

## Wood decay fungi of Bangladesh

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Bangladesh is a tropical country (20° 34'-26° 38' North and 88° 01'-92° 41' East) with an area of 1,47,570 square kilometers. Bangladesh is very rich in biodiversity of wood decay fungi. A qualitative survey of wood rotting and decay fungi on living trees and timbers has been carried out and 115 species of wood decay fungi belonging to 29 genera have been identified of which four are new records from Bangladesh. Wood decay fungi are one of the main bio-degrading agents of the forest. It has been revealed from this study that healthy and vigorously growing trees are usually able to resist decay fungi by out-growing them or by stopping them with barriers but wounded and weakened trees are susceptible to invasion.

**Key words :** Biodiversity, wood decay, wood decay fungi, white rot, brown rot.

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### INTRODUCTION

Bangladesh is a tropical country (20° 34'-26° 38' North and 88° 01'-92° 41' East) with an area of 1,47,570 square kilometers. For ecological balance 36% of land area of a country should be under forest and if it becomes less than 25% it may disturb the ecological balance. According to Bangladesh Bureau of Statistics (B B S) only 14% of the land area of the country is covered with forest.

Very little research work on wood rotting and decay fungi had been carried out earlier in Bangladesh. Shayesta and Rahman (1992) published a list of 67 species of wood decay fungi in *Forest Trees and Timbers of Bangladesh*. Shayesta *et al.* (1999) published a checklist of 167 species of fungi.

Decay fungi are an integral part of forest ecosystems of Bangladesh and can be viewed as both beneficial and detrimental to the health, function and productivity of forests. Decay is the process of disintegration by which sound wood is decomposed.

### MATERIALS AND METHODS

A qualitative survey of wood decay fungi on living trees, timbers and wood in use in Bangladesh has been carried out in this study. About 1620 specimens of wood decay fungi have been collected from different phytogeographical regions of Bangladesh.

The sporophores of wood decay fungi as well as the rotten woods, if present, were collected both during the monsoon and dry seasons. The complete field notes and microscopic details were recorded just after collection. Every efforts were made to identify the speices of the tree upon which the decay fungi were growing, whether on hard-woods or conifers. The nature and part of trees decayed viz. roots, stems, sap wood or heart wood were also noted. Specimens of wood decay fungi after processing have been maintained in the personal herbarium of the author.

Isolation of wood decay fungi was carried out on 2% malt extract agar (20 g malt extract, 15-20 g agar, 1 litre. distilled water). The wood decay fungi

Table - 1 : Major wood decay fungi and their hosts in Bangladesh

Fungus species	Host (s)	Wood decay characteristic	Area (s) of distribution of fungus
1	2	3	4
<i>Daedalea andamani</i> Berk	<i>Shorea robusta</i> Gaertn.	Brown rot	Sal forests of Modhupur, Tangail, Gazipur, Mymensingh.
<i>D. flavida</i> Lev.	<i>Excoecaria agallocha</i> Linn. <i>Shorea robusta</i> Gaertn.	White spongy rot	Mangrove forest of the Sundarbans and Sal forests or Gazipur, Tangil, Mymensingh.
<i>D. zonata</i> Schw.	<i>Tectona grandis</i> Linn. <i>Heritiera fomes</i> . Buch. Ham.	White rot White decay of sap wood	Chittagong and Chittagong Hill Tracts Sundarbans
<i>Daedaleopsis confragosa</i> ( <i>D. confragosa</i> )	<i>Dipterocarpus</i> spp	White spongy rot	Chittagong and Sylhet forests.
<i>Ganoderma applanatum</i> (Per ex. Wallr. Pat.	<i>Mesua nagassarium</i> Kost. <i>Morus alba</i> Linn. <i>Acacia nilotica</i> L. <i>Artocarpus heterophyllus</i> Lam. <i>Dalbergia sisso</i> Roxb. <i>Tectona grandis</i> Linn. <i>Mangifera indica</i> Linn	White rot	Throughout Bangladesh
<i>G. lucidum</i> (Leys) Karst.	<i>Samanea saman</i> (Jacky.) Merr. <i>Mesua nagassarium</i> Kost. <i>Poinciana regia</i> Bog. Ex. Hook. <i>Mangifera indica</i> Linn <i>Samanea saman</i> <i>Dalbergia sisso</i> Roxb. <i>Acacia nilotica</i> (L) Del. <i>Areca Catechu</i> Linn.	White not and White root rot	Throughout Bangladesh
<i>G. Pseudoferrum</i>	<i>Hevea brasiliensis</i> Muell.	Root rot	Chittagong Hill Tracks.
<i>Fomes albomarginatus</i> (Zipp. ex. Lev) Cooke	<i>Shorea robusta</i> Gaertn. <i>Dipterocarpus</i> spp. <i>Elaeocarpus</i> sp.	White pocket rot	Chittagong Hills tracts Mymensinghs and Tangail.
<i>F. durissimus</i> Llyod	<i>Artocarpus heterophyllus</i> Lam. <i>Swietenia mahagoni</i> Linn.	Yellow Pocket rot	Mymensingh, Dhaka, Chittagong.
<i>F. badius</i> Berk	<i>Acacia catechu</i> Willd. <i>Heritiera fomes</i> Buch. Ham.	White spongy butt rot	Khulna and Sundarbans.
<i>F. lignosus</i> Klot. Bres.	<i>Hevea brasiliensis</i> Muell-Arg.	Root rot	Chittagong Hill Tracts.
<i>F. roseus</i> Alb. Schw. Cke.	<i>Gmelina arborea</i> Rox.	Brown rot	Chittagong.
<i>F. rimosus</i>	<i>Terminalia arjuna</i> (Roxb.) Wt. & Arn.	White rot	Throughout Bangladesh.
<i>Hexagonia tenuis</i>	<i>Artocarpus chaplasha</i> , <i>Mangifera indica</i> <i>Shorea robusta</i> Gaertn. <i>Samanea saman</i> (Jacq) Merr. <i>Casuarina equisetifolia</i> Forest.	White fibrous rot	Throughout Bangladesh.
<i>H. discopoda</i> Pat & Har.	<i>Mangifera indica</i> Linn.	White fibrous rot	Rajshahi Mymensingh, forest.
<i>Polyporus anebus</i> Berk	<i>Shorea robusta</i> Gaertn <i>Dipterocarpus</i> sp.	White rot	Modhupur Forest
<i>Bjerkandera adusta</i> ( <i>P. adustus</i> )	<i>Tectona grandis</i> Linn. <i>Shorea robusta</i> Gaertn.	White rot	Modhupur Forest Tangail, Savar.
<i>Trametes hirsuta</i> ( <i>P. hirsutus</i> )	<i>Gmelina arborea</i> , <i>Albizia chinensis</i> <i>Artocarpus chaplasha</i> . Roxb. <i>Lanestroemia speciosa</i> . (L.) Pers.	White spongy rot and Wood decay.	Throughout Bangladesh.
<i>Phellinus gilvus</i> ( <i>P. gilvus</i> Schw. Fries.)	<i>Dalbergia sisso</i> Roxb.	White spongy rot	Throughout Bangladesh.
<i>P. calcuttensis</i> Bose.	<i>Terminalia catappa</i> Linn. <i>Tamarindus indica</i> Linn.	Brown rot	Throughout Bangladesh.
<i>Pycnoporus cinnabarinus</i> ( <i>P. cinnabarinus</i> Jack ex. Fr.)	<i>Mangifera indica</i> Linn. <i>Quercus</i> sp, <i>Shorea robusta</i> .	Pocket rot	Rajshahi Mymensingh.

1	2	3	4
<i>P. shoreae</i> Wakf.	<i>Shorea robusta</i> Gaertn.	White Pocket rot (or Partridge rot)	Modhupur forest Gazipur Tangail, Mymensingh.
<i>P. xanthopus</i> Fr.	<i>Excoecaria agallocha</i> Linn. <i>Shorea robusta</i> Gaertn. <i>Syzygium</i> sp., <i>Dillenia indica</i> <i>Artocarpus chaplasha</i> Roxb.	White rot	Throughout Bangladesh.
<i>Poria rhizomorpha</i> Fr.	<i>Gmelina aroborea</i> Roxb. <i>Hydnocarpus Kurzii</i> King. Warb. <i>Bambusa</i> sp.	White rot and decay	Sylhet, Chittagong.
<i>P. diversispora</i> Berk & Br.	<i>Bambusa</i> sp.	White spongy rot.	Rajshahi Chittagong.
<i>P. vincta</i> .	<i>Tectona grandis</i> Linn.	White fibrous rot.	Chittagong.
<i>Poria</i> sp.	<i>Heritiera fomes</i> (B) Ham <i>Artocarpus chaplasha</i> Roxb. <i>Bambusa vulgaris</i> . Scard. <i>Artocarpus heterophyllus</i> Lam.	Whithe rot & Decay	Tangail, Dhaka, Sundarbans, Mymensingh.
<i>Schizophyllum commune</i> Fr.ex.Fr.	<i>Bombusa arundinacca</i> , <i>Bambusa</i> sp. <i>Mangifera indica</i> Linn, <i>Allbizia richardiana</i> , <i>Heritiera formes Unidentified logs</i>	White spongy rot.	Rajshahi, Sylhet, Dhaka, Sundarban, Savar.
<i>Trametes cingulata</i> Berk	<i>Mesua</i> sp. <i>Swintonia floribunda</i> Giff. <i>Shorea robusta</i> Gaertn.	White spongy rot	Dhaka sal forest of Modhupur.
<i>Daldinia Concentrica</i> (Fr.) ce & de Not.	<i>Artocarpus chaplaha</i> Roxb. <i>Dipterocarpus</i> sp.	White mottle rot	Sylhet and Chittagong.
<i>Xylaria</i> sp.	<i>Swintonia floribunda</i> , Giff. <i>Shorea robusta</i> Gaertn.	Root rot Wood decay	Fazipur
<i>Auricularia auricula</i> (Fr.) Schroet.	<i>Shorea rolusta</i> Gaertn. <i>Syzygium cumini</i> (Linn.)skeel	Wood decay	Throughout Bangladesh.

were identified by the characters of the spores, morphology of the hyphal system and cultural characters following standard literatures.

## RESULTS

Forest tree decays are widespread throughout all forested ecosystems of Bangladesh occurring mainly on broad leaved hosts. 115 species of wood decay fungi under 29 genera have been identified and recorded. The new records from Bangladesh are *Daedalea andamani* on *Shorea robusta* Gaertn. f. in Madhupur Sal forest ; *Ganoderma applanatum* on *Mesua nagassarium* ; and *Polyporus cinnabarinus* on branches of *Mangifera indica* Linn. It has been found that fungi attacking wood are of two broad groups those causing wood rot and decay and others causing sap wood stains.

In case of brown rots lignin rich residue left after decay imparts brown colour to decayed wood. Brown rotted wood shrinks abnormally giving rise to cubical cracking. About only 10% of wood decay fungi cause brown rots. White rot fungi degrade cellulose, hemicellulose and lignin and the wood

becomes fragile and lose its colour and appear whiter. White rot fungi show positive phenol oxidase reaction. White rot cause bleaching of the wood, which acquires fibrous or spongy consistency.

As revealed from this study white rots are more common in hard woods. White rots are caused by root rot pathogens of trees *Coriolus versicolor*, *Ganoderma lucidum* and also by many saprotrophs, including the common coloniser of stumps, *Daedalea confragosa*, *Fomes badius* and *Ganoderma applanatum*. White heart decay hollows out the tree, the tree is in a danger of collapsing.

There are far too many decay fungi in the forests of Bangladesh to detail each individually in this paper. Only the major decay fungi that may affect prescriptions and practices have been listed in Table 1.

## DISCUSSION

The aim of the present study is to assess the actual status of wood decay fungi on trees and timbers in

Bangladesh and their role in forest ecosystem.

It has been observed from the list of the decay fungi that majority of them growing on living trees and timbers in Bangladesh are responsible for white spongy rots.

Wood decay fungi can cause severe damage to standing trees through structural damage to any wood. Tree decay fungi reduce lumber recovery, lower lumber and chip quality. Tree decay may lead to early tree mortality from a variety of factors such as breakage, blow down or predisposition to other forest health factors. Disease have more impact on timber yields than any other pests and the primary cause of disease problem are the heart rot fungi. Heart rot hollows out the tree and the tree is in a danger of collapsing.

Decay fungi also play an important role in creating gaps in forest canopies and play a lead role in nutrient cycling. Species succession bio-diversity and

creation of wildlife habitat. Without wood-decaying fungi, the forest floor would soon become an impenetrable thicket of dead and broken trees and other organic debris.

It has also been observed from this study that decay progresses more quickly and is more severe on older trees. Hence one way to manage wood decay fungi in timber plantations is to harvest the trees at an optimum time, when growth is deficient but rot and decay is not yet too severe.

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