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Documentation of the Ectomycorrhizal Fungal Floral Diversity in Forest College and Research Institute, Jackanari Reserve forest, Tamil Nadu, India

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A B S T R A C T

The Tropical Thorn Forest at foot hills of Niligris located in Forest College and Research Institute, Mettupalayam under Jackanari Reserve forest, Tamil Nadu, India was scouted and surveyed for the presence and prevalence of Ectomycorrhizal Fungal association. About Twelve different groups of fruiting bodies of ECM fungi were identified and their prevalence index ranged between 40-80% indicating wide diversity and dependency of forest trees on ECM fungi

Introduction

Ectomycorrhizae is an association of fungus and feeder roots (root hairs) in which the fungus grows intercellularly in cortical region penetrating the epidermis by secreting proteolytic enzymes and developing extensively outside the root forming a network of hyphae called as 'Fungal sheath' (Harting net) or 'Fungus Mantle' which is of variable thickness and color. Harting net is the distinguishing feature of Ectomycorrhizae and is a hyphal network that extends into the root penetrating between the epidermal and cortical cells of ectomycorrhizal plants. This network is a site of nutrient exchange between the fungus and the host plant

Ectomycorrhizae mostly belongs to Phyla Basidiomycota and Ascomycota. It differs in their ability to associate with different host species. Some fungal species are restricted to specific genera. Some fungi may be able to form ectomycorrhizae with wide range of host species which may be limited in distribution by habitat requirements.

It absorbs and stores plant nutrients like nitrogen, phosphorus, potassium and calcium etc in their mantle thereby help in better forest stand, establishment of high yielding forests, land reclamation and establishment of exotic plant species. It benefits host plants by faster growth, increased uptake of essential nutrients such as phosphorus and inorganic nitrogen.

It improves tolerance to biotic and abiotic stress, and also to toxic metals than the non-mycorrhizal plants. (Manoharachary, 2005). Ectomycorrhizal association helps plants to overcome different kinds of stress such as soil salinity, alkalinity and acidity. Ectomycorrhizal diversity with important trees of India is still in the exploratory phase. Therefore an attempt is made to study ectomycorrhizal association with forest trees of FC&RI , Mettupalayam.

Materials and Methods

Area of sample collection

Forest College and Research Institute, Mettupalayam in Tropical Thorn Forest at foot hills of Niligris, Jackanari Reserve forest, Tamilnadu, India located in the state of Coimbatore district. FC&RI is located at a latitude of 11° 20`N and at a longitude of 76° 56`E . Average rainfall is around 922 mm.

In fig-1, general characteristics was observed using Hand-Lens and other important taxonomic characteristics like colour, shape , cap and stipe were observed.

Counting the number of ECM fungal basidiomata/fruit bodies in different Blocks

Prevalence Index was calculated using the formula.

$$\text{ECM prevalence (\%)} = \frac{\text{Total no. of basidiocarps in each genus identified}}{\text{Total no. of basidiocarps identified}} \times 100$$

Results and Discussion

Twelve different groups of fruiting bodies of ECM fungi were identified and their prevalence index ranged between 40-80%

Table.1 List of ectomycorrhizal fungi found associated with trees of FCRI with an indication of the Block where the observation was made with morphological Features

Figure	Characters
	*Mycena pura* Common name : Lilac bonnet Nature : Poisonous Occurrence – July and December Stem - Pink to white , Slender , fine white woolly patches. Cap – Convex upto 3 cm in diameter.Yellow to pink , radial lines pointing towards the edge. Location : Block - A and Block – J in the Rhizosphere of *Acacia* trees

	*Amanita* Nature : Poisonous Occurrence – December Cap – Fruiting bodies with white to brown colour, stipe thick and white in colour Location - Block F in the Rhizosphere of *Simarouba* trees
	*Mycenaaurantio marginata* Common name : Golden edge bonnet Nature : Poisonous Occurrence – July and December Cap – Fruiting bodies have a bell-shaped to conical cap up to 3 cm in diameter, very slender stipe up to 5-8 cm long with hairy outgrowth Gills – Orange in colour Location - Block F in the Rhizosphere of Simarouba trees
	*Coprinus comatus* Common name : Shaggy ink cap Nature : Edible Occurrence –November Stipe - White, long very thin , presence of ring , base enlarged. Cap - Finger shaped, long cylindrical cap starting to melt from the bottom edges into a conical shape. Occurrence – Block A - , Block C in the rhizosphere of Neem & Eucalyptus
	*Ganoderma lucidum* Common name : Lingzhi mushroom – Nature :edible Occurrence – November and December Cap - soft , cork like surface , kidney-shaped, Presence of minute pores. Location – Block A - , Block C in the rhizosphere of Neem, Dalbergia &Eucalyptus

	*Scleroderma sp* Common name : Earth ball Nature : Edible Occurrence –November Stipe – Very small . Cap – Thick , Brown , covered . Occurrence – Block A - , Block C in the rhizosphere of Neem & Eucalyptus
	*Agaricus augustus* Common name : Prince mushroom Nature : Edible Occurrence – November Stipe - White , scaly and thick . Cap – Large, Circular with Brown patches Location – Block C - , Block F in the rhizosphere of Neem, Cassia & Eucalyptus
	*Macrolepiota procera* Common name : Parasol Nature :Edible Occurrence – November Stipe – White, Flat with brown colouration , 8-10 cm height Cap - Circular Opening into a large flat parasol up to 30 cm. Location : Block - A and Block – J in the Rhizosphere of Acacia & Melia trees
	*Rusulla* Common name : White Brittegill Nature : Poisonous Occurrence – November Cap : Small , Pileus 3-5 cm diameter, convex, Presence of Brown ring. Stipe : Thick , White to Brown in colour Location : Block - A and Block – J in the Rhizosphere of Accacia & Melia trees

	*Laccaria* Common name : Waxy mushroom Nature : Edibles Occurrence – November Cap : Small , Pileus 3-5 cm diameter ,convex. Stipe : Small , Thin , White in coloue Location : Block - A and Block – F in the Rhizosphere of Accacia & Hardwikia trees

Table.2 List of ectomycorrhizal fungi found associated with trees in FC&RI with an indication of the tree rhizosphere where the observation was made and the season during which the observation was made

S.No	Trees and Location	Mycorrhizal Species
1	Block - A and Block – J in the Rhizosphere of Accacia trees	*Mycena pura*
2	Block F in the Rhizosphere of Simarouba trees	*Amanita*
3	Block F in the Rhizosphere of Simarouba trees	*Mycenaaurantio marginata*
4	Block A - , Block C in the rhizosphere of Neem & Eucalyptus	*Coprinus comatus*
5	Block A - , Block C in the rhizosphere of Neem & Eucalyptus	***Scleroderma***
6	Block F in the Rhizosphere of *Simarouba* and *Cassia* trees	*Chlorophyl lummolybdites*
7	Block A - , Block C in the rhizosphere of Neem, Dalbergia & Eucalyptus	*Ganoderma lucidum*
8	Block C - , Block F in the rhizosphere of Neem, Cassia , Casuarina & Eucalyptus	*Lycoperdon marginatum*–
9	Block - A and Block – J in the Rhizosphere of *Accacia & Melia*trees	*Macrolepiota procera*
10	Block C - , Block F in the rhizosphere of Neem, Cassia & Eucalyptus	*Agaricus augustus*–
11	Block - A and Block – J in the Rhizosphere of *Accacia & Melia*trees	*Rusulla* .
12	Block - A and Block – F in the Rhizosphere of *Accacia , Casuarina & Hardwikia* trees	*Laccaria*

Table.3 Abundance of ectomycorrhiza associated with different tree species

S.No	Ectomycorrhizal species	Abundance (%)
1	*Mycena pura*	56
2	*Amanita sp*	40
3	*Mycenaaurantio marginata*	45
4	*Coprinus comatus*	52
5	*Scleroderma sp*	70
6	*Chlorophyl lummolybdites*	35
7	*Ganoderma lucidum*	75
8	*Lycoperdon marginatum*	80
9	*Macrolepiota procera*	40
10	*Agaricus augustus*	80
11	*Rusulla sp*	75
12	*Laccaria sp*	75

Fig.1 Collection & preservation of fruiting bodies
The fruiting bodies were collected from Blocks A,F,C and J

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