

## Two New Species of Cercosporoid Hyphomycetes from West Bengal, India

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### ABSTRACT

The present paper deals with the two hitherto undescribed species of *Cercospora althaeae* Haldar and Bandyopadhyay sp. nov. and *Stenella fici* Haldar and Bandyopadhyay sp. nov. growing on the living leaves of *Althaea rosea* L. (Malvaceae) and *Ficus hispida* L. (Moraceae) respectively collected from Murshidabad district, West Bengal, India. Morphotaxonomic identity of the species are presented here along with the microphotograph and visible symptoms on host plants consulting with the current literature.

**Key Words:** Anamorphic fungi, Morphotaxonomy, Follicolous, *Stenella*, *Cercospora*

### INTRODUCTION

The dematiaceous hyphomycetes are a fascinating group of the Fungi Imperfecti (= Deuteromycotina). They are the conidial fungi in which the conidiophores are free and are borne on the mycelium or in sporodochia or synnemata. The majority of dematiaceous hyphomycetes lack a sexual stage. Approximately 1800 genera and about 17000 species of hyphomycetes have been described in the past (Hawksworth *et al.*, 1995). This is an artificial assemblage of fungi reproduced by asexual spores or conidia. Despite being imperfect in forms, they are the most versatile organisms in nature. The dematiaceous hyphomycetes are conidial fungi that are typically filamentous; however, a few show dimorphism.

Researchers from all over the world have made valuable contribution on the dematiaceous hyphomycetes. Some of them are : Avasthi *et al.* (2016), Baek *et al.* (2014), Bhat (2010), Braun and Hill (2012), Chupp (1954), Crous *et al.* (2007), Haldar (2016 a, b), Haldar (2017), Hawksworth *et al.* (1995), Huang *et al.* (2015), Kharwar *et al.* (2015), Kirschner and Liu (2014), Mukerji and Monoharachary (2010), Raja and Shearer (2008), Rai (2007), Seifert *et al.* (2011), Shivas *et al.* (2015), Singh *et al.* (2014), Souza and Maffia (2011) and YingLan (2012).

While working on the leaf inhabiting fungi of Murshidabad district of West Bengal the authors had collected two members of Hyphomycetes growing on the living leaves of *Althaea rosea* (Malvaceae) and *Ficus hispida* (Moraceae) which on critical examination identified as *Cercospora althaeae* Haldar and Bandyopadhyay sp. nov. and *Stenella fici* Haldar and Bandyopadhyay sp. nov. respectively. The identity of the species was confirmed by the Agharkar Research Institute, ARI, Pune, (MS), India.

Genus *Cercospora* was introduced by Fresenius (in Fuckel, 1863) to accommodate foliicolous hyphomycetes producing vermicular, phragmosporic conidia. The genus *Cercospora* after its establishment inflated so much so that, it came to be represented by around 3000 species (Kamal, 2010) and more than 500 species have been reduced to synonymy or transferred more suitable genera (*Pseudocercospora*, *Stenella*, *Cercoseptoria*, *Mycovellosiella*, *Phaeoramularia* etc.) by Deighton This, in fact, was a heterogeneous assemblage of hyphomycetes representing a 'complex' (*Cercospora* Complex), rather than a single generic entity. The genus was monographed by Chupp (1954) who accepted 1419 species. In *Cercospora* Complex, almost all the generic segregates have their root in monophyletic *Mycosphaerella* teleomorph which is one of the largest genera of Ascomycetes. These segregates of *Cercospora* complex are considered into two groups, the Dematiaceous and Non-dematiaceous. The dematiaceous genera are characterized by their pigmented conidiophores and conidia; conidia being hyaline in case of *Cercospora*. The non-dematiaceous genera however, produce hyaline conidiophores and conidia. This generic segregates of the former are represented by *Cercospora* and are collectively called Cercosporoids. A large number of the species of *Cercospora* is pathogenic with diversified host range some of them are known only from their morphotaxonomical characters in vivo.

The genus *Stenella* was first established by Sydow in 1930 and cited *Stenella araguata* as the type species. The anamorph of the genus *Stenella* Syd. have traditionally been linked to teleomorphs accommodated in *Mycosphaerella* Johanson. However, recent phylogenetic studies have shown that *Mycosphaerella* is polyphyletic (Crous *et al.*,

2007) and that many of these anamorph lineages represent distinct genera with *Mycosphaerella*-like teleomorphs, clustering in different families in the Capnodiales. *Stenella* is a Cercosporoid hyphomycete genus for species characterised by having superficial hyphae, verrucose, olivaceous green, thick walled with thin septa. Conidiophores not differentiated from vegetative hyphae, often reduced to conidiogenous cells. Conidiogenous cells integrated, predominantly terminal, sometimes lateral, arising from aerial hyphae, cylindrical, pale brown; conspicuously pigmented. Conidia formed singly or in chains, with thickened, darkened and refractive hila. The fungus causes foliar diseases in shrub, under shrub and perennial plants, predominating in the tropics and sub tropic regions including India. The genus is represented by about 155 species throughout the globe.

## MATERIALS AND METHODS

Plant specimens with distinct disease symptoms of the parasitic fungi on the leaves of different ages were detached intact from the host plants and they were kept in polythene bags and processed by following standard techniques, (Hawksworth, 1974). Morphological descriptions of the associated fungi were based on the slide preparations mounted on lactophenol cotton blue mixture from infected areas of the leaves. Photographs of the infected spots on the host leaves were captured by Sony DSC-HX200 camera. Morphotaxonomic study of the fungi was done through the low and high magnification 10x40 of the compound microscope, (Olympus-CX21i FS1 Research Microscope) by using USB INSTA CMOS camera. The microphotographs were stored in electronic format JPEG. Morphotaxonomic determinations of the new taxa were done with the help of most up to date literature and expertise available. Holotype being deposited at AMH, Agharkar Research Institute (ARI), Pune (MS), India and Isotypes retained in the Departmental herbarium for future reference. The nomenclatural novelties were deposited in Myco Bank (www.mycobank.org).

## RESULTS AND DISCUSSIONS

***Cercospora althaeae*** Haldar and Bandyopadhyay sp. nov. (Figure 1A, B, C)  
Myco Bank, MB842524

**Etymology**- epithet derived from the host species *Althaea rosea* L.

Leaf spots amphigenous, distinct irregular, uniformly distributed over the spots, whitish to yellowish grey margin, sometimes coalescent, 2-10 mm in extent; caespituli amphigenous, but chiefly hypophyllous; stroma none; conidiophores amphigenous, fasciculate, fascicles consisting of 2-28 divergent stalks emerging by

rupturing the host epidermis, pale brown, straight to flexuous, thick walled, smooth, pleuriseptate (3-25), geniculate, distinct conidial scar situated at subtruncate tip or at the junction of geniculation of the conidiophores, 2.5-3 µm in diam., 75-200 × 5-7.5 µm; conidia hyaline to subhyaline, obclavat, obclavate-cylindric, straight to bend, thin walled, smooth, pleuriseptate (4-32), base subtruncate with conspicuous thickened hilum, tip sub-obtuse, 60.5-370 × 2.5-3 µm.

**Specimen studied:** On the living leaves of *Althaea rosea* L. (Fam: Malvaceae), Ring Road, Murshidabad, West Bengal, India, Holotypus 9848(AMH), 14<sup>th</sup> October, 2016.

No species of *Cercospora* has yet been reported on present host *Ficus hispida*. So the present species is described here as a new taxon.

***Stenella fici*** Haldar and Bandyopadhyay sp. nov. (Figure 1D, E, F, G, H)

MycoBank, MB842522

**Etymology**- epithet derived from the host species, *Ficus hispida* L.

Spots formed on lamina, hypophyllous, virulent, light brown, angular to irregular, 2-10 mm in extent; caespituli hypophyllous, uniformly distributed; mycelium partly immersed and partly superficial, external mycelial hyphae pale olivaceous, septate, branched, profusely distributed over the lower surface bearing conidiophores both laterally and terminally, lower surface 2.5-3 µm wide; stroma none; conidiophores fasciculate, consisting of 5-22 divergent stalks, pale to mid-olivaceous brown, straight to mildly curved, septate (3-11), thin walled, verruculose, 10.5-38.5 × 2.5-3.5 µm; conidia pale olivaceous, septate (1-5), straight to mildly curved, cylindrical, verruculose, tip obtuse, base slightly obconic truncate, 6.5-16.5 × 3.7-5 µm.

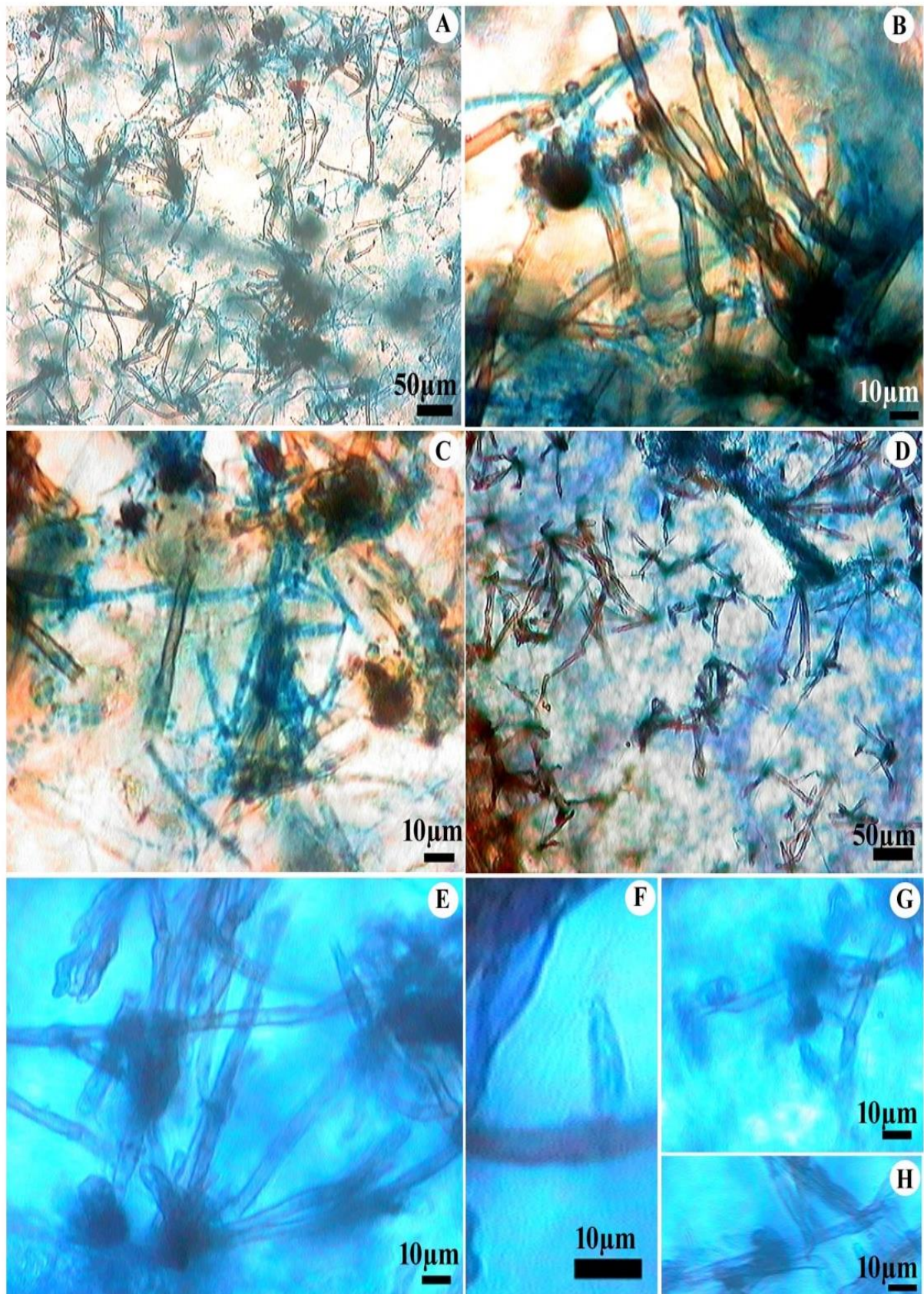
**Specimen studied:** On the leaving leaves of *Ficus hispida* L. (Fam: Moraceae), Kossimbazar, Murshidabad, West Bengal, India, Holotypus 9779(AMH), 2<sup>nd</sup> January, 2016

No species of *Stenella* has yet been reported on *Ficus hispida*. So the present species is described here as a new taxon.

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**Figure 1:** *Cercospora althaeae* Haldar and Bandyopadhyay sp. nov., A, B, Conidiophore fascicles; C, Conidia. *Stenella fici* Haldar and Bandyopadhyay sp. nov., D, E, Conidiophore fascicles; F, Conidia; G, Germinating conidia; H, Conidia attached with conidiophore.

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