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Macrofungi from the Sigiriya wilderness in Sri Lanka

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Macrofungi includes species belonging to several different taxonomic groups. They are quite different in appearance, but have one common feature, easily observable spore-bearing structures that form above or below ground. This study was carried out with the objective of identifying the diversity of macrofungi in Sigiriya wilderness, Sri Lanka. Macrofungi were collected from the forest reserve surrounding the ancient Sigiriya rock (7.9569^0 N, 80.7569^0 E). The collected macrofungi were identified by comparing, the macromorphological characters (colour, shape, texture of fruiting bodies) and microscopic features (spores, hyphal details, presence of cystidia, characters of basidia) with published keys and guides. A total of 49 species were identified based on the above characters. Five forms belonging to phylum Ascomycota were identified. They were *Xylaria polymorpha*, *Xylaria longipes, Daldinia concentrica, Peziza* sp. and *Nectria* sp. which represented 10% of the collection. The remaining forms belonged to phylum Basidiomycota. Majority of forms in Basidiomycota belonged to Polyporales which accounted for 39% of the total collection. *Microporus xanthopus*, *Hexagonia tenuis, Pycnoporus cinnabarinus* and *Ganoderma* sp. were some of the specimens collected.. After polypores most of the specimens found belonged to Agaricales which was 31% of the total collection. *Anthracophyllum* sp., *Marasmius* sp., *Mycena* sp., *Xerula* sp. and *Psathyrella* sp. were some of the specimens included in the collection. In addition 8% of the collection was jelly fungi, including species such as *Tremella, Calocera* and *Auricularia*. Furthermore some of the collected forms are reported to be of medicinal importance, namely *Daldinia concentrica* commonly known as cramp balls and *Ganoderma* sp. Edible species such as *Schizophyllum commune* and *Auricularia* sp. were also found.

Key words: Macrofungi, Sigiriya, Basidiomycota, Ascomycota

INTRODUCTION

Sri Lanka being a tropical island with a warm and humid climate is the home to large numbers of fungal species that have not been surveyed and identified. Macrofungi includes species belonging to several different taxonomic groups and which are quite different in appearance, but having one common feature, easily observed spore-bearing structures that form above or below ground (Coomaraswamy and Kumarasingham, 1988). The knowledge of macrofungi species biodiversity at the community species level is essential to monitor effectiveness of or need for conservation and also to follow natural and artificial disturbances. This study has been carried out with the objective of identifying the diversity of macrofungi in Sigiriya wilderness.

METHODOLOGY

Sampling was done at forest area surrounding the Sigiriya rock. Since it is important to have data on

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all stages of sporocarp development whenever possible, sporocarps exhibiting a range of development stages were collected. Some specimens were removed from the substrate while some specimens were collected together with the substratum (twigs, pieces of wood). Collected fruiting bodies were placed in paper bags, labeled and transported to the laboratory. In-situ photographs of fruiting bodies were taken.

In the laboratory the collected samples were cleaned and sorted out. Identification was carried out using macromorphological characters, microscopic characters and published keys (Coomaraswamy, 1979; Coomaraswamy and Kumarasingham, 1988; Young, 2005; Keizer, 1998; Jordan, 2004).

Since identification of macrofungi relies heavily on the attributes of the fresh specimens, general attributes were first noted with priority given to more fragile specimens.

Specimens were observed under the stereo microscope and characteristics such as colour, shape, texture, odour of fruiting bodies were noted. Furthermore characteristics of the surface of the cap, margin and spore bearing surface were also recorded. Colour change with 2% KOH was also observed for every specimen.

For microscopic character investigation thin sections were cut from each specimen and mounts were prepared. Lactophenol cotton blue or water was used as the mounting medium and prepared slides were observed under the microscope. Hyphal details, presence and nature of cystidia, characteristics of basidia and number of sterigmata were noted.

RESULTS AND DISCUSSION

A total of 49 species were identified based on macromorphological and microscopic characters (Table 1). The collection included 5 specimens (10%) belonging to Ascomycota while the rest of the collected macrofungi around 90% belonged to Basidiomycota.

Majority of the macrofungi samples were from Polyporales which accounted 39% out of the total collection. Polypores as their name refers consist of thousands of tubes which form the layer of pores on the underside of the cap. They have a tough, woody flesh and the fruit bodies last for many years (Coomaraswamy and Kumarasingham, 1988). *Microporus xanthopus*, *Hexagonia tenuis*, *Pycnoporus cinnabarinus* and *Ganoderma* sp. were some of the specimens collected (Fig. 1).

Fig. 1 : Polypores : a. *Pycnoporus cinnabarinus*, b. *Hexagonia* sp., c. *Ganoderma* sp., d. *Microporus xanthopus*

Thirty one per cent of the total collection represented Agaricales such as *Anthracophyllum* sp., *Marasmius* sp., *Mycena* sp., *Xerula* sp., *Psathyrella* sp. and *Schizophyllum commune* (Fig. 2). Usually Agaricales is the taxonomic order used for centu-

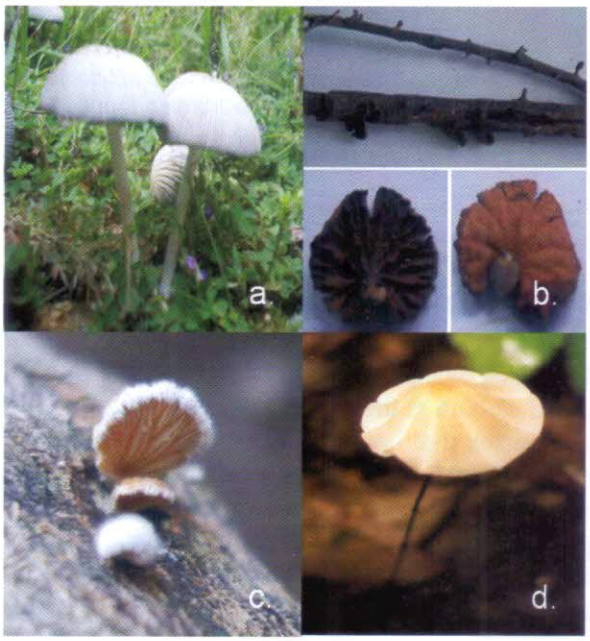

Fig. 2 : Agarics: a. *Coprinus* sp., b. *Anthracophyllum* sp., c. *Schizophyllum commune*, d. *Marasmius* sp.

Table 1 : Identified specimens collected from Sigiriya wilderness

	Name	Division	Order	Family	Substratum	Interaction
	1	2	3	4	5	6
1	*Xylaria polymorpha*	Ascomycota	Xylariales	Xylariaceae	On decaying stump	Saprobic
2	*Xylaria longipes*	Ascomycota	Xylariales	Xylariaceae	Decaying wood	Saprobic
3	*Daldinia concentrica*	Ascomycota	Xylariales	Xylariaceae	Decaying wood	Saprobic
4	*Nectria* sp.	Ascomycota	Hypocreales	Nectriaceae	Dead branches	Saprobic
5	*Peziza* sp.	Ascomycota	Pezizales	Pezizaceae	Dead branches	Saprobic
6	*Trametes* sp. 1	Basidiomycota	Polyporales	Polyporaceae	Decaying wood	Saprobic
7	*Trametes* sp. 2	Basidiomycota	Polyporales	Polyporaceae	Dead branches	Saprobic
8	*Polyporus arcularius*	Basidiomycota	Polyporales	Polyporaceae	Dead branches	Saprobic
9	*Polyporus varius*	Basidiomycota	Polyporales	Polyporaceae	Dead branches	Saprobic
10	*Polyporus* sp. 1	Basidiomycota	Polyporales	Polyporaceae	Dead branches	Saprobic
11	*Polyporus* sp. 2	Basidiomycota	Polyporales	Polyporaceae	Dead branches	Saprobic
12	*Polyporus alveolaris*	Basidiomycota	Polyporales	Polyporaceae	Dead branches	Saprobic
13	*Hexagonia tenuis*	Basidiomycota	Polyporales	Polyporaceae	Dead branches	Saprobic
14	*Hexagonia apiaria*	Basidiomycota	Polyporales	Polyporaceae	Dead branches	Saprobic
15	*Microporus xanthopus*	Basidiomycota	Polyporales	Polyporaceae	Dead branches, twigs	Saprobic
16	*Pycnoporus cinnabarinus*	Basidiomycota	Polyporales	Polyporaceae	Dead branches	Saprobic
17	*Trichaptum* sp.	Basidiomycota	Polyporales	Polyporaceae	Decaying stump	Saprobic
18	*Daedaleopsis* sp.	Basidiomycota	Polyporales	Polyporaceae	Decaying log	Parasitic/saprobic
19	*Irpex* sp. 1	Basidiomycota	Polyporales	Meruliaceae	Dead branches	Saprobic
20	*Irpex* sp. 2	Basidiomycota	Polyporales	Meruliaceae	Dead branches	Saprobic
21	*Ganoderma* sp. 1	Basidiomycota	Polyporales	Ganodermataceae	Tree trunk	Parasitic/Saprobic
22	*Ganoderma* sp. 2	Basidiomycota	Polyporales	Ganodermataceae	Tree trunk	Parasitic/Saprobic
23	*Ischnoderma resinosum*	Basidiomycota	Polyporales	Fomitopsidaceae	Dead branches	Saprobic
24	*Daedalea* sp.	Basidiomycota	Polyporales	Fomitopsidaceae	Dead branches	Parasitic/Saprobic
25	*Inonotus* sp.	Basidiomycota	Hymenochaetales	Hymenochaetaceae	Decaying wood	Saprobic

Continued....

	Name	Division	Order	Family	Substratum	Interaction
	1	2	3	4	5	6
26	*Hymenochaete* sp.	Basidiomycota	Hymenochaetales	Hymenochaetaceae	Decaying wood	Saprobic
27	*Schizophyllum commune*	Basidiomycota	Agaricales	Schizophyllaceae	Dead branches, stumps	Saprobic
28	*Anthracophyllum archeri*	Basidiomycota	Agaricales	Marasmiaceae	Dead branches, twigs	Saprobic
29	*Marasmius* sp. 1	Basidiomycota	Agaricales	Marasmiaceae	Dead twigs	Saprobic
30	*Marasmius* sp. 2	Basidiomycota	Agaricales	Marasmiaceae	Leaf litter	Saprobic
31	*Marasmius* sp. 3	Basidiomycota	Agaricales	Marasmiaceae	Dead twigs	Saprobic
32	*Marasmius* sp. 4	Basidiomycota	Agaricales	Marasmiaceae	Dead twigs	Saprobic
33	*Mycena* sp.	Basidiomycota	Agaricales	Tricholomataceae	Dead twigs	Saprobic
34	*Cyathus* sp.	Basidiomycota	Agaricales	Nidulariaceae	Dead twigs	Saprobic
35	*Inocybe* sp. 1	Basidiomycota	Agaricales	Inocybaceae	Soil	Mycorhizal
36	*Inocybe* sp. 2	Basidiomycota	Agaricales	Inocybaceae	Soil	Mycorhizal
37	*Psathyrella* sp. 1	Basidiomycota	Agaricales	Psathyrellaceae	Soil	Saprobic
38	*Psathyrella* sp. 2	Basidiomycota	Agaricales	Psathyrellaceae	Dead twigs	Saprobic
39	*Psathyrella* sp. 3	Basidiomycota	Agaricales	Psathyrellaceae	Elephant excreta	Saprobic
40	*Entoloma* sp.	Basidiomycota	Agaricales	Entolomataceae	Soil	Saprobic
41	*Xerula* sp.	Basidiomycota	Agaricales	Physalacriaceae	Soil	Saprobic, parasitic
42	*Panus* sp. 1	Basidiomycota	Poriales	Lentinaceae	Dead branches	Saprobic
43	*Panus* sp. 2	Basidiomycota	Poriales	Lentinaceae	Dead twigs	Saprobic
44	*Serpula* sp.	Basidiomycota	Boletales	Serpulaceae	Dead tree trunk	Saprobic
45	*Ramaria* sp.	Basidiomycota	Gomphales	Gomphaceae	Soil	Saprobic
46	*Tremella* sp.	Basidiomycota	Tremellales	Tremellaceae	Dead twig	Parasitic
47	*Auricularia* sp. 1	Basidiomycota	Auriculariales	Auriculariaceae	Dead branches	Saprobic
48	*Auricularia* sp. 2	Basidiomycota	Auriculariales	Auriculariaceae	Dead branches	Saprobic
49	*Calocera viscosa*	Basidiomycota	Dacrymycetales	Dacrymycetaceae	Dead branches	Saprobic

ries to hold mushrooms with gills but recent DNA research has shown that the simple fact that a mushroom has gills does not necessarily relate it to other mushrooms with gills. One such example is that *Cyathus* sp. (found during the collection) commonly known as bird nest fungi also belong to Agaricales.

Fungi belonging to Auriculariales, Dacrymycetales and Tremellales are commonly known as jelly fungi (Young, 2005). Such fungi with rubbery or gelatinous like structure were found during the collection which accounted for 8% of the total collection including species such as *Tremella, Calocera* and *Auricularia* (Fig. 3).

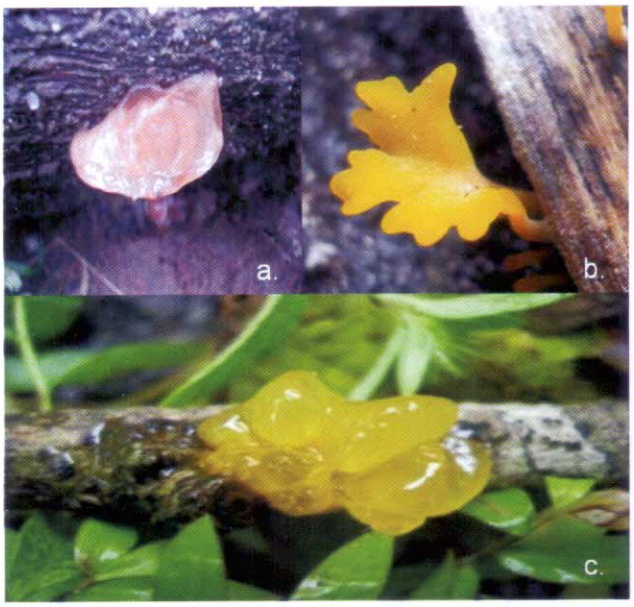

Fig. 3 : Jelly Fungi : a. *Auricularia* sp., b. *Calocera viscosa*, c. *Tremella* sp.

Other than these major groups distinct types of macrofungi *Ramaria* sp. commonly known as coral fungi was also included within the collection.

The nutritional and medicinal properties of many macrofungi are well known. Edible fungi renowned as "myco-meat" are an important contender to animal proteins. *Schizophyllum commune* (Adejoye *et al.*, 2007) and *Auricularia* sp. (Aletor, 1995) are such well known edible forms found during the collection. Medicinal value of macrofungi is also immense.

Daldinia concentrica popularly known as King Alfred cakes or cramp balls due to their supposed ability to cure cramped muscles (Coomaraswamy and Kumarasingham, 1988) were also found during the collection. Several species of *Ganoderma* genus were also included in the collection is known to produce many bioactive compounds, effects ranging from anti-cancer to anti-HIV (Russell and Patterson, 2006).

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