WILD EDIBLE MUSHROOMS USED BY SOME ETHNIC TRIBES OF WESTERN ASSAM

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Edible mushroom

Ethnic tribes

Western Assam

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ABSTRACT

In North-eastern region of India mushrooms are highly coveted item of food. But the knowledge of edible mushroom in Assam is confined only to the ethnic tribes of the state. One also comes across occasional reports about deaths resulting from consumption of poisonous mushroom. Thousands of mushroom species are increasingly studied and collected by amateur mushroom hunters. About 100 of these can cause serious illness, and prove fatal. Mushroom production represents one of the most commercially important step towards diversification of agriculture based microbial technology for large-scale recycling of agro-wastes in an agricultural country like India. It relieves the pressure on arable land, because its cultivation is indoors, and is also more suited to the women folk. Mushrooms are regarded as highly nutritious food containing large amount of proteins. Mushrooms are also important foreign exchange earners. Mushrooms have been recommended as food item contributing significantly to the protein nutrition of the developing countries like India(FAO), which depend mainly on the cereal diets. Low cost labour, varied agro-climatic conditions and abundant cheap raw materials for production of various mushrooms may make India a future mushroom exporter both in form of quality and quantity of diverse food. Among the ethnic tribes, Garos uses at least seven species of mushrooms followed by Adivashis, Bodos and Rajbangshis of Western Assam. But the potentialities of such species are yet to be studied in detail. In this study, an attempt has been made to include few edible mushroom species that are frequently eaten by ethnic tribes of Western Assam.
INTRODUCTION

Fungi have been occupying a prominent position in the biological world because of their variety, economic and environmental importance. The study of fungal biodiversity has been carried out world over (Crous, 2006) and 1.5 million species has been reported so far (Hawksworth, 2004). About 50% of them have been characterized (Monoharachary et al., 2005). The total numbers of fungal species in India is 27,000 (Cowan, 2001; Chang and Miles, 2004). The fungal biotechnology is an emerging area and they are intimately related with our life (Monoharachary et al., 2005). Macrofungi are unique from fungal diversity point of view. Macrofungi grow prolifically and are found in many parts of the world (Smith, 1963). It is usual for a particular fungus to produce a visible fruiting body only under a precise combination of conditions, including geographic location, elevation, temperature, humidity, light and surrounding flora. Studies on macrofungi and their various aspects have been carried out in different parts of the globe (Laferriare and Gilbertson, 1990; Peck, 1873; Stojchev, 1995). Studies on Macrofungi have been an area of importance for the scientists in particular and the people in general, because of their role in human welfare, in food industry, in medicines, and biodegradation (Ozturk et al., 2003). However, the study of macrofungi, having edibility and medicinal properties are yet to be properly dealt with (Jonathan and Fasidi, 2003).

Traditional mycological knowledge of most Indian ethnic groups has proven to be extensive and profound, consuming nearly 283 species of wild mushrooms out of 2000 species recorded world over (Purkayastha and Chandra, 1985). Despite having all the favourable conditions, mushroom farming is not spreading fast in India. Presently, about 70,000 ton of fresh mushroom is being produced in India as against over 5 million ton world production of mushroom annually.

Wild mushrooms are a valuable non-timber forest resource used by mycophilic societies and their use has been documented in many countries around the world (Prance, 1984; Gonzalez-Elizondo, 1991; Harkonen et al., 1993b; Jones and Whalley, 1994; Chang and Lee, 2004, Roberto G.O et al., 2005). They are sold in traditional markets (Roberto G.O et al., 2005; Moreno-Black et al., 1996) or commercially exploited as food (Redhead, 1997; Pilz et al., 1999) or medicines (Oso, 1977; Rai et al., 1993; Vaidya and Rabba, 1993; Chamberlain, 1996). Ethnomycological aspects were also dealt with by few workers in different parts of India and world over (Harsh et al., 1993; Bulakh, 2001; Didukh, 2001; Adhikary et al., 2005). Some of the wild edible mushrooms has also been reported from Manipur and Arunachal Pradesh of North East India (Sing and Sing, 1993; Sing et al., 2002). Whereas, from Assam Baruah et al., (1971) reported few Basidiomycetous fungus of Sibsagar District.

Study Area

The North east India encompasses diverse hills and vales. These areas are rather treasure of diverse flora and fauna. The forest of western Assam residing in between 26° 10’ 123 N-26° 172 NL and 90° 37’ 123 - 90°622 EL (2729 km²) possesses the reserve forests viz., Kachugaon, Haltugaon, Parbatjhora and Chirang of undivided Goalpara district. The forest composition is like – Eastern Himalayan upper Bhabar Sal forest, Eastern Himalayan Lower Bhabar Sal forest, Eastern Terrai Sal forest, Eastern heavy alluvial Plain Sal forest, Eastern Hill Sal forest, Northern Secondary moist deciduous forest, Evergreen forest, Lower alluvial Savanah, Woodland, Eastern west alluvial grass land, Riparian Fringe Forest, Khoir Sissoo forest, Secondary Bamboo brakes (Source: Profile on Forest and Wild Life of Bodoland Territorial, Forest Department). The average maximum temperature 37°C and minimum 8°C, Rainfall 176cm-300cm. All these forest areas with different forest types are unique from biodiversity point of view.

Some of the ethnic tribes viz. Adivashis, Bodos and Rajbangshis are residing by the side of all these forests are consuming some of the mushrooms available in the forests. The relationship of ethnic groups with mushrooms is based on one hand on the casts that are aware of the religious sacredness of the Hinduism and on the other hand on traditional knowledge. The origin and distribution of some ethnic casts are found to localize in particular zone or area. The ethnic groups are the traditional collectors. The different kinds of edible and non-poisonous mushrooms that are consumed in the region grow wild. Their knowledge on mushrooms and fungi are quite different.
In this paper, our aim was to benchmark diversity of macrofungi, collect, preserve, and evaluate their usage in food and medicines by some ethnic tribes of Western Assam.

**MATERIALS AND METHODS**

**Survey collection and identification**

Regular survey and collection of macrofungi were carried out in Kachugaon, Haltugaon, Parbatjhora, and Chirang reserve forest of erstwhile Goalpara district which is located in the western Assam. Along with the forests different markets were also surveyed during April, 2008 to October, 2009. Six different selected sites were visited; viz. Runikhata bengtol, Abhyopuri (hilly area), Kachugaon, Panbari, Goma in Parbatjhora forest and Ultapani. The fleshy fungi were collected from different habitats. The different forest mentioned above are Sal-forest, Evergreen forest and deciduous forests i.e. mixed type of forests are impregnated with -decaying wood and rotting plant parts, termites nests, elephants and cow dungs, leaf litters etc. The specimens were found attached to various substrata. The collection of specimens were also done from different markets of the localities in order to gather information in regards to their place of occurrence. Collected samples were wrapped in cellophane paper and brought to the laboratory for their identification. The macrofungi with leathery texture were preserved in 4% formaldehyde solution where as the samples with soft texture were preserved in 2% formaldehyde solution and kept as herbarium specimens. Dried specimens were also preserved for identification, characterization and documentation. The habitat, colour, shape and size, growth, texture, odour and adaptation to the environment considered prior to the preservation of the collected macro fungi. Identification of the specimens were carried out by standard microscopic methods (Roy and De, 1996), and also considering various morphological and anatomical features into account (Overholts, 1953; Bondarstev, 1953; Bakshi, 1971; Zoberi, 1972; Nilson and Persoon, 1978; Higgins, 1972; Ryvarden and Johansen, 1980; Dickinson and Lucus, 1982; ; Roy and De, 1996; Garnweidner, 1996; Sharma, 2000). Environments were considered prior to the preservation of the collected macro fungi.

**Frequency study**

\[
\text{Frequency of fungal species(\%) = \frac{\text{Number of sites in which the species is present}}{\text{Total number of sites}} \times 100}
\]

**RESULTS**

Species diversity of macrofungi is related to the particular habitats and ecosystem. We found that environmental factors like light, temperature and RH greatly influenced the growth and development of macrofungi. During this period of one and a half year the outcome of the regular survey, 26 different species of macrofungi belonging to 14 genera and 13 families were identified (Table -1). Excepting *Morchella esculanta* (Ascomycetes) rest of the species belongs to Basidiomycetes. Out of the 26 species identified 3 belongs to family Auriculariaceae, 3 belongs to Agaricaceae, 2 belongs to Boletaceae, 2 belongs to Lycoperdaceae, 2 belongs to Cantherallaceae, 1 belongs to Ganodermataceae, 4 belongs to Marasmiaceae, 2 belongs to Polyporaceae, 1 belongs to Schizophyllaceae, 5 belongs to Tricholomataceae (all Basidiomycetes) where as, 1 belongs to Helvellaceae (i.e., Ascomycetes). This study revealed that in this area of the state majority of macrofungi Ganoderma lucidum(100%) was followed by *Cantharellus tubaeformis* (83.33%) and *Agaricus bisporus* (83.33%), *Schizophyllum commune*, *Auricularia delicata*, *Boletus luteus*, *Cantherallus cibarius*, *Lycoperdon cladopus*, *Termitomyces clupeatus* (66.66%), *Auricularia auricula*, *Lentinus edodes*, *Laetiporus sulphureus*, *Morchella esculanta*, *Termitomyces mammiformies*, *Auricularia polytricha*, *Agaricus sylvestica*, *Calvatia gigantea*, *Lentinus sajor-cajo*, *Lentinus ostreatus*, *Tricholoma terreum*(33.33%), *Agaricus campestris*, *Boletus edulis*, *Lentzes betulina*, *Lycoperdon pyriforme*, *Termitomyces robustus*, *Termitomyces microcarpus* (16.66%). Among these 26 species studied *Ganoderma lucidum* (Ganodermataceae) was found to be highest (Table 1, Fig. 1).

**Edible species**
<table>
<thead>
<tr>
<th>Name of the species</th>
<th>Class</th>
<th>Family</th>
<th>Host / Substratum</th>
<th>Use</th>
<th>Frequency of occurrence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Auricularia auricula</em> (Hook)</td>
<td>Basidiomycetes</td>
<td>Auriculariaceae</td>
<td>Dead bamboo culm, Under wood. Live <em>Psidium guava</em></td>
<td>Edible, medicinal</td>
<td>50</td>
</tr>
<tr>
<td><em>A. deliciata</em> (Fr.) Heim.</td>
<td>Basidiomycetes</td>
<td>Auriculariaceae</td>
<td>Dead log of <em>Semecarpus</em> sp.</td>
<td>Edible</td>
<td>66.66</td>
</tr>
<tr>
<td><em>A. polytricha</em> (Mont.) Sacc.</td>
<td>Basidiomycetes</td>
<td>Auriculariaceae</td>
<td>Dead bamboo culms.</td>
<td>Edible</td>
<td>33.33</td>
</tr>
<tr>
<td><em>Agaricus bisporus</em> Quel.</td>
<td>Basidiomycetes</td>
<td>Agaricaceae</td>
<td>The meadows, Humus, Dead wood logs.</td>
<td>Edible</td>
<td>83.33</td>
</tr>
<tr>
<td><em>A. campestris</em> (L) Fr.</td>
<td>Basidiomycetes</td>
<td>Agaricaceae</td>
<td>-do-</td>
<td>Edible</td>
<td>16.66</td>
</tr>
<tr>
<td><em>A. sylvetica</em> (Schaeff.)</td>
<td>Basidiomycetes</td>
<td>Agaricaceae</td>
<td>-do-</td>
<td>Edible</td>
<td>33.33</td>
</tr>
<tr>
<td><em>Boletus edulis</em> (Fr.)</td>
<td>Basidiomycetes</td>
<td>Boletaceae</td>
<td>Dead wood logs, field covered by dead grasses</td>
<td>Edible</td>
<td>16.66</td>
</tr>
<tr>
<td><em>B. luteus</em> Linn.</td>
<td>Basidiomycetes</td>
<td>Boletaceae</td>
<td>elephant dung infested soil.</td>
<td>Edible</td>
<td>66.66</td>
</tr>
<tr>
<td><em>Calvatia gigantia</em> (Batsch ex. Pers.)</td>
<td>Basidiomycetes</td>
<td>Lycoperdaceae</td>
<td>Dead wood logs, On the ground Llyod Field</td>
<td>Edible</td>
<td>33.33</td>
</tr>
<tr>
<td><em>Cantherallus cibarius</em> (L) Fr.</td>
<td>Basidiomycetes</td>
<td>Cantherallaceae</td>
<td>On live coconut, Dead wood logs</td>
<td>Edible, rich in vitamin C, insecticidal</td>
<td>66.66</td>
</tr>
<tr>
<td><em>C. tubiformis</em> (Fr.)</td>
<td>Basidiomycetes</td>
<td>Cantherallaceae</td>
<td>dead wood logs, grows amongst. Mosses in the woods</td>
<td>Edible, rich in vitamin C, insecticidal</td>
<td>83.33</td>
</tr>
<tr>
<td><em>Ganoderma lucidum</em> (Leys ex Fr.)</td>
<td>Basidiomycetes</td>
<td>Ganodermataceae</td>
<td>In living tree. Fallen Wood logs</td>
<td>Medicinal</td>
<td>100</td>
</tr>
<tr>
<td><em>Lentinus edodes</em> (Berk.) Pegler.</td>
<td>Basidiomycetes</td>
<td>Marasmiaceae</td>
<td>Dead wood logs of <em>Cassia fistula.</em></td>
<td>Edible</td>
<td>50</td>
</tr>
<tr>
<td><em>L. cladopus</em> Lev.</td>
<td>Basidiomycetes</td>
<td>Marasmiaceae</td>
<td>dead wood logs.</td>
<td>Edible</td>
<td>66.66</td>
</tr>
<tr>
<td><em>Lentinus sajor-cajo</em> (Fr.) Fr.</td>
<td>Basidiomycetes</td>
<td>Marasmiaceae</td>
<td>dead wood logs</td>
<td>Edible</td>
<td>33.33</td>
</tr>
<tr>
<td><em>Lentinus, ostreatus</em> (Jacquin ex Fr.) Kummer.</td>
<td>Basidiomycetes</td>
<td>Marasmiaceae</td>
<td>-Do-</td>
<td>Edible</td>
<td>33.33</td>
</tr>
<tr>
<td><em>Laetiporus sulphureus</em> (Fr.) Murr.</td>
<td>Basidiomycetes</td>
<td>Polyporaceae</td>
<td>Psidium guava, Dead wood logs</td>
<td>Edible</td>
<td>50</td>
</tr>
<tr>
<td><em>Lenzites betulinus</em> (L.) Fries</td>
<td>Basidiomycetes</td>
<td>Polyporaceae</td>
<td>Dead wood logs</td>
<td>Non-edible</td>
<td>16.66</td>
</tr>
<tr>
<td><em>Lycoperdon pyriforme</em> (Schaeff.)</td>
<td>Basidiomycetes</td>
<td>Lycoperdaceae</td>
<td>Meadows, humus</td>
<td>Edible</td>
<td>16.66</td>
</tr>
<tr>
<td><em>Morchella esculenta</em> (L.) Pers.</td>
<td>Basidiomycetes</td>
<td>Helvellaceae</td>
<td>Ground, Meadows</td>
<td>Edible</td>
<td>50</td>
</tr>
<tr>
<td><em>Schizophyllum commune</em> (Fr.)</td>
<td>Basidiomycetes</td>
<td>Schizophyllaceae</td>
<td>Dead bamboo culms, Dead wood logs.</td>
<td>Edible</td>
<td>83.33</td>
</tr>
<tr>
<td><em>Termitomyces clypeatus</em> (Heim.)</td>
<td>Basidiomycetes</td>
<td>Tricholomataceae</td>
<td>Termites nests</td>
<td>Edible</td>
<td>66.66</td>
</tr>
<tr>
<td><em>T. mammiformies</em> (Heim.)</td>
<td>Basidiomycetes</td>
<td>Tricholomataceae</td>
<td>Termites hive</td>
<td>Edible</td>
<td>50</td>
</tr>
<tr>
<td><em>Tricholoma terreum</em> (Scaeff. Fr.) Kummer</td>
<td>Basidiomycetes</td>
<td>Tricholomataceae</td>
<td>On forest soil</td>
<td>Edible</td>
<td>33.33</td>
</tr>
</tbody>
</table>

Most of the macro fungi studied in these area are edible and medicinal, utilized by the different ethnic tribes of western Assam.
Figure 1: Frequency of occurrence of different macro fungi of western Assam

Plate 1: Cantherallus cibarius

Plate 2: Cantherallus cibarius (ventral view)

Plate 3: Laetiporus sulphureus Murr

Plate 4: Boletus edulis
The consumption of different mushrooms varies from tribe to tribes. Edibility of mushroom is dependent upon the palatability as well as its availability in a particular area. The favourable season for mushrooms collection is rainy season. The picking of mushrooms in these areas was mainly dominated by the males; however, it is followed by women and children. Of course, the Bodo women are fond of collecting the mushrooms. It is also pertinent that utilization of mushroom were being transmitted amongst the ethnic
people orally from one generation to the next. The Garos and the Bodos from western Assam had some knowledge to identify the edible and poisonous forms of mushrooms.

All together 25 edible species from the study areas were recorded (Table 1). The informants were also asked to categories the mushrooms according to their palatability values (Table 1).

**Auricularia auricula** (Hook) Underwood.

Fruit bodies jelly like, ear shaped, solitary, gregarious occasionally, reddish brown, sessile, 2.4-10 cm. in breadth, 0.7-1.5 mm.in thickness, fruit body anchoring to the *Psidium guava* (L) plant and dead bamboo culms. L.S. of the fruit body – divided into 6 zones; viz. Zona pilosa-5μm in diameter, hyaline, Zona compacta-62-72 μm wide; Zona sub compacta, superior, 112-132 wide; hypha 2μm diameter, coarsely granular; Zona intermedia 280-310 μmbreadth, hyphae 1.5-2μ m diameter, Zona sub compacta inferior-95-110μm, dense compact layer. Basidia elongated cylindric with three transverse septa. Spores white, sausage-shaped, 16–18×6–8μm.

**Auricularia delicata** (Fr.) Heim.

Fruit body 2-9.5 cm. width, 0.4x1.5 mm; thick, sessile, solitary, on dead wood logs; ear shaped, brownish black, hard, rubbery- gelatinous when fresh and brittle when dry. Hymenium light reddish brown, basidium is virgate, Spore colourless, transparent, smooth, cylindrical, 10-13i m × 5-6 i. Edible and also used to stop bleeding.

**Auricularia polytricha** (Mont.) Sacc.

Fruiting bodyrubbery, gelatinous when young and on drying become brittle, cartilaginous sheet like; Pileus 4- 7.9. cm. in breadth 0.5-1.6mm. thick; in l. s. of the pileus showing zonapilosa, zona compacta, zona sub compacta, zonalaxa superior, medulla, zonalax inferior, zona subcompacta inferior; hymenium 80-90μm. basidia cylindrical, trisepatale, 50-60x4-5μm; basidiospores curved, cylindrical, 12.3-15x4.5-6μm. Edible.

**Agaricus bisporus** Quell

Cap-6.33-10.16cm.brown with dirty white tint; gills crowded, free, flesh-coloured or chocolate brown,basidia normal,mostly 2-4 spored,basidiospores 4.2-6.2x3.2-4.4μm ,cystidia absent, trama regular in hymenophore, stipe-short, stocky,with wooly ring;grows in humus rich soil .Excellent edible mushroom.

**Agaricus campestris** (L) Fries

Sporophore stipitate, white,growing solitary in soil,Cap 2.95-6.9cm. in diameter,some times arranged in fairy rings; Gills-free,crowded,white in young stage; stipe 3.2-6.2cm.,long,0.6-1.45cm. thick,annulus present,volva absent, Basidia 2.2-5.2-7.8μm.Cystidia absent.Edible .

**Agaricus silvetica** (Schaeff.)

Sporophores grow on soil, stipitate, cap 2.9-8.75 cm. in diameter,canpanulate at youn stage,subumbonate at maturity; white,greysyl brown at maturity; Gills distict,crowded;stipe central, slightly narrow towards the apex, basidia 10.0-16.5 x2.9-8.0μm;Cheilocystidia clavate,; basidiospores 4.2-5.2 x2.9-3.5μm; spore print brown. Edible.

**Boletus edulis** (Fries)

Fruit body whitish, greenish at young stage, yellow at maturity, stipe stout stem-white or yellowish 2.5 cm to 10 cm; partially covered with raised network, gills- narrow, hymenium- adnate, spore print brown, grows on broad leaved woods, mycorhizal.

**Boletus luteus** Linn

Cap-5.0-8 cm., thick shining layer of slime cover the cap, often rain washes this layer, stipe with fluffy spots above the ring, gills narrow ,spore print yellowish white, grows under some deciduous tree. Young ones are good to eat.

**Cantharellus tubaeformis** Fr.

Cap 2.9-10.5 cm, more or less funnel shaped; hollo towards the base of the stem, wavy or crisped margin;
gills thick, forked decurrent. Spore print white, stem-compressed, pitted; flesh tough, edible, tasty. It is available in great numbers in late winter. Very tasty but with no fruity smell. 

Cantharellus tubaeformis is an excellent food, either fried or in soups. 

Cibarius(L)Fr
Fruit body yellowish with orange tints, fruity smell like those of apricots, mildly peppery taste, cap 2.8-10.5cm, cap convex infundibuliform, hymenium attachment irregular, stipe 3.0-8.0 cm, stipe bare, spore ellipsoidal (3.4-9.1 cm x 4.0-6.2 μm; odour mild, basidia 3.5-14.2 μm, clavate, 4-sterignata, 3.8-5.5 μm), spore print yellow, Ectomycorrhizal. 

It has a fruity smell, reminiscent of apricots and a mildly peppery taste and is considered an excellent edible mushroom. 

Marasmius oreades (Bolton) Fr
The fruiting bodies form fairy rings, Cap-1.27-5.08cm; campanulate, umbonate, margin; stem cartilaginous, 7cm. long and 5mm. in diameter gills attached to the stem or free from it, thick, spore print white, basidio spores elliptical, -7-10x4-8μm, cystidia absent. 

Cap 1 cm to 10 cm, Flat- umbonate, margin-striate, Gills-thick, stem-cartilaginous; Flesh tough. Grows amongst the grasses, edible. 

Termitomyces clypeatus Heim
In termites hive of shaded forest. Cap 5.5 cm-7.0 cm, grayish brown, silky; margins reflexed, gills-free, white, crowded, stipe long-7.5 cm, white, solid, equal but sometimes bulbous besides soil, spore print pinkish, basidia- clavate, basidiospores-4 hyaline, smooth, thin walled. 4-8x 3-4.2 μm. 

Termitomyces mammiformis (Heim)
Cap-6.5 cm. in diameter, umbo prominent and inflexed margin; gills free, free white, stipe long-5.5 cm. width-1cm.; solid and white; the lower tapering end of the stipe is deep Seated in the termites hive. presence of persistent annulus is a diagnostic character of this species. Basidia clavate; basidiospores smooth, ellipsoidal, hyaline; 6.2 -3.2 μm ; spore print yellowish grey. 

Termitomyces robusta (Beeli) Heim
Cap dark- brown 7-15 cm. in diameter; with inflexed margin; free gills, white in colour; stipe long-4.8-6.1 μm; it has continuation in the termites nest infested soil; the total length of the stipe along with the buried portion is 25 cm. basidia clavate; basidiospores ellipsoidal. Basidiospores large, 5.6 x 4.58 μm. 

Termitomyces microcarpus (Berk and Br.) Heim
Spread of this fungus is quite striking; they are abundantly present in the termites disused nests. Cap- 1.9cm in diameter; umbonate, yellowish grey in the margin; olive in the centre; Stipe long-5.2 cm., more or less straight, white, a part of it is inside the soil, nearly3.2 cm.; basidia clavate, basidiospores 4 in number, smooth, hyaline, ellipsoidal 6.5 - 7 x 3-4 μm; spore print white or grey. 

Tricholoma terreum (Scaeff. Fr.) Kummer
Fruit body solitary, pileus 2.5-5.6 cm. in diameter, bell-shaped, slightly umbonate, grayish, margin incurved, fleshy; gills greyish white, broad, thick; basidiospores ellipsoidal, 6.4-7.3x3.2-4.4μm. Edible ; With a mild taste, the species is regarded as a good edible. 

Calvatia gigantia (Batsch ex.Pers.) Llyod.
Diameter of the sporophore 15cm.-20cm. exoperidium leathery, smooth, white for along period; gradually turning yellowish brown; spongy inside; at the top portion the sporophore splits gleba greenish yellow; spores globose, 3.3-5.2μm in diameter; spores ornamented sharp spines. Specimens at young stage are consumed. 

Ganoderma lucidum (Leys ex Fr.) Karsten
Pileus 6-22 cm wide, mostly kidney shaped or circular, flat, concentrically grooved, with shining blood red varnished crust, some times almost black; but some times colourless; stipitate or sessile; 15.2 cm. long stipe with irregular pseudosclerotia buried deep in the substratum (in soil or dead wood logs or living deciduous trees; with poroid hymenium; pore minute, 165 μm wide, spores brown, ovate, warty, rough, 11-13.5 x 6-7.5 μm.

**Laetiporus sulphureus** (Fr.) Murr
Bracket like fruiting body growing on Psidium guava plant and in dead wood logs sessile pileus dull yellow to when young, pale white in maturity; hymenial portion yellowish, pore tubes present 0.3-0.4 cm. long, more or less elliptical; Basidia sub-clavate, basidiospores 6.2-7.2 x 5.0-5.3 μm.

**Lentinus edodes** (Berk) Pelger
Fruiting body solitary, centrally stipitate, substratum dead wood logs of cassia fistula, Pileus 3.3-14 cm. in diameter, convex, subumbonate to depress, with smooth surface, in young stage the margin incurved; at maturity – decurved; gills whitish at first, later reddish brown tint; spore print white; stipe 3.3 -7.3 mm wide; central to eccentric; subcylindric, poorly developed veils, volva absent; Basidia clavate, 16.2-24.5 x 4.8-5.9 μm; basidiospores 7.25-8.5 x 5.2-6.7 more or less ellipsoid, hyaline, spore wall thin.

**Lentinus cladopus** Lev.
Fruiting body found in decaying stumps and the roots of trees, cap 2.2-7.6 cm in diameter, central portion is depressed, funnel shaped, large scales present at the centre and the smaller towards the margin; creamish white at young stage gradually yellowish at maturity; gills crowded, decurrent; spore print white.; stipe 2.2-10.2 mm long; annulus and volva absent; basidia clavate, 4-spored.

**Lentinus sajor cajo** (Fr.) Fr.
The fruiting body colour pale white, brown, extremely tough, stalk central in position, 4-8 cm long; 0.5-1.7 cm. in diameter; eccentric, solid and cylindric, annulus present, often lost at maturity volva absent; basidia clavate with 4-basidiospores; basidiospores 6.4-8.0 x 2.5-4.5 μm; pleurocystidia absent; cylindrical, smooth, hyaline, thin walled, well developed, solitary, stipitate, growing in dead wood logs which are mostly composed; pileus 3.5-15.0 cm., margin of cap rolled in drying condition.

**Lenzites betulina** (L) Fries.
Fruiting body 2-10 cm. width, 0.5-2.0 cm. thick; sessile, fan shaped, concentrically zoned, pale cream to greyish brown; gills- white, well spaced radiating from point of attachment, tough; Basidiospores 4-5.5 x 1.5-2.1 μm, smooth, cylindrical or bean shaped, spore print white; cystidia absent, non edible.

**Lycoperdon pyriforme** (Schaeff.)
Fruiting body 1-4.5 cm across, solitary, globose or pyriform, mealy granules cover the exoperidium, endoperidium greyish brown, smooth, whitish to greyish brown; angiocarpic, gleba white, soft, fleshy at young stage, brown cottony at later stage; spores olive brown, spores 2.5-4.5 μm. Edible when young.

**Morchella esculenta** (L) Pers.
Ellipsoidal head of the fruit body; apothecium forms depressions that are fertile with the sterile ridges in between, 5.08-7.0 cm tall colour pale brown to dark brown, stem as long as the cap, hollow; Grows in woods and amongst the grasses. Edible.

**Schizophyllum commune** (Fries)
Fruiting bodies leathery, cap grayish, white, fan shaped, ranging from 1 cm. -4 cm. broad, lobed, deeply cleft, attached to the substratum laterally; gills grayish–violet radiating from the point of attachment, basidium normal, spore print white, spores 5.5-6.5 x 2.5-3.5 μm, cystidia absent. Edible.

**DISCUSSION**

In Western Assam, the result of the survey concluded that *Auricularia auricula, A. delicata, A. polytricha,*
Agaricus bisporus, A. campestris, A. sylvetica, Boletus edulis, B. luteus, Calvatia gigantia, Cantharellus cibarius, C. tubaeformis, Ganoderma lucidum, Lentinus edodes, L. cladopus, L. ostreatus, Laetiporus sulphureus, Lycoperdon pyriforme, Morchella esculenta, Schizophyllum commune, Termitomyces clypeatus, T. mammiformes, T. robustus, T. microcarpus, Tricholoma terreum were good for edible purpose. Whereas Cantharellus tubaeformis and C. cibarius (Table 1, Plate-1) were considered to be the best amongst them. Similarly, Tricholoma terreum, Marasmius oreades, Laetiporus sulphureus, Lentinus edodes, Lentinus cladopus, Lentinus sajor cajo, Morchella esculenta, Schizophyllum commune were good for edible purpose while Calvatia gigantia and Lycoperdon pyriforme are edible at their young stage. Similarly, Auricularia auricula, Auricularia delicata, Auricularia polytricha were considered as edible but not very much tasty. On the other hand, the Garo people used Auricularia auricula (Table: 1, Plate-7) in some sorts of ailments like rheumatic pain and some injuries. Though Lenzites betulina is very much available but not consumed by these tribes.

Garos and Bodos dwelling near by hilly region of the forest area also do not prefer Marasmius oreades. It has been observed that people living in mountainous areas preferred wood-inhabiting fungi while those living in plains preferred the species growing on soil (viz. Termitomyces clypeatus, T. mammiformes, T. robustus, T. microcarpus, Lentinus edodes, L. cladopus, L. ostreatus). Cantharellus cibarius was found to be most delicious and highly preferred species in all the sites of Western Assam. The species of Cantharellus are rich in vitamin c. Though it has insecticidal properties but the local people are not aware of this fact. However, Adivashi people are very much fond of mushrooms. They prefer some of the wood decaying mushrooms viz. Laetiporus sulphureus, Lentinus sajor cajo, Calvatia gigantia, Cantharellus cibarius, C. tubaeformis, Schizophyllum commune.

The Rajbanshi people are also consuming many of these macrofungi, still they are less habituated in taking these mushrooms in comparison to the Garos and Bodos as they are more developed than those of the other tribes living in this area. There are some types of mushrooms like Ganoderma lucidum which have medicinal properties (Chang and Bushwell, 1999). But the medicinal use of mushrooms among the tribes of Western Assam was scarce.

Identification of non poisonous mushrooms is a major point in mushroom study. There is very little report available on mushroom poisoning or about deaths resulting from consumption of poisonous mushrooms from Western Assam. Both the traditional and modern knowledge of mushrooms does not define any type of hard and fast rule for the identification of edible and poisonous forms of mushrooms (Adhikari, 2000, 2004 and 2005). But the inhabitants of Western Assam can distinguish the poisonous and nonpoisonous type of mushrooms.

CONCLUSION

The identification and use of wild edible mushrooms play a vital role in enrichment of the socio-economic life of the tribal people. Besides their consumption, the use of mushrooms in folk medicines also paves the way for the upbringing new industries.

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