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# Diversity of macrofungi in 'Jalukbari reserve forest' of Kamrup District, Assam

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**ABSTRACT**

*A study on seasonal diversity of macrofungi was conducted for two consecutive years (2010-2012) in Jalukbari reserve forest of Kamrup district of Assam. As a result of the study, different macrofungi were reported representing 38 species, 28 genera and 19 families. Maximum species were saprophytic (28) in nature inhabiting the dead logs, leaf litter, compost etc. while 3 species were mycorrhizal with trees. Only 2 species were parasitic while 2 species were termitophilic. Maximum frequency of occurrence was exhibited by Schizophyllum commune (50%) and also the the highest density was of the same species(4.44). Lentinus polychrous was the most abundant species (12.33).Species Richness Indexwas highest in rainy season (4.57)followed by summer season (1.57) and winter (0.84). Currently there is no evidence on the status of macro fungi of this part of the state. Regarding the importance of fungi in various aspects of life and for the conservation purpose, the present study has been undertaken.*

**Key words:** Jalukbari reserve forest, Assam, macro fungi, seasonal diversity, species richness.

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## INTRODUCTION

Macrofungi is a distinct artificial group of fungi based on size. It includes species with large and visible fruiting bodies which may be either epigeous or hypogeous. Macrofungi appear basically only under precise combinations of conditions like geographical locations, temperature, humidity, light and surrounding flora. Macrofungi are not only beautiful but also play a significant role in industry, agriculture, medicine (6), and in many other ways. Out of 1.5 million species of fungi estimated (3), a total of only 21,679 macrofungi of Ascomycetes and basidiomycetes have been enlisted (7) from fourmajor geographical regions of the world.

Ecologically macrofungi can be classified into three major groups: saprophytes, parasites and symbionts (mycorrhizas); among them many form obligatory relationship with plant/trees. Rapid depletion of the forest area in this region due to human activities has resulted in the fast reduction of plant species thus decreasing the number of macrofungi from forests. This may bring status of many macrofungi as extinct even without being documented. Several workers have studied diversity of macrofungi from different parts of India namely Kashmir (8),Garhwal (9), Tamil Nadu (5)etc.However very less number of reports appeared from north eastern part of India. No attempt has been initiated to document macrofungi from this area.An attempt was made by Gogoi and Sarma to find out some edible mushrooms of Dhemaji district of Assam (2). Some 12 edible fungi were found to be utilized by the ethnic tribes of this region. No such attempts have been made from Kamrup district of Assam. Although, the district is surrounded by forests from three sides; fast developmental activities in the area is reducing it at a faster rate. Hence documentation of macrofungi from this district is of utmost importance before they are wiped out from the face of

the earth. Keeping this aspect in view the present study was conducted during 2010-2012 to document the macro fungal species and their uses.

## MATERIALS AND METHODS

### Study site

The present study was conducted in the Jalukbari Reserve Forest of Kamrup District of Assam. It is located between 25°5" - 25°53" N latitude and 91°22" E to 91°28" E longitude in the direction of south west corner of Kamrup district and in the southern bank of river Brahmaputra. The average total area covered was approximately 40 $km^2$, most of which are undulating hilly terrain and floodplains of river Brahmaputra. The area is highly rich with natural and cultivated flora. Diverse types of vegetation are found throughout Jalukbari reserve forest which represents evergreen, semi-evergreen, deciduous type, shrubs and grasslands of tall and short. The herbs and shrubs are mainly dominated *by Ageratum conyzoids, Bigonia lanciniata, B. roxburghii, Centella asiatica, Hydrocotyle rotundifolia, Eupatorium odoratum, Melastoma malabarthricum and Lantana camera.* The natural vegetation comprised of *Cassia fistula, C. sophera, C. nodosa C. tora, M. prurita, Psidium guava, Citrus sp, Murraya koenigii, Ficus religiosa, F. glomarata, F. benghalensis, Aegle marmelos, Bombax ceiba, Zizyphus jujuba etc. The Polialthia longifolia, Dalbergia sisso, Eucalyptus alba and Tectona grandis* are commonly found planted trees. The temperature ranges between 10.6° C - 32°C and the average annual precipitation ranges between 300- 400mm. The most rainfall takes place during monsoon period with a maximum temperature of 32°C and minimum temperature of 24° C and relative humidity between 55.5-85.5%.

### Collection of macrofungi

The study was conducted for two consecutive years from November, 2010 to October, 2012. In order to collect macrofungi, three plots of about were selected randomly covering the whole reserve forest. Sampling was done during summer, rainy and winter seasons each year. The samples were collected with care to avoid the damage using knife or forceps, and transported to the laboratory in separate and sterilized containers/ polythene bags. Accession number were allotted to each sample and other details like host/substratum, color, smell (if any) of the sporocarp and other visible features were recorded at site.Proper photographs were taken in the habitat as well as after reaching the laboratory. Pen, book, lens and labels were also carried along with for recording and relevant information. Date and place of collection were also immediately recorded.

### Identification of macro fungi

The sporocarps encountered were identified by comparison using relevant literatures (1), (4) (11). Preservation of the samples was done in 2% and 4% formaldehyde depending upon sporocarp's texture.

### Data analysis

Three attributes of the species in the community: Density (number of sporophores per unit area), which is a measure of the numerical individuals relative to species; Frequency (how many samples contain sporophores of a given species), which measures the commonness of the species and Dominance, the incidence at which the species occurs most in the sampling area.

The frequency, density and abundance were determined using the following formulae.

$$\text{Frequency of fungal species (\%)} = \frac{\text{No.of site in which the sp is present}}{\text{Total no.of sites}} \text{x}100$$

$$\text{Density} = \frac{\text{Total no.of individuals of a particular species}}{\text{No.of study sites}}$$

Abundance (A) = Total number of sporomas in all transects/ Number of transects of occurrence

### Alpha diversity

Statistical analysis was applied to calculate richness index. (Margalef's richness index(R). The computation of formula is as shown below:

Richness index (R) = (S-1)/lnN

(Where, *S* is the total number of species in the quadrat of species *i*; Ni is the number of species and N is the total number of S species)

## RESULTS AND DISCUSSION

A total of 38 species belonging to 28 genera and 19 families were collected from the study site.(**Table:1**).Maximum seven genera were assigned to family Polyporaceae, four each to Agaricaceae and Tricholomataceae, three to Psathyrellaceae two each to Ganodermataceae Hymenochaetaceae, Lyophyllaceae, Marasmiaceae and Xylariaceae**.** Maximum frequency was exhibited by Schizophyllaceae (50%) and the least value was 5.56 exhibited by a number of species like *Coprinus atramentarius*, *Clitocybe geotropa*, *Entoloma conferendrum*, *Ganoderma carnosum*, *Ganoderma sp*, *Lepiota alba*, *Marasmius haematocephalus*, *Phallus indusiatus*, *Tricholoma scalpturatum*, *Trametes gibbosa* and *Termitomyces mammiformis*. The density of *Schizophy*llum commune is the maximum and the least is 0.11 exhibited by *Clitocybe geotropa* and *Entoloma conferendum*.

*Lentinus polychrous* was found to be the most abundant species (12.33) and the least abundant species was *Clitocybe geotropa* and *Entoloma conferendum* (2.00). Regarding the ecological preference it was observed that maximum number of species 28 were saprophytic, 3 were mycorrhizal while 2 were parasitic. (**Fig: 1**). Two species were found to be termitophilic and three coprophilous. The parasitic macrofungi are *Ganoderma sp and G. carnosum*. The pathogenic fungi directly are responsible for destroying the standing trees which declines the forest health and productivity. But according to Molina, 1994, the pathogens below threshold population are a natural component of the forest ecosystem. Though *Ganoderma sp* are present but their population is very low. Besides their harmful nature there is a very important aspect of these fungi. They are being used by the pharmaceutical companies for drug manufacturing processes. *Ganoderma* is well known to promote health and lowers the risk of cancer and heart diseases and boost immune system (10). The Species richness fairly rich diversity. A comparison of the richness with species number and number of sporophores showed that richness was highest in rainy season (5.91) followed by summer season (1.13) and the least was observed in winter season (0.74). Richness index is directly proportional to an increase in species number. **(Table: 2)**

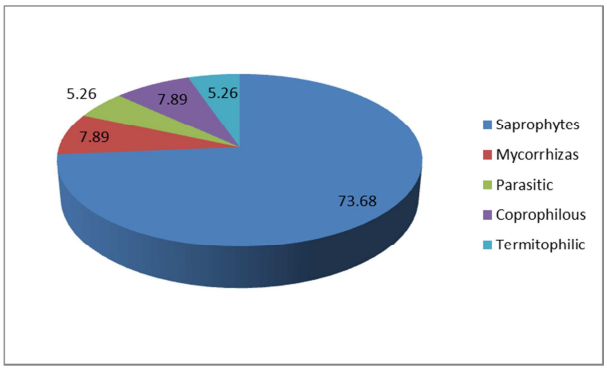


**Fig: 1 Distribution of ecological groups of macro fungi in Jalukbari reserve forest of Assam**

**Table1. List of macro fungi in Garbhanga Reserve Forest of Assam with uses and ecological relationship**

| Name of the species | Family | Ecological relationship | Edibility | Den | Freq | Abun |
|---|---|---|---|---|---|---|
| *Auriculariaauricula-judae* | Auriculariaceae | Saprophytic | Edible | 1.28 | 22.22 | 5.75 |
| *Bovista plumbea* | Lycoperdaceae | saprophytic | Edible | 0.89 | 11.11 | 8.00 |
| *Calocera cornea* | Dacrymycetaceae | saprophytic | Inedible | 1.06 | 16.67 | 6.33 |
| *Clavulinopsisfusiformis* | Clavariaceae | saprophytic | Inedible | 0.78 | 11.11 | 7.00 |
| *Coltriciacinnamomea* | Hymenochaetaceae | saprophytic | Inedible | 1.78 | 27.78 | 6.40 |
| *Coprinusatramentarius* | Agaricaceae | saprophytic | Inedible | 0.33 | 5.56 | 6.00 |
| *Coprinusplicatilis* | Agaricaceae | saprophytic | Inedible | 0.72 | 11.11 | 6.50 |
| *Clitocybe geotropa* | Tricholomataceae | saprophytic | Inedible | 0.11 | 5.56 | 2.00 |
| *Creterellusodoratus* | Cantharelaceae | mycorrhizal | Edible | 0.22 | 5.56 | 4.00 |
| *Entolomaconferendum* | Entolomataceae | saprophytic | Inedible | 0.11 | 5.56 | 2.00 |
| *Ganoderma carnosum* | Ganodermataceae | parasitic | Inedible | 0.44 | 5.56 | 8.00 |
| *Ganoderma sp* | Ganodermataceae | parasitic | Inedible | 0.44 | 5.56 | 8.00 |
| *Geastrumsaccatum* | Geastraceae | mycorrhizal | Inedible | 0.61 | 11.11 | 5.50 |
| *Innonotustomentosus* | Hymenochaetaceae | saprophytic | Inedible | 0.28 | 11.11 | 2.50 |
| *Lentinus polychrous* | Polyporaceae | saprophytic | Edible | 2.06 | 16.67 | 12.33 |
| *Lentinussquarrosulus* | Polyporaceae | saprophytic | Edible | 1.22 | 16.67 | 7.33 |
| *Lentinustigrinus* | Polyporaceae | saprophytic | Edible | 1.00 | 16.67 | 6.00 |
| *Lepiota alba* | Agaricaceae | saprophytic | Inedible | 0.28 | 5.56 | 5.00 |
| *Lepiotacristata* | Agaricaceae | saprophytic | Inedible | 0.78 | 11.11 | 7.00 |
| *Marasmiuscorbariencis* | Marasmiaceae | saprophytic | Inedible | 0.39 | 11.11 | 3.50 |
| *Marasmiushaematocephalus* | Marasmiaceae | saprophytic | Inedible | 0.22 | 5.56 | 4.00 |
| *Microporusxanthopus* | Polyporaceae | saprophytic | Inedible | 0.44 | 11.11 | 4.00 |
| *Mycena cinerella* | Tricholomataceae | saprophytic | Inedible | 2.17 | 33.33 | 6.50 |
| *Omphalina ericotorum* | Tricholomataceae | saprophytic | Inedible | 0.39 | 5.56 | 7.00 |
| *Paneoluspapilionaceus* | Psathyrellaceae | coprophilous | Inedible | 1.44 | 22.22 | 6.50 |
| *Phallus indusiatus* | Phallaceae | saprophytic | Inedible | 0.28 | 5.56 | 5.00 |
| *Polyporusalveolaris* | Polyporaceae | saprophytic | Inedible | 1.94 | 27.78 | 7.00 |
| *Psathyrellacandolleana* | Psathyrellaceae | coprophilous | Inedible | 0.67 | 11.11 | 6.00 |
| *Psathyrelladelineata* | Psathyrellaceae | saprophytic | Inedible | 1.17 | 16.67 | 7.00 |
| *Psilocybe subcubensis* | Psilocybaceae | coprophilous | Inedible | 0.28 | 5.56 | 5.00 |
| *Schizophyllum commune* | Schizophyllaceae | saprophytic | Edible | 4.44 | 50.00 | 8.89 |
| *Termitomyces heimii* | Lyophyllaceae | termitophilic | Edible | 1.28 | 16.67 | 7.67 |
| *Termitomyces mammiformis* | Lyophyllaceae | termitophilic | Edible | 0.33 | 5.56 | 6.00 |
| *Trametesgibbosa* | Polyporaceae | Saprophytic | Inedible | 0.33 | 5.56 | 6.00 |
| *Trametesversicolor* | Polyporaceae | Saprophytic | Inedible | 1.94 | 16.67 | 11.67 |
| *Tricholoma scalpturatum* | Tricholomataceae | mycorrhizal | Inedible | 0.22 | 5.56 | 4.00 |
| *Xylarialongipes* | Xylariaceae | saprophytic | Inedible | 1.89 | 16.67 | 11.33 |
| *Xylariapolymorpha* | Xylariaceae | saprophytic | Inedible | 2.56 | 22.22 | 11.50 |

**Table: 2 Richness index, number of species and number of sporophores of macro fungi recorded during 2010-12 in Garbhanga Reserve Forest of Assam**

| Seasons | Number of species | Number of sporophores | Species richness |
|---|---|---|---|
| Summer | 8 | 87 | 1.57 |
| Rainy | 29 | 460 | 4.57 |
| Winter | 5 | 115 | 0.84 |

## CONCLUSION

During the present study, 38 species were collected which were distributed in 19 families and genera. The diversity of flora and climatic conditions in the forest region has created conditions for the growth and development of a wide variety of macro fungal species. These macro fungi play an important role in the maintenance of ecosystem and also serve as a substitute of food for the local inhabitants. The tribal community gathers wild fungi from the forest for consumption as well as for selling in the local market. Considering the importance of macro fungi with regards to environment, health and economy, their documentation is very essential. Hence further survey of macro fungi in this region is of great importance and should be carried out for conservation before it is wiped from the face of the earth due to human intervention

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**REFERENCES**

[1] Alexopoulos CJ, Mims CW, Blackwell. **1996**. Introductory Mycology
[2] Gogoi Y, Sarma TC. **2012**. An ethno mycological survey in some areas of Dhemaji district (Assam).
[3] Hawksworth DL. **2004**. *Stud Mycol* 50: 19.
[4] Lamaison,J.L., Polese J.M. The Great Encyclopedia of Mushrooms. Germany: Konemann.(**2005**).
[5] Mani, S& V. Kumaresan. (**2009**). *Journal of Threatened Taxa1* (1):54-57.
[6] Molina, R, O'Dell T.,Amaranthus,M., Castellano and Russel, K. (**1993**). Biology, Ecology and Social aspects of Wild Edible Mushrooms in the forest of the Pacific Northwest: A Preface of Managing Commercial Harvest. U.S. Dept. of Agriculture Forest service, Pacific Northwest Research station, United States. 45pp
[7] Mueller, G.M. & J. P. Schmit (**2007**). *Biodiversity and Conservation*. 16(1):1-5.
[8] Sheikh P.A, Dar G.H, Beig M.A. and ShaheenKousar(**2014**). *Caribbean Journal of Science and Technology*, Vol.2,399-404
[9] Vishwakarma M.P., Bhatt R.P and Sweta Joshi. *Indian Journal of Science and Technology*, Vol 5 No.1 (Jan **2012**)
[10] Wachtel-Galor S, Tomlinson B, Benzie IFF. **2004**. *Br J Nutr* 91:263-269.
[11] Zoberi MH. **1973**. *Nigerian Field* 38: 81-90.