Occurrence of macrofungi on the Coromandel coast of Tamil Nadu, southern India

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Introduction

Fungi are key functional components of forest ecosystems (Brown et al. 2006) and they have received less attention than animals and plants, although they are omnipresent and highly diverse in nature (Piepenbring 2007). Many macrofungal species are believed to fruit sporadically, with no consistent pattern of occurrence from year to year (Watling 1995). Moreover, their sporocarps are ephemeral and even when produced, may last only a few days before decomposing or being eaten (Brown et al. 2006). Having a stable and accepted estimate of taxonomic diversity for fungi is also necessary to enable fungi to be included in considerations of biodiversity conservation, land-use planning and management (Mueller & Schmit 2007). In southern India, taxonomy of agarics has been carried out in the Western Ghats region (Natarajan et al. 2005a,b), but so far there are no reports on the study of macrofungal diversity in tropical dry evergreen forests. Thus, the aim of this study was to generate a baseline data on macrofungal diversity in the tropical dry evergreen forests on the Coromandel Coast of peninsular India.

Materials and Methods

The present study was conducted in one man-made forest and two naturally occurring forests. All the sites were within 25km and were located on the Coromandel Coast of Tamil Nadu, southern India. The man made Pitchandikulam Forest (PF) (11°59'N & 79°49'E) is a well protected in 30ha of land having restored mixed forest. Reforestation programmes began in 1973 by planting exotics, *Acacia auriculiformis* and *Eucalyptus globulus* and later there has been a significant shift in priority for restoring the indigenous tropical dry evergreen forest species (Ramanujam & Anbarasan 2007).

The other two sites Oorani (OR) (12°11'N & 79°57'E, 1.5ha) and Puthupet (PP) (12°03'N & 79°52'E, 12ha) are naturally occurring in this part and are described as tropical dry evergreen forests (Champion & Seth 1968). These sites are two to three layered forests occurring in drier areas, that experience about 3-6 dry months in a year, tree boles are mostly 8-12m in height, harbor largely evergreen species with a few deciduous and brevi-deciduous species and also a considerable number of lianas. It is mainly composed of *Pterospermum canescens*, *Diospyros ebenum*, *Drypetes sepiaria*, *Garcinia spicata*, *Lepisanthes tetraphylla*, *Memecylon umbellatum* and *Eugenia bracteata* (Venkateswaran & Parthasarathy 2003; Parthasarathy & Karthikeyan 1997). These sites occur presently in the form of 'temple forests' or 'sacred groves' and are disturbed by temple visitors. However, the Oorani site is comparatively less disturbed.

The present study was carried out during the rainy season between October 2006 - January 2007, the most favourable season for fruit body production. Macrofungal fruit bodies were collected once in a week from all the three sites. In the cases where fungi were not identified up to the species level, numbers were given to differentiate species belonging to the same genera after the study.

Results and Discussion

A total of 39 species of macrofungi, belonging to 25 genera in 17 families were recorded in the three study sites (Table 1). Twenty-eight species were enumerated in site PF, 20 species in site OR and 16 species in site PP. The species richness was high in site PF as the areal extent is more when compared to other two sites. Of the 39 species, 9 species (23%) including *Agaricus* sp.1, *Coprinus* sp.1, *Ganoderma lucidum*, *Gymnopilus* sp., *Marasmius* sp.1, *Marasmius* sp. 2, *Stereum* sp., *Termitomyces* sp.1 and *Xylaria* sp.1 were common to all the three sites (Table 2). This could be due to the fact that all the three sites have similar vegetation type influencing the macrofungal species composition; it is known that vegetation type influences the fungal species composition (Runge 1964). However, 23 species were unique to any one of the sites showing some degree of specificity for the sites (Table 2). But, a caveat needs to be added here since the sites compared are not of equal area and the number of sampling times is limited. Straatsma et al. (2001) monitored a plot area of 1500m² in western Switzerland for agarics for over a period of 21-years with sampling frequency of 7 days and recorded 408 species but concluded that the number of species would increase if the survey continued.

The species occurring on different substrates varied considerably across the sites (Table 1). Most of the macrofungal species were recorded from soil (50.8%), whereas only 9.5% of the species occurred in litter. This poor representation of litter fungi could be due to a more open canopy of the forests consequently leading to higher light levels, higher temperature and lower humidity. These environmental differences may have contributed to low sporocarp production

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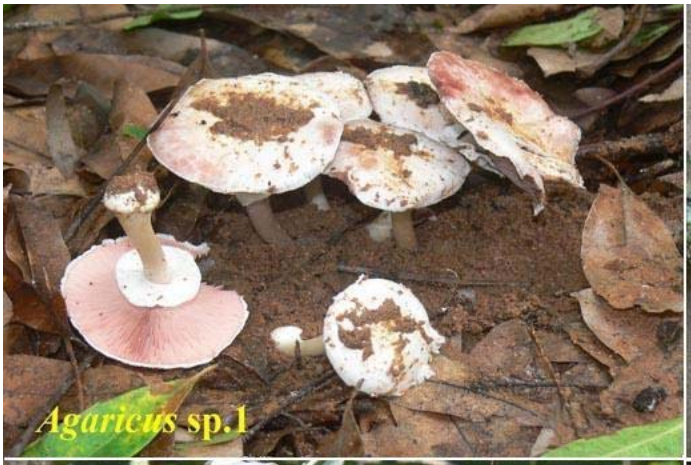
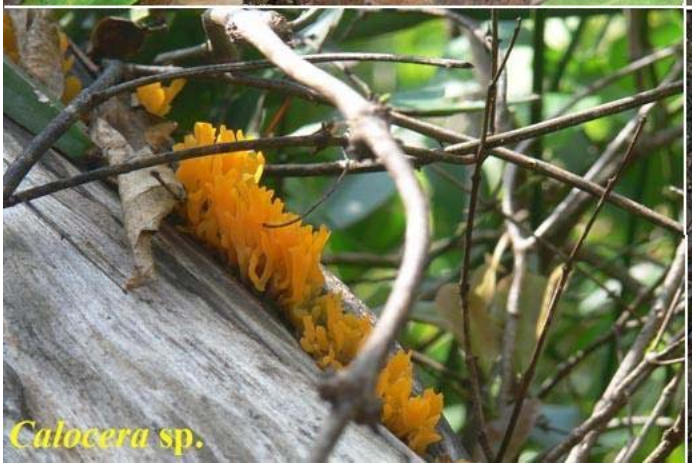

Agaricus sp.1


Auricularia sp.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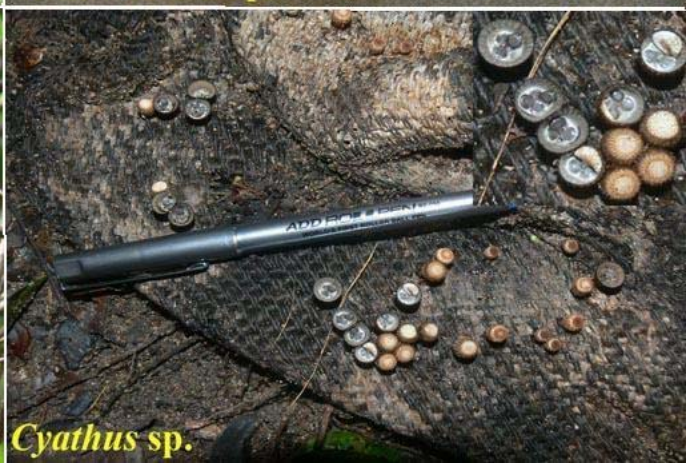
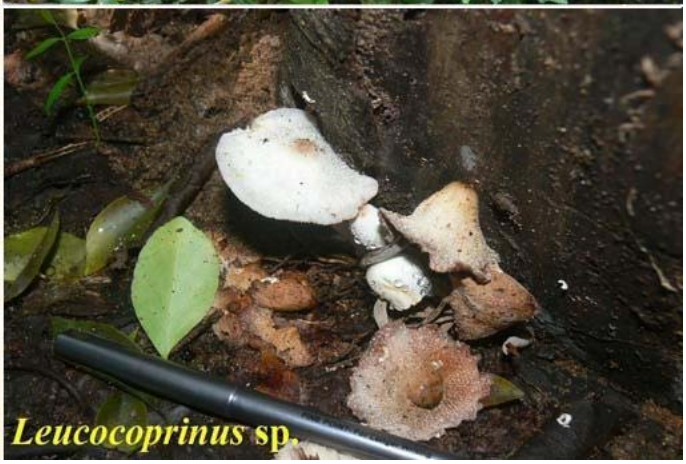

Cyathus sp.


Geastrum sp.


Gymnopilus sp.


Lepiota sp.


Leucocoprinus sp.


Macrolepiota sp.
Marasmiellus sp.
Marasmius sp.1
Marasmius sp.2
Marasmius sp.3
Pisolithus sp.
Termitomyces sp.1
Termitomyces sp.2

Table 1. Occurrence of macrofungi in the three tropical forest sites (PF - Pitchandikulam Forest, PP – Puthupet, OR – Oorani) on the Coromandel Coast of southern India

Variables	Site			Total for three sites
	PF	OR	PP	
Species richness	28	20	16	39
Genera	23	13	13	26
Family	15	10	12	17
Substratum				
Dead wood	8	3	3	14
Dead twig	5	3	3	11
Leaf litter	3	1	2	6
Soil	12	13	7	32

(Brown et al. 2006). This baseline survey provides useful information on the occurrence and distribution of macrofungal species, particularly in the tropical dry evergreen forests.

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Table 2. List of macrofungi enumerated in the three forest sites of Tamil Nadu, southern India

SNo	Species name	Substratum	PF	OR	PP
1	*Agaricus* sp.1 (Agaricaceae)	Soil	*	*	*
2	*Agaricus* sp.2 (Agaricaceae)	Soil	-	*	-
3	*Agaricus* sp.3 (Agaricaceae)	Soil	-	*	-
4	*Agaricus* sp.4 (Agaricaceae)	Soil	-	*	-
5	*Auricularia* sp. (Auriculariaceae)	Dead twig	*	-	*
6	*Calocera* sp. (Dacrymycetaceae)	Dead wood	*	*	-
7	*Camarophyllus* sp. (Hygrophoraceae)	Dead wood	*	-	*
8	*Coprinus* sp.1 (Coprinaceae)	Soil	*	*	*
9	*Coprinus* sp.2 (Coprinaceae)	Soil	-	*	-
10	*Cyathus* sp. (Nidulariaceae)	Jute sac	-	-	*
11	*Cystoagaricus trisulphuratus* (Berk.) Singer (Agaricaceae)	Soil	*	*	-
12	*Daldinia concentrica* (Bolton) Ces. & De Not. (Xylariaceae)	Dead wood	*	-	-
13	*Ganoderma lucidum* (Curtis) P. Karst. (Ganodermataceae)	Dead wood	*	*	*
14	*Geastrum* sp. (Geastraceae)	Soil	-	-	*
15	*Gerronema* sp. (Tricholomataceae)	Dead twig	*	-	-
16	*Gymnopilus* sp. (Cortinariaceae)	Dead wood	*	*	*
17	*Lepiota* sp. (Agaricaceae)	Soil	*	*	-
18	*Leucocoprinus* sp. (Agaricaceae)	Soil	-	*	-
19	*Lycoperdon* sp. (Lycoperdaceae)	Soil	*	*	-
20	*Macrolepiota* sp. (Agaricaceae)	Soil	*	-	*
21	*Marasmiellus nigripes* (Schwein.) Singer (Tricholomataceae)	Leaf litter	*	-	-
22	*Marasmiellus* sp. (Tricholomataceae)	Leaf litter	*	-	-
23	*Marasmius* sp.1 (Tricholomataceae)	Leaf litter	*	*	*
24	*Marasmius* sp.2 (Tricholomataceae)	Dead twig	*	*	*
25	*Marasmius* sp.3 (Tricholomataceae)	Dead twig	-	*	-
26	*Micropsalliota* sp. (Agaricaceae)	Soil	*	-	-
27	*Mycena* sp. (Tricholomataceae)	Dead twig	*	-	-
28	*Pisolithus* sp. (Sclerodermataceae)	Soil	*	-	-
29	*Ramaria* sp.1 (Gomphaceae)	Soil	*	-	-
30	*Ramaria* sp.2 (Gomphaceae)	Dead wood	*	-	-
31	*Schizophyllum commune* Fr. (Schizophyllaceae)	Dead wood	*	-	-
32	*Stereum* sp. (Stereaceae)	Dead twig	*	*	*
33	*Termitomyces* sp.1 (Amanitaceae)	Soil	*	*	*
34	*Termitomyces* sp.2 (Amanitaceae)	Soil	*	-	-
35	*Xylaria* sp.1 (Xylariaceae)	Soil	*	*	*
36	*Xylaria* sp.2 (Xylariaceae)	Soil	-	-	*
37	*Xylaria* sp.3 (Xylariaceae)	Soil	-	*	-
38	Unidentified 1	Leaf litter	-	-	*
39	Unidentified 2	Dead wood	*	-	-

PF - Pitchandikulam Forest; OR - Oorani; PP - Puthupet; * - present, - absent