

**A SURVEY FOR LEAF SPOT FUNGI FROM FOREST REGION OF BANDA WITH  
SPECIAL REFERENCE TO GENUS *CERCOSPORA***

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**ABSTRACT**

Five species of *Cercospora* viz. *C. albizziicola*; *C. curcumina*, *C. dolicosina*; *C. nyctanthidis* and *C. ocimigena* producing leaf spots on *Albizzia lebbeck*, *Curcuma angustifolia*, *Dolicos lab-lab*, *Nyctanthis arbor-tristis* and *Oscimum sanctum* respectively are described.

Figures : 05

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KEY WORDS : *Cercospora*, Fungi, Follicolous hyphomycetes.

**Introduction**

Banda is the largest district of Bundelkhand region of Uttar Pradesh. It is located between 240-59'N – 250-55'N latitude and 800-70'E – 810-02'E longitude and sorrouded by mix deciduous and saltype forest.

The genus *Cercospora*, a foliar hyphomycetes is a well known pathogen, was introduced<sup>8</sup>, when he described *C.apii* on *Apium graveolens*. Later on this fungus was described by several worker from India<sup>2,9,11,12 & 13</sup> and abroad<sup>1,3,4,5,6,7 & 10</sup>. This fungus was characterized by mononematous, macronematous, stromatic, usually unbranched, coloured and cicaterized conidiophores as well as hyaline, acicular and phragmosporic conidia with rim like thickening at the base representing the hilum. This fungus causes leaf spots on a number of higher plants, because plant leaves provided a very suitable habitat for the growth and development of fungal organism and hence they are called as foliar or follicolous organism. These leaf spots are mostly necrotic and often spreading, thereby reducing the photosynthetic productivity of affected plants. Bundelkhand region and adjoining forest area are

not an ideal habitat for foliar fungi specially *Cercospora* Sp. but our recent surveys of these areas have revealed the presence of several interesting species of *Cercospora* few of them are already reported and described from north eastern tarai forest of U.P. a as new species<sup>11</sup>, are reported here.

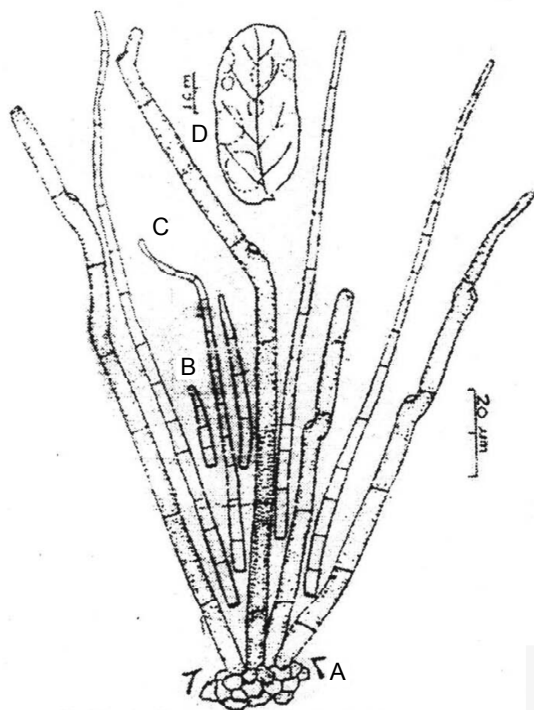
Viz. *C. albizziicola*; *C. curcumina*, *C. dolicosina*, *C. nyctanthidis*, and *C. ocimigena* occurring on living leaves of *Albizzia lebbeck*, *Curcuma angustifolia*, *Dolicos lab-lab*, *Nyctanthis arbotristis* and *Oscimum santum*.

**Material and Method**

Fungi were collected from forest areas of Banda district. The infected living leaves having district symptoms were pressed and dried to make permanent herbarium specimens. Morpho-taxonomic features of the fungi were studied from fresh and dried specimens, using routine methods of light microscopy. Slides were prepared in lectolophenol cotton blue<sup>6,7</sup>. Since Holotype of the collection on same host have been already deposited in HCIO, New Delhi, so no need to deposited it again. Isotypes are deposited in the

***Cercospora albizzicola* Spp.nov. (Fig. 1)**

**Infection spots** : necrotic, dark brown, circular to subcircular measuring 2-8 mm in diam. **Fruiting**: amphigenous, chiefly epiphyllous. **Stromata** absent or poorly developed, pseudoparenchymatous. **Conidiophores**: mononematous, macronematous, smooth walled, pale brown straight to curved, septate, 1-2 geniculate, unbranched with subtruncate to broad obtuse tip,  $75-151 \times 3-3.6$   $\mu$ m. **Conidiogenous** cells terminal to intercalary, monoblastic darker than other cells having distinct thick spore scars. **Conidia** simple, acicular small one narrowly cylindrical, hyaline straight, some times curved, acropleurogenous, 4-12 septate, with sub obtuse tip and truncate base and conspicuous hilum, measuring  $18-138 \times 1.6-2.4$   $\mu$ m.



**Fig. 1 : *Cercospora albizziicola* spp.nov.**

- A. Stroma
- B. Conidiophore
- C. Conidia
- D. Symptoms

departmental herbarium and used for description of pathogen.

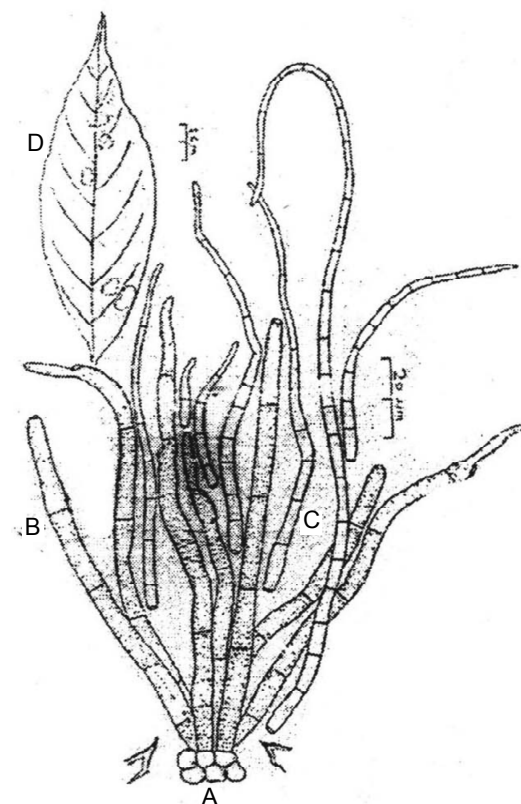
**Identification of Fungi**

The infected living as well as dried specimen leaves were put into compound microscope and morpho-taxonomic features of the fungi, specially, symptom's, stroma, conidia and conidiophores were drawn and measurement has been taken to same scale (with the help of stage and oculometer).

Identification of fungus has done with the help of relevant monographs<sup>4,10,13</sup>, reviews<sup>3</sup>, books<sup>1,2,6,7</sup> and research references<sup>5,8,9 & 12</sup>.

**Descriptions and Illustrations**

Descriptions and illustrations of the fungi are as follows :



**Fig. 2 : *Cercospora curcumina*<sup>12</sup>**

- A. Stroma
- B. Conidiophore
- C. Conidia
- D. Symptoms

On living leaves of *Albizzia lebbeck* (Mimosaceae), Banda Feb. 2015; Bot-8 isotype no.; HCIO no. 30943, holotype reported by author.

This fungus species has almost similar morpho-taxonomic characters, with species reported earlier as new species by author from Gorakhpur (U.P.). Now this is a new collection for Bundelkhand region.

***Cercospora curcumina*<sup>12</sup> (Fig. 2)**

**Infection spots** necrotic, found in patches throughout the surface, circular to subcircular, 2-5 mm in diam. **Fruiting amphigenous. Stromata** poorly developed, subglobulose dark brown, pseudoparenchymatous, upto 18-25 µm in diam. **Conidiophores** arising in a fascicles of 3-5

mononematous, macronematous, thick walled light brown, straight, some times curved, unbranched, geniculate indistinctly septate, 80-118×2.2-3.5 µm. Conidiogenous cells terminal polyblastic, integrated, distinctly cicatrized slightly darker. **Conidia** hyaline, some what curved, single smooth walled, acrogenous, with acute to obtuse apex and subtruncate to subobconicotruncate base bearing conspicuous hilum, 2-20 septate, measuring 17-210×2-3.1 µm.

On living leaves of *Curcuma angustifolia* (zingiberaceae) Banda (U.P.) Jan., 2016; Bot.-15 isotype no.; HCIO no. 30881, holotype reported by author.

Some slight differences in morpho-taxonomic characters are due to weather condition of this region. This is a new collection for Bundelkhand region<sup>12</sup>.

***Cercospora dolicosina* Spp.nov. (Fig.-3)**

**Infection spots** distinct, mostly angular to irregular 2-4 mm in diam, spot almost red with some what dark margin. **Fruiting** amphigenus, mostly hypophyllous. **Stromata** very poorly developed. **Conidiophores** mononematous, macronematous, thick walled, straight to sinuous, 1-2 geniculate, unbrached subhyaline to olivaceous, distinctly septate, often slightly attenuated tip, 80-158×3-5.5 µm. **Conidiogenous** cells terminal to intercalary, cicatrized with medium sized spore scars. **Conidia** acicular, hyaline straight to mildly curved, multiseptate, sometimes with forking tips, with truncatate to subtruncatate base with a notch in its middle, 35-188×2-4µm.

On living leaves of *Dolicos lab-lab* (Fabaceae); Banda, Jan. 2016; Bot.-20 isotype no.; HCIO no.-41077 holotype reported by author.

The morpho-taxonomic character of this fungus is similar to that description discuss earlier as a new species from Gorakhpur (U.P.). This is a new collection for Bundelkhand region<sup>12</sup>. Some variation in the size and shape of conidia and conidiophores are due to weather condition.

***Cercospora nyctanthidis* Spp.nov. (Fig.-4)**

**Infection spots** light yellow, turning to brown, upto 4-8m in diam, amphigenous, subcircular to elliptical. **Fruiting** chiefly hypophyllous. **Stromata** little developed, pseudoparenchymatous or sometime absent. **Conidiophores** macronematous, mononematous, usually spreading, unbranched, geniculate, 2-8 septate,

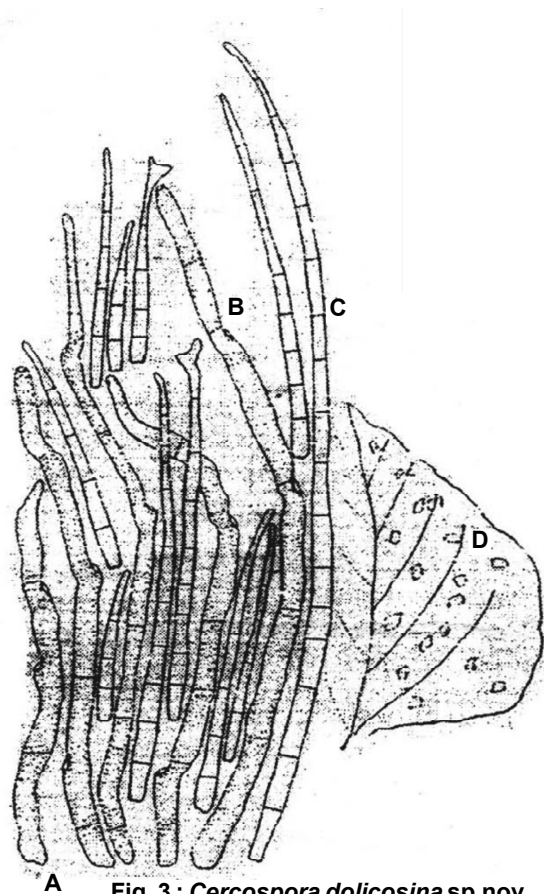


Fig. 3 : *Cercospora dolicosina* sp. nov.

- A. Stromata
- B. Conidiophore
- C. Conidia
- D. Symptoms

light pale brown, uniform in colour and width, with obtuse apex, varying from  $59-220 \times 2-3.5 \mu\text{m}$ . *Conidiogenous* cells monoblastic, cicatrized, with distinct terminal to intercalary scars. **Conidia** simple, solitary, acropleurogenous in origin, smooth, 5-10

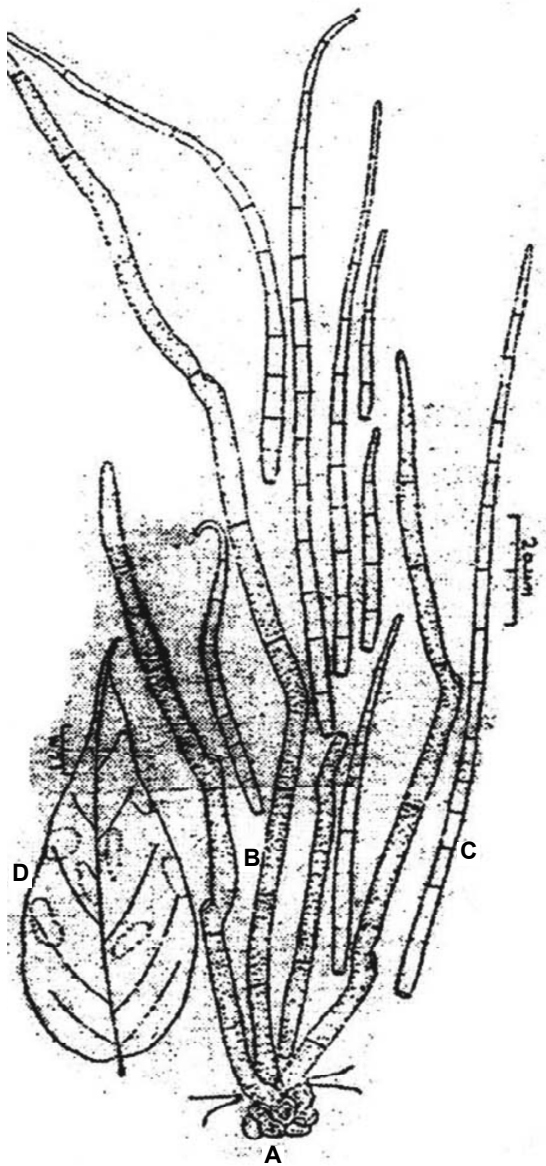


Fig. 4 : *Cercospora nyctanthidis* spp. nov.

- A. Stroma
- B. Conidiophore
- C. Conidia
- D. Symptoms

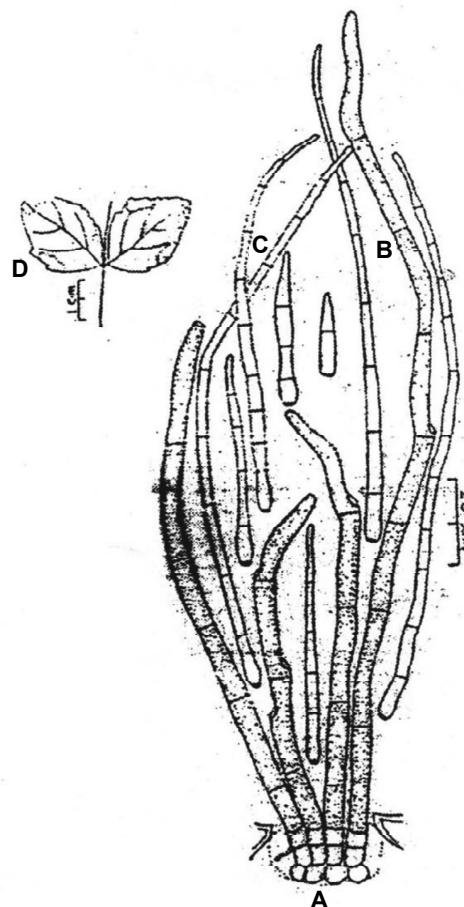


Fig. 5 : *Cercospora ocimigena* spp. nov.

- A. Stroma
- B. Conidiophore
- C. Conidia
- D. Symptoms

septate, hyaline acicular with subacute apex and slightly conicotruncate base bearing distinct hilum. Some times curved at the apex, varying from  $30-145 \times 1.5-3.5 \mu\text{m}$ .

On living leaves of *Nyctanthes arbor-tristis* (oleaceae); Banda, Feb. 2015, Bot.-09 isotype no.; HCIO no. 30931 holotype reported by author.

This fungus as a new species collected from north-eastern tarai forest of U.P. The morpho-taxonomic features of this fungus still constant with few differences in size and shape of conidia and conidiophore which is due to difference in weather condition of collection site. This is a new collection

for Bundelkhand region.

***Cercospora ocimigena* Spp.nov. (Fig.-5)**

**Infection spots** : dark brown, necrotic, curcular, irregular, along the margin and on the leaf surface, 2-5 mm in diam. **Fruiting** amphigenous. **Stromata** globular, composed of dark brown to blackish brown cells, immersed, pseudoparenchymatous, 20-38  $\mu$ m. in diam **Conidiophores** straight to slightly curved, some time undulate, emerging through stromata, less fasciculate, mononematous, macronematous, pale olivaceous, apex sub-truncate to narrowly rounded, 0-3 geniculate, unbranched, multiseptate (3-7), 80-190 $\times$ 3.8-4.5  $\mu$ m. *Conidogenous* cells cicatrized with distinct spore scars, comparatively darker to

other cells, terminal to intercalary. *Conidia* hyaline, acicular to cylindrical, base of conidia characteristically swollen with thick hilum, distinctly septate (2-10), straight to curved, apex subacute to obtuse, acropleurogenous, 18-135 $\times$ 2.5-4.2  $\mu$ m.

On living leaves of *Ocimum sanctum* (Lamiaceae); Banda, March 2015; Bot.-11 isotype no.; HCIO no. 30928 hototype reported by author..

Morpho-taxonomic character of this fungus similar to that Xis reported from North-Eastern tarai forest of Gorakhpur by author himself. Few differences in size and shape of conidia and conidiophore is due to differences in weather condition of collection site. This is a new collection for Bundelkhand region.

### References

1. AGRIOS, G.N. (1997) Plant pathology 4<sup>th</sup> ed. Academic Press. New York.
2. BILGRAMI, K.S., JAMALUDDIN, S. AND RIZWI, MA (1991) Fungi of India. New Delhi, pp 798.
3. BRAUN, U. (2001) Revision of *Cercospora* species described by K.B. Boedijin, *Nova Hedwigia* **73**:419-436.
4. CHUPP, C. (1954) A monograph of the fungus genus *Cercospora*, Ithaca, New York.
5. DEIGHTON, F.C. (1973B) Five north-american *Cercospora* like fungi. *Trans. Brit. Mycol. Soc.* **61**:107-120.
6. ELLIS, M.B. (1971) Dematiaceous Hyphomycetes, CMI, Kew, England.
7. ELLIS, M.B. (1976) More Dematiaceous Hyphomycetes, CMI, Kew, England.
8. FRESENIUS, G. (1863) Beitrage zur mycologie 3. Heinrich Ludwig Brommer verlag, Frankfurt.
9. KAMAL (2010) Cercosporoid fungi of India. B.S. Mahendra Pal Singh Publication, Dehradun. 372.
10. POLLACK, F. G. (1987) An annotated compilation of cercospora name. *Mycol. Mem.* **12** :1-122.
11. SRIVASTAVA, R.K. (1992) "Taxonomy of foliicolous Hyphomycetes with special reference to *Cercospora* Senu-Stricto". Ph.D. thesis.
12. SRIVASTAVA, R.K. ET AL. (1994) "Additions to genus *Cercospora* from North-Eastern Uttar-Pradesh" *Proc. Nat. Acad. Sci. India* **64**(B) I : 105-113.
13. VASUDEVA, R.S. (1963) Indian *Cercosporae* ICAR, New Delhi 245.