

Diversity of macrofungi in Sirsitaluk of Uttara Kannada district, Karnataka

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Abstract -Macrofungi have been fascinating to man due to their unusual characters like sudden appearance in isolated places in groups, rings and in different geometrical shapes. Their sporocarps are ephemeral, may last only a few days before decomposing or being eaten. The study was conducted in five sampling plots of Sirsi taluk, each measuring 50 × 20 m transect during January 2018 to December 2019. The sporocarps encountered were collected and analysed for their identity. The collected macrofungi belongs to 48 species, 33 genera, 26 families, two classes and nine morpho-groups. A total of 26 families were encountered. The highest species were found in Tricholomataceae and Marasmiaceae with six and five species respectively. Abundance and diversity was found to be more in rainy season than winter and summer. Heavy rain affected the growth and development of macrofungal fruiting bodies. More number of species belonged to fleshy gilled fungi as the same species may need less rain or moisture content for its development and they found in all the substratum. *Termitomycesclypeatus* were found as edible species in the study area.

Key Words: Mushrooms, Sporocarps, Morpho-groups, Gilled fungi, Tricholomatcaee

1. INTRODUCTION

Macrofungi belong to the kingdom fungi, which constitutes the most diverse group of organisms after insects on this biosphere [1]. There are many thousands of species which are unique and each species beautiful in its own way [2]. Since the dawn of civilizations, macrofungi have been fascinating to man due to their unusual characters like sudden appearance in isolated places in groups, rings and in different geometrical shapes [1]. The macro fungi are differentiated by containing spore bearing structures "Sporocarps" that are seen by naked eye, it consist of mushrooms, puffballs, bracket fungi, false-truffles and cup fungi are common examples of macro fungi.

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 [2]. Sporocarps are ephemeral, may last only a few days before decomposing or being eaten [3]. In some species sporocarp is short-lived; in others they are persistent and may be perennial. Fruiting body of this group is extremely dependent on weather conditions and abundance of sporocarp may therefore vary by several orders of magnitude between the years.

The two major groups which include macrofungi are *Ascomycota* and *Basidiomycota*. While most of the *Ascomycota* are microscopic species, these are also contains some "larger fungi" cup-fungi, morels and truffles. The *Basidiomycota*, which is a larger group including mushrooms,

toadstools, bracket fungi, polyporus and puffballs, although about 30% of its species are microscopic [4]. Although macrofungi have perhaps the longest history of diversity studies of any group of fungi, they are nevertheless understudied over most of the world [5]. Of the 1.5 million species, there may be 1,40,000 species to be considered as macrofungi, but only 14,000 species are known to man, which would account for 10% of the estimated mushroom species [1].

Wood-inhabiting fungi release the carbon fixed during photosynthesis and stored in the form of cellulose, hemicellulose and lignin, and return other nutrients from the woody debris back to the soil. The bracket fungi are the main wood decayers [6]. The socio-economic significance of wild fungi as food, medicinal source, ecosystem conservation, plant growth promotion, etc., has long been recognized in Europe, USA, China and other developed countries and this has attracted scientists to explore the potential macrofungi and their diversity [3].

Macrofungi were considered ideal for the purpose of evaluation as biosorbents, because it has been demonstrated that many fungal species exhibit high biosorptive potentials [7]. Many macrofungi are becoming extinct or facing threat of extinction because of habitat destruction and global climate change [1]. Habitat degradation adversely influences the number of fruitbodies of macrofungi and diminishes the diversity of the fungal community [8].

2. Materials and Methods

Study Area

The study was conducted in Sirsi taluk (Fig. 01) located in Uttara Kannada district of Karnataka during January 2018 to December 2019, situated between 13.7° North latitude, 75.23° East longitude and 591 metres altitude. The average annual rainfall in the taluk is 1900 mm. The annual mean air temperature is 16°C to 23°C in winter and 30°C to 37°C in summer. The study area is located in 60 kms away from Sahyadri Science College, Shivamogga.

Survey and Sampling

The sporocarps encountered were collected and analysed for their identity. In the survey, macrofungi were identified by the presence-absence for sporomas and were limited to epigeous macromycetes of soil and wood-inhabiting macrofungi that were visible to the naked eye (>1mm). The study sites were plotted in 5 sampling plots of Sirsi taluk. A 50 × 20 m transect was measured out in each of the sampling plot. The study sites were selected randomly and macrofungi were collected within transects and characterized for further analysis.

Collection and Characterization

Fresh specimens were collected with great care without any damage and soil debris were removed using a soft brush. Wood inhabiting macrofungi were collected along with the substratum [9]. The habitat and morphological characteristics of the macrofungi were noted [10] and photographed for further diagnosis during the collection [11]. Macrofungi were assessed for morphological and microscopical characters. They were identified with appropriate monographs and nomenclature is based on Mycobank (<http://www.mycobank.org>).

Results and Discussion:

The survey was undertaken in five transects for documentation of macrofungi occurring in Sirsi taluk during January 2018 to December 2019. The collected macrofungi belongs to 48 species, 33 genera, 26 families, two classes and nine morpho-groups. The collected species showed highest rate in basidiomycota with 43 species followed by five species in Ascomycota (Fig. 02).

Macrofungal studies were carried out in Sirsi taluk according to their respective morphology and encountered a total of nine different types of morpho-groups. The survey recorded 26 species in fleshy gilled fungi accounting for maximum species encountered during 2018 and second highest in coral fungi with seven species followed by six species (bracket fungi), three species (cup fungi), two species (Jelly fungi) and one each in birdnest fungi, flask fungi, stinkhorns and tongue fungi (Fig. 03).

Families encountered in Sirsi taluk during 2018 were enumerated. A total of 26 families were encountered. The highest species were found in Tricholomataceae and Marasmiaceae with six and five species respectively. Families with three species were found in Agaricaceae, Clavariaceae, Gomphaceae and Polyporaceae. Bolbitiaceae, Coprinaceae, Inocybaceae, Psathyrellaceae and Strophariaceae were associated with two species and the families with one species were Auriculariaceae, Cantharellaceae, Exidiaceae, Ganodermataceae, Geoglossaceae, Gloeophyllaceae, Helotiaceae, Hymenochaetaceae, Lyophyllaceae, Phallaceae, Pleurotaceae, Pyrenomataceae, Sarcoscyphaceae, Tremellaceae and Xylariaceae (Fig. 04).

During five months study, species were recorded highest in *Marasmius* with five species followed by *Hygrocybe* (4 species), *Ramaria* (3 species) and *Clavulinopsis*, *Conocybe*, *Coprinus*, *Crepidotus*, *Gymnopilus*, *Tricholoma* (2 species) and *Aleuria*, *Auricularia*, *Bisporella*, *Cantharellus*, *Clathrus*, *Clavaria*, *Cookiella*, *Coprinopsis*, *Cyathus*, *Ganoderma*, *Gloeophyllum*, *Lepiota*, *Micropus*, *Parasola*, *Phellinus*, *Pleurotus*, *Polyporus*, *Pycnoporus*, *Termitomyces*, *Tremella*, *Tremellodendron*, *Trichoglossum* and *Xylaria* possess only one species (Fig. 05).

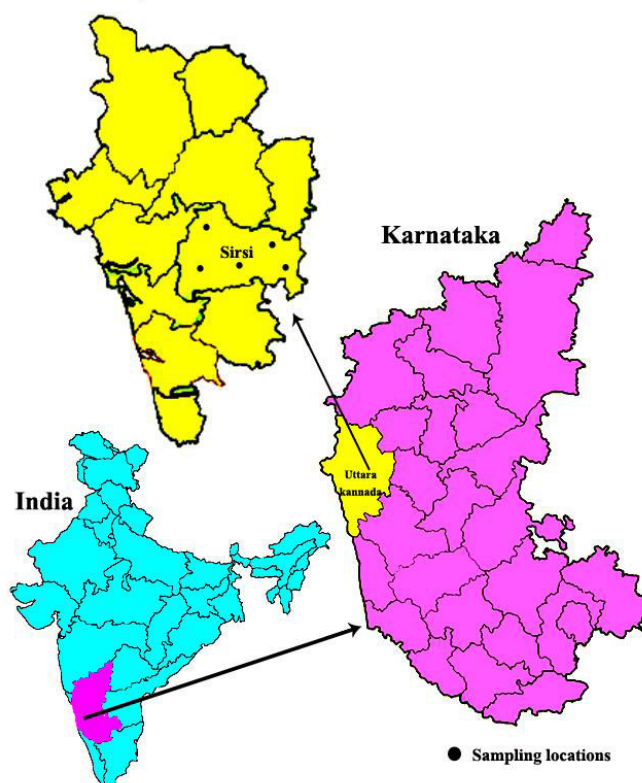


Fig-1: Sampling locations of Sirsi taluk in Uttara Kannada district, Karnataka

Charts

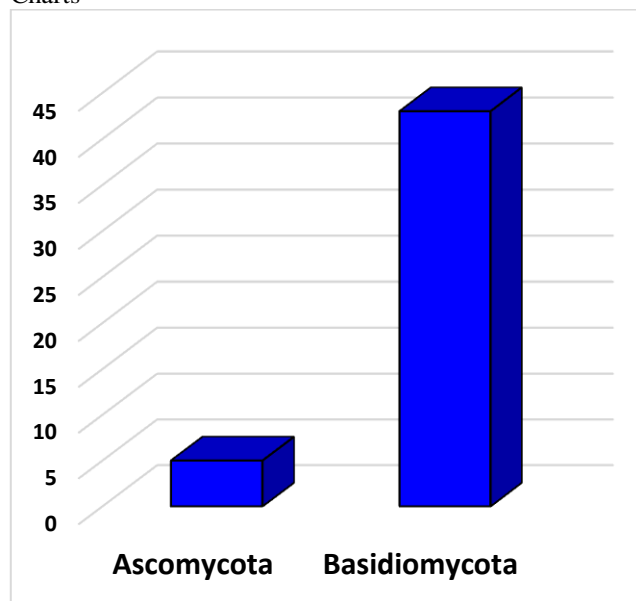


Fig-2: Total number of species occurred in Ascomycota and Basidiomycota of macrofungi in Sirsi taluk

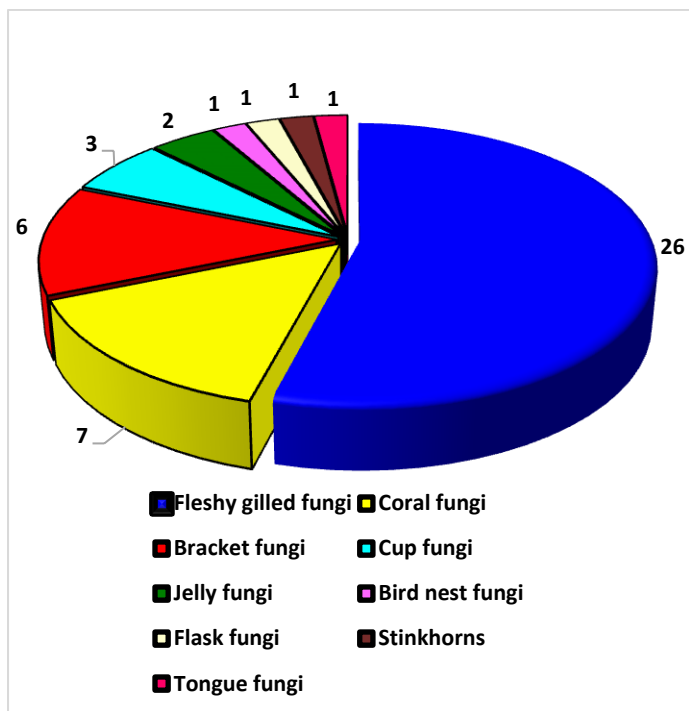


Fig-3: Total number of species occurred in different morpho-groups of macrofungi in Sirsi taluk

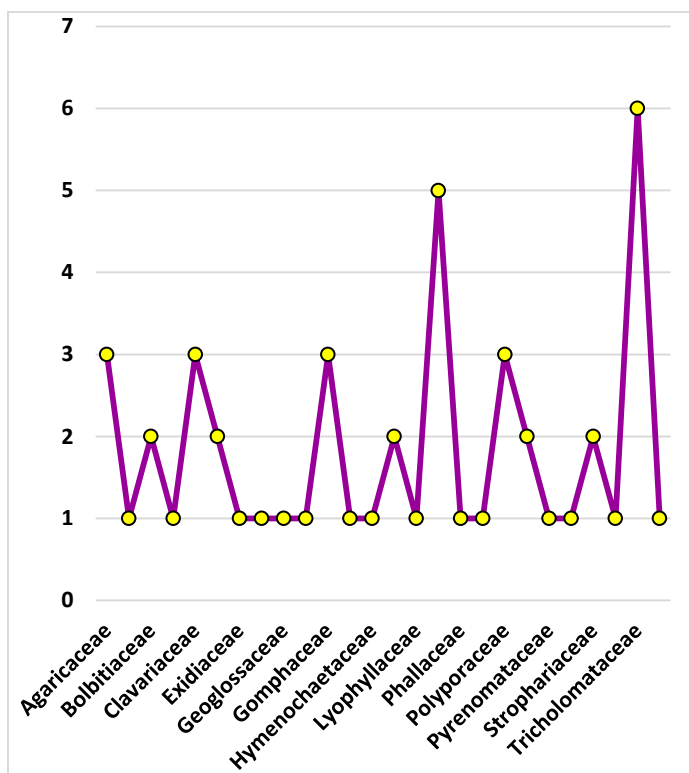


Fig-4: Total number of species occurred in different families of macrofungi in Sirsi taluk

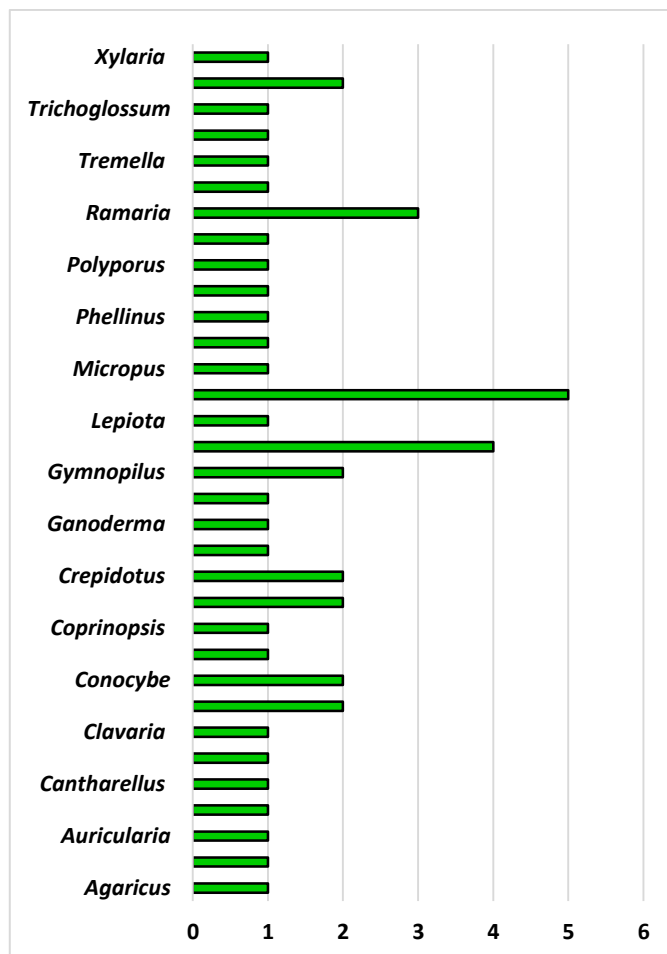


Fig-5: Total number of species in different genera of macrofungi in Sirsi taluk

3. CONCLUSIONS

The study on macrofungal diversity in Sirsi taluk of Uttara Kannada district, Karnataka is conducted during the period of two years from January 2018 to December 2019 to identify and document the species which are present in the mentioned place. Abundance and diversity is more in rainy season than winter and summer. Mulching and moisture content of substratum play very important role in the growth of macrofungi. But the work usually needs more time because every time we wouldn't get the macrofungi in the study sites. It is difficult to get the same species due to loss of substratum or change in it. The wood decaying fungi were usually present in all the seasons. Heavy rain also affects the growth and development of macrofungal fruiting bodies. More number of sporocarps and species were found in the month of July 2018, probably for the highest rainfall and percolation was more in the soil and high moisture in the substratum, which produced more number of fruiting bodies and different macrofungal species. In our study more number of species belong to fleshy gilled fungi as the same species may need less rain or moisture content for its development and they found in all the substratum. Some species were edible

(*Termitomycesclypeatus*) and many species found to be non-edible.

The same work has not been dealt by researchers in the past, but our working duration is very short. However, the species collected were more in the short span of time. The research on macrofungi should be more in the future days and utilization of these for mankind should be traced out. By the literature survey, we came to know that the study on macrofungi is less preferable in the field of Indian science. More encouragement and preference should be given to the “diversity of macrofungi” and the nature’s miracle i.e., Macrofungi should be conserved for the welfare of present and future human generations.

ACKNOWLEDGEMENT

The authors are thankful to the Chairman, Dept. of P.G. Studies and Research in Applied Botany, Kuvempu University, Shankaraghatta, for providing facilities during the research.

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