, P. (1998). Some common macrofungi in Malaysia. *FRIM Technical Information*, 64, 1-4.

Smith, A.H., Smith, H.V., & Weber, N.S. (1979). *How to know the gilled mushrooms*. USA: Wm. C. Brown Company.

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