



Research Article

Edible macrofungi of Kaliabar sub-division of Nagaon district, Assam, India.

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Abstract: The investigation encompasses the study of macro fungi collected from rural areas inhabited by tribal people particularly in the fringe area of forest of Kaliabar Sub-division of Nagaon District, Assam (India). Some wood inhabiting macro fungi which were found to be edible and generally used by ethnic tribes of Kaliabar sub-division were observed. A total of 14 species belonging to 9 families were recorded.

Key words: Macro fungi, fruiting body, Basidiomycetes.

Introduction

Wood inhabiting macro fungi draw attention from the mycologists, forest pathologists along with the naturalists by their showy large, unique and different colours of fruiting bodies. Macro fungi with great diversity produce large fructifications of different size, shape and colour. The detailed study of macrofungi having edibility and medicinal properties were carried out by Jonathan and Fasidi (2003). Some Basidiomycetes are good sources of medicine (Rambelli and Menini, 1983; Buswell and Chang, 1993). Edible Basidiomycetes are good sources of proteins, vitamins and minerals (Alector 1995; Okwulchie and Idunze, 2004). Different fungi have their influence on human and human related activities (Mueller and Bills, 2004). Ethnomycological studies on wild mushrooms of central Africa were carried out by Yongabi *et al.*, (2004). In Nepal, Adhikary (2004) studied about mushroom poisoning. Mushrooms have therapeutic value. They possess anti cancer, anti tumor, anti cholesterol and anti hemorrhagic properties (Bushwell and Chang, 1993). Mushrooms are the potential source of dietary fibers. Studies on edible mushrooms used by some ethnic tribes of Western Assam were carried out by Sarma *et al.*, (2010). Some non edible wood inhabiting macro fungi also possess medicinal properties. Mushrooms are valuable non timber forest resources. Most of the wild edible and ethnomycologically important mushrooms are sold in local markets of Assam. The diversity of wild edible wood inhabiting macro fungi in Kaliabar subdivision of Nagaon district is yet to be explored. In this context an extensive survey was carried out in order to collect, identify and enumerate the wood inhabiting macro fungi of the area.

Materials and Methods

The present study covers Kaliabar sub division of Nagaon Dist. of Assam which is located in the flood plains of the river Brahmaputra. Geography of the study area is characterized by various highlands, marshy lands, beels and rivers. The monsoon lasts from April to July. The maximum and minimum range of temperature during winter is 11.2°C and 24.8°C respectively; again in summer temperature varies from a minimum 24.5 °C to a maximum 32.9°C. Regular survey and collection of samples of macro fungal fruit bodies were carried out in different localities during the period 2013-2015. The collection of samples were also done from different local markets in the tribal inhabited areas and information gathered about their place of occurrence.

All the fruiting bodies were photographed in their natural habitat and then collected in cellophane bags after wrapping them in wax paper. Various parameters like habitat, size, shape, texture were noted in the field. Identification of each sample was done by observing macro and micro-morphology and going through available literatures (Alexopoulous and Mims (1979), Arora (1986), Bacon (2012), Bandoni *et al.*, (1996), Cartwright St. G. (1929), Cartwright *et al.*, (1950), Chowdhury (1944), Ellis and Ellis (1990), Else and Hvass (1979), Gilbertson (1980), Green *et al.*, (1980), Jennison *et al.*, (1955), Kornerup and Wanscher (1978), Largent (1977), Mueller *et al.*, (2007), Overholts (1967), Philip (1971), Roy (1965), Shigo (1967), Snell (1929), Zoberi (1972) were consulted for identification. The samples with hard and leathery texture were preserved in 4% formaldehyde solution and samples with soft texture were preserved in 2% formaldehyde solution. More over samples with soft texture were preserved in 70% ethyl alcohol.

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Frequency study:

$$\frac{\text{Frequency of Occurrence (\%)} = \frac{\text{Number of sites in which species is present}}{\text{Total number of sites}} \times 100$$

Results and Discussion

During the period of study 14 species of edible macro fungi belonging to 12 genera and 9 families were identified. It is found that all the edible as well as wood inhabiting macro fungi collected from

study sites belong to Basidiomycetes. Out of 14 species identified, 2 species belong to family Auriculariaceae, 1 belongs to Agaricaceae, 1 belongs to Cantherallaceae, 1 belongs to Ganodermataceae, 2 belong to Marasmiaceae, 4 belong to Polyporaceae, 1 belongs to Boletaceae, 1 belongs to Schizophyllaceae and 1 belongs to Tricholomataceae.

Table 1. List of wood inhabiting macro-fungi with its family, frequency, preferred substrata and uses

Name of species	Family	Host/Substratum	Uses	Frequency
1. <i>Auricularia auricula-judae</i> (Bull.) J.Schrot	Auriculariaceae	<i>Bambusa</i> sp. (Dead) <i>Cocos nucifera</i> (Dead) <i>Areca catechu</i> (Dead) <i>Gmelina arborea</i> (Dead log) <i>Anthocephalus cadamba</i> (Decaying wood)	Medicine	100%
2. <i>Auricularia delicata</i> (Fr.) Heim.	Auriculariaceae	Dead log		40%
3. <i>Agaricus bisporus</i> Q'uel.	Agaricaceae	Humus, dead wood logs		60%
4. <i>Boletus edulis</i> (Fries)	Boletaceae	Dead wood logs,		
5. <i>Cantherallus cibarius</i> (L.) Fr.	Cantherallaceae	Dead wood logs	Insecticidal	33%
6. <i>Ganoderma lucidum</i> (Leyss ex Fr.) Karsten	Ganodermataceae	In living trees, Dead wood logs.	Medicinal	100%
7. <i>Lentinus edodes</i> (Berk.) Pegler.	Marasmiaceae	Dead wood logs.		20%
8. <i>Marasmius epiphyllus</i> (Pers.) Fr.	Marasmiaceae	Living tree trunk		40%
9. <i>Polyporus alveolaris</i> (DC.) Bondartsev & Singer	Polyporaceae	Wood logs		47%
10. <i>Polyporus squamosus</i> (Mont.) Singer.	Polyporaceae	On tree trunks, Wood logs.		72%
11. <i>Pleurotus ostreatus</i> (Jacq. Ex Fr.) P.Kumm.	Polyporaceae	On tree trunks, Wood logs.		36%
12. <i>Schizophyllum commune</i> Fries.	Schizophyllaceae	<i>Gmelina arborea</i> , <i>Dalbergia sissoo</i> Dead bamboo culms, Dead wood logs.	Edible	100%
13. <i>Trametes pubescens</i> (Schumach.) Pilat	Polyporaceae	<i>Dalbergia sissoo</i> (Dead wood logs)	Medicinal	80%
14. <i>Tricholoma strictipes</i> (Fr.)	Tricholomataceae	Dead wood		40%

Table 2: Edible basidiomycetes used by different ethnic groups

Name of the ethnic groups	Name of fungi used as food	Vern. name	Uses
Tiwa	<i>Agaricus</i> sp., <i>Auricularia</i> sp., <i>Tricholoma strictipes</i> Fr., <i>Pleurotus ostreatus</i> (Jacq. Ex Fr) P.Kumm. <i>Marasmius epiphyllus</i> (Pers.) Fr, <i>Schizophyllum commune</i> Fries	Laphu	Eaten as vegetables and curry is made by mixed with some wild sour fruits
Karbi	<i>Agaricus bisporous</i> Quell <i>Auricularia auricula</i> (Hook) Underwood <i>Tricholoma strictipes</i> Fr., <i>Pleurotus ostreatus</i> (Jacq. Ex Fr) P.Kumm	Kimu	Eaten as curry
Kachari	<i>Agaricus bisporous</i> Quell <i>Auricularia auricula</i> (Hook) Underwood <i>Tricholoma strictipes</i> Fr., <i>Pleurotus ostreatus</i> (Jacq. Ex Fr) P.Kumm, <i>Marasmius epiphyllus</i> (Pers.) Fr	Moikhun and Naphu	Use as medicine and eaten with other herbs and used as curry
Rajbongshi	<i>Agaricus bisporous</i> Quell., <i>Tricholoma strictipes</i> Fr.	Naphuge	Eaten as curry

Enumeration***Auricularia auricula* (Hook) Underwood**

Common name: Jelly ear

Description: Jelly like fruiting body, yellow brown to reddish brown, wavy and irregular, downward fertile surface gelatinous, sessile to sub stipitate, hyphae about 2.5 in diameter, basidiospores reniform.

***Auricularia delicata* (Fr.) Henn.**

Description: Fruit body sessile, 2-9 cm width, 0.4×1.5 mm thick, ear shaped, brownish black, rubbery-gelatinous when fresh and brittle when dry.

Hymenium reddish brown, Spore colourless, edible and also possess medicinal use.

***Agaricus bisporous* Quell**

Description: Colour of the fruiting body is whitish, cap 6-10 cm, gills free, chocolate brown, stipe-short. Edible.

***Boletus edulis* (Fries)**

Description: Sporocarp whitish, gills narrow, hymenium-adnate, stipe stout 4-10 cm. Spore print brown.

***Cantharellus cibarius* Fr.**

Description: Cap flat with wavy and irregular margin, under surface with well developed false gills, stem about 7 cm long, spore print whitish, spore smooth, ellipsoid, 7-11 μm , no reaction with KOH.

***Ganoderma lucidum* var. *capense* (Curtis.) P. Karst**

Description : Basidiocarp 7-12 x 11-19 x 1.5 cm, woody to corky, sub sessile to laterally stipitate, reniform, upper surface laccate, dark reddish, yellowish towards margin, pore surface creamish to milky coffee, spore 5 per mm, round, hyphal system trimitic, basidiospore 8.3-10 x 6.6 μm .

***Lentinus edodes* (Berk) Pelger**

Description: Fruit body large, pileus 4-14 cm in diameter, gills whitish, spore print white, volva absent, basidia clavate, basidiospores more or less ellipsoid, hyaline.

***Marasmius epiphyllus* (Pers.) Fr.**

Description: Parasitic on hard wood, cap-3-8mm, white, gill prominent, stem about 50 mm long, shiny, spores are smooth, 8 x 4 μm .

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

Description: Saprobiic on small logs of hard wood, Growing alone or scatters, fruiting body 2-7 cm across, semicircular or kidney shaped or fan shaped, upper surface orange colour, stubby lateral stem, spore print white, spore 8-14 x 4 μm , smooth cylindrical, basidia 4 spored, hyphal system dimitic .

***Pleurotus squorrosulus* (Mont.) Singer.**

Description: It is generally found growing on dead leaves and logs, cap 2-10cm, fan-shaped or circular, margin in rolled when young, gills close or nearly distant, whitish, stem rudimentary, flesh white KOH show negative reaction, odour not distinctive.

***Pleurotus ostreatus* (Jacq. Ex Fr.) P. Kumm.**

Description; Grows on dead wood logs, flat, kidney shaped to fan shaped, gills are closed, white stem small and laterally attached, spore print whitish, spores smooth, cylindrical, spores 5-7 x 3.5 μm , odour unpleasant .

***Schizophyllum commune* Fries**

Description : Annual saprobic fungi, always grow gregariously, fruits body fan shaped, upper surface covered with small hairs, dry, lower surface composed of gill like folds, stems absent, leathery, spores 3 x 1.5 μm , cylindrical .

***Trametes pubescens* (Schumach.) Pilat**

Description : Annual saprobic fungi, occur as clustered, overlapping, caps are about 7 cm in diameter, upper surface cream white, or light yellow, lower surface white, leathery basidiocarp, bracket shaped, stipe absent .

***Tricholoma strictipes* Fr.**

Description: Saprobiic, cap 5 cm to 10 cm, gill crowded, colour of gills are white, Stem 7 cm, slender. Spore print white, fruiting body odourless, no reaction with KOH.

Plate 1. *Auricularia auricula*Plate 2. *Auricularia delicata*Plate 3. *Cantharellus cibarius*Plate 4. *Ganoderma lucidum*

Plate 5. *Marasmius epiphyllus*Plate 6. *Polyporus alveolaris*Plate 7. *Pleurotus squorrosulus*Plate 8. *Pleurotus ostreatus*Plate 9. *Schizophyllum commune*Plate 10. *Tricholoma strictipes*

Conclusion

There is no hard and fast rule for identification for edible and poisonous mushrooms (Adhikari, 2000, 2004), hence, proper identification of edible mushrooms is a matter of concern in mushrooms study. Mushrooms may be exploited for enriching the socio economic condition of the rural people. More over some mushrooms have the potentialities to be used in modern medicine in near future. From this study it was revealed that ecological factors have great influence on the growth and distribution of wood inhabiting edible macro fungi. Among the 14 species, *Auricularia auricula*, *Schizophyllum commune* and *Ganoderma lucidum* found in each study area.

Some wood decaying macro fungi are consumed as food by some ethnic group of the study area by Tiwa, Karbi, Kachari, and Koch-Rajbongshi tribes. It is clear that hill tribes prefer wood inhabiting edible macro fungi while the plain tribes prefer the soil growing mushrooms. Some species are rich in vitamins and some have insecticidal properties. Some tribes use *Auricularia* species in the treatment of pains specially pain of joints and ear. Though some mushrooms are not so tasty the rural tribes used these mushrooms for preparations of different delicious food items. Most of them use some wild sour fruits with these wild mushrooms. The use of different mushrooms varies from tribe to tribes. The favorable season for mushrooms collection is mainly rainy season.

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