Journal of Plant Development Sciences
Meerut, India

RESEARCH ARTICLE

WOOD-DECAYING CRUST FUNGI OF SAL FORESTS: AN ANNOTATED CHECKLIST FROM KODERMA WILDLIFE SANCTUARY, JHARKHAND

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Received-25.04.2026, Revised-09.05.2026, Accepted-29.05.2026

Abstract: Corticoid fungi are not a natural and well-defined group but assemblage of many ecological life forms which are kept together for the convenient of survey, collection, characterization, identification, documentation and preservation. In the present communication an annotated checklist of 20 taxa falling under 11 genera belonging to 9 families showing similar ecological life forms i.e. crusty basidiomata, also known as corticoid fungi is being provided.

Keywords: Crust fungi, India, Jharkhand, Koderma, Taxonomy

INTRODUCTION

Kingdom Fungi represents one of the most taxonomically diverse kingdoms. Fungi are multicellular, organized as simple as mycelia, invisible to naked eye (micro-fungi) to complex and well developed, tiny to large sized and variously shaped fruiting bodies, which can be termed as "Macrofungi". Corticioid fungi are a diverse and heterogeneous group of fungi which are usually consist resupinate form of Basidiomata. However, Basidiomata of these groups of fungi are simple and consist only generative hyphae in most of the species but, more or less sclerified hyphae are also found in some species. The Hymenophore in these groups of fungi may be smooth or sometimes with different variations to increase the spore production area such as rugose, tuberculate, aculeate, merulioid, folded, or poroid hymenial surfaces. Micro-morphologically these fungi surprise us with a great diversity of forms of basidia, cystidia, spores and other microscopic elements (Hjortstam et al. 1987). For survival they are largely depends upon the wood and completing their life cycle by causing either white- or brown-rot on the host wood.

Koderma Wildlife Sanctuary, situated in the northern Part of Jharkhand, India (24°25′–24°38′ N and 85°25′–85°40′ E), with an area of 150 km² of predominantly dry deciduous forest within the Chotanagpur Plateau (Figure 1). Macrofungi constitute a vital component of the sanctuary's trophic architecture, functioning as saprotrophs, parasites, and mycorrhizal symbionts. These fungi facilitate nutrient cycling, organic matter decomposition, and symbiotic interactions with vascular plants, thereby enhancing forest resilience and productivity. The sanctuary's fungal diversity remains underexplored, but a comprehensive study of wood rotting Fungi by BSI indicates a high representation of Basidiomycetes, particularly corticioid and polyporoid taxa associated with decaying wood and leaf litter.

MATERIALS AND METHODS

During the year 2013-2019 Corticoid fungus were contineoously monitored and collected in the months of June to November in order to fulfill the objectives of survey and collection from various regions of Koderma Wildlife Sanctuary, Jharkhand. Habitat and habit images of each taxon were taken with the help of Digital Camera followed by assigning a unique field number to each specimen. Essential informations like locality name, GPS coordinates, habitat type, substratum or host, and macro-morphological features along with suitable reference measuring tool of the fruiting bodies were noted down and specimens were kept in brown paper bags with a unique collection number for every specimen. Fresh samples were macroscopically examined on the same day upon return to the base camp. Dried specimens were stored in airtight zip-lock bags.

In the laboratory, macro-morphological features were re-examined using an Olympus SZ51 stereo-zoom dissecting microscope. Micro-morphological observations including measurements of

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taxonomically important structures are based upon on free-hand sections of dried material stained with 5% KOH and phloxin, and mounted in 30% glycerol. Cyanophilic reactions and amyloidy tests were checked by using Cotton Blue and Melzer's reagent. Microscopic structures like hyphae, cystidia, setae, basidia, and other sterile elements were measured and examined under 100X magnification.

RESULTS

During the survey more than 50 localities of the study area were surveyed and 38 specimens of Corticoid fungi were collected. After two folds critical examination of morphological characterization in the field and laboratory we assigned them into 20 taxa. In this study we successfully recovered 9 families, 14 genera and 20 species each is having unique combination of macro- and micro-scopic features and adopted to either saprophytic or parasitic mode of nutrition. Phanerochaetaceae is having three genera namely *Phanerochaete* and *Phlebiopsis* are represented by two species each whereas, *Porostereum* is represented by one species. Hymenochaetaceae is a unique family which is characterized by the Xanthochoric reaction in which taxa are reactive to KOH solution and permanently changes into black color is being represented by one genus i.e. *Hymenochaete* and four species showing highly diversified genus. In the family *Peniophoraceae* three genera namely *Duportella*, *Peniophora* and *Scytinostroma* each with single species is recorded. Whereas, *Cerrenaceae*, *Corticiaceae*, *Irpicaceae*, *Phleogenaceae*, *Polyporaceae* and *Serpulaceae* circumscribes single genera each with single species.

Duportella tristicula (Berk. & Broome) Reinking, *Philipp. J. Sci*. **17**: 364 (1920).

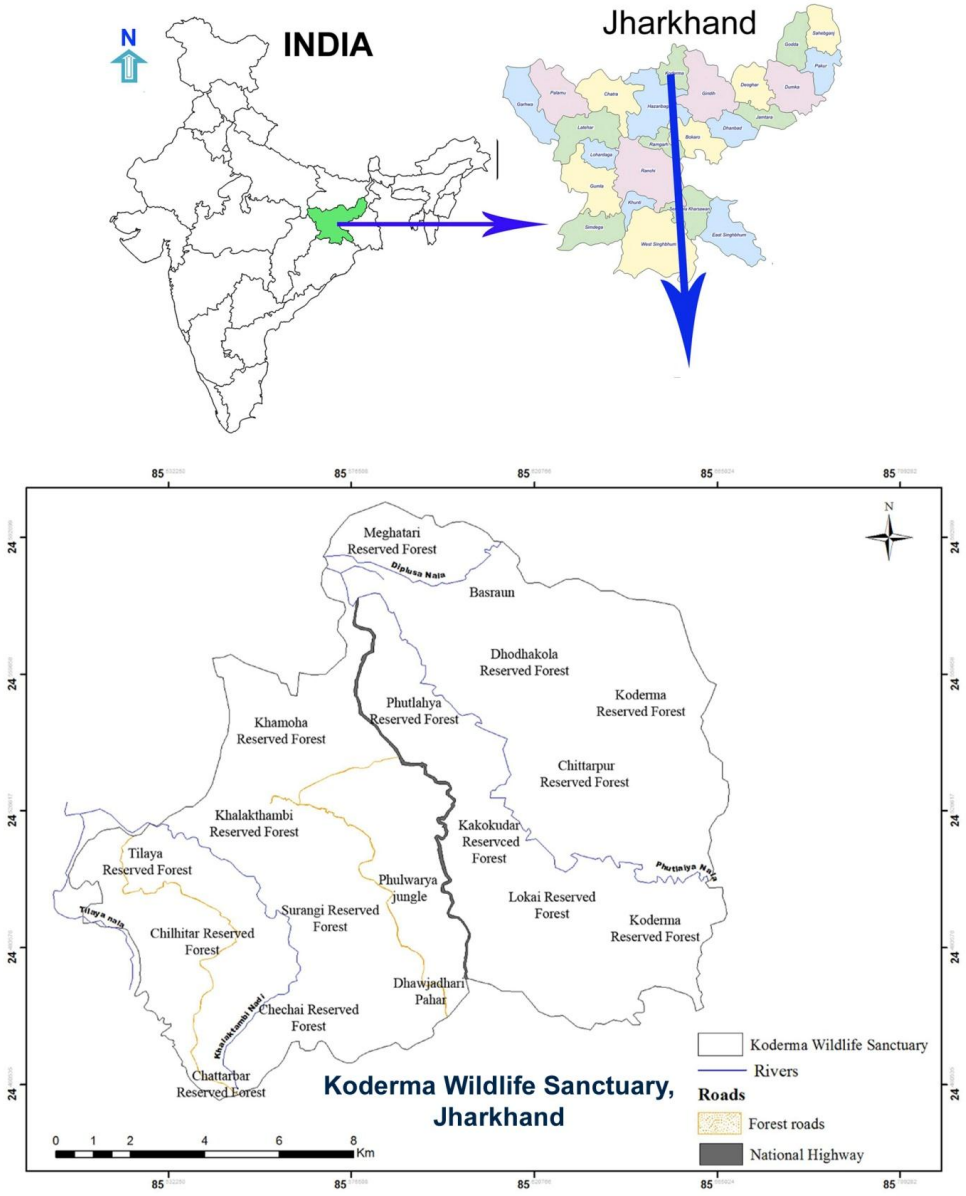

Figure 1: Map of Koderma Wildlife Sanctuary, Jharkhand

Figure 2: A. *Phlebiopsis friesii*; B. *Peniophora lycii*; C. *Gyrodontium sacchari*; D. *Hymenochaete conchata*; E. *Scytinostroma duriusculum*; F. *Hymenochaete rubiginosa*; G. *Hymenochaete villosa*; H. *Pseudolagarobasidium subvinosum*; I. *Hymenochaete rheicolor*; J. *Flavodon flavus*; K. *Lyomyces sambuci*.

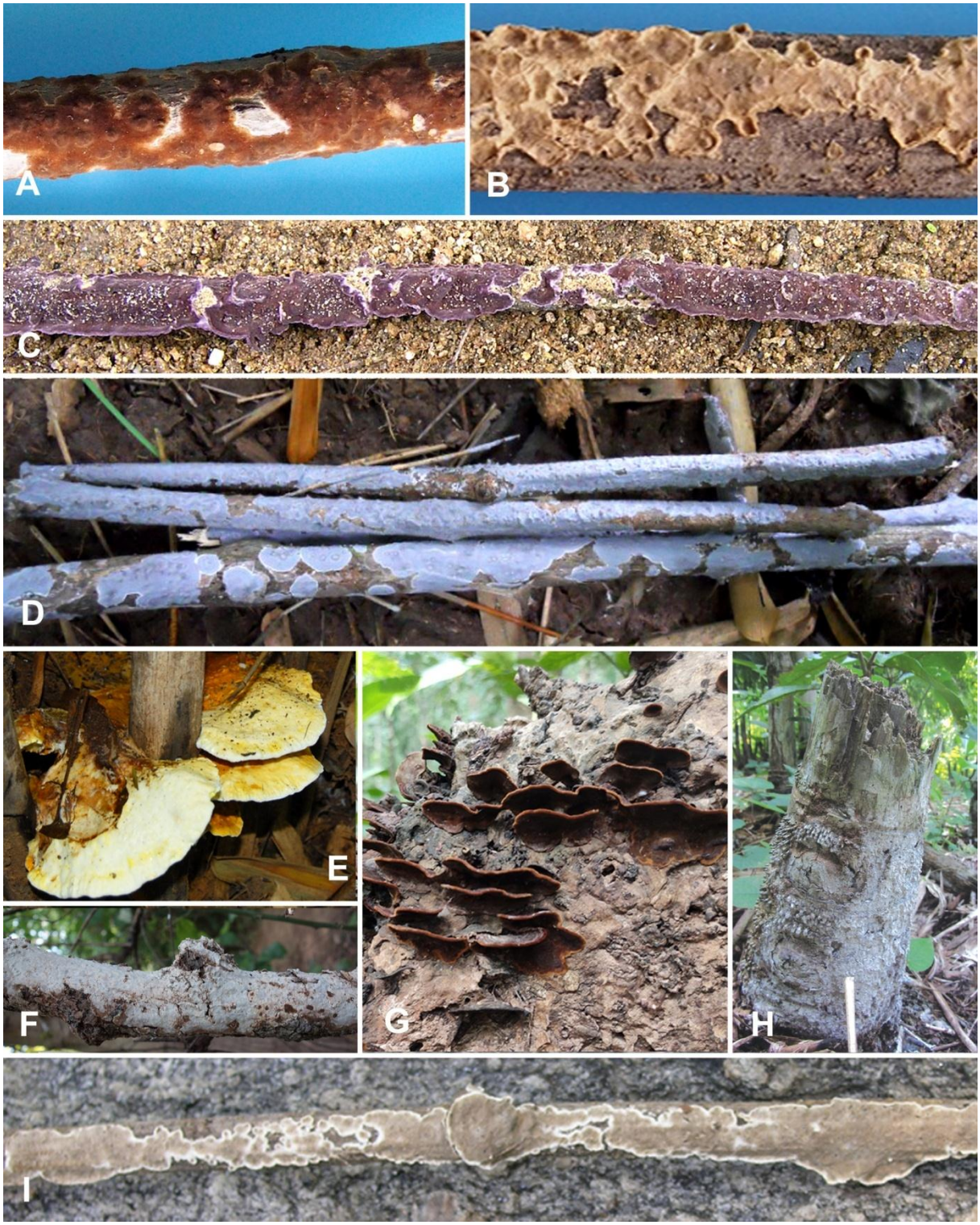

Figure 3: A. *Duportella tristicula*; B. *Phlebiopsis crassa*; C. *Porostereum spadiceum*; D. *Grammothele fuligo*; E. *Serpula similis*; F. *Phanerochaete affinis* G; *Hymenochaete variegata*; H. *Helicogloea globosa*; I. *Phanerochaete velutina*

LEGENDS FOR FIGURES

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Figure 2: A. *Phlebiopsis friesii*; B. *Peniophora lycii*; C. *Gyrodontium sacchari*; D. *Hymenochaete conchata*; E. *Scytinostroma duriusculum*; F. *Hymenochaete rubiginosa*; G. *Hymenochaete villosa*; H. *Pseudolagarobasidium subvinosum*; I. *Hymenochaete rheicolor*; J. *Flavodon flavus*; K. *Lyomyces sambuci*.

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G; *Hymenochaete variegata*; H. *Helicogloea globosa*; I. *Phanerochaete velutina.*

Specimen examined: INDIA, Jharkhand, Koderma, KWLS, near phulwaria road, alt. 368 m, 06 Oct., 2012, N24°29′42.2″ E85°35′20.0″, on dead thin branches, *Arvind Parihar*, AP 6569.

Notes: This species is widely distributed especially on the dead thin branches along the road sides. Most specimens were observed to be sterile, particularly the fresh collections, which displayed a dark brown, velvety hymenial surface with a distinct golden-brown margin and a more or less leathery basidiomata. However, a few specimens were fertile, showing mature basidiomata that were papery-thin, brittle, and ochraceous to greyish-white in colour, with an indistinct margin on macroscopic examination. Microscopically, gloeocystida filled with encrusted contents and apically encrusted pseudocystidia are the combination of features to identify the young basidiomata as *D. tristicula*.

Flavodon flavus (Klotzsch) Ryvarden, *Norw. Jl Bot*. **20**(1): 3 (1973); *Irpex flavus* Klotzsch, *Linnaea* **8**(4): 488 (1833). Figure 1(J)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Meghatari, Diplaswa nala, alt. 300 m,N24°35′32.8″ E85°34′51.8″, on a dead wood log, 13 Sept.2010, *Arvind Parihar*, AP 44976; ibid., KWLS, Meghatari, Suggi point, alt. 300 m, N24°35′32.8″ E85°34′51.4″, on a dead standing log, 15 Aug., 2011, *Arvind Parihar*, AP 45053; ibid., KWLS, Meghatari, Durwasha rishi pahar, alt. 300 m, N24°35′19.6″ E85°34′531.0″, on a dead wood log, 16 Aug., 2011, *Arvind Parihar*, AP 45077; ibid., KWLS, Meghatari, Durwasha rishi pahar, alt. 300 m, N24°35′19.68″ E85°34′31.0″, on a dead wood log, 04 Oct., 2012, *Arvind Parihar*, AP 6529, AP 6534; ibid., KWLS, Khalakhtambhi, alt. 310 m, N24°31′59.1″ E85°33′55.8″, on a dead thin branches, 10 Oct., 2012, *Arvind Parihar*, AP 6602; ibid., KWLS, Chatarbar, Mahuatad, alt. 330 m, N24°28′22.8″ E85°34′07.6″, on a dead twigs, 12 Oct., 2012, *Arvind Parihar*, AP 6624; ibid., KWLS, Taraghati, alt. 290 m, N24°32′05.1″ E85°35′42.1″, on a living shrub, 18 Sept., 2013, *Arvind Parihar*, AP 6635.

Notes: Almost all kind of economically important dead woods either fallen in forest or kept in various prmises and houses are severely attacked by this species in the entire areas except monocots/bamboos. Present species a well known white rot causing agent can easily be identified with the help of bright yellow to egg yellow coloured polymorphic hymenophore which have tendency to form angular to circular pores to iripicoid to hydnoid to irregular teeth like structures. So far it's basidiomata shapes are concerned they are equally variable like their hymenophore ranging from resupinate to effused reflexed to pileate forms depending upon the place and position of the host however, dimitic hyphal system with non clamped generative hyphae and cylindrical clavate encrusted cystidia are the constant features to identify this species.

Grammothele fuligo (Berk. & Broome) Ryvarden, *Trans. Br. mycol. Soc.* **73**(1): 15, 1979; *Polyporus fuligo* Berk. & Broome, *J. Linn. Soc*., Bot. **14**(no.73): 53, 1875. Figure 2(D)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Lokai, alt. 337 m, N24°29′35.8″ E85°57′33.4″, on a dead thin branch, 08 Oct., 2012, *Arvind Parihar*, AP 6583

Note: Growing exclusively on woody monocots and causes white rot on them. Morphologically, its grayish brown to bluish white hymenophore with minute pores almost invisible to the naked eyes makes it easy to identify in the field. Microscopically, presence of dendrohyphidia and hymenophore being limited at base of tubes are significant to identify.

Gyrodontium sacchari (Spreng.) Hjortstam, *Mycotaxon* **54**: 186 (1995); *Hydnum sacchari* Spreng.:Fr. *Syst. Mycol*. **I**: 416 (1821). Figure 1 (C)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Koderma enclosure, alt. 369 m, N24°30′17.1″ E85°35′30.8″, on dead bamboos, 08 Sept., 2010, *Arvind Parihar*, AP 44958

Notes: Present species is widely distributed in the tree inhibiting continents. This is a monotypic species under the genus though, designated by various names by various workers (www.indexfungorum.org). But detailed and critical studies of these misidentified taxa (Hjortstam, 1995) reveal them as *Gyrodontium sachari*. Features like resupinate to effused-reflexed basidiomata which is easily separable from its host, thick and yellowish white subiculum, distinctly hydnoid olive-green to sulphurecolured hymenophore, thick-walled septate generative hyphae, absence of cystidia and strongly dextrinoid and cyanophilic basidiospores are identifying and unique for this species.

Helicogloea globosa Chee J. Chen & Oberw., *Mycotaxon* **76**: 280 (2000). Figure 2(H)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Basraun, alt. 378 m, N24°44'51.9″ E85°42'34.6″, on a dead twig, 06 Sept., 2010, *Arvind Parihar*, AP 44939

Notes: Genus *Helicogloea* is sharing similar habit and habitat like other corticoid macrofungi and characterized by widely effused, resupinate basidiomata. However, when microscopically investigated it shows peculiar features including variable thickness of basidiomata, gelatinous subhymenium, probasidia with lateral sacs and usually stalked metabasidia (Baker, 1936 and Chen and Oberwinkler, 2000).

Hymenochaete conchata L.W. Zhou, *Phytotaxa* 273(3): 202 (2016). Figure 1(D)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Koderma enclosure, alt. 369 m,

N24°36′58.8″ E85°59′30.3″, on the living *S. robusta* trunk, 17 Sept., 2010, *Arvind Parihar*, AP 44997

Notes: It usually found to grow exclusively on dead branches, stumps and living trees of *Shorea robusta* throughout the study areas. Morphologically, presence of duplex subiculum with context, abundant subulate hymenial setae, dense setigerous layer and oblong ellipsoid basidiospores are identifying features of this species.

Hymenochaete rheicolor (Mont.) Lév., *Annls Sci. Nat*., Bot., sér. 3 **5**: 151 (1846); *Stereum rheicolor* Mont., *Annls Sci. Nat*., Bot., sér. 2 **18**: 23 (1842). Figure 1(I)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Koderma enclosure, alt. 389 m, N24°29′18.7″ E85°35′50.1″, on a dead wood log, 08 Sept., 2010, *Arvind Parihar*, AP 44959; ibid., KWLS, Meghatari, Suggi point, alt. 369 m, N24°33′54.7″ E85°34′55.2″, on a dead wood log, 08 Sept., 2010, *Arvind Parihar*, AP 45043.

Notes: Its pileus (reflexed part which itself is quite distinct in the field upper surface remain silky fibrous weakly zonate and concentrically sulcate; can be easily folded without breaking seems good field characters to identify. Microscopically, longest (among known species of *Hymenochaete* from the study area) cylindrical to narrowly ellipsoidal and guttulate basidiospores (6.5–7.5 µm long) are unique identifying characters.

Hymenochaete rubiginosa (Dicks.) Lév., *Annls Sci. Nat*., Bot., sér. 3 **5**: 150 (1846); *Helvella rubiginosa* Dicks., *Fasc. pl. crypt. brit*. (London) **1**: 20 (1785). Figure 1(F)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Mughalamaran, alt. 369 m, N24°30′59.7″ E85°34′29.4″, on a living tree, 03 Sept., 2010,*Arvind Parihar*, AP 44907; ibid., KWLS,Basraun, alt. 359 m, N24°34′48.9″ E85°37′44.8″, on a dead standing log, 06 Sept., 2010,*Arvind Parihar*, AP 44938; ibid., KWLS, Koderma enclosure, alt. 339 m, N24°29′18.7″ E85°35′50.1″, on a dead log, 08 Sept., 2010,*Arvind Parihar*, AP 44953; ibid., KWLS,Kodermaenclosure, alt. 329 m, N24°29′42.9″ E85°35′63.8″, on a living tree, 11 Aug., 2011,*Arvind Parihar*, AP 45020; ibid., KWLS, Meghatari, Suggi point, alt. 319 m, N24°33′54.7″ E85°34′55.2″, on a dead standing log, 15 Aug., 2011,*Arvind Parihar*, AP 45055; ibid., KWLS, Dhodhakhola, alt. 328 m, N24°30′36.6″ E85°39′30.1″, on a dead tree, 17 Aug., 2011,*Arvind Parihar*, AP 45084; ibid., KW1LS, Meghatari, Sambhu bhura mines, alt. 310 m, N24°35′02.3″ E85°35′29.6″, on a dead standing log, 03 Oct., 2012,*Arvind Parihar*, AP 6517; ibid., KWLS, Meghatari, Suggi point, alt. 319 m, N24°33′54.7″ E85°34′55.2″, on a dead standing log, 15 Aug., 2011,*Arvind Parihar*, AP 6546.

Notes: Present species is widely distributed in tropical India (Cunningham, 1957; De, 2008; Sharma, 1995, 2012). Macroscopic features of present species like effused-reflexed, woody pileate basidiomata with villose zonate pilear surface are good identifying charecters.

Hymenochaete variegata Bres., *Hedwigia* **56**: 301 (1915). Figure 2(G)

Specimen examined: INDIA, Jharkhand, Koderma, KWLS, Chatarbar, Mahuataan, alt. 230 m. 12 Oct., 2012, N24°27′59.3″ E85°33′56.7″, on a dead wood log, *Arvind Parihar*, AP 6623.

Notes: The thin, shiny, confluent, flexible and yellowish basidiomata with smaller hymenial setae and basidiospores differetiate it from *H. rubiginosa*.

Hymenochaete villosa (Lév.) Bres., *Annls mycol*. **8**(6): 588 (1910); *Stereum villosum* Lév., *Annls Sci. Nat*., Bot., sér. 3 **2**: 212 (1844). Figure 1(G)

Specimens examined: INDIA; Jharkhand, KWLS, Khalakhtambhi, alt. 356 m, N24°31′59.1″ E85°33′55.8″, on the fallen branches of unknown wood, 10 Oct., 2012, *Arvind Parihar*, AP 6604.

Notes. Present species is characterized by resupinate basidiomata with date brown to umber brown smooth hymenial surface with light yellow to corn colored floccose to fibrous marginin. Microscopically, hymenial setae which arise from hymenium and subhymenium are very characteristic. Scrutiny of literature (Cunningham, 1957 and De, 2008) reveals the report of basidiomata of *H. villosa* as effused-reflexed but only resupinate forms of specimens were recovered from present survey and collection. Microscopic features like organization of subiculum (presence of context near base), hyphal and setal dimension and orientation were found agreeable with the earlier report.

Lyomyces sambuci (Pers.) P. Karst., *Bidr. Känn. Finl. Nat. Folk* **37**: 153 (1882); *Corticium sambuci* Pers., *Neues Mag. Bot*. **1**: 111 (1794). Figure 1(K)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Baghitan road, Lokai, alt. 370 m, N24°19′42.8″ E85°25′10.8″, on a decaying tree log, 10 Aug., 2011, *Arvind Parihar*, AP 45015

Notes: Present species was known earlier from temperate regions of North West Himalaya (Prashar, 2015) and southern peninsular regions of India (Natarajan and Kolandavelu, 1998). *Lyomyces sambuci* is characterized by chalky white resupinate, sparsely tuberculate hymenophore, clamped generative hyphae and projecting papillate cystidia which is projected beyond hymenium (Prashar, 2015). However, Natarajan and Kolandavelu (1998) have mentioned smooth nature of cystidia whereas, encrusted cystidia are found in present observation that completely agree with other extralimital materials (Eriksson and Ryvarden, 1976; Wu, 1990; Bernichia and Gorjón, 2010 and Yurchenko and Wu, 2016).

Peniophora lycii (Pers.) Höhn. & Litsch., *Sber. Akad. Wiss. Wien*, Math.-naturw. Kl., Abt. 1 **116**: 747 (1907) [1906]; *Thelephora lycii* Pers., *Mycol. eur*. (Erlanga) **1**: 148 (1822). Figure 1(B)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Koderma enclosure, alt. 360 m,

N24°29′28.3″ E85°38′36.1″, on dead thin branches, 08 Sept., 2010, *Arvind Parihar*, AP 44954.

Notes: *Peniophora lycii* is characterized by wide globose encrusted cystidia and presence of dendrohyphidia (Lambevska, 2015) an ecological adaptation against drought (Bernicchia and Gorjón, 2010). At a glance the present species is microscopically appears peculiar due to presence of richly branched dendrohyphidia, obovate to subglobose encrusted cystidia and acute to obtuse sulphocystidia. Its, whitish blue grey hymenophore with sparsely distributed tubercules/papillae in basidiomata macroscopically coupled with dimensions of basidiospores length and other sterile structures microscopically are identifying features of the present species.

Phanerochaete affinis (Burt) Parmasto, *Consp. System. Corticiac*. (Tartu): 84 (1968); *Peniophora affinis* Burt, *Ann. Mo. bot. Gdn* **12**: 266 (1926) [1925]. Figure 2(F)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Koderma enclosure, alt. 388 m, N24°29′18.7″ E85°35′50.1″, on a dead thin branch, 14 Sept., 2010, *Arvind Parihar*, AP 44986.

Notes: Previously this species is known to occure at North Western Himalaya (Prasher, 2015) and Southern Peninsular India (Natarajan and Kolandavelu, 1998). Macroscopically, white to cream, smooth, resupinate to effused-reflexed basidiomata with floccose to fibrous margin are striking feature for identification, whereas, microscopically subiculum is characteristic because it bears loose crystals imbedded on it and possess thin- to moderately thick-walled generative hyphae in which width doesn't remain uniform.

Phanerochaete velutina (DC.) P. Karst., *Kritisk Öfversigt af Finlands Basidsvampar*, (Basisiomycetes; Gastero- andHymenomycetes) (Helsingfors) **3**: 33 (1898); *Thelephora velutina* DC., in de Candolle and Lamarck, *Fl. franç*., Edn 3 (Paris) **5/6**: 33 (1815). Figure 2(I)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, near Phulwaria. 388 m, 06 Oct., 2012, N24°29′34.2″ E85°35′33.7″, on a dead thin branch, *Arvind Parihar*, AP 6562.

Notes: Earlier this species is known to be distributed in Western Ghats (Ranadive et al., 2011) and Western Himalaya (Prasher, 2015) only. The resupinate basidiomata which is yellowish white to pale yellow when fresh and becoming yellowish brown on drying are the notable features of this species. Microscopically abundant encrusted cystidia which remains subcylindrical, comparatively thick-walled (up to 3 µm thick) and much longer projection (upto 50 µm) beyond hymenium are characteristic features for this species (Bernichia and Gorjón, 2010 and Prasher, 2015).

Phlebiopsis crassa (Lév.) D. Floudas and Hibbett, *Fungal Biology* **119**: 710 (2015); *Thelephora crassa* Lév., *Annls Sci. Nat*., Bot., sér. 3 **2**: 209 (1844). Figure 2(B)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Meghatari, Durwasha rishi pahar, alt. 308 m, 04 Oct., 2012, N24°35′29.5″ E85°34′43.3″, on dead thin branches, *Arvind Parihar*, AP 6532; ibid., KWLS, Chatarbar,Dumariya tan, alt. 386 m, 21 Sept., 2013, N24°32′20.0″ E85°35′01.0″, on dead thin branches, *Arvind Parihar*, AP 6653.

Notes: This is a common and easily recognized species in the field due to it's brown to purple colored basidiomata with narrowly reflexed margin. But, confused with *Hypoxylon haematostroma* Mont. (a carbon and cushion fungi commonly occupying similar habitat) as both of them possess similar macromorphology (pale purple colored corticoid fruiting bodies). But, present species still can be distinguished because it doesn't bear any papillate ostiole like *H. haematostroma* (belongs to the phylum Ascomycota).

Phlebiopsis friesii (Lév.) Spirinand Miettinen, in Miettinen, Spirin, Vlasák, Rivoire, Stenroos and Hibbett, MycoKeys 17: 25 (2016); *Thelephora friesii* Lév., *Syst. Verz*.: 17 (1854). Figure 1(A)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Koderma NRF, alt. 388 m, N24°39′28.30″ E85°56′59.60″, on dead wood log, 13 Aug., 2011, *Arvind Parihar*, AP 45034.

Notes: Macromorphologically, turning (with the application of KOH) of basidiomata to violet is a worth mentioning macroscopic feature for identification. Apart from leathery nature of basidiomata with pale cinnamon brown wrinkled to folded hymenophore, coarsely encrusted hyaline cystidia are its characteristic microscopic features (Hjortstam and Ryvarden, 1990 and Tiwari et *al*., 2010).

Porostereum spadiceum (Pers.) Hjorstam & Ryvarden, *Syn. Fung.* (Oslo) **4**: 51 (1990); *Lopharia fulva* (Lév) Boidin, *Bull.mens. Soc. linn.Soc. Bot.* Lyon **28** (7): 213 (1959). Figure 2(C)

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Meghatari, Durwasha rishi pahar, alt. 348 m, 04 Oct., 2012, N24°35′29.5″ E85°34′43.3″, on dead thin branches, *Arvind Parihar*, AP 6535.

Notes: Morphologically brown coloured resupinate to effused-reflexed basidiomata with pseudo-dimitic hyphal system (basal part of skeletocystidia appear as skeletal hyphae) and encrusted hyaline cystidia are unique characters to identify the present species. Possession of another important feature i.e. origin of skeletocystidia from basal part of subiculum is also on conformity with the earlier statement made by Wu and Chen (1992).

Pseudolagarobasidium subvinosum (Berk. & Broome) Sheng H. Wu, Acta bot. fenn. 142: 113 (1990); *Hydnum subvinosum* Berk. & Broome, *J. Linn. Soc., Bot.* **14**(no. 73): 60 (1873) [1875]. Figure 1(H).

Specimens examined: INDIA, Jharkhand, Koderma, KWLS, Koderma enclosure, alt. 358 m, N24°39′21.7″ E85°35′48.4″, on a dead tree trunk branch, 07 Oct., 2012, *Arvind Parihar*, AP 6577.
Notes: Closely adnate basidiomata with obtuse to acutely toothed greyish violet to bluish violet hymenophore which being developed from meruloid surface when young are characteristic in the present species. Microscopically, presence of gloeocystidia is an additional identifying feature within family. Earlier, this species was recorded from Kerala growing on similar host (Sankaran and Sharma, 1986) but unfortunately not included in any checklist and references of Indian mycobiota.
Scytinostroma duriusculum (Berk. & Broome) Donk, *Fungus* **26**: 20, 1956; *Stereum duriusculum* Berk. & Broome, *J. Linn. Soc*. Bot. **14**: 66, 1873. Figure 1(E)
Specimens examined: **Specimen examined**: India, Jharkhand, Koderma, KWLS, Koderma enclosure, alt. 390 m N24°29′18.7″ E85°35′50.1″, on a dead tree log, 16 Sept., 2010, *Arvind Parihar*, AP 44988.
Notes: Whitish cream to yellowish white, leathery resupinate basidiomata with smooth hymenial surface is distinguishing macro-morphological feature of this species. Microscopically, dimitic hyphal systems with septate generative hyphae and thick-walled dextrinoid skeletal hyphae (dichohyphidia) and globose amyloid basidiospores are the important characters of this species.
Serpula similis (Berk. and Broome) Ginns, *Mycologia* **63**(2): 231, 1971; *Merulius similis* Berk. & Broome, *J. Linn. Soc*., Bot. **14** (no. 73): 58, 1873. Figure 2(E)
Note: This species was found to grow exclusively on dead and living bamboo culms in the entire study area. Its glutinate leathery resupinate to effused-reflexed to pileate basidiomata with chalky consistency, folded and pale brown to orange yellow hymenophore are quite characteristic. In the field young basidiomata of *Gyrodontium sacchari* is often mistaken as present species because both attains almost similar habit and habitat i.e. similar shape and size of pileus and association with bamboos; although, *G. sacchari* prefers to grow on other dicot hosts as well. Moreover, presence of toothed hymenophore in *G. sacchari* easily distinguishes it from the present species.

DISCUSSION

Ecologically, *Hymenochaete conchata* and *Serpula similis* were found host specific and showing pathogenic nature causing brown rot on *Shorea robusta* and Bamboos successively in the entire study areas. But, rest eighteen species are successfully recovered from various other angiospermic woods showing the saprophytic nature of habit. *Grammothele fuligo* is also host specific particularly affecting abundantly the monocots species belonging to the Bamboos and Palms in the Koderma Wildlife Sanctuary.
So far hymenial configurations is concerned most of the species are having smooth hymenophore like *Duportella tristicula, Helicogloea globosa, Hymenochaete conchata*, *Phanerocahete affinis, P. velutina*, *Phlebiopsis crassa*, *P. freisii*is. *Grammothele fuligo* is having minutely shallow pores whereas *Serpula similis* is having meruloid hymenophore configuration. Some of the species like *Xylodon sambuci*, *Peniophora lycii* are having papillate hymenophore whereas *Flavodon flavus* and *Gyrodontium sacchari* are having distinct toothed hymenophore.
All these species caused various types of rots to the trees of Koderma Wildlife Sanctuary, Jharkhand and plays an important role in the Ecology of the forest ecosysytem. The majority of the species—including *Duportella tristicula*, *Flavodon flavus*, *Grammothele fuligo*, *Pseudolagarobasidium subvinosum*, and other members of the genera *Hymenochaete*, *Phanerochaete*, *Phlebiopsis*, and *Peniophora* were responsible for causing white rot fungi. These organisms are characterized by their ability to degrade lignin alongside cellulose and hemicellulose, often producing oxidative enzymes such as laccases and peroxidases. However, *Serpula similis* and *Gyrodontium sacchari*, were classified as a brown rot fungus and decay nature caused by *Helicogloea globbosaa* is still unclear.

ACKNOWLEDGEMENTS

We extend our sincere gratitude to the Director of the Botanical Survey of India (BSI), Kolkata, and the Head of Office of BSI, AZRC, Jodhpur and Head of Office of BSI, ISIM, Kolkata for providing facilities.

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