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RESEARCH ARTICLE

TWO NEW CERCOSPOROID FUNGI FROM INDIA

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ABSTRACT

This communication deals with the description and illustrations of two undescribed species of *Cercosporoid* fungi viz. *Cercospora pachyrhizicola*, sp.nov. and *Curvularia tremae* sp.nov. growing on the living leaves of *Pachyrhizus angulatus* Rich., (Fam.Fabaceae) and *Trema orientalis* Blume (Fam.Ulmaceae), collected from Murshidabad district, West Bengal, India.

Key words:

Morphotaxonomy, Foliicolous,
Hyphomycete, *Cercospora*, *Curvularia*.

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INTRODUCTION

The genus *Cercospora* was erected by Fresenius (1863), which is one of the largest genus of hyphomycetes producing vermicular frugosporic conidia. This genus is globally distributed and represented by around 3000 species. In fact, it is a heterogeneous assemblage of hyphomycetes representing a "complex" (*Cercospora* complex), rather than a single generic entity. The taxonomic position of the genus *Cercospora* is almost accepted as being a member of the form family *Mycosphaerallaceae*, under the order *Hyphomycetes* of the form class *Deuteromycetes*. A large number of the species of *Cercospora* is pathogenic with diversified host range and most of them are known only from their morphotaxonomical characters *in vivo*. The reproductive structure of the fungi is the *conidia*, acropleurogenous, simple obclavate or subulate, colourless or pale, pleuriseptate, smooth. *Conidiophores* macronematous, mononematous, caespitose, straight or flexuous, sometimes geniculate, unbranched or rarely branched, olivaceous brown or brown, paler towards the apex, smooth.

The genus *Curvularia* was founded by Boedijn in 1933 and the anamorph of this fungus is known as *Curvularia lunata*, while *Cochliobolus lunatus* denotes the teleomorph or sexual state. This filamentous fungi belonging to the family *Pleosporaceae* under the form class *Deuteromycetes*. The *Curvularia* are ubiquitous, cosmopolitan, and more common in tropical and subtropical zones, particularly on the grass as well as the land plants. *Conidiophores* macronematous,

mononematous, straight or flexuous, often geniculate, sometimes nodose, brown, usually smooth. *Conidiogenous cells* polytretic, integrated, terminal, sometimes later becoming intercalary, sympodial, cylindrical or occasionally swollen, cicatrized. *Conidia* solitary, acropleurogenous, simple, often curved, clavate, ellipsoidal, broadly fusiform, obovoid or pyriform with 3 or more transverse septa, pale or dark brown, often with some cells, usually the end ones, paler than the others, sometimes with dark bands at the septa, smooth or verrucose, hilum in some species protuberant. In many species occasional triradiate stauroconidia are formed at the same time as normal conidia (Ellis, 1976). Researchers' from all over the world have made valuable contributions on the *Cercosporoid* fungi and the systematic of the taxa are given in accordance with Archana and Dubey, (2012), Baek *et al.* (2014), Bhat (2010), Bligrami *et al.* (1991), Braun and Crous, (2007), Cannon and Kirk, (2007), Chupp, (1954), Deng *et al.* (2015), Dubey and Rai, (2003), Garganese *et al.* (2015), Girish *et al.* (2011), Haldar and Ray, (2011), Hawskworth, (1974), Hosokawa *et al.* (2003), Huang *et al.* (2015), Huang, *et al.* (2005), Kamal (2010), Kumar and Kharwar (2006), Manamgoda *et al.* (2012), Mycobank (2015), Savile (1962), Seifert *et al.* (2011), Seifert and Gams (2001), Shivas *et al.* (2015), Singh *et al.* (2011), Sivanesan *et al.* (2003), Souza and Maffia (2011), YingLan, (2012). The district Murshidabad, in West Bengal exhibits rich diversity of leaf inhabiting fungi in general and Hyphomycetes in particular as event from. During the preparation of the inventory of Dematiaceous Hyphomycetes from Murshidabad, West Bengal the author had collected foliar diseases on *Pachyrhizus angulatus* Rich., (Fam.Fabaceae) and *Trema orientalis* Blume (Fam. Ulmaceae). On critical examination the pathogen of the above

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stated hosts were identified as two new species of Cercosporoid fungi viz. *Cercospora* and *Curvularia* respectively.

MATERIALS AND METHODS

The infected leaves of different ages were detached intact from the host plants and they were kept in polythene bags and processed by following standard techniques (Hawskworth 1974, Savile 1962). The infected leaves having distinct symptoms were collected and dried to make herbarium specimens. Photographs of the infected spots on the host leaves were captured by Sony DSC-HX200 camera and for the examination of fungal structure and spore morphology, the microscope slides were prepared in lacto-phenol cotton blue mixtures. Depending on the size of the leaf and the nature of infection the entire or a portion of the infected host tissue along with the adjoining healthy tissue was detached carefully with a sharp scalpel. It was then mounted on a glass slide in a drop or two of lacto phenol and covered with a cover glass and warmed on a flame so as to make the host tissue transparent. Morphotaxonomic study of the associated fungi was done through the low and high magnification 100x400 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 was done with the help of most up to date literature and expertise available. Holotypes being deposited at AMH, Agharkar Research Institute (ARI), Pune (MS), India and isotypes retained in the Departmental herbarium for future reference.

Taxonomic description

Cercospora pachyrhizicola Haldar sp.nov.

Mycobank number 819959

Incidence in winter, spots formed on the lamina, on both the corresponding surfaces, moderately virulent, more distinct on dorsal surface, angular to irregular, sometimes sub orbicular to irregular, deep brown margin, necrotic lesion observed in the periphery of the lamina, greyish brown, scattered, becoming coalescent at later stages 1 mm-9mm; in diam; caespituli chiefly epiphyllous thickly and uniformly distributed over the spots; Sexual morph undetermined: Asexual morph: *stroma* moderately developed; stalks usually fasciculate, in fascicles of 2-9 divergent stalks, emerging through stomata, sometimes solitary, apex roundish, 0-6 geniculate, spore scar 1-12 in number average length-1560.02µm and breadth 50.26 µm, *conidia* hyaline, distinctly pluriseptate, sub cylindrical to acicular straight to curved, base truncate with thickened hilum 21.41µm, tip sub acute to acute, average length 767.38 µm and breadth 28.00µm.

Material examined: On the living leaves of *Pachyrhizus angulatus* Rich., (Fam. Fabaceae), 2nd January, 2016; Kashimbazar, Murshidabad, West Bengal, India. Dinesh Haldar, AMH 9783(**Holotype**), KNC 0316(**Isotype**).

Etymology: from the name of the host genus

Teleomorph -Not observed

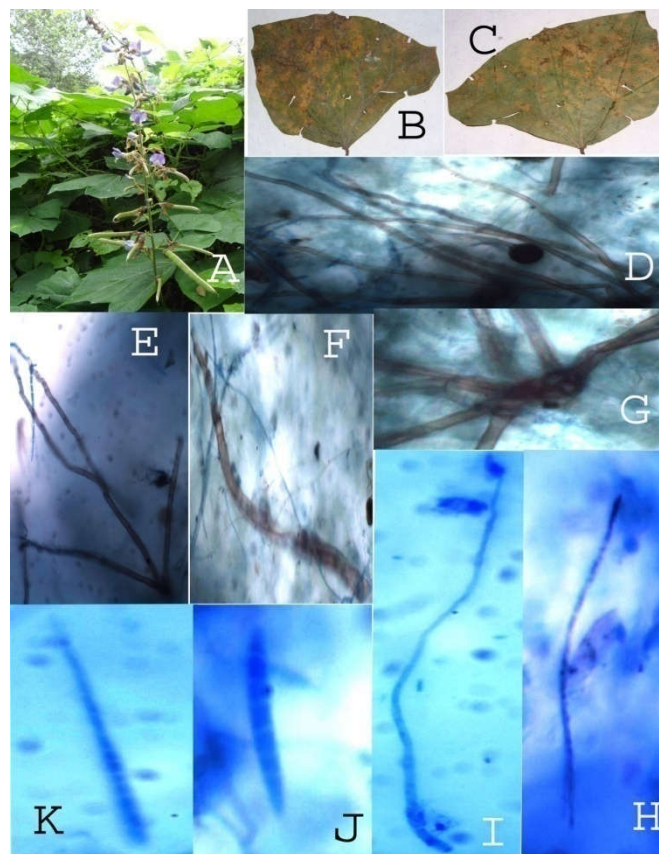


Fig.1. *Cercospora pachyrhizicola* on *Pachyrhizus angulatus* A. Host plant. B-C Leaf spots. D-E. Conidiophore fascicles. F. Single conidiophore. G. Stroma. H, I, J & K. Conidia. Scale bars= 20 µm

Known distribution-India

No species of *Cercospora* has yet been reported on the present host on *Pachyrhizus angulatus* Rich., (Fam. Fabaceae). Therefore, the description of *Cercospora pachyrhizicola* is described as a new species.

Curvularia tremae Haldar sp.nov.

Mycobank number 819917

Incidence in winter season, spots formed on lamina, very virulent, amphigenous, circular to irregular, spots distinct on upper surface; blighten occurs in few portions of the lamina; slightly whitish centre surrounded by blackish grey margin, 2-44mm in extn; Sexual morph undetermined: Asexual morph: *caespituli* amphigenous, chiefly epiphyllous, brownish; non stromatic; *conidiophores* emerging through stomata arising laterally from superficial hyphae, erect, simple, thick walled, straight to flexuous, smooth, blackishbrown, fasciculate to solitary, paler near the tip, geniculate 40.34-22.91µm near the apex (2-6), pluriseptate (2-8), *conidiophores*, average length 1126.01µm and breadth 68.38 µm; *conidia* ellipsoid to fusiform, curved or straight, pale brown, central 1 cell or 2 cells more swollen, bigger and darker than the end cells, smooth, septa distinct (1-4), average length 152.21 µm and 67.75 µm wide at the broadest part.

Etymology: from the name of the host genus

Teleomorph-Not observed

Known distribution-India

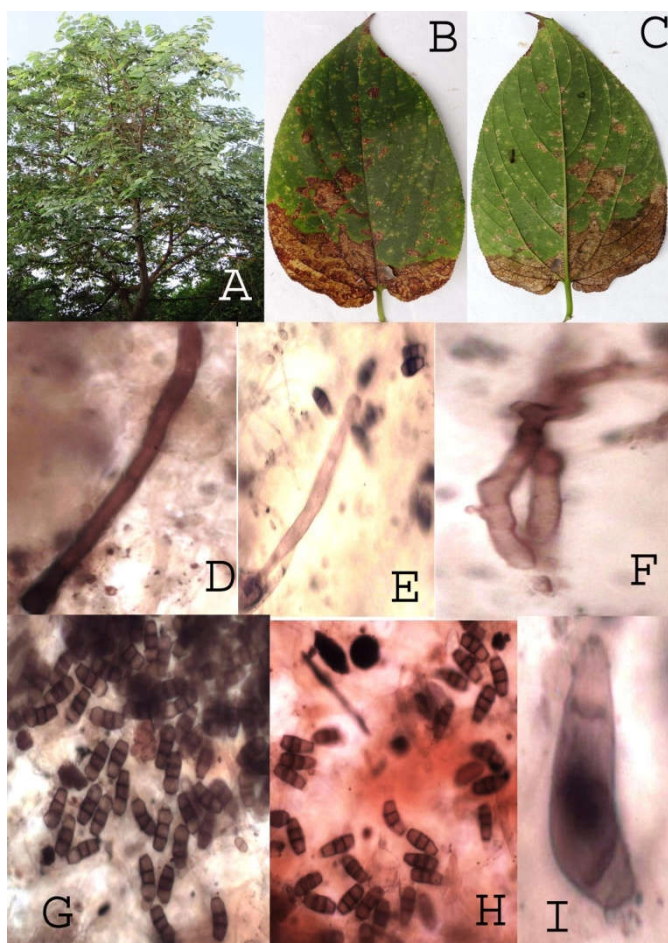


Fig. 2. *Curvularia tremae* on *Trema orientalis* A. Host plant. B-C. Leaf spots. D.E. & F. Conidiophores. G-H. Cluster of conidia. I. Single conidia. Scale bars= 20μm

Material examined: On the living leaves of *Trema orientalis* Blume., (Fam.Ulmaceae), Lalbagh, Murshidabad, West Bengal, India; 25th December, 2015; Dinesh Haldar, AMH 9770 (Holotype), KNC 0277 (Isotype).

Perusal of literature reveals that no species of *Curvularia* has yet been reported on the present host *Trema orientalis* Blume., (Fam.Ulmaceae). Therefore it merits its description as a new taxon.

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