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Original Research Article

New Records of Wood Decay Fungi from Eastern Ghats of Andhra Pradesh, India

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Abstract

A wood decay fungus is any species of fungus that digest moist wood causing it to rot. The decomposition of coarse woody debris like fallen trunks, branches, stumps, etc was done by wood decaying fungi and releasers of important elements from wood into soils of forest ecosystem. The wood decay fungal samples are collected in the Darapalli and Kondapalli reserve forest of Central Eastern Ghats, during May 2018 to February 2019. Based on the phenotypical or morphological characters the fungal specimen was identified as *Artolenzites acuta* (Berk) Mossebo & Ambit comb., *Cubamyces flavidus* (Lév.) Lücking, *Cubamyces lactineus* (Berk.) Lücking, *Daedaleopsis confragosa* (Bolton) J. Schröt., *Daldinia concentrica* (Bolton) Cesati & De Notaris, *Daldinia childiae* J.D. Rogers & Y.M. Ju,. *Funalia aspera* (Jungh.) Zmitr. & V. Malysheva, *Ganoderma applanatum* (Pers.) Pat, *Ganoderma lipsiense* (Batsch) G.F. Atk., *Gloeophyllum sepiarium* (Wulfen) P. Karst. *Lenzites eximia* Ber. and Curt, *Phellinus badius* (Cooke) Cunn, *Phellinus gilvus* (Schw., Fr.) Pat., *Phylloporia pectinata* (Klotzsch) Ryvarden, *Trametes gibbosa* (Pers.) Fr., Epicrisis. All the fungal specimens are new records to Darapalli Reserve forest, and Kondapalli reserve forest of Andhra Pradesh, Eastern Ghat, India except *G. applanatum* and *D. concentrica*. For the first time *Cubamyces flavidus* (Lév.) Lücking, is reported from India.

Keywords: Wood decay fungi, Kondapalli, Central Eastern Ghats, Andhra Pradesh.

INTRODUCTION

Fungi compose about 4% of the known species of life on earth and about 8% of estimated unknown species. In spite of their importance, less than 5% of the estimated 1.5 million fungi have been identified (Sunita *et al*., 2013). The tropical forest systems estimates clear that the current number of described fungal species is only a small fraction existing in it (Arnold *et al*., 2001). Tropical fungi that infect plants show strong preferences to particular hosts, then the high diversity of plants in tropical forests implies that high tropical fungal diversity in that forest area (Gilbert and Sousa 2002). In India a great variety of climatic, altitudinal and hilly slopes with ecological habitats have contributed to the rich vegetation wealth and varied flora and fauna generating, thus a very unique biodiversity (Sunita *et al*., 2013). Wood-decay fungi are one of the major threats to the old and valuable trees in Hong Kong, as well as throughout the world and constitute a main conservation and management challenge because they inhabit dead wood as well as living trees (Ding *et al*., 2020). Depending on the tree host, decay fungi can destroy the living sapwood or the central heartwood part of the tree. Decay isn't always visible on the outside of the tree, except where the bark has been cut or injured, when a cavity is present, or when rot fungi produce reproductive structures. The reports for wood decay fungi from Krishna district, Andhra Pradesh is lacking. In this line, only few works had been conducted (Nagadesi *et al.*, 2014, Nagadesi 2018, and Nagadesi and Rampilla 2021). The present investigation mainly focus on the wood decay fungi of Kondapalli tropical reserve forest.

MATERIALS AND METHODS

Study area and Phenotypical identification

A survey was conducted in different seasons of year from 2018 – 2020 for collection of different lignicolous fungi from Darapalli and Kondapalli reserved forest, Central Eastern Ghats, Andhra Pradesh, South India. The Kondapalli tropical forest was spread over an area of 120 km^2 in the Krishna district, protected by Andhra Pradesh Forest Department. The forest area in this hill range have flora like herbaceous

grasses, light wood trees, and medicinal plants. The reserve forest also has different types of lignicolous macro fungi on dead trees, damp places, wood logs, and live trees which forming biodiversity of macro fungi. The wood decaying fungal bodies were collected in clean polythene bags from different parts of Darapalli and Kondapalli tropical reserve forest, Andhra Pradesh (Plate I Fig. A) and brought to the laboratory for phenotypical identification. The fungal bodies were examined for morphological characters based on the method followed by Ryvarden (1991), Nagadesi *et al.*, (2014) and. Nagadesi (2018). The compound microscope was used to observe the microscopic characters. The material preservation, date of collection, host and locality were documented at ALC, Andhra Pradesh, India.

RESULT AND DISCUSSION

The wood decay fungal samples are collected in the tropical forest areas of Kondapalli, Andhra Pradesh, Central Eastern Ghats, South India, during different seasons of years 2018-2020. Based on the phenotypical characters fungal specimen were identified. More than 30 fungal samples are collected, among them 15 samples are identified. The fifteen specimen belongs to class Ascomycotina, Basidiomycotina, and family Xylariaceae, Hymenochaetaceae, Polpyporaceae, Ganodermataceae. The Fungal Specimens are identified as *Artolenzites acuta* (Berk) Mossebo & Ambit comb., *Cubamyces flavidus* (Lév.) Lücking, *Cubamyces lactineus* (Berk.) Lücking, *Daedaleopsis confragosa* (Bolton) J. Schröt., *Daldinia concentrica* (Bolton) Cesati & De Notaris, *Daldinia childiae* J.D. Rogers & Y.M. Ju,. *Funalia aspera* (Jungh.) Zmitr. & V. Malysheva, *Ganoderma applanatum* (Pers.) Pat, *Ganoderma lipsiense* (Batsch) G.F. Atk., *Gloeophyllum sepiarium* (Wulfen) P. Karst. *Lenzites eximia* Ber. and Curt, *Phellinus badius* (Cooke) Cunn, *Phellinus gilvus* (Schw., Fr.) Pat., *Phylloporia pectinata* (Klotzsch) Ryvarden, *Trametes gibbosa* (Pers.) Fr., Epicrisis All the fungi are newly reported from study area Darapalli Reserve forest, and Kondapalli reserve forest Andhra Pradesh, Eastern Ghat, India except *G. applanatum* and *D. concentrica*. For the first time *Cubamyces flavidus* (Lév.) Lücking, is reported from India. The phenotypical or morphological characters of fungal sporocarps are describe as follows

***Artolenzites acuta* (Berk) Mossebo & Ambit comb.**

Sporophore annual, dimidiate, substipitate, with few imbricate outgrowths of medium sized basidiocarps attached to the pileus; measuring in average 27.6 x, 17.5 x 3.5 cm in size, flexible on drying; pileus most often multicoloured in the tropics, in dry state of basidiocarp light brown to brown or creamish yellow near the tips, concentrically zonate (Plate II. Fig. A) and clay coloured to dirty brown spots originating from the base of the pileus. These clay colour spots sometimes extend over the lower half of the pileus and are rather restricted to the disc on basidiocarps showing a disc at the attachment point to the substrate. Pileus surface most often glabrous, slightly sulcate, concentrically zonate; margin sharp, entire. Hymenium surface have lamellate structures in young and mature specimens, When lamellate, lamellae measure 0.5−2.3 cm wide, are cream colour. 9 per cm (Plate II. Fig. B); Context relatively thin, measuring just about 2-5 mm thick at the base, yellowish; Hyphal system trimitic; Generative hyphae with clamps, hyaline, thinwalled, branched, 2.34 µm in width; Skeletal hyphae, pale yellowish, unbranched, hyaline in KOH with a lumen, thickwalled 6.28 µm width; Binding hyphae thickwalled with a narrow lumen, richly branched, projecting sword like structures in the hymenium 125 x 6.8 µm in size. Cystidia absent; Basidia not seen; Basidiospores cylindrical, thin-walled, hyaline, inamyloïd, 7.82 µm × 2.35 µm in size.

Collection examined: On partially decomposing dead wood of *Cassia fistula* from Darapalli forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCDP02, 25-8-2018.

A. acuta is collected mainly in Asia, from Pakistan to China, Thailand to tropical South East Asia and Australia (Ambit and Mossebo 2015). In the present study for the first time the specimen was collected from Darapalli reserve forest, Rampachodavaram, Andhra Pradesh, India. It is particularly characterized by its glabrous, concentrically zonate pileus, the hymenophore which is most often lamellate, but also poroid and daedeloid nature is observed in young sporocarps, lamellae could be partly subdentate to dentate particularly in old basidiocarps (Ambit and Mossebo 2015). In the present study, the upper surface of sporophore shown glabrous, concentrically zones and the hymenial surface was mostly lamellated on older specimens.

***Cubamyces flavidus* (Lév.) Lücking, Willdenowia 50 (3): 396 (2020)**

Sporophore annual, sessile, dimidiate, fan-shaped, imbricate, 12.0 x 8.0 x 0.5 cm in size; Pilear surface white when fresh, yellowish brown, becoming brown near the base, zonate, sulcate, glabrous in old specimen, thinning out towards margin, margin irregular, lacerate, serrate; (Plate II. Fig C); Hymenial surface white when young, creamish yellow coloured, poroid in young specimen, becomes daedaloid to lamellate with maturity, fertile up to the margin, pore tube conclolorous with hymenial surface 2.5 cm long (Plate II. Fig D); Context yellowish brown, floccose, 0.3 cm thick Hyphal system trimitic; Skeletal hyphae light yellow, thick-walled, aseptate, unbranched. 3.74 x 6.25 µm in diameter, Binding hyphae hyaline, thick-walled, aseptate, branched, with ishort branches 3.59 × 2.75 µm in diameter; Generative hyphae, hyaline,

thinwalled, branched, septated with occasional clamp connection 2.56 – 5.12 µm in diameter. Basidia clavate, 30 x 6.25 µmin size with four sterigmata;. Basidiospores cylindrical, hyaline, thinwalled, 11.89 x 2.35 µm in size,

Collection examined: On dead wood logs of *Pongamia pinnata* from Darapalli forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCDP05, 25-8-2018.

It is causing white rot and grows on dead wood of sal, bamboo different woods but rarely observed on stems of living teak (Bakshi 1971). In the present study for the first time it was collected from Darapalli forest, Andhra Pradesh, Eastern Ghat, India and it is causing white rot in wood logs of *Pongamia pinnata.*

Plate 1: Fig A: Tropical reserve Forest of Kondapalli hills, Andhra Pradesh, Eastern Ghat, Fig B: Upper surface of *G. sepiarium* showing the darkbrown colouration near the attachment with the stem, Fig C: Hymenium surgace of the *G. Sepiarium* showing lamellae

***Cubamyces lactineus* (Berk.) Lücking, Willdenowia 50 (3): 396 (2020)**

Sporophores are sessile, applanate, imbricate, semicircular, hard, 6 x 5 x 3 cm; margin thin, entire; upper Surface yellowish brown, azonate, typically uneven, nodulose, smooth, matted tomentose (Plate IV Fig. G), hymenial surface yellow, pores regular, rounded, 2 - 3 per mm extending up to margin, pore wall thin, pore tube white, nearly straight, up to 8 mm long (Plate IV Fig. H); context yellow soft corky, up to 1 - 1.8 cm long, hyphal system trimitic. skeletal hyphae hyaline thickwalled with broad lumen, unbranched, long, flexuous 4.25 – 8.56 µm in width, uncommon; binding hyphae hyaline thickwalled, much branched, 2.31- 4.5 µm in width, generative hyphae hyaline thin, septate with clamp 2.5 – 4.6 µm in width; basidia clavate, 5.8 – 6.4 µm in size; Basidiospores hyaline, cylindrical 6.5 x 2.5 µm.. The fungus causes white rot in hard woods.

Collection examined: On dead wood of *Pongamia pinnata* from Kondapalli reserve forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCkP69, 19-4-2018.

The *C. lactinea* clade encompasses accessions from all tropical regions, including the Amphi-Caribbean region in Florida and northern South America (Venezuela, French Guiana), as well as India, Sri Lanka and Thailand i.e. the type regions for both taxa, so it would be extremely unlikely that either *T. cubensis* or *L. lactinea* existed in these regions as separate taxa (Lücking *et al.*, 2020). In the present study the sporophore collected from kondapalli area of Andhra Pradesh was identified as *C. lactinea* based on the morphological characters

***Daedaleopsis confragosa* (Bolton) J. Schröt., Kryptogamen-Flora von Schlesien 3-1(4): 493 (1888)**

Sporophore annual, pileate, dimidiate, tough-corky, 8.4 x 6.8 x 0.5 cm in size; Pilear surface yellowish to light brown, matted, glabrous in old specimen, usually zonate and shallowly sulcate (Plate II. Fig E). Hyminial surface light yellow, the pores variable, circular to radially elongated and up to 1 mm

wide, daedaleoid, tubes pale buff (Plate II. Fig F), continuous with the context, up to 1 cm long; Context concolorous with the tubes, firm-corky, azonate, up to 2 cm thick. Hyphal system trimitic; Generative hyphae with clamps, thin-walled, hyaline, with occasional branching, 2.35 – 6.75 µm width; Skeletal hyphae light brown, thick-walled, with rare branching, 3,65-7.56 µm width; Binding hyphae light brown, thick-walled, frequently branched, 2.31 - 4.5 µm width. Dendrohyphidia present in the hymenium and dissepiments, thin-walled, not encrusted 2.35 – 3.56 µm width. Basidia narrowly clavate, hyaline, thinwalled, 25.6 – 38.5 x 4.7 – 5.65 µm in size, with four sterigmata. Basidiospores cylindrical, hyaline, thinwalled. 8.54 – 10.76 x 2.31 - 3.56 µm in size.

Collection examined: On dead wood and living tree of *Ficus racemosa* from Darapalli forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCDP08, 25-8-2018

It grows on hardwoods, and rarely grows on coniferous wood. Temperate circumpolar species reported from East Asia known from China, Japan, Far East Russia, and Northern Thailand (Bakshi 1971). In the present study it was observed for the first time in dead wood of *Ficus racemosa* from Darapalli forest, Andhra Pradesh, Eastern Ghat, India.

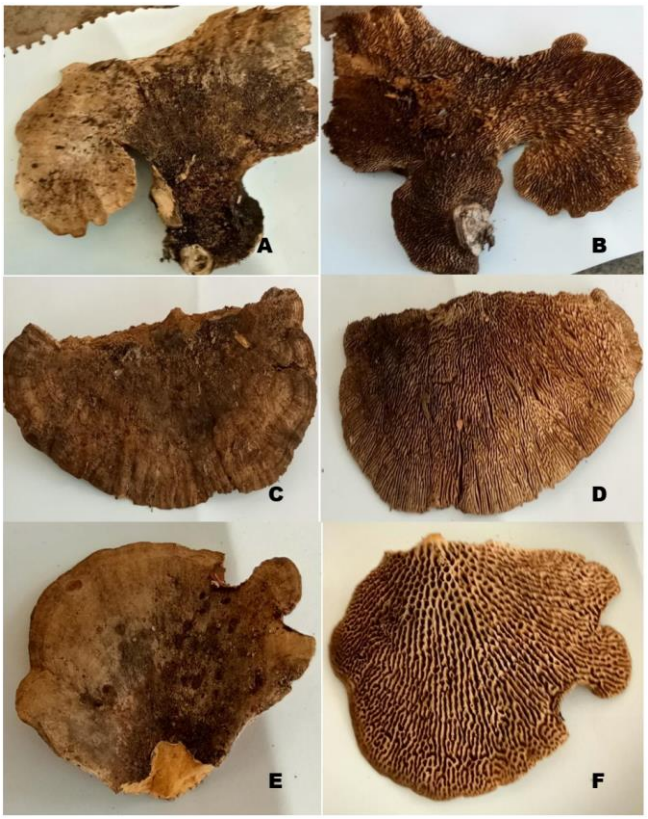

Plate II. Fig. A. Upper surface of *Artolenzites acuta* showing the melanisation, Fig. B. Lower surface of *A. Acuta* showing the lamellate with melanisation areas, Fig. C. Upper surface of *Cubamyces flavidus* showing concentric zones, Fig. D. Lower surface of *C. flavidus* showing the porous to lamellate, Fig, E. Upper surface of *D. confragosa* showing concentric zones, Fig. F. Lower surface of *D. confragosa* showing the porous to lamellate

***Daldinia concentrica* (Bolton) Cesati and de Notaris** Comment. Soc. Crittog. Ital. 1: 197. 1863.

Ascocarps are ball like rounded or hemispherical, initially brown and dense; stroma spherical, turbinate, sessile, aggregated, smooth (Plate III Fig. C), perithecial mounds, 6.5 x 4 x 2 cm; violet-black in colour, with KOH-extractable pigments dark purple. Section of stroma shows concentric rings (Plate III Fig. D). The tissue between perithecia grayish brown, woody; the tissue below the perithecial layer composed of alternating zones, the darker zones dark brown, woody, 0.2-0.6 mm thick, the lighter zones brown, pithy, persistent, 0.6-1 mm thick. On the upper side cup shaped perithecia are present. Perithecium tubular, 0.3-0.5 mm x 1-2 mm, shows attachment of asci with 8 inequilateral ascospores. Ostioles slightly papillate. Asci 212.35-250 µm total length x 9.33-12.25 µm broad, the spore-bearing part 75-90 µm long, the stipe 130-170 µm long, with apical ring bluing in Melzer's iodine reagent, discoid, 0.5-1 µm x 3.12- 4.5 µm. Ascospores brown to dark brown, unicellular, ellipsoid-inequilateral, with narrowly rounded ends, 12.45-18.7 x 6.25-9.33 µm, smooth; epispore smooth.

Collection examined: On dead wood of *Enterlobium saman* from Kondapalli forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCkP50, 19-4-2018.

***Daldinia childiae* J.D. Rogers & Y.M. Ju,** in Rogers, Ju, Watling & Whalley, Mycotaxon 72: 512 (1999).

Stromata depressed sub-globose, solitary, with short stipe, extended to a flattened apex 4 x 2.5 x 2 cm (Plate III Fig. E). The size of stroma ranges 6 – 12 × 8–15 mm in size. The surface is smooth and dark brown, which becomes dark black with maturity, orange brown granules can also be seen beneath the surface (Plate III Fig. F). Perithecia monostichous, tubular, 1.5 – 2.5 × 0.3 – 0.8 mm in diameter with umbilicate ostiole. Asci cylindrical but appears at too old age. Ascospores brown to dark brown, unicellular, ellipsoid-inequilateral, with rounded ends, 10 – 16 × 4 – 8 µm, with straight germ slit spore-length on convex side.

Collection examined: On dead wood of *Enterlobium saman* from Kondapalli reserve forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCkP52, 21-4-2018.

***Funalia aspera* (Jungh.) Zmitr. & V. Malysheva, Mikologiya i Fitopatologiya 47 (6): 375 (2013)**

Sporophore annual, sessile, single, applanate, rigid, 14.5 x 11 x 2 cm with a thick broad base; upper surface with shades of red and brown, subzonate, glabrous, rough with small raised areas like blisters, margin thin (Plate IV Fig. C); hymenial surface dark bay, pores regular, round 2 - 3 per mm, pore wall thick, margin sterile, pore tubes sepia brown, straight, forming a distinct layer, up to 4 mm long (Plate IV Fig. D); context brown, hard slightly fibrous, with a sheen, up to 3 mm thick; Hyphal system trimitic. skeletal hyphae pale brown, insepaeable, flexuous, thickwalled, with narrow lumen, rarely branched, 3.5-5,5 µ broad, generative hyphae hyaline, thinwalled branched, septate with clamps 2.5-3.6 µ broad, offend collapsing, un common. Basidia clavate, 6.8 - 8.5 µ broad; basidiospores hyaline, cylindric, 8.5 - 12.5 x 3 - 3.7 µm in size.

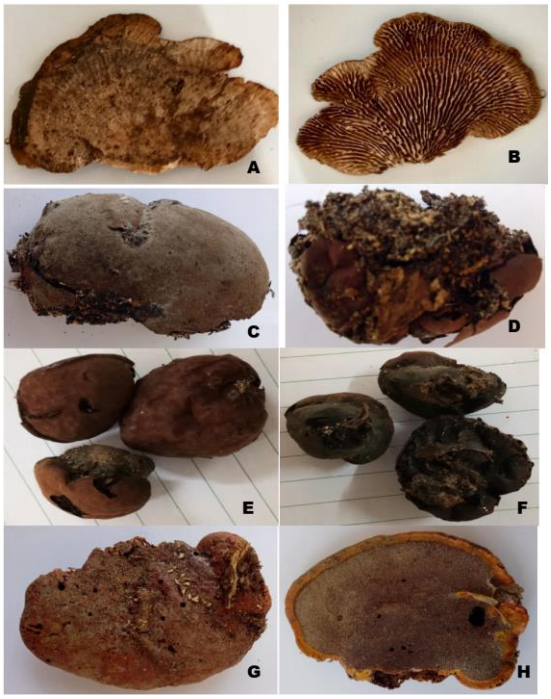

Plate III: Fig A: Upper surface of *L. eximia* showing granules, Fig. B. Hymenium surface of *L. eximia* showing gills with wavy margin, Fig. C. Ascophore of *D. concentric*, Fig. D. Lower surface of *D. concentrica*, Fig. E. Ascophore of *D. childiae*, Fig. F. stroma region of *D. chidiae*, Fig. G the upper surface of *G. applanatum* , Fig H. The lower surface of *G. Applanatum*

Collection examined: On dead wood of *Pongamia pinnata* and *Enterlobium saman* from Kondapalli reserve forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCkP65, 21-4-2018.

For the first time *F. aspera* (Jungh.) Zmitr. & V. Malysheva was reported from Rathanmahal wildlife Sanctuary, Gujarat, India (Arya et al., 2008). In the present study the same wood rotting fungi was reported for the second time from Kondapalli reserve forest, Andhra Pradesh, Eastern Ghat, India.

***Ganoderma applanatum* (Pers.) Pat**

Sporophore: perennial, sessile, applanate, fan-shaped, semicircular, corky, hard 5 x 2 x 1.5 cm; upper surface having dull unvarnished outer crust, furrowed in the different zones, greyish brown-brownish, margin

wavy (Plate III Fig. G); Pore surface white which turns dirty yellowish in colour, 4 - 5 circular, tiny pores/mm (Plate III Fig. H); Stem- absent; context Brown to cinnamon brown, very tough, in KOH tubes and flesh turns black. Hyphal system trimitic, Basidiospores elliptical, truncated end, brown, 7.5 - 11.6 x 6.4 - 7.4 µm,. Setae and cystidia absent. It is causing a white rot on hardwoods and resulting in the white to straw coloration rotting in sapwood and heartwood.

Collection examined: On dead wood of *Enterlobium saman* from Kondapalli reserve forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCkP55, 21-4-2018

***Ganoderma lipsiense* (Batsch) G.F. Atk., Annales Mycologici 6: 189 (1908)**

Sporophore: perennial, sessile, applanate, reflexed, single, corky soon becoming hard and woody, 12 x 8 x 2.5 cm in size; abhymenial surface dull rusty brown, zoned, uneven, crusty, margin light brown, entire, aplanate; pore surface white when fresh, turning light brown on drying, pores round, 4-5 per mm (Plate IV Fig. A). pore wall thick, pore tubes distinct from context, grey, a distinct white region bordering pore surface, distinctly stratified, intervening context up to 2 mm broad tubes up to 2 cm long, in each layer (Plate IV Fig. B); context brown, interspersed with white lint-like material, corky-fibrous, transversely zoned, up to 2 - 3 cm thick; hyphal system trimitic, generative hyphae brown, thick-walled, lumen small, unbranched, up to 2.5 - 7.8 µm in diameter; skeletal hyphae brown, thick-walled, lumen broad, freely branched, up to 2.9 – 6.0 µm in diameter; binding hyaline, thick walled, very few, up to 1.5 - 2.5µm size; basidiospores brown, broadly ellipsoid, thick-walled, outer wall smooth, inner wall echinulate, truncate, up to 6.5 – 9.8 x 4.5- 7.5 µm in size.

Collection examined: On dead wood of *Peltophorum rouxbergii* from Kondapalli reserve forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCkP57, 21-4-2018.

***Gloeophyllum sepiarium* (Wulfen) P. Karst. 1882**

Sporophore compound and then either fused laterally; up to about 10.5 x 8.5 cm deep; semicircular, irregularly bracket-shaped; flattened-convex; velvety; rugged; with concentric zones of texture and color; at first yellow, becoming yellow-brown to nearly black toward the point of attachment but usually remaining yellow on the growing margin (Plate I Fig. B); hymenium surface: Irregular, lamellated, often fusing; fairly close; edges yellowish becoming darker brown with age; faces creamy, darkening with age; up to about 1.2 cm deep (Plate I Fig. C). context: dark yellow-brown; corky; in KOH black. Hyphal system trimitic; Basidia often elongated. Basidiosporespores smooth, cylindric, inamyloid, 12.65 x 4.75 µm insize; hyaline in KOH. Cystidia cylindric, up to about 98.52 x 11.56 µm.

Collection examined: On dead wood of *Tamatindus india* from Darapalli reserve forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCDP10, 19-4-2018.

***Lenzites eximia* Ber. and Curt**

Sporophore sessile, attached by a broad base, dimidiate, corky, imbricate, 6.5 x 7.3 x 2 cm, upper surface is clay coloured to cinnamon, glabrous, zonate, concentrically and radially ridged (Plate III Fig. A); hymenial surface grayish yellow, lamellate, irregular, 8 per cm, 3 - 7 mm broad, margin entire (Plate III Fig. B), context light buff, fibrous, up to 11 mm thick; hyphal system; trimitic basidiospores hyaline, thinwalled, allantoids, 4.85 x 2.31 in size. generative hyphae hyaline, thinwalled, branched, clamped, 2.35 µm in width, binding hyphae hyaline, thickwalled, aseptate, branched, 4.56 µm in width, skeletal hyphae hyaline, thick walled unbranched, 5.65 µm in width.

Collection examined: On dead wood of *Hibiscus rosasinesis* from Darapalli forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCDP 13, 19-4-2018.

***Phellinus badius* (Cooke) Cunn. Bull. New Zealand Dept. Sci. Industr. Res. 164: 233, 1965.**

Basidiocarp perennial, seesile, hoof shaped to ungulate easily detachable from host, 6 x 5.2 x 2 cm, head woody; pilear surface yellowish brown when young dark brownish when maturity. Glabrous, weakly zoned, rimose, crust up to 0.2 mm thick margin obtuse, sterile (Plate V Fig. A); pore surface dark brown glancing tubes ferruginous brown, paler than pore surface, stratified distinctly, 3mm deep in each layer pores 7 per mm angular, pore wall thick (Plate V Fig. B). Context brown lustrous, corky when fresh hard on drying 1 – 5 mm thick faintly zoned, granular core of dull yellowish brown mycelium with patches of white mycelium and dark reddish brown hard glossy granules scattered throughout, hyphal system dimitic. Hymenial setae absent or very rarely present in older specimen. Basidia broadly clavate 14.26 x 7.87µm in size, Basidiospores broadly ellipsoidal, golden brown, thickwalled 6.3 x 5.1 µm.

Collection examined: On dead wood of *Pongamia pinnata* from Kondapalli reserve forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCkP59, 21-4-2018.

***Phelinus gilvus* (Schw., Fr.) Pat. Essai taxonomique: 97, 1900.**

Basidiocarp annual, imbricate, sessile, coriaceous, hard and brittle on drying, pileus dimidiate upto 7 cm broad, 4 cm wide and 1.5 cm thick, applanate, Upper surface golden brown, lighter towards margin, azonate, finely velutinate, finelt and densly warted with irregular protruberances; margin thin, acute, even (Plate V Fig. C), Pore surface dark purplish brown, fertile up to the margin, glancing when fresh, tubes reddish brown, single layered, 2-4 mm deep, pores round and regular, 5-6 per mm (Plate V Fig. D), context palr reddish brown 5 mm thick zonate, fibrous, with a thin cuticle on upper side in older specimens, hyphal system dimitic, hymenial setae abundant 24.8-36.5 (40.5) x 6.25 – 9.33 µm subulate, sharp, thickwalled, dark reddish brown in KOH; basidia clavate, 6.25-12.35 X 4.23- 6.25 µm; basidiospores ellipsoid, hyaline, thinwalled, more or less flatend at one end, 6.5 x 4.25 µm.

Collection examined: On dead wood of *Enterlobium saman* from Kondapalli reserve forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCkP61, 21-4-2018.

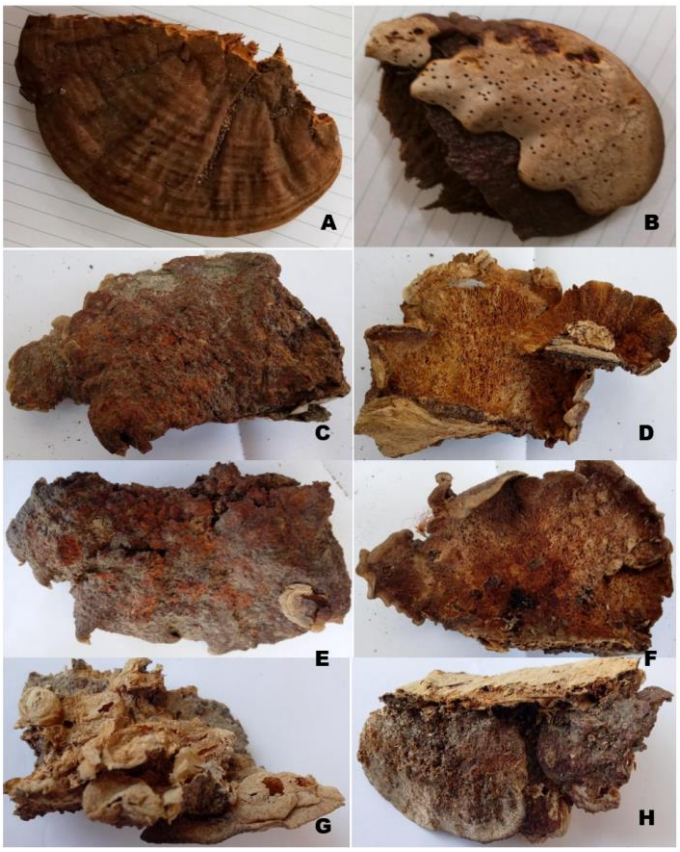

Plate IV: Fig A: The upper surface of *G. lipsiense*, Fig. B. The lower surface of *G. lipsiense*, Fig. C. The upper surface *F. aspera*, Fig D. Lower surface of T *F. aspera*, Fig. E. The upper surface of *T. gibbosa*, Fig F Lower surface of *T. gibbosa*, Fig G. The upper surface of *C. lactineus*, Fig. H. The lower surface *C. lactineus*

***Phylloporia pectinata* (Klotzsch) Ryvarden, Synopsis Fungorum 5: 196 (1991)**

Sporocarp perennial, pileate, applanate, frequently imbricated with several pilei from a common base, up to 8 cm wide, 5 cm broad and 2 cm thick near the base, woody hard and heavy when dry; upper surface compressible tomentum when young, yellowish brown, with age a black surface is exposed from base, finely sulcate with a thin black crust; margin entire, usually paler than the basal part of the pileus (Plate V Fig. E). Pore surface golden brown, glancing on turning to incident light, tubes distinctly stratified, 2 to 0.5 mm thick pores thiny, invisible to the naked eye, 6-8 pores per mm (Plate V Fig. F). Thin context present between tube layer, context duplex in younger specimens, the lower part very dense and dark reddish brown, 0.1 cm thick, the upper part more loose consistency than the lower part, distinct black line separating the upper tomentum and lower denser part. Hyphal system dimitic, hymenial setae absent, Basidia 8.36 x 6.35 µm in size, spores abundantly present, globose, hyaline, often collapsed 3.12 X 2.5 µm in size.

Collection examined: On dead wood of *Pongamia pinnata* from Kondapalli reserve forest, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCkP63, 21-4-2018.

To date, 42 species of *Phylloporia* are recorded worldwide. Most species of Phylloporia are considered to be potential forest pathogens with high levels of host specificity (Zhou 2016). Found on the living tree trunk at the base of *Peltophorum rouxbergii* causing white rot, from Andhra Loyola College, Krishna district, Andhra Pradesh, India (Ribka et al., 2021). In the present study, it is causing white rot on woods of *Pongamia pinnata* from Kondapalli reserve forest, Andhra Pradesh, Eastern Ghat, India. For the first time Mycochemical bio active compounds, proximate composition evaluation, antifungal activity of *Phylloporia ribis* were reported from India (Ribka et al., 2021). In the present study, for the first time *P. pectinata* (Klotzsch) Ryvarden was reported Eastern Ghat, India.

Trametes gibbosa (Pers.) Fr., Epicrisis Systematis Mycologici: 492 (1838)

Sporophore annual, usually imricate, dimidiate, applanate, lethary when fresh, woody on drying 14 x 13x 9 cm ; upper surface cream to white darkening on drying, uneven, concentrically zonate, hairs white (Plate IV Fig. E);; hymenial surface cream to yellow, smooth, even, margin concolorous, with narrow sterile margin, 1 - 1.5 mm thick; pores angular, mostly radially rectangular, usually circular near the margin and sometime daedaloid towards margin; 1-2 per mm; (Plate IV Fig F) Hyphal system trimitic. skeletal hyphae subhyaline, thickwalled, aeptate, unbranched, 4.5 – 7.8 µ diameter, Binding hyphae subhyaline, thickwalled, aseptate, branched, 2.5 – 3.8 µ diameter generative hyphae hyaline thickwalled septate branched 1.5 -3.5 µ diameter; hyphal pegs occasional, light brown, 10 – 50 µ broad. Basidia clavate, subhyaline, 8.5 x 2.6 µ sterigmata 4, straight, 1.8- 3.8 µ long; basidispores hyaline, globose , smooth, aguttate, very small 1.2 – 3.0 µ diameter.

Collection examined: On dead wood of *Hibiscus rosasinensis* from Rajamendri, Andhra Pradesh, Eastern Ghat, India. Collected by N. Praveen Kumar and B. Srinivasarao, Accession no: ALCkP67, 21-4-2018.

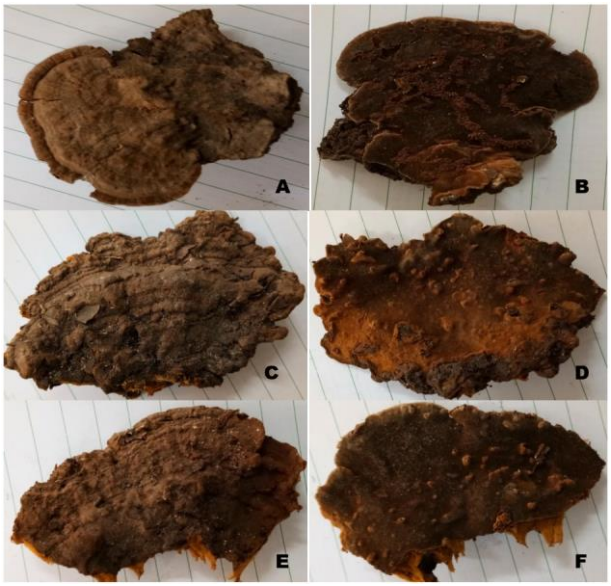

Plate V: Fig A: Upper surface of *P. badius*, Fig. B: Lower surface of *P. badius*, Fig C: Upper surface of *P. gilvus*, Fig D: Lower surface of *P. gilvus*, Fig E: Upper surface of *P. pectinata*, Fig F: Lower surface of *P. pectinatus*

The infected tree became structurally unstable and broke off at the severely infected area. Brown rots and white rot are known to cause trunk breakage due to extensive internal decay in the forest trees (Arya et al 2008). The tree breakage in the present study was found to be associated with Brown rot and white rot. Forest trees are highly wind resistant but the branches were broken at brown rot and white rot fungi infected areas, which weakens the living trees. Such trees should be detected through symptoms of brown rot, white rot and signs of fruit bodies (Nagadesi et al 2014). In the present study all the fungi were causing white rot in dead woods and living tree hosts, so in the forest, the infected branches will fall down and trees will be uprooted during storm due to high wind velocity.

CONCLUSIONS

The fungal diversity and distribution is very vast in different ecosystems around the world. The decomposition of wood debris like fallen trunks, branches, stumps, etc in different forest ecosystems was done by wood decaying fungi. It makes the forest soil rich in micronutrients, organic content and humus. The fertile soil in the forest will helps in establishing the different flora. The collection of fungal samples in the Darapalli and Kondapalli reserve forest of Central Eastern Ghats, was done during May 2018 to February 2019. The phenotypical or morphological characters of fungal specimen confirm the identity of wood decaying

fungi as *Artolenzites acuta* (Berk) Mossebo & Ambit comb., *Cubamyces flavidus* (Lév.) Lücking, *Cubamyces lactineus* (Berk.) Lücking, *Daedaleopsis confragosa* (Bolton) J. Schröt., *Daldinia concentrica* (Bolton) Cesati & De Notaris, *Daldinia childiae* J.D. Rogers & Y.M. Ju,. *Funalia aspera* (Jungh.) Zmitr. & V. Malysheva, *Ganoderma applanatum* (Pers.) Pat, *Ganoderma lipsiense* (Batsch) G.F. Atk., *Gloeophyllum sepiarium* (Wulfen) P. Karst. *Lenzites eximia* Ber. and Curt, *Phellinus badius* (Cooke) Cunn, *Phellinus gilvus* (Schw., Fr.) Pat., *Phylloporia pectinata* (Klotzsch) Ryvarden, *Trametes gibbosa* (Pers.) Fr., Epicrisis. New records of wood decaying fungi from Darapalli Reserve forest of Andhra Pradesh was *A. acuta*, *C. flavidus*, *D. confragosa*, *G. sepiarium*, and *L. eximia*. New records of wood decay fungi from Kondapalli reserve forest of Andhra pradesh was *C. lactineus*, *D. Childiae*, *F. aspera*, *G. lipsiense*, *P. badius*, *P. gilvus*, *P. pectinata* and *T. gibbosa*. For the first time all the wood decay fungi was reported from Central Eastern Ghats, India. For the first time *Cubamyces flavidus* (Lév.) Lücking, is reported from India. *C. lactineus* (Berk.) Lücking,, *F. aspera* (Jungh.) Zmitr. & V. Malysheva, and *P. pectinata* (Klotzsch) Ryvarden was reported second time from India. All the wood decaying fungi was a good source of nutrition and having wide range of medicinal values. So the present study will provide wide scope in the field of pharmaceutical and drug development in which different fugal samples were used as raw materials. The correct or proper identification of fungal samples very much needed in traditional medicine.

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