Morphological and molecular diversity of macrofungi in selected dry zone forest reserves in Sri Lanka and optimization of culture conditions of the edible counterparts

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Abstract

Fungi which produce fruiting bodies large enough to be observed by the naked eye are identified as macrofungi. Information on macrofungal diversity in Sri Lanka is sparse. However, studying the diversity of macrofungi is very important since they can be an indicator on detecting anthropogenic disturbances such as air pollution and deforestation and the wealth of natural compounds they behold. This study was carried out with the objectives of identifying and recording the fungal diversity of macrofungi in selected dry zone forest reserves of Sri Lanka and to optimize artificial culturing of edible types of macrofungi in the collection.

Opportunistic and random sampling was carried out and specimens were analyzed macromorphologically (shape, colour, hymenial surface) and micromorphologically (hyphal system, presence/absence and measurements of sterile structures and basidiospores). Initial identification was carried out by comparing the morphological characters with that of published keys and guides. Identification was confirmed by sequencing the Internal Transcribed Spacer (ITS) region in the nuclear ribosomal repeat unit, using the primers ITS1F and ITS4B or ITS1 and ITS4.

A total of 108 different types of macrofungi were recorded. Fifty three percent (53%) of the recorded macrofungi are polypores which are hard and woody textured with pores on the lower surface. Agarics which are fleshy with a stalk and a cap bearing hymenium with gills on the lower side represented 28% of the total collection. In addition 06 different types of jelly fungi, 03 types of boletes and 10 Ascomycetes were encountered. These fungi were found on several substrates such as decaying logs, branches and sticks lying on the forest floor, on the trunks of angiosperms, on soil as well as on heaps of elephant dung. Agarics such as *Panaeolus sphinctrinus*, *Panaeolus foenisecii*, *Lecoagaricus rubrobrunneus*, *Pleuroflammula praestans*, *Anthracophyllum lateritium*, *Coprinopsis strossmayeri*, *Agrocybe subpediades*, *Gymnopilus lepidotus*, *Psilocybe cubensis*, *Gyrodontium sacchari* and polypores such as *Fulvifomes fastuosus*, *Fuscoporia gilva*, *Fuscoporia senex*, *Fomitopsis feei*, *Austrlohydnum dregeanum*, *Phanerochaete chrysosporium*, *Earliella scabrosa*, *Panus conchatus*, *Panus similis*, *Trametes cubensis*, *Trametes elegans*, *Trichaptum byssogenum*, *Stereum hirsutum* are new records and their detailed descriptions were added to the wealth of macrofungal diversity in Sri Lanka, as a result of this study.

To address the paucity of available data on macrofungi, arrangements were made to upload the detailed descriptions of collected specimens to a database and was linked to the website of University of Colombo so that anyone interested can easily access. Furthermore, macrofungal samples have been preserved and stored in the herbarium of Department of Plant Sciences, University of Colombo for future references.

This study also investigated the potential of locally available substrates to grow *Schizophyllum commune*, *Auricularia polytricha* and *Lentinus squarrosulus* which are edible and proven to be medicinally important. Alternative substrates including dried banana leaves, coconut leaves, paddy straw and coir dust were compared with saw dust (rubber) which is the commonly used substrate for commercial production of mushrooms. Highest mushroom yield for *S. commune* was obtained in coconut leaf and coir dust containing mixtures. Medium prepared from banana leaves was preferred by *A. polytricha* and saw dust (rubber) substrate by *L. squarrosulus*. The initial knowledge gained from this study can be accelerated by carrying out more experiments to develop commercially profitable products in Sri Lanka.