

Study on some Wild Mushrooms of Order Boletales and Polyporales in Mon-bin village, Thazi Township

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Abstract

The present paper deals with the study on the morphological characterization of wild mushroom in Mon-bin village, Thazi Township in Mandalay region. The total nine species belong to two orders, five families and seven genera were identified and classified. In order Boletales in three families, four species and order Polyporales in two families and five species. According to the morphological characters, the pileus shape was expanded, depressed, circular shape, star shape, fan shape and kidney shape respectively. All of these nine porous species, the stipe of *Xerocomellus chrysenteron* (Bull.) Sutara was changed in blackish blue colored when the stipe cut it out, the other species were not change in color. The eight species of porous mushroom, the porous shape were rounded pores (7species), one species was polygonal porous. According to microscopical characters, the texture of spores was smooth (8 species) and echinulate (1) species. The spore's shape was globoid, ellipsoid, fusoid and oblongoid respectively.

Introduction

In the present study, the wild mushroom were collected in Mon-bin village, Thazi Township in Mandalay Region. The fungi kingdom currently consists of eight major group: The most advanced group of fungi are the club fungi or phylum Basidiomycota containing about 30,000 described species of true fungi. They are fleshy, subfleshy, or sometimes leathery and woody and bear their fertile surface either on lamellae or lining the tubes, opening out by means of pores. The lamellate members are called agarics and the tube bearing poroid members, as Boletes and Polypores (Denchev & Assyov 2012). The mushrooms, because of their size are easily seen in fields and forests. The substrate on which mushrooms grow may be bare soil, humus, dung, other organic materials, living tree or decayed wood material. Mushrooms were generally classified under Phylum Basidiomycota, Division Eumycota, Subdivision Basidiomycotina, and Class Hymenomycetes. Mushrooms under this class were separated into different Orders: Order Agaricales, Polyporales, Sclerodermatales, Aphyllophorales, Lycoperdales, Auriculariales and Tremellales (Alexopoulos 1996). The Boletales are an order of Agaricomycetes containing over 1300 species with a diverse array of fruiting body types. The Boletes are the best known members of this group, and until recently, the Boletales were thought to only contain boletes. The Boletales are now known to contain distinct groups of agarics, puffballs, and other fruiting-body types. The order also includes some gilled mushrooms, in the families Gomphidiaceae, Serpulaceae, Tapinellaceae, Hygrophoropsidaceae, and Paxillaceae (Binder & Hibbett, 2006). The Polyporales are an order of about 1800 species of fungi in the division Basidiomycota. The order includes some (but not all) polypores as well as many corticoid fungi and a few agarics. Many species within the order are saprotrophic, most of them wood-rotters. Some genera, such as Ganoderma and Fomes (zhao, 2015). The aim and objectives was to collect, identify and classify the wild mushrooms of Mon-bin village, Thazi Township in Mandalay Region. to describe the detail characteristics, to record their distribution, to provide a valuable information as practical field guide on this area to researchers who interested in mushrooms and to fulfill the need in compilation the mushroom flora of Thazi Township, Mandalay Region.

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Materials and Methods

The naturally growing wild mushrooms were collected from Mon- bin village, Tharzi Township in Mandalay Region. The specimens were collected from different localities and habitats, and locations of specimens were determined by using a Global Positioning System (GPS) device. The classification and identification of collected specimens were done by comparing the literature of Thomas (1948), Alexopoulous (1962), Krieger (1967), Pacioni (1981), Keizer (1998),Phillips (2006) and Weber (2007).The spore prints were taken according to the Krieger (1967). The fungal specimens were also preserved in Formalin, Acetic acid, Alcohol (FAA) by the ratio of 5:5: 90.

Results

In the present study, altogether nine species of seven genera belonging to five families and two orders were collected from Mon-bin village in Thazi Township, Mandalay Region. According to the morphological and spores' characters, these species were classified and identified. The lists of collected species were shown in Table 1.

Table 1. Lists of collected species Mon-bin village in Thazi Township

Orders	Family	No	Scientific Name	Status of Edibility
Boletales	Boletaceae	1	<i>Tylopilus felleus</i> (Bull.)P. Karst	edible
		2	<i>Xerocomellus chrysenteron</i> (Bull.) Sutara	poisonous
	Diplocystidiaceae	3	<i>Astraeus hygrometricus</i> (Pers.) Morgan	poisonous
	Hygrophoropsidaceae	4	<i>Hygrophoropsisaurantiaca</i> (Wulfen) Maire	poisonous
Polyporales	Ganodermataceae	5	<i>Ganoderma lucidum</i> (Curtis)P. Karst	inedible
		6	<i>Ganoderma sessile</i> Murrill	edible
	Polyporaceae	7	<i>Polyporus alveolris</i> (DC.) Bondartsev & Singer	inedible
		8	<i>Polyporus ciliatus</i> Fr	edible
		9	<i>Pycnoporus cinnabarinus</i> (Jacq.) P.karst	edible

Taxonomic description of collected species

No.1 *Tylopilus felleus* (Bull.) P. Karst., Reve mycol., Toulouse 3(no.9): 16 (1881)

Pileus 6.5 cm broad, fleshy, thin, convex then expanded, umbo absent, smooth, glabrous, pale pink. Pores broad, angular, adnate, pink. Stipe 4.5 cm long, 0.3 cm thick, solid, equal, brown. Ring absent. Spores brown, smooth, fusoid, 15.0× 10.0 um. Edible.

No.2 *Xerocomellus chrysenteron* (Bull.) Sutara, (2008) ***Boletus chrysenteron*** Bull. 1791

Pileus 8.0 cm broad, fleshy, thin, convex then expanded, umbo absent, areolate, yellowish brown, turning blue when buried. Pores decurrent, greenish yellow, turning blue when buried. Stipe 8.0 cm long, 0.7 cm thick, solid, equal, yellow with reddish tints. Ring absent. Spores' olive brown, smooth, fusoid, 17.5 -22.5× 10.0-12.5 um. Edible.

No.3 *Astraeus hygrometricus* (Pers.) Morgan, J. Cincinnati Sac. Nat. Hist. 12:20 (1889)***Geastrum hygrometricum*** Pers. 1801

Carpophore 2.5-4.0 cm in diameter, globose, brow. Exoperidium open into star shape, 6.5-8.5 cm in diameter, dark brown. Endoperidium 2.0-3.5 cm in diameter globose, sessile, brownish with irregular apical ostiole. Gleba powdery when mature, brown. Stipe absent. Ring absent. Spores blackish brown echinulate, globose, 15.0-25.0um. Edible.

No.4 *Hyrophoropsis aurantiaca* (Wulfen) Maire, L'Empoisonnem. champ: 99 (1921)***Agaricus aurantiacus*** Wulfen, in Jacqin 1781

Pileus 2.8-3.9 cm broad, fleshy, thin, ovate then convex then slightly depressed, glabrous, margin incurved, yellow. Gills thin, broad, decurrent, repeatedly forked, yellow. Stipe 3.2-3.5 cm long, 0.3 -0.5 cm thick, equal, hollow to stuffed, yellow. Ring absent. Spores white, smooth, ellipsoidal, 10.0×7.5 um. Edible.

No.5 *Ganoderma lucidum* (Curtis) P. Karst., Revue mycol., Toulouse 3 (no.0) : 17 (1881) ***Boletus lucidus*** Curtis 1781

Pileus 5.0-15.0cm broad, tough, at first knobby or elongated then kidney shaped, concentrically sulcate, reddish brown with white margin. Pores minute, adnate, white then brownish. Stipe 4.0-6.6cm long, 1.5-2.5 cm thick, equal, solid, reddish brown. Ring absent. Spores brown, smooth, ellipsoidal, 12.5-15.0× 7.5-10.0um. Inedible.

No.6 *Ganoderma sessile* Murrill, Bull. Torrey bot. club 29: 604 (1902)***Boletus lucidus*** Curtis 1781

Pileus 12.3-17.0cm broad, tough, cluster of circular shaped, concentrically sulcate, reddish brown with white margin. Pores minute, adnate, white then brownish. Stipe 2.3-4.0 cm long, 1.5-2.3 cm thick, equal, solid, reddish brown. Ring absent. Spores brown, smooth, globular 5.0-7.5 um. Inedible.

No.7 *Polyporus alveolaris* (DC.) Bondartsev & Singer, Annis mycol. 39 (1): 58 (1941)***Merulius alveolaris*** DC., in de Candolle & Lamark, Fl. Franc., Edn 3 (Patis) 5\ 6 : (1815)

Pileus 4.2cm broad, tough, rounded to fan shaped, cuticle not detachable, smooth, yellow. Tubes short, decurrent, white. Pores broad, alveolate, polygonal, white. Stipe 0.3cm long, 0.1 cm thick, equal, solid, pale yellow. Ring absent. Spores white, smooth, oblongoid, 25.0× 10.0um. Inedible.

No.8 *Polyporus ciliatus* Fr. Observ, mycol. (Havniae) 1: 123 (1815)

Pileus 3.4-5.0 cm broad, tough, applanate, yellowish brown with ciliate hairs. Pores small, round, white. Stipe 2.3-2.7 cm long, 0.1-0.2 cm thick, equal, hollow, pale yellow. Ring absent. Spores white, smooth, oblongoid, 12.5-15.0× 5.0-7.5um. Inedible.

No.9 *Pycnoporus cinnabarinus* (Jacq.) P. Karst., Revue mycol., Toulouse 3 (no.9); 18 (1881) *Boletus cinnabarinus* Jacq. 1776

Pileus 3.0-5.0 cm broad, tough, semicircular to kidney shaped, deep orange red. Tubes short, blood red. Pore small, round, blood red. Stipe absent. Ring absent. Spores white, smooth, oblongoid, 12.5× 7.5um. Inedible.



Figure 1. *Tylopilus felleus* (Bull.) P. Karst



Figure 2. *Xerocomellus chrysenteron* (Bull.) Sutara



Figure 3. *Astraeus hygrometricus* (Pers.) Morgan

A. Natural habitat of Mushroom B. Basidiocarp in lower view C. Spores



Figure 4. *Hyphoropsis aurantiaca* (Wulfen) Maire



Figure 5. *Ganoderma lucidum* (Curtis) P. Karst



Figure 6. *Ganoderma sessile* Murrill , Bull



Figure 7. *Polyporus alveolaris* (DC.) Bondartsev & Singer

A. Natural habitat of Mushroom B. Basidiocarp in lower view C. Spores



Figure 8. *Polyporus ciliatus* Fr.**Figure 9. *Pycnoporus cinnabarinus* (Jacq.) P. Karst****A. Natural habitat of Mushroom B. Basidiocarp in lower view C. Spores****Table 2. Comparable characteristics of collected species in Mon-bin village**

No	Scientific Name	Pileus shape	Stipe present absent	Stipe Solid hollow	Spore shape	Spore texture	Spore size
1	<i>Tylophilus felleus</i> (Bull.)P. Karst	expended	Present	Solid	fusoid	smooth	15.0× 10.0um
2	<i>Xerocomellus chrysenteron</i> (Bu ll.) Sutare	expended	Present	solid	fusoid	ridge	22.5× 12.0um
3	<i>Astraeus ygrometricus</i> (Pers.) Morgan	Star shape	Absent	-	globoid	Echinul -ate	15.0× 25.0um
4	<i>Hygrophoropsis aurantiaca</i> Wulfen) Maire	depressed	Present	Hollow	Ellipsoi -d	smooth	6.25× 5.0um
5	<i>Ganoderma lucidum</i> (Curtis) P. Karst	kidney	Present	Solid	Ellipsoi -d	smooth	12.5× 7.5um
6	<i>Ganoderma sessile</i> Murrill	circular	Present	Solid	globoid	smooth	5.0- 7.5 um
7	<i>Polyporus alveolaris</i> (DC.) Bondartsev & Singer	Fan shape	Present	Solid	obolon- goid	smooth	25.0× 10.0um

8	<i>Polyporus ciliatus</i> Fr	applanate	Present	hollow	Obolon-goid	smooth	12.5× 5.5um
9	<i>Pycnoporus cinnabarinus</i> (Jacq.) P.karst	Fan shape	absent	-	Obolon-goid	smooth	12.5× 7.5um

Artificial key to collected species

1. Stipe absent -----2
1. Stipe present-----3
 2. Spore shape globoid, spore texture echinulate-----
----- 3.*Astraeus hygrometricus*
 2. Spore shape oblongoid, spore texture smooth-----
-----9. *Pycnoporus cinnabarinus*
3. stipe hollo-----4
3. stipe solid-----5
 4. Spore print color pale yellow, spore shape ellipsoid-----
-----4. *Hygrophoropsis aurantiaca*
 4. spore print color white; spore shape oblongoid-----
-----8. *Polyporus ciliatus*
5. Spore texture ridge-----
-----2. *Xerocomellus chrysenteron*
5. Spore textur-----6
 6. Spore print color white-----7. *Polyporus alveolaris*
 6. spore print color -----7
7. Pileus shape expanded-----1. *Tylopilus felleus*
7. Pileus shape kidney or circular-----8
 8. Pileus shape kidney, spore shape ellipsoid-----
-----5. *Ganoderma lucidum*
 8. Pileus shape circular, spore shape globoid-----
-----6. *Ganoderma sessile*

Discussion and Conclusion

The present study deals with the study on wild mushroom in Mon- bin village, Thazi Township in Mandalay Region. A total of nine species of mushrooms,

belonging to seven genera five families were found in the study areas. All these identified mushrooms belong to two orders, namely, Boletales and Polyporales. In order Boletales consists of three families and Polyporales consists of two families respectively. All the species were identified on the basis of their morphological characters as well as spores shape and texture. All information about mushrooms such as scientific name, habitat, morphological characters were presented.

Mushrooms may occur on variety of habitat i.e soil, dung, wood etc. In this study, six species were found growing on the soil, while three species were identified growing on the decaying wood debris. Mushrooms can be roughly divided into four groups, those are edible mushrooms, medicinal mushrooms, poisonous mushrooms and miscellaneous mushrooms (Christensen 1970). According to the literature, seven species were inedible and two species edibles. the four porous species *Tylopilus felleus* (Bull.) P. Karst., *Xerocomellus chrysenteron* (Bull.) Sutar, *Ganoderma lucidum* (Curtis) P. Karst., *G. sessile* Murrill were found growing on the soil, the rest 3 species *Polyporus alveolaris* (DC.) Bondartsev & Singer, *P. ciliatus* Fr. and *Pyncoporous cinnabarius* (Jacq.) P. Karst. were found growing on decaying wood debris In the present study, seven species are fruting body with stipe and two species are stipeless. These stipeless species were *Astraeus hygrometricus* (Pers.) Morgan. and *Pyncoporous cinnabarius* (Jacq.) P. Karst.

According to the resulting data, the cap shape of mushroom is various depending on the species. The cap shape of *Astraeus hygrometricus* (Pers.) Morgan was star shaped, *Polyporus alveolaris* (DC.) Bondartsev & Singer and *Pyncoporous cinnabarius* (Jacq.) P. Karst. were fan shaped, *Ganoderma lucidum* (Curtis) P. Karst. was kidney shape, *G. sessile* Murrill was circular shape. Spores colour is one of the simplest aids in the identification of mushrooms. The colour of the spores often differ from the colour of the gills and pores. These colour are white, yellow to yellow-brown, pink, purple to purple-brown, and black (Christensen 1972). The spores may possess any one of several colors according to the genus to which the specimen belongs.

Many basidiospores have smooth outer wall, but other have characteristic ornamentations, e.g. spines, folds or ridges. The basidiospores are typically a unicellular, uninucleate, haploid structure. Basidiospores may be globose, ellipsoidal, oblong/ cylindrical, angular, ovoid, fusoid, citriniform, phaseoliform and amygdaliform (Wesbter 2007). According to the resulting data, the 4 shapes spores were found in the nine species. The common spore shape were ellipsoidal (two) species, globoid (two) species, oblongoid (three) species and (two) species were fusoid respectively.

In the present study, *Xerocomellus chrysenteron* (Bull) Sutar, the tubes are yellow and decurrent; pores are yellow and large, the spores fusoid, ridges (longitudinally striate, the spore print is olive brown. These finding agree with Sutar (2008). Murrill (1909) stated that *Tylopilus felleus* (Bull.) P. Karst. have stout stipes, which do not have ring, pores are pink tinged colour. The spore print was pinkish brown. In the present study, these characters similar to those stated by Murrill (1909).

In the present study, *Xerocomellus chrysenteron* (Bull) Sutar, the tubes are yellow and decurrent; pores are yellow and large, the spores fusoid, ridges (longitudinally striate, the spore print is olive brown. These finding agree with Sutar (2008).

Mushrooms grow in different habitats, however the vast majority of them are found in forest. Many mushrooms are linked to the geology of a region, since some species prefer specific soils as well as geological formations. Mushrooms play a vital role in human life due to various benefits. The mushroom cultivation practices can raise the economy of the country and can enhance food security with sustainable use of natural resources.

In the study areas have varied topography with different climatic zones have forest land. These habitats are rich in mushroom biodiversity. Therefore, the present study is one of the systematic records of wild mushrooms to be used by various researchers in various field of study. The study will partially fulfill the requirement of information on wild mushrooms of the Mon- bin village, Thazi Township in Mandalay Region.

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