



First report of two wood-rotting fungi, *Cyclomyces fuscus* and *Humphreya coffeatum*, from India

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ABSTRACT

The state of Meghalaya, located in the north eastern region of India, is a treasure house of nature where a unique array of vegetation is found. This in turn provides congenial habitat for the growth of diverse macro fungal species. However, these wood-rotting macro fungal species are the least studied species of the region. This paper gives the first report of two wood-rotting fungi, *Cyclomyces fuscus* and *Humphreya coffeatum* – from India.

Key Words: *Cyclomyces fuscus*, *Humphreya coffeatum*, new record, India.

INTRODUCTION

Wood-rotting fungi are the group of fungi that have the ability to digest wood causing it to rot. They comprise 10% of total fungal diversity, of which 16 - 41% have been described to date (Rossman 1994; Mueller *et al.* 2007). *Cyclomyces fuscus* Fr. was reported and described by Nunez & Ryvardeen (2000) as a pantropical species, in East Asia known from warm-temperate and subtropical Japan (Kyushu, Okinawa) and Taiwan. *Humphreya coffeatum* (Berk.) Steyaert has been reported as a neotropical species, from Brazil, Bolivia, Cuba and Puerto Rico, from dead wood of deciduous trees (Ryvardeen 2004).

The state of Meghalaya is situated in the north eastern region of India. It is a land-locked territory lying between latitudes 25°47' N and 26°10' N and longitudes 89°45'E and 92°47'E. Meghalaya is a treasure house of nature where a unique array of vegetation ranging from tropical, subtropical and temperate forest is found. Diverse topography, varied climatic and edaphic conditions of the state favour the diversity in vegetation which in turn provides congenial habitat for the growth of diverse macro fungal species.

However, these wood-rotting macro fungal species are the least studied species of the region. Not much work had been done so far. This paper gives the first report of two wood-rotting fungi, *Cyclomyces fuscus* and *Humphreya coffeatum*, from India.

MATERIAL AND METHODS

The fruiting bodies of the wood-rotting fungi were collected in clean polythene bags from Mawphlang sacred grove in East Khasi Hills district of Meghalaya. They were first photographed in the field and all important morphological characters were noted down. They were then brought to the laboratory where close-up images and detailed observations of the fruiting bodies were made. The specimens were preserved by air drying. Voucher numbers were given to the specimens and stored in the Microbial Ecology Laboratory, Department of Botany, North Eastern Hill University, Shillong (India) for future reference.

The study of the microscopic characters (presence/absence of structures, spores, dimensions) and identification was done at the Forest Pathology Division, Forest Research Institute, Dehra Dun

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(India) through consultation with appropriate literatures (Gilbertson and Ryvarden 1986; Núñez and Ryvarden 2000).

RESULTS

Cyclomyces fuscus Fr. and *Humphreya coffeatum* (Berk.) Steyaert, are reported here as new to India.

1. *Cyclomyces fuscus* Fr. (Fig. 1) Linnaea 5:512, 1830.

Synonyms: *Polyporus campyloporus* Mont., Annales des Sciences Naturelles Botanique 1: 132 (1854); *Inonotus fuscus* (Kunze ex Fr.) Corner, Beihefte zur Nova Hedwigia 101: 87 (1991); *Hymenochaete cyclolamellata* T. Wagner & M. Fisch., Mycological Progress 1 (1): 101 (2002).

This species belongs to Phylum: Basidiomycota, Subphyllum: Agaricomycotina, Class: Agaricomycetes, Order: Hymenochaetales, Family: Hymenochaetaeaceae.

Description: Basidiocarps annual to biannual, solitary to imbricate, flabelliform to more broadly attached, consistency coriaceous when dry; pileus up to 5 cm wide and long and 1-3 mm thick, ferruginous, fuscous to sepia, concentrically zonate in different shades of brown, tomentose to velvety and slightly furrowed, margin acute, entire or lobed, usually deflexed; pore surface bay, ferruginous or dark brown, hymenophore concentrically lamellate, 4-5 lamellae per mm, when older 2-3 per mm, dissepiments dentate or fimbriate, up to 1 mm long, near the periphery they may anastomose to form angular, shallow pores; context up to 2 mm thick, duplex, lower part dense, chestnut to dark fuscous, separated with a black zone from the looser tomentum.

Hyphal system monomitic; generative hyphae simple-septate, yellowish to pale ferruginous, thick-walled. 4-8 μm wide, sparingly branched. Setae dark brown, thick walled and acute. 25-40 \times 5-10 μm , projecting, often bent at the base. Basidia broadly clavate, 7-10 \times 3-4 μm with four sterigmata. Basidiospores narrowly ellipsoid, hyaline, smooth. 3.5-4 \times 1.5-2 μm .

Material investigated: *Cyclomyces fuscus*, on log of hardwood, India, Meghalaya, Mawphlang sacred grove, 1900 metres (6233.6 ft), 19 March 2008, Aroma Lyngdoh, (NEHU-M 202).

2. *Humphreya coffeatum* (Berk.) Steyaert (Fig. 2) Persoonia 7 (1972) 102.

Synonyms: *Ganoderma coffeatum* (Berk.) Murr., Bull. Torrey bot. Club 32 (1905) 367; *G. opacum* (Berk. Et Mont.) Pat., Bull. Soc. Mycol. Fr. 5 (1889) 67; Dennis, Fungi. Fl. Venez. (1970) 116.

The species belongs to Phylum Basidiomycota, Subphyllum: Agaricomycotina, Class: Agaricomycetes, Order Polyporales, Family Ganodermataceae.

Description: Pileus up to 14 cm wide, mesopodal, centric, limb horizontal, pileus velutinate, greyish fawn with narrow richer brown zones, with a rich ochraceous ferruginous zone next the white margin, the central zones fuscous and darker, drying somewhat light cinnamon brown and subsulcate.

Tubes 9 mm long, sinuato – adnexed, not decurrent, cream colour then subfuscous, drying light dull brown; pores 100 – 150 μm wide, circular, entire, dissepiments 50 – 80 μm thick, white then bright yellow. Fresh 4 – 10 mm thick in the centre of the pileus, coriaceous, drying rather punky, pallid white or sub-ochraceous, becoming slightly ochraceous on cutting, especially in the core of the stem, not rufescent; with dark crust. Mycelium and growing tips of the primordial stem bright yellow.

Spores 10 – 11 \times 6 – 8 μm , ellipsoid; endospore 7.5 – 9 \times 5.5 – 6.5 μm , fuscous brown, marked with short, more or less transverse, ridges 1 – 4 \times 0.3 μm , somewhat anastomosing, rarely subreticulate; not evidently truncate, not dextrinoid, apparently with a fine reticulum on the inner surface of the exospores. Cystidia and hyphal pegs none.

Hyphae as in *Ganoderma*, with terminal arboriform skeletal, not encrusted, not dextrinoid, scarcely swelling in potash; skeletal stalks 4 – 6 μm wide, walls colourless 1.5 – 2.5 μm thick, arising from long thin walled mediate hyphae, many skeletal apparently unlimited but others ending in 1 – 3 branches as binding processes arising directly from generative hyphae but most from the ends of the skeletal; generative hyphae 2 – 7 μm wide, clamped, abundant.



Fig. 1. *Cyclomyces fuscus*; A – Growing on substratum; B – Close up photo (pore surface).

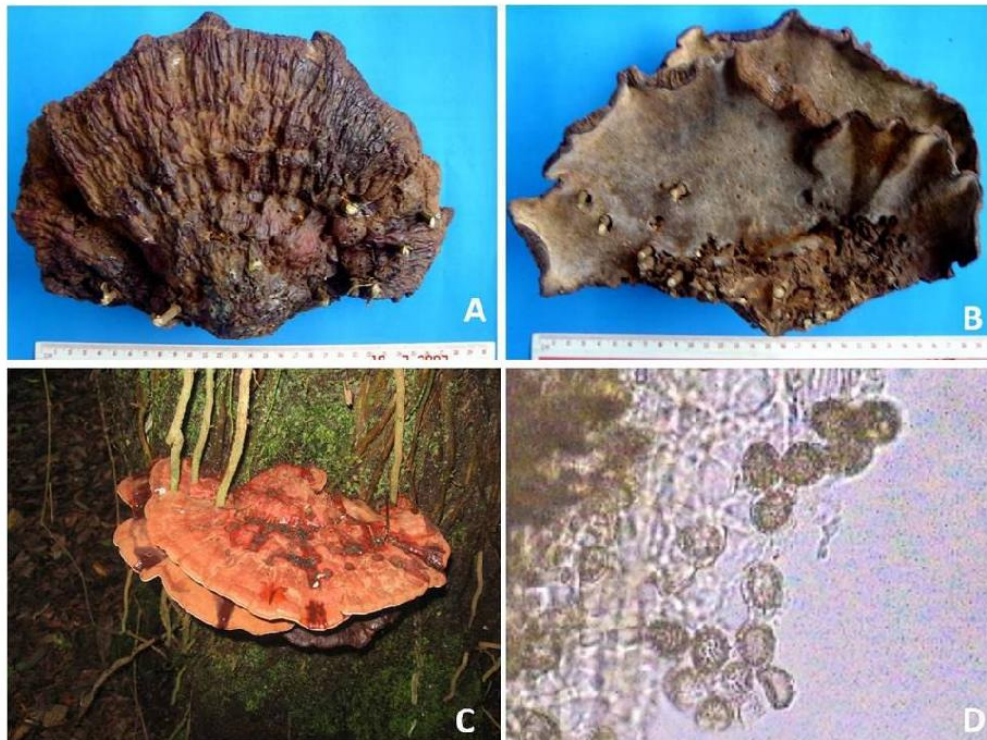


Fig. 2. *Humphreya coffeatum*; A – Upper surface; B – Pore surface; C – *H. coffeatum* attached to the host tree; D – Spores.

Material investigated: *Humphreya coffeatum*, on living tree of *Elaeocarpus lancifolius*, India, Meghalaya, Mawphlang sacred grove, 1900 metres (6233.6 ft), 28 May 2008, Aroma Lyngdoh, (NEHU-M 44).

DISCUSSION

In India, the study of wood-rotting fungi is quite old. Bose (1919–1928) gave a comprehensive account on Indian Polypores collected from Bengal. Sundararaman *et al.* (1924) reported several polypores from Madras. Decay fungi belonging to Polyporaceae attacking different forest trees in India are also described by Bakshi (1971), Harsh and Bisht (1997), Leelavathy and Ganesh (2000). In recent years many workers gave first reports of several wood-rotting fungi in India. Arya *et al.* (2008) reported that *Lenzites sterioides* is recorded for the first time on *Tectona grandis*. Nagadesi and Arya (2012; 2013) reported four new records to India - *Fomitopsis cupreorosea*, *Ganoderma curtisii*, *Microporus alboater*, *Phellinus shaferi* from Ratanmahal Wildlife Sanctuary and first records of 13 lignicolous fungi infecting living trees of *Peltophorum ferrugineum* from Rajpipla, India. Pala *et al.* (2012) identified three species viz., *Thelephora caryophyllea* (Schaeff.) Pers., *Coltricia cinnamomea* (Pers.) Murr., and *Guepinia helvelloides* Fr. as new reports from Kashmir.

Continued exploration and systematic collection would bring to light many unreported and rarely known fungi which will further add to our knowledge of wood-rotting fungi in India.

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