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MACROFUNGAL FLORA OF PEECHI-VAZHANI WILDLIFE SANCTUARY

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ABSTRACT

A survey of macrofungi occurring in the Peechi-Vazhani Wildlife Sanctuary, situated in Trichur District was conducted for a period of three years (1995-1997) and six hundred macrofungal specimens were collected. Macrofungi are represented by 57 species belonging to 37 genera. Most of the species (61%) belonged to Aphyllophorales; 11 species from Agaricales were also collected. Among the Agaric macrofungi, *Termitomyces microcarpus* and *T. eurrhizus* are known to be edible. Ascomycotina (Pezizales and Sphaeriales) was represented by only four species.

Although, most of the macrofungi recorded from the Sanctuary are widely distributed throughout Kerala, species such as *Amauroderma rugosum, Clarkeinda trachodes, Coriolopsis caperata, C. telfari, Cyathus striatus, Ganoderma australe, Hydnum subvinosum, Lenzites torulosus, Loweporus jusco-purpureus, Nigroporus niger, Peziza* sp.. *Phellinus curyophyllaceus, P. dependens, P. nilgheriensis, P. setulosiis* and *P. ostreiformis* are of rare occurrence in India. *Collibia leucophaea, Lenzites acuta, Marusmieus androsaceus. Microporus xanthopus, Phellinus fastuosus, Polyporus gilvus, P. arcularis, Pycnoporus sanguineus, Termitomyces microcarpus* and *Xylaria hypoxylon* are very common in Kerala forests.

Most of the macrofungi collected are white rot fungi while *Fomitopsis rhodophaeus* and *Nigroporus niger* are brown rot fungi. *Collibia leucophaea, Mycena alphitophora* and *Marasmius androsaceus* were found abundantly on decomposing leaf litter. *Ganoderma lucidum* and *Hydnum subvinosum* were saprophytic as well as pathogenic.

1. INTRODUCTION

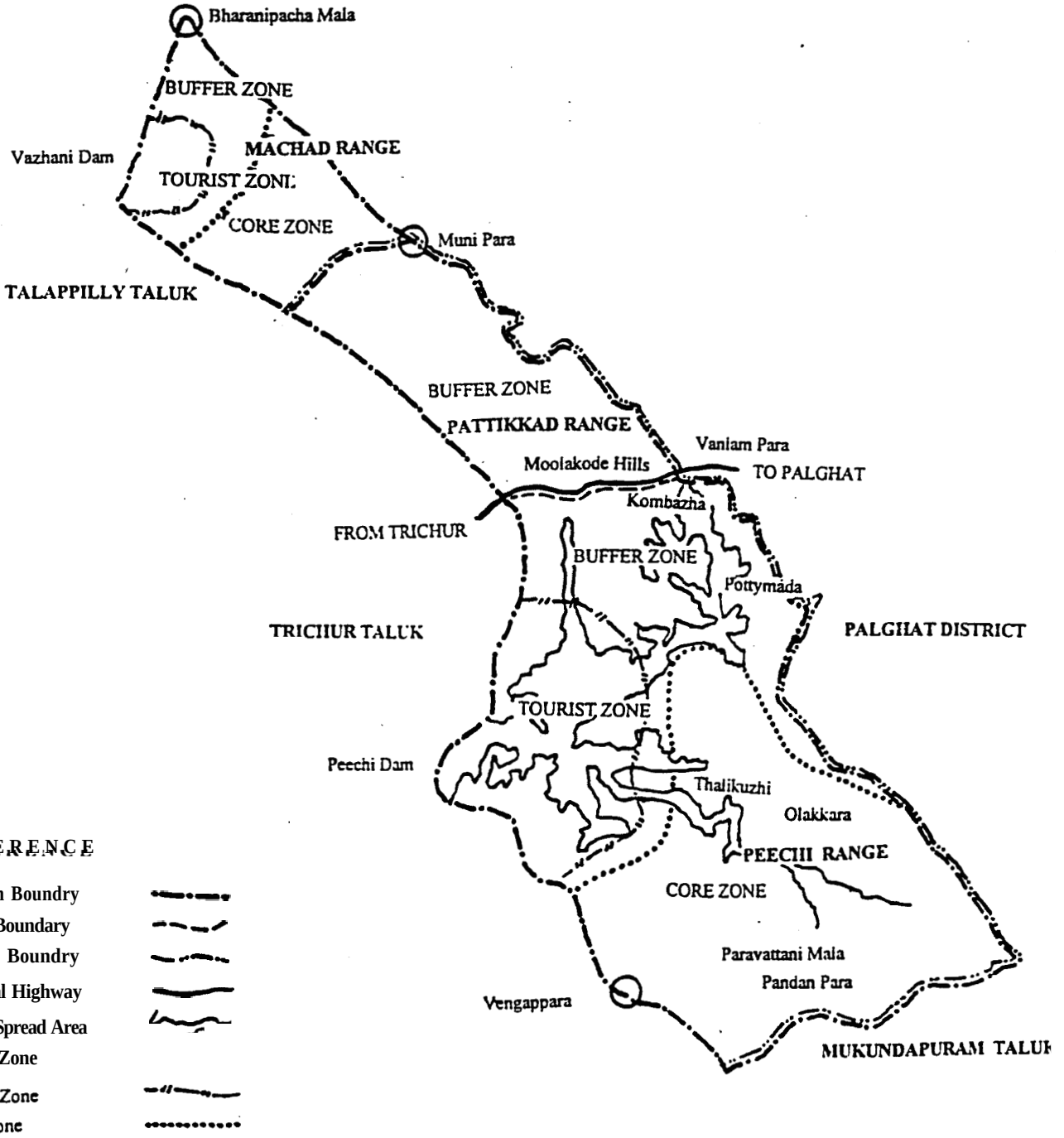
The Peechi-Vazhani Wildlife Sanctuary situated in Trichur District, Kerala was formed by combining some portions of Peechi, Pattikkad and Machad ranges of Trichur Forest Division. The sanctuary was established in 1958. The total area of the sanctuary is 125 sq. km (Fig.1). Peechi and Vazhani dams are situated within the sanctuary with water spread area of 12.95 sq. km and 1.843 sq. km respectively (Narayanankutty and Nair, 1990). The sanctuary is contiguous with the forest areas of Nelliampathy and Palappilly Reserves, and has a common boundary with the Chimmony wildlife sanctuary on the south. It is situated between 10° 28' and 10° 38' north and between 76° 18' and 76° 28' east longitude. The continuity of the Peechi Forest Range with the Vazhani side is lost due to the Trichur Palakkad National Highway.

The terrain is undulating and the elevation varies from 45 to 900 m. The sanctuary receives an annual rainfall of about 3000 mm. The months of March and April are rather warm. The catchment area of Peechi and Vazhani reservoirs forms the habitat of varying types of flora and fauna.

The habitat in the Peechi-Vazhani sanctuary is dominated by the moist deciduous forests and semi evergreen forests, which are confined to the upper regions. In the moist deciduous forests grow teak, rosewood, irul, thembavu, venteak, terminalias etc. while kalpine, kambakam, white cedar, mesua, karakil, toona etc. grow in the semi evergreen forests. There are about 500 ha of teak and teak-soft wood plantations (i.e. teak mixed with *Bombax)* in the sanctuary adjacent to Peechi reservoir and Kuthiran areas. The sanctuary area harbours a good variety of mammals including tiger, elephant, gaur, sambar deer and bear.

The fungi are a major component of tropical ecosystems. They are involved in innumerable interactions with plants, animals and man ranging from saprophytes, parasites and symbionts (Subramanian, 1982). Fungi are

PEECHI VAZHANI WILD LIFE SANCTUARY
TRICHUR FOREST DIVISION



considered to be the second largest group of organisms in the world after insects. A total of 69,000 species are currently known to occur in the world (Hawksworth, 1991). It is well known that microorganisms particularly fungi are largely responsible for decomposition. They are the major agents of decomposition of leaf litter. Very little is known on the quantitative ecology of these organisms in tropical forests.

Macrofungi (Basidiomycetes and Ascomycetes) play an important role in decaying wood, a natural resource of great value to man. Their primary importance, however, is in the continuous functioning of the carbon cycle. The amount of carbon returned to the atmosphere each year as a result of the microbial degradation of cellulose has been estimated in the magnitude of 85 billion tonnes per year (Cowling, 1963). Fungi play an essential role in maintaining tropical forest ecosystem. However, the existing role of the decomposition and parasitic fungi present in tropical forest, especially moist deciduous and semi- evergreen, is deficient in all aspects.

The tropics are very rich source of potentially useful fungi, many of which probably have not even been recognized, described or named (Subramanian, 1982). A perusal of literature reveals that the macrofungi of tropical forests have been comparatively less studied. 'Only very few attempts have been made to study the tropical fungal flora systematically. Vast tracts in tropical regions are still unexplored for fungal diversity. To begin with, the proposed study was envisaged to identify the macrofungi occurring in the Peechi-Vazhani Wildlife Sanctuary. The present study was undertaken with the following objectives.

1. To prepare a substratum wise checklist of macrofungi occurring in the sanctuary,
2. To identify edible fungi,
3. To prepare herbarium/museum specimens for display in Peechi-Vazhani Wildlife Information centre and
4. To isolate wood decay fungi in pure culture to differentiate them into white and brown rot fungi.

2. MATERIALS AND METHODS

Collections of the macrofungi were made during the period 1994-1997. The various localities visited under Peechi-Vazhani wildlife sanctuary for the collection of macrofungi were Vallikkayam, Kallidukku, Nelliyampadam, Elnad, Choolippadam, Neelipparutha, Thirumani, Kuthiran, Vazhani, Machad, Vadakkanchery, Peechi, Pattikkad, Palakkunnu, Vellakkarithadam, Moodal, Vaniyampara, Munipara, etc. The above areas were visited during dry as well as rainy seasons. The specimens were collected from the forests as well as the disturbed areas by human inhabitation.

As far as possible the fructifications were collected along with the attached host/wood. General macrocharacters of the fruitbody including colour of the different tissues and the type of rot were noted in the field and when possible the host trees were also identified in the field. Fruit bodies were wrapped in paper bags and brought to the laboratory. Spore prints were taken on microslides by keeping the fresh fruitbody in humid condition. Measurements and detailed observation of the fruit bodies were made in the laboratory and the materials were dried in hot air oven maintained at 65-70^{o}C. A small portion of the fructification was preserved for studying the microscopic characters. The rest of the fruitbody along with a portion of the host wood was treated with saturated solution of mercuric chloride in ethyl alcohol against attack of mites and moulds and preserved using mothballs in wooden boxes as museum specimens and maintained periodically. The collection numbers, location of collection, and the identified host wood species were displayed along with each specimen.

The fleshy fructifications (mostly Agaricales and Ascomycetes) were collected during the monsoon months. Macroscopic characters such as colour, size and shape of the pileus, stipe and lamellae and odour of the basidium, etc. were noted from the fresh specimens and habit sketches drawn. Spore prints were

also taken. The dried specimens were preserved in paper bags. Specimens were also preserved in FAA (Formalin Acetic Alcohol) for keeping them as museum mounts. Microscopic examinations were made in laboratory. Microscopic details of various parts of fruitbody, hyphal system and spores were studied as suggested by Teixeira (1962). Thin sections of lamella and cuticle were made directly from the dried material and revived in 5% KOH. Congo red and cotton blue stains were routinely used. Amyloid reaction of the spores was studied using Melzer's reagent. Measurements of all microscopic structures were taken using Leitz Dialux compound microscope. Among the collected mushrooms the edible fungi were also identified and compared with the species described in Manual of Indian Edible Mushrooms by Purkayastha and Chardra (1985).

Identification of the fungi was based on the micro and macrocharacters of the fruitbody. Type of rot produced by the fungus on wood was also considered for identifying members of Aphyllophorales. Comparison with authentic materials collected by Dr. P.N. Ganesh available in the Mycology Laboratory, Dept. of Botany, Calicut University was also helpful in identifying the specimens. Books and monographs used for identifying the macrofungi included 1. Indian Polyporaceae by Bakshi (1971), 2. A Preliminary Polypore Flora of East Africa by Ryvarden and Johansen (1980), 3. Studies on Wood Inhabiting Macrofungi of Kerala by Ganesh (1988), 4. A preliminary Agaric Flora of East Africa by Pegler (1977), 5. Agaric Flora of Sri Lanka (Pegler, 1986) and 6. Taxonomic Studies on Agaricales of Kerala (Manimohan, 1987).

2.1. Culturing of wood decay fungi

Cultures were made from decaying wood specimens for the identification of the decay fungus. Malt extract agar medium was used for isolating the wood decay fungi. The rot isolates were made by keeping a small portion of the wood in early or intermediate stage of decay aseptically in Petri dishes containing sterile

malt extract agar medium. The cultures were maintained in test tube slants containing malt extract agar for further study. Cultures were also obtained by keeping a small portion of the fruitbody aseptically in malt extract agar medium in Petri dishes.

2.2. Identification of white and brown rot fungi in agar medium

Oxidase reactions were determined by growing wood rotting fungi on malt extract agar medium containing gallic or tannic acid. In the presence of polyphenol oxidases, these compounds will give a dark brown reaction zone (Gilbertson and Ryvarden, 1986). Both gallic and tannic acid agar media were made by dissolving 5 g of the powdered acid in 180 ml of water. The acid solution and 820 ml of malt extract medium (15 g agar, 20 g malt extract and 820 ml water) were sterilized separately in an autoclave at 100 kPa for 15 minutes. After cooling (50^{o}C), the acid solution was added aseptically to the agar medium and the mixture was poured in Petri dishes. Rot isolations were made by transferring aseptically small pieces of wood in early or intermediate stage of decay into the Petri dish. Isolations were also made by removing small pieces of tissues from the context with a sterile scalpel. It took about 3-4 days to develop the oxidase reaction. Species that cause white rot gave positive oxidase reaction and that those cause brown rot gave negative reaction.

3. RESULTS AND DISCUSSION

A total of 600 macrofungal specimens were collected during the course of study. A checklist of all the species collected during the survey is given in Table 1. Brief descriptions of the micro and macro characters of the fungi collected from various localities in the wildlife sanctuary is given is provided below.

Among the collections, 57 species belonging to 37 genera were recorded. Of these, 61% of the collections belonged to Aphyllophorales and most of the species were Polypores. Eleven species from Agaricales were also collected. Ascomycotina (Pezizales and sphaeriales) was represented by only four species. *Calocera cornea* was the only species belonging to Dacrymycetales. The results of the survey of macrofungi are summarised in Table 1.

Description of species

Amauroderma rugosum (Nees) Bose
(Basidiomycotina, Aphyllophorales)

Occurrence: On ground near bamboo stands

Locality: Peechi, Vallikkayam and Munipara

Description: Fruitbody pileate, stipitate; pileus surface dark brown to black, concentrically and closely zonate; pore surface golden grey; pores small and not visible to naked eye; context yellow when young, brown when matured; hyphal system di- to trimitic.

Distribution: Rare. Reported earlier from India by Banerjee (1947), Bose (1937a), Bakshi (1971) and Ganesh (1988).

Calocera cornea (Fr.) Fr. (Basidiomycotina, Dacrymycetales)

Occurrence: On dead wood and fallen branches of unknown species.

Locality: Vazhani, Peechi and Machad

Description: Fruitbody gregarious or in small tufts, erect, club shaped or awl shaped, occasionally forked near top, yellow to orange- yellow, firm, gelatinous, sometimes longitudinally wrinkled, simple, on drying, it becomes hard; spores not observed.

Distribution: Common

Chlorophyllum molybdites (Meyer ex Fr.) Massee

(Basidiomycotina, Agaricales)

Occurrence: On ground among grasses

Locality: Kallidikku and Palakunnu

Description: Fruitbody large; pileus fleshy, convex, surface entire; lamella free, white, broad, lamella edge sterile; stipe central, elongate with a bulbous base; context whitish reddening on bruising; spores green or brownish, ovoid, smooth and thick walled.

Distribution: C. *molybdites* is one of the most common fleshy agaric associated with grasses is known from tropical and subtropical localities. It is reported from Tamil Nadu (Natarajan and Manjula, 1981) and common in Kerala (Little flower, 1983; Sankaran and Florence, 1993).

Clarkeinda trachodes (Berk.) Singer

(Basidiomycotina, Agaricales)

Occurrence: On ground among leaf litter

Locality: Kuthiran

Description: Pileus 8-15 cm diam, bulb globose when young, becoming broadly converse to plane at maturity, margin entire, white when young, dirty white to yellowish when old; context up to 8 mm thick, spongy to touch, lamella white changing to dirty white and finally becoming brown; stipe long (90-120 mm), cylindrical, surface smooth, annulus present; spores dark olive brown, ovate to broadly ellipsoid, smooth and thick walled; spore print olive brown in colour.

Distribution: Leelavathy *et al.* (1981) first reported the agaric from India. Later it was recorded by Little Flower (1983) and from Malayattoor forests (Sankaran and Florence, 1993). Pegler (1986) also reported the species from Sri Lanka.

***Clavaria* sp.**

(Basidiomycotina, Aphyllophorales)

Occurrence: On ground in clusters and on wood.

Locality: Peechi and Kuthiran

Description: Basidiocarp spindle shaped, white to grey, 3-7 cm high which are often wavy or irregular and somewhat flattened or grooved adhering closely at the base; tips of the branches blunt, sometimes flattened and toothed; spores white.

Distribution: Common. *Clavaria cineria* is the most common species reported from India (Dubey, 1990).

Collybia leucophaea (Berk. and Br.) Sacc.

(Basidiomycotina, Agaricales)

Occurrence: On ground among the fallen leaves under teak tree in-groups or scattered.

Locality: Vallikkayam, Peechi, Machad and Vazhani

Description: Pileus 3-4 cm diam, broadly convex to applanate with recurved margin, surface dark brown, radially striate; lamella adnexed, white to cream colour with lamellulae of two lengths; stipe slender, 2.5 cm, cylindrical, glabrescent, basal part slightly broad, hollow; context very thin, purplish brown; spore print white; spores hyaline, ellipsoid to ovoid hyaline and thin-walled.

Distribution: This is the most common species of *Collibia.* (Manimohan, 1987). *Collybia leucophaea* was also reported from Malayattoor forests (Sankaran and Florence, 1993).

Coriolopsis caperata (Berk.) Murr.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead log of *Xylia xylocarpa* and unidentified stump

Locality: Kuthiran, Vaniyampara and Peechi

Description: Fruitbody effused-reflexed; pileus surface mustard brown to tobacco brown, concehtrically zonate and striate; pore surface wax white to silver white or yellowish white; pores small but visible to naked eye, round to oval or rarely elongated; context concolourous with the pileus surface; hyphal system trimitic; basidiospores not observed.

Distribution: From Kerala it was earlier reported by Ganesh (1988) and Sankaran and Florence (1993). The species was also found associated with decay of trees in natural forests (Mohanan, 1994).

Decay: White fibrous rot

Coriolopsis telfarii (Kl.) Ryv.

(Basidiomycotina, Aphyllophorales)

Occurrence: On decaying logs of *Tectona grandis* and *Xylia xylocarpa*

Locality: Kuthiran, Vazhani and Vallikkayam

Description: Fruitbody pileate and attached with a narrow lateral base; pileus surface covered with hairs; pore surface ochraceous; pores large, arranged in somewhat radial rows; context fibrous; hyphal system trimitic; basidia and basidiospores not observed.

Distribution: Rare. Reported earlier by Bakshi (1971) as *Polyporus zeylanicus.* Ganesh (1988) had reported from various places in Kerala. The fungus was also reported from Malayattoor forests (Sankaran and Florence, 1993).

Decay: White rot

Cyathus striatus (Willd.) Pers.

(Basidiomycotina, Nidulariales)

Occurrence: On unidentified rotten wood

Locality: Peechi

Description: Fructifications appear in large numbers, fruitbody small or cup-shaped or globose, reddish brown externally, inner surface greyish with longitudinal striations, fluted and composed of three layers on which contain 10 or more small egg like bodies (peridioles) inside the fruitbody which carry the spores; dissemination of the peridiole by rain drops (Fig. 2)

Distribution: Rare

Dictyophora sp.

(Basidiomycotina, Phallales)

Occurrence: On soil

Locality: Peechi and Vallikkayam

Description: Fruitbody whitish, stalk spongy which supports a ridged receptacle; stem cylindrical, hollow with spongy walls, white; volva covers the entire unripe mushroom giving it an egg like appearance; spores greenish yellow.

Distribution: common during rainy seasons

Favolus brasiliensis (Fr.) Fr.

(Basidiomycotina, Aphyllophorales)

Occurrence: On decaying branches of *Macaranga peltata* and *Xylia xylocarpa*.

Locality: Kuthiran, Vallikkayam, Machad, Vazhani dam, Palakkunnu, and Peechi.

Description: Fruitbody annual, solitary or sometimes a group of fruit bodies arise from a single stock, flabelliform to reniform; pileus surface light yellow, cream or yellowish brown towards margin; pore surface pale to pale yellow; pores large and visible to naked eye, pentagonal to hexagonal; context white to cream coloured; hyphal system dimitic; basidiospores hyaline, cylindrical to ellipsoid.

Distribution: Rare. Known to occur in northern part of India (Bakshi, 1971; Bose, 1937a). From Kerala, it was reported by Ganesh (1988) and Sankaran and Florence (1993).

Decay: White fibrous rot

Flavodon flavus (Kl.) Ryv.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead stumps of *Cassia fistula, Strychnos nux-vomica, Tectona grandis, Terminalia paniculata* and *Terminalia* sp.

Locality: Peechi, Machad, Vazhani, Palakkunnu, Vallikkayam and Kuthiran.

Description: Fruitbody annual; pileus surface yellowish, reddish to brown with KOH, pileus margin tomentose first but later glabrous, pore surface lemon yellow when young and slightly darker when mature but soon becoming hydnoid; context lemon yellow, fibrous; hyphal system dimitic; basidiospores hyaline, smooth, ovoid to broadly ellipsoid (Fig. 3).

Distribution: Common throughout Kerala (Ganesh, 1988; Mohanan, 1994).

Decay: White fibrous rot

Fomitopsis dochmius (Berk. & Br.) Ryv.

(Basidiomycotina, Aphyllophorales)

Occurrence: On decaying trunk of *Terminalia paniculata, Xylia xylocarpa,* and *Tectona grandis,*

Locality: Kuthiran

Description: Fruitbody perennial, solitary; pileus surface dark, uneven and rough, pore surface dirty white to light yellow, even and smooth; pores minute and not visible to naked eye; context light orange to light brown, dark brown in KOH, hyphal system trimitic; basidiospores not observed.

Distribution: It is one of the most common perennial polypore of the evergreen, semi evergreen and deciduous forests of Kerala (Mohanan, 1994)

and causes severe brown cuboid rot in commercially valuable timber (Ganesh, 1988).

Decay: white cuboid rot

Fomitopsis rhodophaeus (Lev.) Imaz.

(Basidiomycotina, Aphyllophorales)

Occurrence: On decaying logs of *Cassiafistula* and *Xylia xylocarpa.*

Locality: Peechi, Vazhani dam and Kuthiran

Description: Fruitbody pileate, mostly imbricate, dimidiate to conchate, rigid when dry with concentric butter yellow zonations; pileus brown; pore surface dull white, smooth; pores minute, not visible to naked eye, oval to round; context yellowish - white, fibrous; hyphal system trimitic; basidiospores not observed.

Distribution: Common in Kerala Forests (Ganesh, 1988). It is known to occur in other states of India also (Bakshi, 1971).

Decay: Brown cuboid rot

Ganoderma applanatum (Pers. ex. Wallr.) Pat.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead logs of *Tectona grandis, Xylia xylocarpa, Bombax ceiba, Terminalia* sp.

Locality: Machad, Kuthiran, Vaniyampara, Elnad and Vazhani

Description: Fruitbody perennial, sessile or roughly substipitate, applanate, single, corky soon becoming hard and woody, sometime very large, upper surface dull brown to blackish, uneven, crusty, context deep brown, corky fibrous, transversely zoned, 2-3 cm thick; basidiospores brown, broadly ellipsoid, thick walled with outer smooth and inner echinulate wall.

Distribution: The polypore is worldwide in distribution. Bakshi (1971) reported its occurrence on dead trees, logs and stumps. It is a wound parasite on a variety of hardwood species and attacks both heart and sap wood. The species is distributed throughout India in plains as well as in

temperate regions of Himalayas. The species is reported to be wide spread in Kerala forests (Ganesh, 1988; Mohanan, 1994).

Decay: white rot

Ganoderma australe (Fr.) Pat.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead logs of *Xylia xylocarpa*, *Cassia* sp. and *Mesua ferrea*.

Locality: Peechi, Kuthiran and Vaniyampara

Description: Fruitbody annual, pileate, variable in size; pileus brownish orange or brownish grey, smooth or rough; pore surface cream; context dark brown; hyphal system trimitic; basidiospores golden brown and truncate.

Distribution: Tropical and subtropical occurrence. The species was first reported in India by Butler and Bisby (1931) and Bakshi (1971). Ganesh (1988) had reported from various cultivated as well as forest trees of Kerala.

Decay: White rot

Ganoderma lucidum (Leyss.) Karst.

(Basidiomycotina, Aphyllophorales)

Occurrence: On root of living tree of *Grewia tiliifolia*, and dead stumps of *Tectona grandis* and *Terminalia* sp.

Locality: Peechi, Kuthiran, Vazhani and Vadakkancherry

Description: Fruitbody attached to underground roots, annual, centrally or laterally stipitate, solitary or imbricate; pileus surface reddish brown, shiny, smooth, margin thick, smooth, rounded; pore surface pale grey or cream; pores circular and visible to naked eye; hyphal system trimitic; spores truncate with an outer hyaline exosporium supported by a thick walled inner episporium.

Distribution: Common root parasite. This has been frequently collected from many parts of India on various hosts (Bakshi, 1971).

Decay: White spongy rot

Geastrum sp.

(Basidiomycotina, Lycoperdales)

Occurrence: On leaf litter

Locality: Peechi

Description: Fruitbody at first globular, sharply pointed at the top and end projecting above the surface; peridium is 3-layered and the exoperidium at maturity splits from top downwards into 5-7 pointed rays, inner fruiting body almost spherical, sessile, pale brown, surrounded by a basal cup; spores brown in mass, globose and spiny.

Distribution: Common. Seen on rich soil and rotten wood

Hexagonia apiaria (Pers.) Fr.

(Basidiomycotina, Aphyllophorales)

Occurrence: On branches of *Terminalia paniculata, Tectona grandis* and *Xylia xylocarpa*

Locality: Vellakkarithadam and Vallikkayam

Description: Fruitbody sessile or substipitate, dimidiate, pileus surface light brown to reddish brown; pore surface greyish brown; pores large, hexagonal; context reddish brown; hyphal system trimitic; basidiospores hyaline, and cylindrical.

Distribution: Common saprophyte on branches and twigs. Mohanan (1994) had reported this species associated with decay in several tree species grown in natural forests.

Decay: White rot

Hexagonia tenuis (Hook.) Fr.

(Basidiomycotina, Aphyllophorales)

Occurrence: On stem of *Tectona grandis, Xylia xylocarpa* and *Terminalia* SP-

Locality: Vazhani, Peechi, Kuthiran, Vellakkarithadam and Palakkunnu

Description: Fruitbody annual, sessile, pileate; pileus surface brown, dimidiate, upper surface glabrous, concentrically zonate; pore surface pale brown (Fig. 4a); pores large, hexagonal and regular; context dark brown; hyphal system trimitic; spores hyaline, thin walled and cylindrical; spore print white (Fig. 4b).

Distribution: The polypore is common in inhabited areas, mostly seen on dead branches (Ganesh, 1988; Sankaran and Florence, 1993). *H. tenuis* is distributed worldwide in warm localities (Bakshi, 1971).

Decay: White fibrous rot

Hydnum subvinosum Berk. & Br.

(Basidiomycotina, Aphyllophorales)

Occurrence: On living tree of *Xylia xylocarpa*

Locality: Peechi

Description: Fruitbody first appears as isolated patches which later enlarge and fuse together covering a large area of the affected bark (Fig. 5), effused, margin broad, sterile, fimbriate to fibrillose, whitish; context very thin, soft orange white monomitic, basidia clavate, thin walled, hyaline, 4-spored; basidiospores broadly ellipsoidal, smooth hyaline with a prominent hilar appendage inamyloid; hyphal system monomitic, consisting of generative hyphae; spore print white.

Distribution: Rare. *H. subvinosum* is a pathogen causing stem canker disease of *Leucaena leucocephala* (Sankaran and Sharma, 1986).

Decay: white rot

Hypoxylon rubiginosum (Persoon ex Fries) Fries.

(Ascomycotina, Sphaeriales)

Occurrence: on dead stem of *Albizia odoratissima*

Locality: Vazhani and Peechi

Description: Fruitbody immersed in a stroma; stroma flattened forming a thin crust on wood surface, convex, applanate, erumpent from substrate,

brick red to reddish brown and blackening with age, woody; perithecia forming in a single layer in periphery of stroma; asci unitunicate, cylindrical, 8 spored; ascospores uniseriate, one celled, light to dark brown, elliptical and smooth.

Distribution: Common

Lenzites acuta Berk.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead branches and stumps of *Tectona grandis, Dillenia pentagyna, Xylia xylocarpa, Terminalia paniculata* and *Bombax ceiba.*

Locality: Peechi, Vallikkayam, Kuthiran and Machad

Description: Fruitbody annual, pileate and sessile, broadly attached with a lateral base; pileus surface pale yellow, concentrically striate, velutinate at first later becoming glabrescent with age (Fig. 6); pore surface yellowish, extremely variable; context cream coloured to yellowish; hyphal system trimitic; spores hyaline, smooth and cylindrical; spore print white.

Distribution: One of the commonest species found in Kerala, which shows a lot of morphological variations. The polymorphic fruit bodies of *L. acuta* are common in Kerala in all types of habitats including forests (Mohanan, 1994), garden, timber depots, exposed wooden structures of buildings and on dead branches of living trees.

Decay: White spongy rot

Lentinus squarrosulus Mont.

(Basidiomycotina, Aphyllophorales)

Occurrence: On unidentified wood and *Bombax ceiba*

Locality: Machad

Description: Sporophore 12-16 cm. diam., thin, convex, soon depressed, surface white or cream coloured, margin down curved, initially involute, thin eventually lobed; lamella deeply decurrent, white; stipe central or eccentric or lateral, tapering below and sometimes with a subglobose base,

cylindric, solid; context up to 2mm thick, fleshy, coriaceous; hyphal system dimitic; spores straight, cylindric, hyaline and thin-walled; spore print cream coloured.

Distribution: Common. This is wide spread and extremely common paleotropical species, growing in caespitose clusters. It is common on logs and stumps. Natarajan and Manjula (1976) have reported it from Tamil Nadu on unidentified dead trunks. Sharma *et al.* (1985) and Ganesh (1988) also reported it from Kerala.

Decay: White rot

Lentinus torulosus (Pers. Fr.) Lloyd.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead branches of unidentified species

Locality: Peechi and Machad

Description: Fruitbody tough, coriaeous, applanate to depressed; surface pinkish when young to reddish purple when old, glabrescent margin thin; lamellae deeply decurrent with a ridge extending down the stipe; stipe eccentric to lateral, sometimes central, cylindrical, solid; context 1-3 mm thick, white, dimitic; spores ellipsoid to short cylindric, hyaline, thin - walled.

Distribution: rare

Decay: white rot

Loweporus fusco-purpureus (Pers.) Ryv.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead branches of *Haldina cordifolia, Cassia* sp. and *Terminalia paniculata*

Locality: Vazhani

Description: Fruitbody pileate, sessile and broadly attached; pileus first tomentose and then glabrous, concentrically striate and zonate; pore surface

pale pinkish; context deep vinaceous brown; hyphal system dimitic; basidiospores yellowish and ellipsoid.

Distribution: Rare. From Kerala, it was first reported by Ganesh (1988) and later by Sankaran and Florence (1993).

Decay: White fibrous rot

***Lycoperdon* sp.**

(Basidiomycotina, Lycoperdales)

Occurrence: On soil

Locality: Peechi, Pattikkad, Vallikkayam and Kuthiran

Description: The fruitbody globose and developed from the ground, wrapped by a double involucre, the outer one very thick and first white and velvety; later becomes rather smooth with yellowish or brownish colour, finally breaks dividing into many tile like pieces, the inner involucre thin and white then becomes greyish, fuliginous and more and more fragile; spores pale yellow.

Distribution: Commonly found in soils

Marasmius androsaceus (Jacq. Fr.) Fr.

(Basidiomycotina, Agaricales)

Occurrence: On leaf littler

Locality: Peechi

Description: Fruitbody pale reddish brown, darker in the centre, finally black, 0.75-1cm diam., first hemispherical, later becoming flattened, finally emblicate; cuticle radially wrinkled; gills white to dirty white, adnate, narrow, rather distant, stipe very slender, rigid, often bent and twisted, 3.6 cm long, black and tough; spores white, pip- shaped and smooth.

Distribution: Commonly found in decaying leaf litter

Marasmius haematocephalus (Mont.) Fr.

(Basidiomycotina, Agaricales)

Occurrence: On soil

Locality: Peechi and Vazhani

Description: Fruitbody small; pileus 5-20 mm diam., convex to companulate or expanding, umbilicate, reddish brown or pinkish brown; stipe central, filiform, smooth, glabrous; lamella free to adnexed, white to pale purplish pink; context thin, white dextrinoid; spores cylindrical, hyaline and thin walled.

Distribution: *M. haematocephalus* is a tropical agaric commonly found on dead twigs and forest litter.

Marasmius ignobilis (Berk. & Br.) Singer

(Basidiomycotina, Agaricales)

Occurrence: On the bark of living *Xylia xylocarpa*

Locality: Peechi, Machad and Kuthiran

Description: Fruitbody in groups; pileus 0.6-2 cm diam., slightly reniform, surface dull white, tomentose at the centre, margin slightly incurved; stipe eccentric to lateral, tapering towards base, cylindrical or slightly depressed, solid, surface dull white; spore print white; context not gelatinised, inamyloid; spores ellipsoid, hyaline, thin- walled and smooth.

Distribution: common

Marasmiellus purpureoalbus (Petch.) Singer

(Basidiomycotina, Agaricales)

Occurrence: On decaying leaf litter

Locality: Vallikkayam and Palakunnu

Description: Fruitbody in groups; pileus 2 - 6 diam, orbicular to reniform or convex with slightly depressed centre, yellowish white surface; stipe broad at the apex, tapering towards base, cylindrical to slightly compressed, solid, surface white, glabrous; context inamyloid, not gelatinised; hyphae

hyaline and thin walled; spores ellipsoid, hyaline, thin walled and smooth; spore print white.

Distribution: common

Microporus affinis (Blume & Nees ex. Fr.) Kuntze.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead branches of *Xylia xylocarpa*

Locality: Vazhani and Kuthiran

Description: Fruitbody annual, laterally pileate, solitary or in gregarious groups, laterally stipitate; pileus tomentose or glabrous, colour almost black (Fig. 7); pore surface white to cream while fresh and with brownish tinge when old; context white while fresh, yellowish white when dry; hyphal system trimitic; spores hyaline, cylindrical to ellipsoid, 1-2 guttulate; spore print grey.

Distribution: Widely distributed in forests of Kerala (Ganesh, 1988; Mohanan, 1994).

Decay: White rot

Microporus xanthopus (Fr.) Kuntze.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead branches of *Tectona grandis*, *Xylia xylocarpa* and *Terminalia paniculata*

Locality: Peechi, Kuthiran, Elnad, Vazhani, Vallikkayam and Nelliyampadam

Description: Fruitbody annual, centrally or laterally stipitate, single or confluent, funnel shaped; stipe yellow or yellowish brown; pileus surface violet brown, radially wrinkled; stipe central or slightly eccentric, base expanding, shiny and glabrous (Fig. 8); pore surface yellowish white; context white, very thin; hyphal system trimitic; basidiospores hyaline, cylindrical, smooth and thin walled.

Distributiom: Very common on all forest tree species throughout Kerala. This species has been earlier reported from India (Bose, 1946; Bakshi, 1971) and from Kerala (Sharma *et al.* 1985; Ganesh, 1988; Mohanan, 1994).

Decay: White rot

Mycena alphitophora (Berk.) Sacc.

(Basidiomycotina, Agaricales)

Occurrence: On soil and leaf litter

Locality: Peechi, Vaniyampara and Kuthiran

Description: Fruitbody small; pileus 2-5 cm diam. membranous, companulate, surface white, dry, weakly sulcate towards margin; lamella free to adnexed, white, distant with occasional lamellulae; edge fimbriate; stipe cylindrical, tapering above, hollow, surface white; context very thin, white, vinoid; spores ellipsoid to subcylindric, hyaline, amyloid and thin walled.

Distribution: Commonly occurring on leaf litter, in shaded areas, scattered or in-groups. Manimohan and Leelavathy (1989) had reported the species from Kerala.

Nigroporus niger (Berk.) Ryv.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead branch of *Tectona grandis*

Locality: Vazhania and Palakunnu

Description: Fruitbody perennial, broadly effused, inseparable from the host surface, woody hard; pore surface pale grey; pores small and not visible to naked eye; context dark grey; hyphal system dimitic; basidiospores not observed.

Distribution: Rare. Reported earlier from Kerala by Ganesh (1988).

Decay: Brown cuboidal rot

Peziza sp.

(Ascomycotina, Pezizales)

Occurrence: On ground among decomposing wood

Locality: Palakunnu

Description: Apothecium scattered to gregarious, sometimes caespitose, sessile or short stalked 30-40 mm diam. superficial; disc smooth, deeply to shallowly concave, brown to black in colour; asci, unitunicate, operculate, cylindrical, narrowing slightly towards base, 8-spored; ascospores hyaline, 1-celled, ellipsoidal and smooth.

Distribution: The species was collected from only one locality in the sanctuary thus indicating its rare occurrence.

Phellinus caryophyllaceus (Cooke.) Ryv.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead stem of *Cleistanthus collinus*

Locality: Nelliampadam and Thirumani

Description: Fruitbody broadly attached; pileus tomentose, rusty to reddish brown; pore surface reddish brown, pores small, invisible to the naked eye; context brown; hyphal system dimitic; basidiospores brown, globose to sub-globose.

Distribution: Rare

Decay: White rot

Phellinus dependens (Murr.) Ryv.

(Basidiomycotina, Aphyllophorales)

Occurrence: On unidentified wood and *Terminalia paniculata*

Locality: Vazhani, Machad and Neelipparutha

Description: Fruitbody perennial, solitary to imbricate, effused, reflexed initially, later becoming pileate; pileus surface glabrous when young and rough and uneven when old, concentrically ridged, smooth; pore surface olive brown; context concolourous with pore tubes; hyphal system dimitic;

basidiospores light yellow, globose to subglobose, thick walled, smooth and nonamyloid.

Distribution: Rare. Reported earlier from Kerala by Ganesh (1988) and other states by Bakshi (1971).

Decay: White pocket rot of heartwood

Phellinus fastuosus (Lev.) Ryv.

(Basidiomycotina, Aphyllophorales)

Occurrence: On trunk of living *Albizia odoratissima, Xylia xylocarpa,* and *Grewia tiliifolia* (Fig. 9a).

Locality: Vellakkarithadam and Kuthiran

Description: Fruitbody perennial, pileate, sessile, solitary, broadly attached; pileus , brown or black, mostly colour varying from one fruitbody to another, concentrically striate, margin entire, smooth, finely velutinate (Fig. 9b); pore surface yellowish brown, pores rough and uneven; context brown, fibrous, homogenous; hyphal system dimitc; basidiospores yellowish, subglobose to globose, thick walled and smooth.

Distribution: Common on living hardwood trees in disturbed forests and open areas in Kerala. *P.fastuosus* has got a wide host range (Mohanan, 1994) and causes severe heart rot (Ganesh, 1988).

Decay: white pocket rot

Phellinus gilvus (Schw.) Pat.

(Basidiomycotina, Aphyllophorales)

Ocurrence: On dead branches of *Terminalia paniculata, Tectona grandis* and *Macaranga peltata*

Locality: Vellakkarithadam, Kuthiran

Description: Fruitbody annual or reviving during next season, solitary or imbricate, broadly attached, coriaceous to corky while fresh, woody when dry (Fig. l0); pileus surface brown, glabrous or rough; pore surface yellowish brown, pores minute, angular to oval to round; context golden

brown, shiny; hyphal system dimitic; spores hyaline to yellow, smooth and ellipsoid.

Distribution: Cosmopolitan. *P. gilvus* is of common occurrence in India (Bose, 1937a; Bakshi, 1971). It is a common polypore of the timber depots in Kerala causing white rot of commercially important timbers.

Decay: White rot of both heart and sapwood.

Phellinus nilgheriensis (Mont.) Cunn.

(Basidiomycotina, Aphyllophorales)

Occurrence: On unidentified wood

Locality: Peechi

Description: Fruitbody annual to perennial, pileate, sessile, attached with a broad lateral base, tough woody and heavy; pileus reddish brown, first tomentose, then glabrous; pore surface yellowish brown, pores minute and round; context golden brown, fibrous; hyphal system dimitic; spores brownish yellow, globose, thick walled and smooth.

Distribution: Rare. Earlier reported from Kerala by Ganesh (1988).

Decay: White rot of heartwood.

Phellinus setulosus (Lloyd) Imaz.

(Basidiomycotina, Aphyllophorales)

Occurrence: On living tree of *Grewia tiliifolia* (Fig. 11).

Locality: Peechi

Description: Fruitbody imbricate, broadly attached; pileus tomentose, concentrically zoned and sulcate; pore surface brown, pores round; context yellow, fibrous; hyphal system dimitic; basidiospores pale yellow, smooth and elliptical.

Distribution: Rare

Decay: White rot

Polyporus arcularis (Batsch.) Fr.

(Basidiomycotina, Aphyllophorales)

Occurrence: On *Tectona grandis, Terminalia* sp. and unidentified wood

Locality: Peechi, Vaniampara and Machad

Description: Fruitbody annual, pileate, stipitate, either solitary or in groups, orbicular, centrally notched, coriaceous while fresh, brittle when dry (Fig. 12); pileus surface yellowish brown, glabrous, margin thin and papery; stipe centrally or rarely eccentric; pores slightly decurrent, absent near margin, large, angular or pentagonal; context white; hyphal system dimitic; basidiospores hyaline, smooth, thin-walled, cylindric to ellipsoid and guttulate.

Distribution: Cosmopolitan. The fungus was reported earlier in India by Thind and Chatrath (1957) and Bakshi (1971). From Kerala, it was reported by Ganesh (1988).

Decay: White fibrous rot

Polyporus grammocephalus Berk.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead wood of *Macaranga peltata* and *Cassia fistula.*

Locality: Nelliampadam and Choolipadam

Description: Fruitbody epixylous, annual, piliate, and laterally attached with a sub-stipe, coriaceous while fresh becoming tough when dry; pileus pale brown, radially striate, glabrous; stipe reduced or well developed; pores surface pale yellowish; pores round to angular, small and visible to naked eye; context cream coloured; hyphal system dimitic; basidiospores hyaline, oblong to ellipsoid, thin walled and smooth.

Distribution: One of the common polypore. Reported from trees of northern and southern parts of India (Bakshi, 1971; Bilgrami *et al.* 1991). Ganesh (1988) and Sankaran and Florence (1993) had reported its occurrence in Kerala.

Decay: White stringy rot

Polyporus ostreiformis Berk.

(Basidiomycotina, Aphyllophorales)

Occurrence: On unidentified wood

Locality: Kuthiran, Vallikkayam and Machad

Description: Fruitbody applanate, imbricate; pileus pinkish, glabrous; pore surface pale pinkish, pores minute; context pale pinkish; spores hyaline and cylindrical.

Distribution: Rare

Decay: White rot

Pycnoporus sanguineus (Linn. ex Fr.) Murr.

(Basidiomycotina, Aphyllophorales)

Occurrence: On *Macaranga peltata*

Locality: Elnad

Description: Fruitbody annual, pileate, sessile, arising in small groups, often solitary, imbricate and confluent, attached laterally either with a broad base or with a converged narrow base, coriaceous and flexible while fresh, slightly tough when dry; pileus orange to red, surface with concentric striations; pore surface orange-red; pores circular; context red in colour; hyphal system trimitic; spores hyaline, smooth and cylindrical.

Distribution: Common in Kerala and other parts of India (Bilgrami *et al*. 1991; Ganesh, 1988; Sankaran and Florence, 1993)

Decay: White stringy rot

Ramaria **sp.**

(Basidiomycotina, Aphyllophoprales)

Occurrence: On forest soil

Locality: Kuthiran and Peechi

Description: Fruitbody large densely branched from a short stout base, 10-25 cm height, branches elongated, erect, divided at the ends into thin

straight branchlets, yellow or pinkish yellow in colour, spore ochre in mass, ellipsoid to ovoid and rough.

Distribution: Commonly found in forest soils in groups.

Rigidoporus lineatus (Pers.) Ryv.

(Basidiomycotina, Aphyllophorales)

Occurrence: On dead stem of *Tectona grandis* (Fig.14a).

Locality: Peechi and Kuthiran

Description: Fruitbody epixylous, annual, attached with a slightly covering lateral base, corky while fresh, woody when dry, pileate, imbricate; pileus surface light yellow, velutinate while young, becoming glabrescent when mature (Fig.14b); pore surface, greyish; pores round, very small; context yellowish white, fibrous, hyphal system monomitic, hyaline; spores hyaline, globose, thin-walled and smooth.

Distribution: Commonly occurring in forests. Bakshi (1971) had reported the fungus from India.

Decay: White pocket rot

Schizophyllum commune Fr.

(Basidiomycotina, Aphyllophorales)

Occurrence: On wood of *Xylia xylocarpa*

Locality: Peechi

Description: Pileus 1-5 cm. diam., laterally attached by a small base, fan shaped or kidney shaped, margin incurved, somewhat lobed (Fig. 15); surface pale to dark greyish brown; hymenophore falsely lamellate; stipe absent; context brownish non-gelatinised, thick-walled; spores hyaline, cylindrical, thin-walled and smooth; spore print white.

Distribution: Worldwide. Grows gregariously in trunks, dead branch, newly felled logs, domestic wood, etc. This fungus is an edible one.

Scleroderma verrucosum (Bull.) Pers.

(Basidiomycotina, Sclerodermatales)

Occurrence: On ground

Locality: Peechi and Vallikkayam

Description: Fruitbody round, flattened at the top, smooth with a quite distinct stem like rooting base which binds together a mass of soil; skin is pale brownish with fine wart-like scales; spore mass finely olive-brown, spores with spines and ridges.

Distribution: Common.

Termitomyces eurrhizus (Berk.) Heim.

(Basidiomycotina, Agaricales)

Occurrence: On ground

Description: Fruitbody fleshy, 6-15 cm diam; pileus glabrous, fleshy, with obtusely rounded perforations surface brown and off-white at margins, gelatinized, rugulose towards the centre; hymenophore lamellate; lamellae free to adnexed, cylindrical; stipe firm, and sometimes with a bulbous base, surface white above and brownish below; context up to 1 cm. thick, white, fleshy, fibrous; spores subhyaline, ellipsoid and smooth. Spore print salmon pink.

Distribution: Common. Reported from Kerala (Leelavathy *et al.* 1985) and other parts of India (Manjula, 1983; Bilgrami *et al.* 1991). Usually appears just after the pre monsoon showers. This is an edible fungus.

Termitomyces heimii Natarajan

(Basidiomycotina, Agaricales)

Occurrence: On ground

Locality: Peechi, Vazhani and Vallikkayam

Description: Fruitbody annual, pileate, sessile, effused-reflexed, imbricate and confluent, attached laterally with a broad base, semicircular to flabelliform, coriaceous and flexible when fresh, tough when dry; pileus

surface pale grey to greenish grey towards margin, tomontose, concentrically zonate when young, margin thin and entire; pore surface pale yellow; context yellowish white; hyphal system trimitic; basidiospores hyaline, oblong-elliptical, eggtulate and nonamyloid.

Distribution: Common. Known to occur in Kerala (Leelavathy *et al.*. 1985). Edible.

Termitomyces microcarpus (Berk & Br.) Heim.

(Basidiomycotina, Agaricales)

Occurrence: On soil in groups

Locality: Peechi and Vazhani

Description: Fruitbody 0.5-2.5 cm diam, campanulate to convex; pileus surface white to cream; hymenophore lamellate; lamellae adnexed to almost free, white; stipe slender, cylindrical, solid, surface white, glabrous with a short rooting base; context white, thin; spores hyaline, ovoid and smooth.

Distribution: Common edible fungi found in Kerala and other parts of India (Manjula, 1983; Leelavathy *et al*. 1985).

Trametes hirsuta (Wulf. ex Fr.) Lloyd

(Basidiomycotina, Aphyllophorales)

Occurrence: On decaying wood of unidentified species

Locality: Peechi, Kuthiran and Machad

Description: Fruitbody dimidiate, fan-shaped, hard on drying; pileus yellowish, hirsute, concentrically zonate; pore surface white when first and yellowish on drying; context white to yellow; basidiospores hyaline, cylindrical and slightly curved.

Distribution: Common. Reported earlier from various tree species in Kerala by Ganesh (1988).

Decay: White fibrous rot

Trametes scabrosa (Pers.) G.H.Cunn.

(Basidiomycotina, Aphyllophorales)

Occurrence: On wood of *Bombax ceiba*, *Macaranga peltata* and *Tectona grandis*

Locality: Peechi, Vazhani, Kuthiran and Machad

Description: Fruitbody annual, sessile, broadly attached, imbricate, coriaceous to corky while fresh, rigid and tough when dry; pileus surface dark brown, glabrous, concentrically zonate, radially wrinkled, margin lobed or entire, rounded or acute, pale brown (Fig. 16); pore surface cream, ochraceous; context yellowish white; hyphal system trimitic; basidiospores hyaline, cylindrical to elliptical, smooth and thin walled.

Distribution: This is a common polypore in Kerala and has been collected from various localities. The species is also reported to occur in open areas and evergreen forests in Kerala (Ganesh, 1988; Sankaran and Florence, 1993).

Decay: White stringy rot

Xylaria hypoxylon (Linn. ex Hooker) Greville

(Ascomycotina, Sphaeriales)

Occurrence: On wood *of Xylia xylocarpa*

Locality: Peechi and Vazhani

Description:, Fruitbody (stroma) slender, up to 8 cm. tall, subcylindrical to strap-shaped and usually branched, black below and powdery white above (Fig. 17); asci cylindrical, 8 spored, ascospores black, uniseriate, smooth, slightly bean-shaped.

Distribution: Very common on dead wood throughout the year. Causes root rot in plants.

Xylaria polymorpha (Pers. ex Merat) Greville

(Ascomycotina, Sphaeriales)

Occurrence: On unidentified wood, *Bamboo* sp. and seed of *Xylia xylocarpa*

Locality: Peechi, Vallikkayam and Kuthiran

Description: Fruitbody (stroma) club shaped with short cylindrical stalk, solitary or often clustered; flesh tough, solid, white with a thin black crust, surface black, minutely wrinkled; asci cylindrical. 8-spored; ascospores uniseriate, fusiform but with one side flattened, dark brown to black.

Distribution: Common

Most of the macrofungi recorded are distributed widely throughout Kerala. *Collibia leucophaea, Lenzites acuta, Marasmieus androsaceus, Microporus xanthopus, M. affinis, Phellinus fastuosus, Polyporus gilvus, P. arcularis, Pycnoporus sanguineus, Termitomyces microcarpus* and *Xylaria hypoxylon* are most commonly occurring in Kerala forests. However, species such as *Amauroderma rugosum, Clarkeinda trachodes, Coriolopsis caperata, C. telfari, Cyathus striatus, Geastrum* sp., *Hydnum subvinosum, Hypoxylon rubiginosum, Lenzites torulosus, Loweporus fusco-purpureus, Nigroporus niger, Phellinus caryophyllaceus, P. dependens, P. nilgheriensis, P. setulosus, and P. ostreiformis* are reported rarely from India (Table 2). Most of the macro fungi collected were causing white rot and white fibrous rot but, *Fomitopsis rhodophaeus* and *Nigroporus niger* only caused brown cuboidal rot. Few species caused white spongy rot and few others caused white stringy rot (Table 2).

The fructifications were mainly recorded either on stem or branches while *Collibia leucophaea, Mycena alphitophora* and *Marasmius androsaceus* were found abundantly on decaying leaf. They were always found associated with decomposition of leaf litter. Among the Agaricales, *Termiotmyces* spp. are

edible. *Ganoderma lucidum* and *Hydnum subvinosum* were collected from dead wood and they are pathogenic.

Most of the species recorded during the study were common in occurrence in Kerala/India. The results of the study indicated that continued exploration and systematic collection and study of macrofungi found in tropical forests would bring to light many unidentified and rarely known fungi which are economically important and may be of potential use in biotechnology.

Table. 1 Macrofungi recorded from various localities in Peechi - Vazhani wildlife sanctuary

Species	Family	Locality
1. *Amauroderma rugosum*	Aphyllophorales	Peechi, Vallikkayam and Munipara
2. *Calocera cornea*	Dacrymycetales	Vazhani, Peechi and Machad
3. *Chlorophyllum molybdites*	Agaricales	Kallidukku and Palakkunnu
4. *Clarkeinda trachodes*	Agaricales	Kuthiran
5. *Clavaria* sp.	Aphyllophorales	Peechi and Kuthiran
6. *Collibia leucophaea*	Agaricales	Vallikkayam, Vazhani, Peechi and Machad
7. *Coriolopsis caperata*	Aphyllophorales	Kuthiran, Vaniyampara and Peechi
8. *C. telfari*	Aphyllophorales	Kuthiran, Vazhani and Vallikkayam
9. *Cyathus striatus*	Nidulariales	Peechi
10. *Dictyophora sp.*	Phallales	Peechi and Vallikkayam
11. *Favolus brasiliensis*	Aphyllophorales	Kuthiran, Vallikkayam, Machad, Vazhani, Palakunnu and Peechi
12. *Flavodon flavus*	Aphyllophorales	Machad, Vazhani and palakkunnu, Vallikkayam, Peechi and Kuthiran
13. *Fomitopsis dochmius*	Aphyllophorales	Kuthiran
14. *F. rhodophaeus*	Aphyllophorales	Peechi, vazhani and Kuthiran
15. *Ganoderma applanatum*	Aphyllophorales	Machad, Vaniyampara, Elnad, Kuthiran and Vazhani
16. *G.australe*	Aphyllophorales	Peechi, Kuthiran and Vaniyampara
17. *G. lucidum*	Aphyllophorales	Peechi, Kuthiran and Vazhani,
18. *Geastrum* sp.	Lycoperdales	Peechi

19. *Hexagonia apiaria*	Aphyllophorales	Vellakkarithadam and Vallikkayam
20. *H.tenuis*	Aphyllophorales	Vazhani, Peechi, Kuthiran, Vellakkarithadam and Palakkunnu
21. *Hydnum subvinosum*	Aphyllophorales	Peechi
22. *Hypoxylon rubiginosum*	Sphaeriales	Vazhani and Peechi
23. *Lentinus sguarrosulus*	Aphyllophorales	Machad
24. *L. torulosus*	Aphyllophorales	Peechi and Machad
25. *Lenzites acuta*	Aphyllophorales	Peechi, Vallikkayam, Kuthiran and Machad
26. *Loweporus fusco purpureus*	Aphyllophorales	Vazhani
27. *Lycoperdon* sp.	Lycoperdales	Peechi, Kuthiran, Pattikkad and Vallikkayam
28. *Marasmius androsaceus*	Agaricales	Peechi
29. *M. haematocephalus*	Agaricales	Peechi and Vazhani
30. *M. ignobilis*	Agaricales	Peechi, Machad and Kuthiran
31. *M. purpureoalbus*	Agaricales	Vallikkayam and Palakunnu
32. *Microporus affinis*	Aphyllophorales	Vazhani and Kuthiran
33. *M. xanthopus*	Aphyllophorales	Peechi, Kuthiran, Elnad, Vazhani, Vallikkayam and Nelliyampadam
34. *Mycena alphitophora*	Agaricales	Pecchi, Vaniyampara and Kuthiran
35. *Nigroporus niger*	Aphyllophorales	Vazhani, Machad and Neelipparutha
36. *Peziza sp.*	Pezizales	Palakunnu
37. *Phellinus caryophyllaceus*	Aphyllophorales	Nelliampadam and Thirumani
38. *P. dependens*	Aphyllophorales	Vazhani, Machad and Neelipparutha
39. *P.fastuosus*	Aphyllophorales	Vellakkarithadam and Kuthiran
40. *P. gilvus*	Aphyllophorales	Vellakkarithadam
41. *P.nilgheriensis*	Aphyllophorales	Peechi
42. *P.setulosus*		Peechi
43. *Polyporus arcularis*	Aphyllophorales	Peechi,Vaniampara and Machad

44. *P.grammocephalus*	Aphyllophorales	Nelliampadam and Choolippadam
45. *P. ostreiformis*	Aphyllophorales	Kuthiran, Vallikkayam and Machad
46. *Pycnoporus sanguineus*	Aphyllophorales	Elnad
47. *Ramaria* sp.	Aphyllophorales	Peechi and Kuthiran
48. *Rigidoporus lineatus*	Aphyllophorales	Peechi and Kuthiran
49. *Schizophyllum commune*	Aphyllophorales	Peechi
50. *Scleroderma verrucosum*	Sclerodermatales	Peechi, Vazhani and Vallikkayam
51. *Termitomyces eurrhizus*	Agaricales	Peechi, Machad and Vallikkayam
52. *T. heimii*	Agaricales	Peechi, Vazhani and Vallikkayam
53. *T. microcarpus*	Agaricales	Peechi and Vazhani
54. *Trametes hirsuta*	Aphyllophorales	Peechi
55. *T. scabrosa*	Aphyllophorales	Peechi, Vazhani and Kuthiran
56. *Xylaria hypoxylon*	Sphaeriales	Peechi and Vazhani
57. *X. polymorpha*	Sphaeriales	Peechi, Vallikkayam and Kuthiran

Table 2. Macrofungi associated with different types of rot

S1.No.	Suecies	Type of rot	Host/Substratum
1.	*Coriolopsis caperata*	white fibrous rot	*Xylia xylocarpa*
2	*C. telfari*	white rot	*Tectona grandis, Xvlia xvlocarua*
3.	*Favolus brasiliensis*	white fibrous rot	*Macaranga peltata, Xylia xylocarpa*
4.	*Flavodon flavus*	white fibrous rot	*Cassia fistula, Stiychnos nux- vomica, Tectona grandis, Terminalia paniculata, Terminalia* sp..
5.	*Fomitopsis dochmius*	white cuboid rot	*Tectona grandis, Terminalia paniculata Xvlia xvlocarua*
6.	*F. rhodophaeus*	brown cuboid rot	*Cassia fistula, Xylia xylocarpa,*
7.	*Ganoderma applanatum*	white rot	*Bombax ceiba, Tectona grandis, Terminalia* sp., *Xylia xylocarpa,*
8.	*G.australe*	white rot	*Mesua ferrea, Xvlia xvlocarua. Cassia* SP.
9.	*G. lucidum*	white spongy rot	*Grewia tiliifolia, Terminalia sp..Tectona grandis*
10.	*Hexagonia apiaria*	white rot	*Terminalia paniculata, Tectona grandis, Xylia xylocarpa*
11.	*H.tenuis*	white fibrous rot	*Terminalia* sp., *Xylia xylocarpa*
12.	*Hydnum subvinosum*	white rot	*Xvlia xvlocarua*
13.	*Lenzites acuta*	white spongy rot	*Bombax ceiba, Dillinia pentagyna, Tectona. grandis, Xylia xylocarpa*
14.	*Lentinus sauarrosulus*	white rot	*Bobax ceiba*
15.	*L. torulosus*	white rot	unidentified wood
16.	*Loweporus fusco purpureus*	white fibrous rot	*assia* sp., *Haldina cordifolia, Terminalia paniculata*
17.	*Microporus affinis*	white rot	*Xylia xylocarpa*
18.	*M.xanthopus*	white rot	*Tectona grandis, Terminalia paniculata, Xylia xylocarpa,*

19.	*Nigroporus niger*	brown cuboid rot	*Tectona grandis*
20.	*Phellinus caryophyllaceus*	white rot	*Cleistanthus collinus*
21.	*P. dependens*	white pocket rot	Unidentified wood *Terminalia aniculata*
22.	*Pfastuosus*	white pocket rot	*Albizia odoratissima, Grewia tiliifolia, Xylia xylocarpa,*
23.	*P. gilvus*	white rot	*Macaranga peltata, Tectona grandis, Terminalia paniculata.*
24.	*P.nilgheriensis*	white rot	Unidentified wood
25.	*Psetulosus*	white rot	*Grewia tiliifolia*
26.	*Polyporus arcularis*	white fibrous rot	*Tectona grandis, Terminalia* sp.
27.	*P.grammocephalus*	white stringy rot	*Cassiafistula, Macaranga peltata.*
28.	*P. ostreiyormis*	white rot	Unidentified wood
29.	*Pycnoporus sanguineus*	white stringy rot	*Macaranga ueltata*
30.	*Rigidoporus lineatus*	white pocket rot	*Tectona grandis*
31.	*Trametes hirsuta*	white fibrous rot	Unidentified wood
32.	*T.scabrosa*	white stringy rot	*Bombax ceiba, Macaranga peltata , Tectona grandis*
33.	*Xylaria hyuoxylon*	root rot	*Xylia xylocarpa*

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5. GLOSSARY

Amyloid	blue-black reaction of spores or flesh to iodine solution
Adnate	attached to stem for most of their depth
Adnexed	(of lamellae) narrowly joined to the stipe
Applanate	flattened or horizontally expanded
Ascus	cell in which the spores of an ascomycete are formed
Basidiospore	a propagative cell containing one or two haploid nuclei produced, after meiosis, on a basidium
Basidium	usually club shaped cell on which spores are borne in basidiomycetes
Campanulate	bell shaped
Clavate	club-like, gradually broadening
Conchate	like bivalve shell
Concolorous	of one colour
Confluent	(of the flesh of a stipe) continuous with the trama of the pileus
Context	tissue formed between the hymenium and the true mycelium
Coriaceous	leathery, applied to leaves and certain insects
Decurrent	with part attached to and running down stem
Dextrinoid	describes the reddish brown reaction of spores and flesh to iodine solution
Dimidiate	appearing to lack one half, (of a pileus) without a stalk and semicircular
	of two kinds of hyphae, generative with binding hyphae or with skeletal hyphae
Eccentric	(stem) Off centre
Ellipsoidal	elliptical in optical section
Epixylous	growing on wood
Exposporium	The outer of two layers forming the wall of spores such as pollen and bacterial spores.

Fibrillose	covered with silk like fibres
Fimbriate	having a fringe along the edge
Fruitbody	entire spore bearing part of a fungus
Fusiform	(spores) spindle shaped
Gill	thin plate like structure on the undersurface of an agaric cap which produce spore bearing cells
Glabrous	having a smooth surface, specifically having the epidermis devoid of hair
Globose	(cap or spores) rounded
Hirsute	having long hairs
Hymenium	fertile layer of spore bearing basidia or asci
Hymenophore	portion of a sporophore that bears the hymenium
Hypha	(pl. hyphae) individual microscopic threads making up mycelium
Hyphae	individual microscopic threads making up mycelium
Imbricate	(scales, brackets) overlapping like roof tiles
Incurved	curving down and inwards
Involute	curving down and inwards
Lamellae	(of an agaric) one of the characteristic hymenium covered vertical plates on the underside of the pileus; gill
Lateral (stem)	joined to cap edge
Monomitic	a system composed of generative hyphae which are thin walled branched, normal and septate
Mycelium	mass of interwoven hyphae in large fungi usually forming cobweb like filaments in the substrate (eg. soil or wood)
Ochraceous	bright yellow brown
Ovate	(cap or spores) more or less broadly egg shaped
Ovoid	egg shaped with the narrower end at the top
Peridium	outer skin or wall of Gasteromycete fruitbody
Perithecium	(mycol) a spherical, cylindrical or oval ascocarp which usually opens by a terminal slit or pore
Pileus	part of a fungus fruitbody bearing the spores beneath it.

Reniform	kidney shaped
Spore	minute reproductive unit of a fungus
Stipe	the stem which supports the cap (pileus) of many fungi
Striate	marked with delicate lines, or fine grooves
Stroma	the supporting tissues of an organ, including connective and nervous tissues and blood vessels
Subfbsiform	(spores) broadly spindle shaped
Subglobose	(spores) almost spherical
Sulcate	grooved or furrowed
Terrestrial	growing on land
Tomentose	thickly covered with soft, matted short hairs
Trimitic	a system composed of generative, skeletal and binding hyphae
Truncate	abbreviated at an end, as if cut off
Velutinate	thickly covered with delicate hair
Zonate	having concentric lines often forming alternating pale and darker zones near the margins.

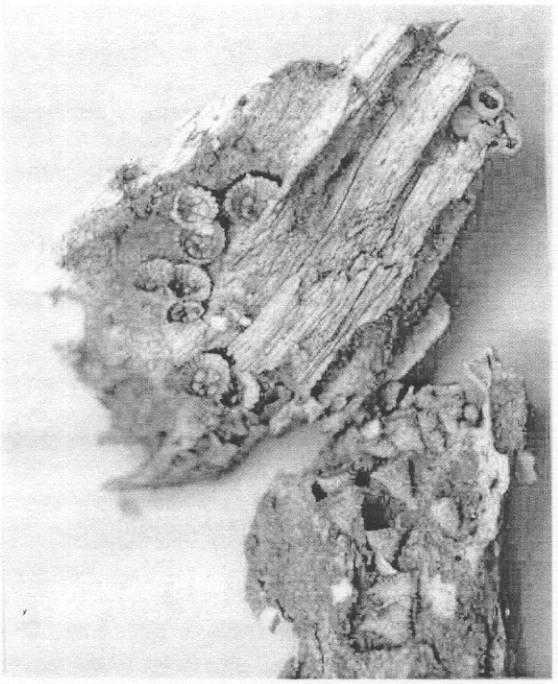

Fig. 2 *Cyathus striatus*

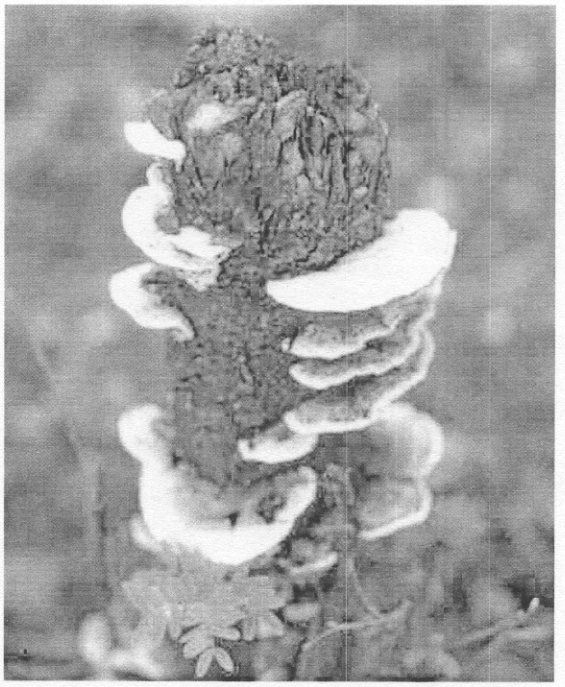

Fig. 3 *Flavodon flavus*

Fig. 4a *Hexagonia tenuis*

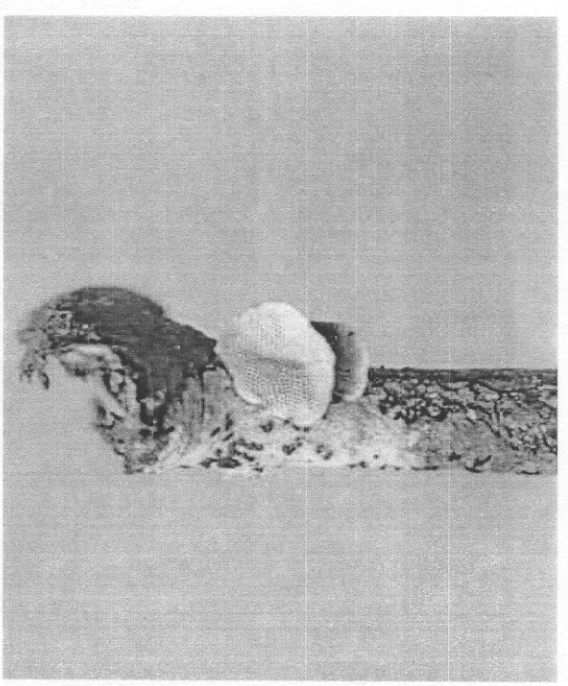

Fig. 4b *Hexagonia tenuis* - Pore surface

Fig. 2 *Cyathus striatus*

Fig. 3 *Flavodon flavus*

Fig. 4a *Hexagonia tenuis*

Fig. 4b *Hexagonia tenuis* - Pore surface

Fig. 5 *Hydnum subvinosum*

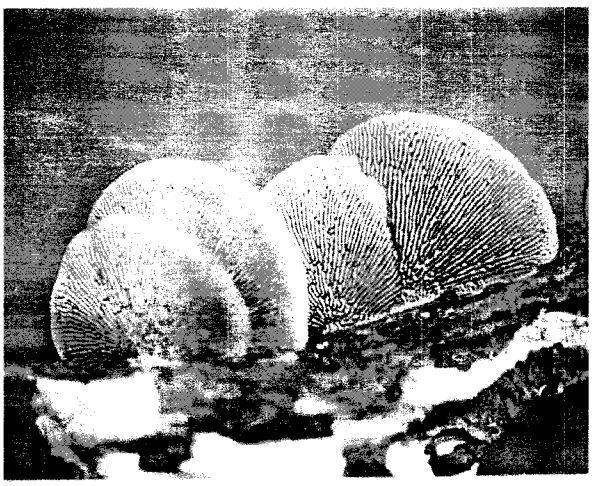

Fig. 6 *Lenzites acuta*

Fig. 7 *Microporus affinis*

Fig. 8 *Microporus xanthopus*

Fig. 9a *Phellinus fastuosus* Habit

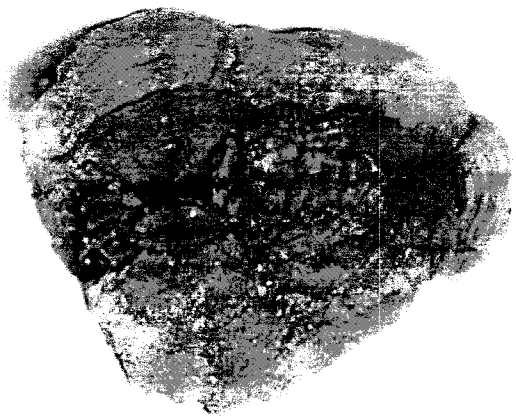

Fig. 9b *Phellinus fastosus* Pileus surface

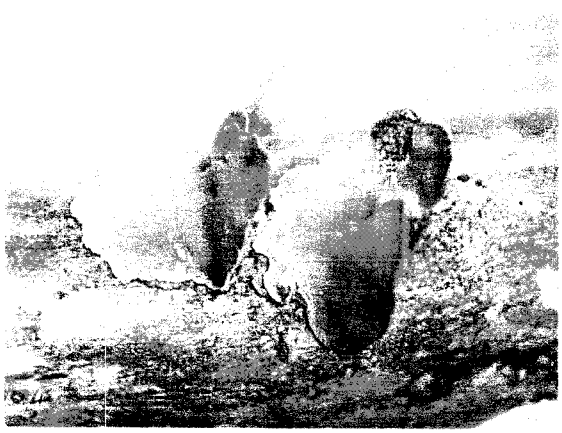

Fig. 10 *Phellinus gilvus*

Fig. 11 *Phellinus setulosus*

Fig. 12 *Polyporus arcularis*

Fig. 13 *Polyporus* sp.

Fig. 14a *Rigidoporus lineatus* Habit

Fig. 14b *Rigidoporus lineatus*
Pileus surface

Fig. 15 *Schizophyllum commune*

Fig. 16 *Trametes scrbrosa*

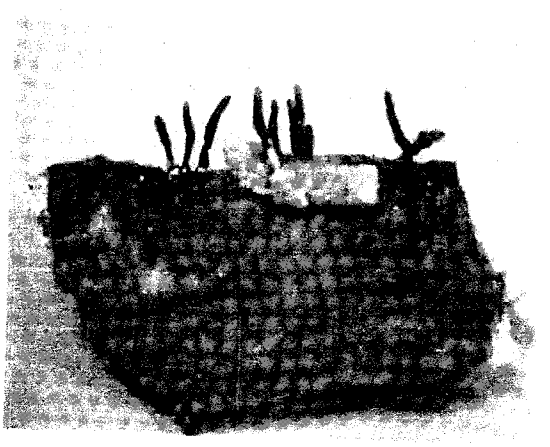

Fig. 17 *Xylaria* sp.