TAXONOMIC STUDY OF THE WOOD INHABITING FUNGI OF REIEK RESERVED FOREST, MIZORAM, INDIA

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ABSTRACT. Reiek Reserve Forest is situated 29 kms western from Aizawl city. The forests of Reiek are home to rich flora and fauna including a number of fungal species both soil and wood inhabiting. A three year survey was done in which a total of 46 species were identified, 42 belonging to the Basidiomycota and 4 Ascomycota, spreading across 15 family, 7 orders, 4 class, and 26 genera. The fungal specimens were identified on the basis of their morphological and microscopic characters. Among the identified samples collected 13 species were found to be edible *Auricularia auricula-judae, A. cornea, A.mesenterica, A.polytricha, Fistulina hepatica, Lentinula edodes, L. lateritia, Lentinus polychrous, L. roseus, L. sajor caju, Pleurotus djamor, Schizophyllum commune and Tremella mesentrica.*

Keywords : Ascomycetes, Basiodiomycetes, Taxonomy, Mycodiversity

I. Introduction

Reiek forest is located between 92˚37’ and 93˚28’E and latitude 20˚45’ and 22˚46’N in the north western part of Mizoram. It occupies an area of 10 sq.km and is about 29 kms from Aizawl. The highest point is the peak of Reiek Mountain which is 1485 m asl. The temperature ranges between 8˚C - 22˚C in winter and 20˚C - 28˚C in the summer with an average rainfall of 2670 mm annually. The forest is tropical in nature and is dominated by evergreen tree species and thus may be classified as an evergreen or semi-evergreen forest (Lalzarzovi and Lalnuntluanga, 2014).

Fungi are a group of heterotrophic organisms that consist of a thallus, an assemblage of vegetative cells not forming tissue in the functional sense, and therefore not having differentiated organs. They are one of the most diverse groups of organisms on earth, and constitute a significant part of terrestrial ecosystems. They form a large share of the species richness and are key-players in ecosystem processes (Keizer, 1998; Seen-Irlet et al., 2007). Mushrooms are economically important since they serve as food, medicine, biocontrol agents, chemical producers of bioactive compounds used in the pharmaceutical and many other industries (Duarte et al., 2006).

Only about 6.7% of 1.5 million species of fungi estimated in the world have been described and most of these are in temperate regions. The tropical region which is undoubtedly hosting the highest mycodiversity has been inadequately sampled and the mycoflora scarcely documented (Hawksworth, 2001). This makes the situation of macrofungi in the tropical forests unclear (Hawksworth, 2004). However, new species are still being identified in the tropics (Douanla-Meli et al., 2007). One-third of the fungal diversity of the globe exists in India and of this, only 50% are characterized until now (Manoharachary et al. 2005). Having a stable and accepted estimate of the taxonomic diversity for fungi is necessary to enable fungi to be included in considerations of biodiversity conservation, land-use planning and management (Mueller and Schmit 2007).

Wood-inhabiting fungal communities are typically species-rich, and include multiple decomposer species in the same wood substrate. Throughout the decomposition of a fallen tree, fungal species interact with each other as community composition develops over time. The resident fungi must either defend an occupied domain or replace the mycelia of primary established species (Ottosson, 2013). As the main agents of wood decay, fungi can be considered as ecosystem engineers (Lonsdale, *et al.*, 2008). The rich diversity of wood inhabiting fungi is one of the important factors for the functioning of forest ecosystem. Until now, only a few studies of the wood inhabiting fungi have been done from Mizoram (Zothanzama, 2011; Zothanzama and Lalrinawmi, 2015; Zothanzama et al., 2016). This paper mainly deals with the identification of wood inhabiting fungi from Reiek Reserved Forest of Mizoram, India.

II. Materials and Methods

a. Collection and Preservation of Specimens

The samples were collected or isolated from its substrates or host (dried wood/branches) with the help of knife or other sharp materials and sometimes simply plucked with bare hand (in case of soft samples). Samples collected were kept in air-tight container or plastics bags which are labeled after collection. Photograph of each sample collected were taken in the field and in the laboratory with scales (Prasher, 2015; Zothanzama, 2011).

The specimens are preserved by air drying, deep freezing and liquid preservation(Meenakshisundaram and Bharathiraja, 2013; Zothanzama and Lalrinawmi, 2015). Voucher numbers are given to the specimens and stored in the Department of Environmental Science, Mizoram University.

b. Identification of specimens

The collected specimens were identified according to standard macroscopic and microscopic characteristics through consultation with appropriate literature (Gilbertson and Ryvarden,1986; Núñez and Ryvarden, 2000). The morphology or the macro-charateristics *i.e.* the outward appearance(fruiting body) were studied carefully and compared or expressed through appropriate photographs and literatures from books and journals.
For microscopic study, thin sections of fresh or dried specimens are taken with the help of a sharp razor blade and were mounted in 3% KOH solution and stained in Lactophenol or 60% lactic acid + cotton blue. Spore print of the collected specimens were taken by cutting off the cap and placing it in a piece of white paper (Surcek, 1988).

III. Result and Discussion

A total of 46 species were identified 42 belonging to the phylum Basidiomycota and 4 Ascomycota, spreading across 15 family, 7 orders, 4 class, and 26 genera. Polyporaceae represents the most abundant family with 14 number of species **"Table.1".** Among the identified samples collected 13 species were found to be edible which are - *Auricularia auricula-judae, A. cornea, A.mesenterica, A.polytricha, Fistulina hepatica, Lentinula edodes, L. lateritia, Lentinus polychrous, L. roseus, L. sajor caju, Pleurotus djamor, Schizophyllum commune and Tremella mesentrica* **"Fig.1"**. During the course of field study and collection of specimens, the local people were seen collecting some of the edible fungi such a *Lentinula lateritia*(Pa-Pal,Mizo), *Schizophyllum commune*(Pasi,Mizo), *Lactifluus corrugis* (Pa-Uithin,Mizo), *Russula subfragiliformis*(Pa lengsen,Mizo).

Table 1 | Species identified and their Taxonomical position

Basidiomycetes	
Auriculariaceae	*Auricularia auricular-judae, Auricularia cornea, Auricularia mesenterica, Auricularia polytricha*
Dacrymycetaceae	*Dacryopinax spathularia*
Fomitopsidaceae	*Daedalea circularis, Daedalea confrogosa, Daedalea quercina*
Fistulinaceae	*Fistulina hepatica*
Ganodermataceae	*Amauroderma rude, Amauroderma rugosum, Ganoderma applanataum, Ganoderma lingzhi*
Maramiaceae	*Campanella sp, Lentinula edodes, Lentinula lateritia, Marasmius sp*
Meruliaceae	*Cymatodermata dendriticum*
Mycenaceae	*Filoboletus manipularis*
Nidulariaceae	*Cyathus striatus*
Pleurotaceae	*Pleurotus djamor*
Polyporaceae	*Hexagonia tenuis, Lentinus polychrous, Lentinus roseus, Lentinus sajor-caju, Microporus affinis, Microporus ochrotinctus, Microporus xanthopus, Polyporus alveolaris, Polyporus badius, Polyporus circularis, Polyporus dictyopus, Trametes gibbossa, Trametes hirsuta, Trametes trogii,*
Schizophyllaceae	*Schizophyllum commune*
Stereaceae	*Stereum hirsutum, Stereum ostrea, Xylobolus subpiletus*
Tremellaceae	*Tremella mesenterica*
Ascomycetes	
Xylariaceae	*Daldinia concentric, Xylaria hypoxylon, Xylaria longipes, Xylaria polymorpha*

1.*Auricularia auricula-judae* **2**.*A. polytricha* **3**.*A mesenterica* **4**.*A. cornea* **5**.*Fistulina hepatica* **6**.*Lentinus roseus* **7**.*L sajor-caju* **8**.*L polychrous* **9**.*Lentinulla edodes* **10**. *L. lateritia* **11**.*Pleurotus djamor* **12**. *Shizophyllum commune* **13**. *Tremella mesenterica*

Fig 1. Some of the common Species

It has been observed that the diversity of tree species have a great influence on the species richness of wood rotting fungi in a forest community (Egbe, et al,.2013). Reiek forest being a community reserved forest harbour diverse variety of tree species. It has been reported that a total of 103 tree species are present in this area(Lalzarzovi and Lalnuntluanga, 2014) and this may have a great influence on the diversity of wood rotting fungi. It can also be noted that Reiek Reserved Forest has a favourable climatic and topographical condition for development of various fungal species and it also receive adequate amount of precipitation throughout the year.

There is increasing interest in the mapping of macrofungal flora of many areas to obtain the distribution records similar to those already existing for flowering plants. However, unlike plants the identification of macrofungi relies on the collection and preservation of fruiting bodies, which in turn is largely dependent upon the availability of host(fallen logs,twigs) and moisture in most cases.

14.*Coprinus dessimentus* **15**.*Cyathus striatus* **16**.*Cymatodermata dendriticum* **17**.*Daedalea quercina* **18**.*Hexagonia tenuis* **19**.*Microporus xanthopus* **20**.*Ganoderma applanatum* **21**.*Marasmius* sp.**22**.*G. lingzhi* **23**.*Xylaria hypoxylon* **24**.*Dacyropinax spathularia* **25**.*X.longipes* **26**.Basidium of *Lentinus* sp.(40x) **27**.Cross-section of *Ganoderma* sp. showing Spores (40x) **28**. C-S of Gills *Lentinus* sp.(40x) **29**.C-S of Ganoderma sp.(10x) **30**. Spores (*Lentionus sajor-caju*.40x).

Fig 2. **Species and microscopic characteristics of some genus.**

IV. Conclusion

It can be concluded that the 46 species list of macrofungi in this study provides the baseline information needed for the assessment of changes in biological diversity in Reiek Reserved Forest for the future. It is also an important step towards producing a checklist of macrofungi in Mizoram. The importance of mushrooms not only in the ecosystem dynamics but also in human diet and health also increases the need for the conservation of this non-timber forest product resource. Conservation can also be achieved through further extension of forest reserve areas, and the reduction of illegal logging of timber along with capacity building of the local community. It is also further suggested to include macrofungi biodiversity conservation in state forest management policies.

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