NEW RECORDS OF THREE CERCOSPORA SPECIES FROM WEST BENGAL, INDIA

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ABSTRACT: Three dematiaceous leaf inhabiting fungi viz. Cercospora adenostemae, Cercospora gerberae and Cercospora helianthicola have been collected and described from West Bengal, India. These are the first records of these fungi from West Bengal.

Key words: Cercospora, West Bengal, Hyphomycetes.

INTRODUCTION

The genus Cercospora was erected by Fresenius (1863), which is one of the largest genera of hyphomycetes producing vermicular fragmosporic conidia. The genus is globally distributed and represented by around 3000 species. The genus is monographed by Chupp and Viegas, and is almost accepted as being a member of the form family Deuteromycetes, under the order Hyphomycetes of the form class Dematiaceae. The taxonomic position of the genus Cercospora is almost accepted as being a member of the form family Deuteromycetes, under the order Hyphomycetes of the form class Deuteromycetes.

A large number of species of Cercospora are pathogenic with diversified host range and most of them are known only from their morphotaxonomical characters in vivo. The reproductive structures of the fungi are conidia, acropleurogenous, simple obclavate or subulate, colourless or pale, pleuriseptate, smooth. Conidiophores are macronematous, mononematous, caespitose, straight or flexuous, sometimes geniculate, unbranched or rarely branched, olivaceous brown or brown, paler towards the apex, smooth. Researchers from all over the world have made valuable contributions on the genus Cercospora. Some of them are: Behrooz et al [3], Braun and Hill [4], Ellis [5], Firmino et al [6], Groenewald et al [7], Hesami et al [8], Hong et al [9], Kim et al [10], Kirschner [11], Milosavijevic et al [12], Nakashima et al [13], Souza and Maffia [14] and Shivas et al [15].

Indian researchers have not fallen back, a good number of workers have worked on this group of fungi. Special mention may be made of some as: Archana and Dubey [16], Bhat [17], Bilgrami et al [18], Haldar and Ray [19], Haldar and Ray [20], Haldar and Ray [21], Hosagoudar et al [22], Jamaluddin et al [23], Kumar et al [24], Mall [25], Meghvansi et al [26], Patil et al [27], Raghavendra et al [28], Sharma et al [29], and Swamy et al [30].

During working on dematiaceous hyphomycetes from West Bengal the author had identified three species of Cercospora viz. Cercospora adenostemae, Cercospora gerberae and Cercospora helianthicola. Review of literature reveals that the species of Cercospora adenostemae, Cercospora gerberae and Cercospora helianthicola have been reported from the states of Uttar Pradesh (U.P), Maharashtra, Bihar, Karnataka, Andhra Pradesh (A.P) and Delhi., (Bilgrami et al 1991, Jamaluddin et al 2001, Kamal 2010) but it is yet to be reported so far from West Bengal. Hence it is the first time report of the occurrence of these fungi from the state of West Bengal.
MATERIALS AND METHODS

The infected leaves of different ages were detached intact from the host plants and they were kept in polythene bags, closing the mouth by rubber ring. The infected leaves having distinct symptoms were collected and dried to make herbarium specimens, a part of which was deposited in the herbarium of IMI, Kew, Surrey UK. 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. Stained preparations were also made with lacto phenol accompanied with a drop of cotton blue to study the details of transparent parts of the fungal specimens. Morphotaxonomic study of the associated fungi was done through the low and high magnification of the compound microscope. The measurements of the different structures were also taken and camera lucida drawings were made with the aid of standard camera lucida attachment.

RESULTS


*Leaf spots* amphigenous, distinct on dorsal surface, indistinct on ventral surface, scattered, sometimes coalescent, vigorous, pale white centre, surrounded by dark brown to blackish margin, 1-6 mm extn., *caespituli* amphigenous, chiefly hypophyllous, dark; *stroma* present and well developed; *conidiophores* fasciculate, 3-12 in a fascicle, pale olivaceous brown to light brown, slightly paler at the apex, simple, straight to slightly curved, pleuriseptate (upto 7 septa), distinct, mildly narrower towards the tip, very poor geniculation in some cases, conidial scar present and distinct, thickened, lying by the side wall or tip of the conidiophores, tip sub obtuse to acute, 35.7-86.1× 5.77-6.3 µ; *conidia* cylindric to obclavate cylindric, straight, olivaceous, mildly curved, smooth, thick walled, pleuriseptate, slightly tapered to thickened distinct hilum, 34.99-96.6×3.15-4.2 µ.

Specimen studied: On the living leaves of *Adenostemma viscosum* Forst., (Fam. Asteraceae), Darjeeling, West Bengal, India, IMI 372362, 29 September, 1995.

Leaf spots amphigenous, well developed on dorsal surface, light brown centre with dark brown margin, to almost black at maturity, circular to sub circular, numerous, scattered, virulent, 1.5-2.5 mm diam., caespituli amphigenous, chiefly epiphyllous, effuse; stroma present, composed of a few brown cells; conidiophores emerging through stomata, usually fasciculate, in fascicles of 2-15 divergent stalks, emerging through stomata, sometimes solitary, olivaceous brown, paler and narrower towards the tip, smooth, thick walled, simple, straight to flexuous, 1-3 geniculate, sparingly septate (1-12), base slightly swollen, tip obtuse to sub obtuse, with distinct spore scar (1-8), spore scar 2.5 μ in diam., 20.0-214.5 × 4.0-5.0 μ; conidia hyaline, acicular, thin walled, straight to curved, smooth, indistinctly pleurisepate (3-17), base truncate, tip acute to sub acute, 43.0-198.0 × 2.0-3.0 μ.

Specimen studied: On the living leaves of Gerbera sp. (Fam. Asteraceae), Madhyamgram, North 24 Parganas, West Bengal, India, IMI 304867, 11 May, 1985.

Leaf spots amphigenous, distinct on dorsal surface, light reddish brown, initially very minute, older spots irregular, virulent, scattered, covering major portion of the leaf surface, numerous, up to 5 mm in extent, stroma none, only a few loose mass of cells; conidiophores fasciculate (2-6), stalks divergent, emerging through the stomata, olivaceous brown, more paler and narrower towards the tip, usually simple, very rarely branched, smooth, thick walled, rarely geniculate, distinctly multisepate (upto 7), straight to bent, base swollen, apex rounded, spore scar (2.5 µ), tip geniculate, in diam., 26.5-198.0 × 3.0-5.0 µ; conidia acicular hyaline, straight to curved, smooth, indistinctly multisepate (2-17), base truncate, apex bluntly rounded, 49.5-237.6 × 2.5 - 4.0 µ.

Specimen studied: On the living leaves of *Helianthus annuus* L., (Fam. Asteraceae), Bhabla, North 24 Parganas, West Bengal, IMI 311791, 16 August, 1986.

DISCUSSION
This fungi *Cercospora adenostemmae*, *Cercospora gerberae* and *Cercospora helianthicola* are abundant in nature during the month of October to March of the year forming striking symptoms such as spot may be regular or irregular, sometimes concentric rings with brown to dark brown margin, blotch sooty in nature and blight. Spots become sometimes necrotic leaving hole in the leaves.

CONCLUSION
The present study reveals that the *Cercospora adenostemmae*, *Cercospora gerberae* and *Cercospora helianthicola* primarily grows on the leaf blades as well as petioles, stems, inflorescence and fruits. The characteristics of the symptoms depend on the nature of leaves as well as parasites. The effects may vary from plant to plant and even on same plant. When infection reaches a certain degree of severity, the leaves curl, dry and drop down. Thus it may be concluded that the species of the genus *Cercospora* grow vigorously on leaves throughout the seasons but virulent in winter to early summer.
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REFERENCES


