



## New Report of *Pseudocercospora* Speg on Some Medicinal Plants from Sonebhadra Forest U.P.

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**ABSTRACT :** Description and illustrations are provided for six new report of *Pseudocercospora* viz *Ps. adinicola* on living leaves of *Adina cordifolia* (Roxb.) Hook (Rubiaceae), *Ps. anogeissi* on living leaves of *Anogeissus pendula* Edgew. (Combretaceae), *Ps. formosana* on living leaves of *Lantana camara* Linn. (Verbenaceae), *Ps. malloti* on living leaves of *Mallotus philippinensis* Muel (Euphorbiaceae), *Ps. withaniae* on living leaves of *Withania somnifera* Dunnal (Solanaceae), *Ps. sydowiana* on living leaves of *Woodfordia fruticosa* (Linn) Jourz. (Lythraceae) from Sonebhadra forest U.P.

**Keywords :** Foliar fungi, hyphomycetes, morphotaxonomy, *Pseudocercospora*

### INTRODUCTION

Sonebhadra district lies in extreme south east of Uttar Pradesh. It is the second largest district of Uttar Pradesh. Sonebhadra forest is one of the less studied regions of India. This area exhibits a great diversity with large number of medicinal plants. The forest of Sonebhadra is tropical, dry deciduous type. The maximum Sonebhadra region covered by laterite soil it consist of iron bricks, in local language it is called 'Murrum'. The climatic conditions of the area are congenial for the growth of different foliicolous fungi and for the infection of the medicinal plants of the area. The genus *Pseudocercospora* encountered in this region causing infection on living leaves of *Adina cordifolia* (Roxb.) Hook (Rubiaceae), *Anogeissus pendula* Edgew. (Combretaceae), *Lantana camara* Linn. (Verbenaceae), *Mallotus philippinensis* Muel (Euphorbiaceae), *Withania somnifera* Dunnal (Solanaceae), *Woodfordia fruticosa* (Linn) Jourz. (Lythraceae) respectively are described and illustrated in this communication.

### MATERIALS AND METHODS

Infected leaves having distinct symptoms (Fig.7) were collected and dried to make herbarium specimens, a part of which was deposited in the Herbarium Cryptogamiae Indiae Orientalis, IARI, New Delhi, as type materials. Microscopic slides were prepared in lactophenol and cotton blue mixture from the scrapping taken from the infected leaf portions.

The mounted slides were examined and Camera Lucida drawings made by using different powers of eye pieces and objective combinations. The taxonomic determinations were made with the help of relevant literature. (Vasudeva, 1963; Crous and Braun, 2003; Kamal, 2010; Hsieh and Goh 1990; Goh and Hsieh 1995) for confirming the identity of the *Pseudocercospora* species encountered. Beside aforesaid literature the "Index of Fungi" published regularly from

C.A.B. International Mycological Institute Kew England, and two website [www.mycobank.org/mycotaxo.aspx](http://www.mycobank.org/mycotaxo.aspx) and [www.indexfungorum.org/names/names.asp](http://www.indexfungorum.org/names/names.asp) were also taken in account.

### RESULT AND DISCUSSION

#### 1. *Pseudocercospora adinicola* (A. K. Kar and M. Mandal) Deighton, Mycol. Pap. 140:138, 1976. (Fig. 1)

≡ *Cercospora adinicola* A.K. Kar & Mandal, Indian Phytopathol. 26: 76 (1973)1975

≡ *Cercocladospora adinicola* (A.K. Kar & Mandal) J.L.Mulder, Trans. Brit. Mycol. Soc. 67: 151, 1976

Leaf spots amphigenous, grayish brown, angular, vein limited, later coalescing becoming irregular, covering the whole leaf surface. Colonies hyphophyllous, effuse. Mycelium superficial, external hyphae septate, branched, smooth walled, light olivaceous, 1-3  $\mu\text{m}$  wide. Stromata absent. Conidiophores arising singly from external hyphae as lateral or terminal branches, micronematous to semimicronematous, mononematous, unbranched to rarely branched, thin and smooth walled, erect, straight to flexuous, cylindrical, 1-5 transversely septate, sometimes geniculate, light olivaceous, 7-33  $\times$  2-3  $\mu\text{m}$ . Conidiogenous cells integrated terminal, cylindrical, sympodial, polyblastic, cicatrized, scars conspicuously thickened. Conidia dry, holoblastic, acropleurogenous, solitary to catenate, simple to branched chains, obclavate cylindrical, straight to curved, smooth walled, pale olivaceous, 0-5 transversely septate, tip subacute, base obconicotruncate, hilum conspicuous and slightly thickened 15-62  $\times$  2-4  $\mu\text{m}$ .

From living leaves of *Adina cordifolia* (Roxb.) Hook (Rubiaceae) Rihand dam forest, Pipari, Sonebhadra, U.P. India Nov. 2009, Archana Singh, BHU Herb No. AS/9053, HClO No.50126.

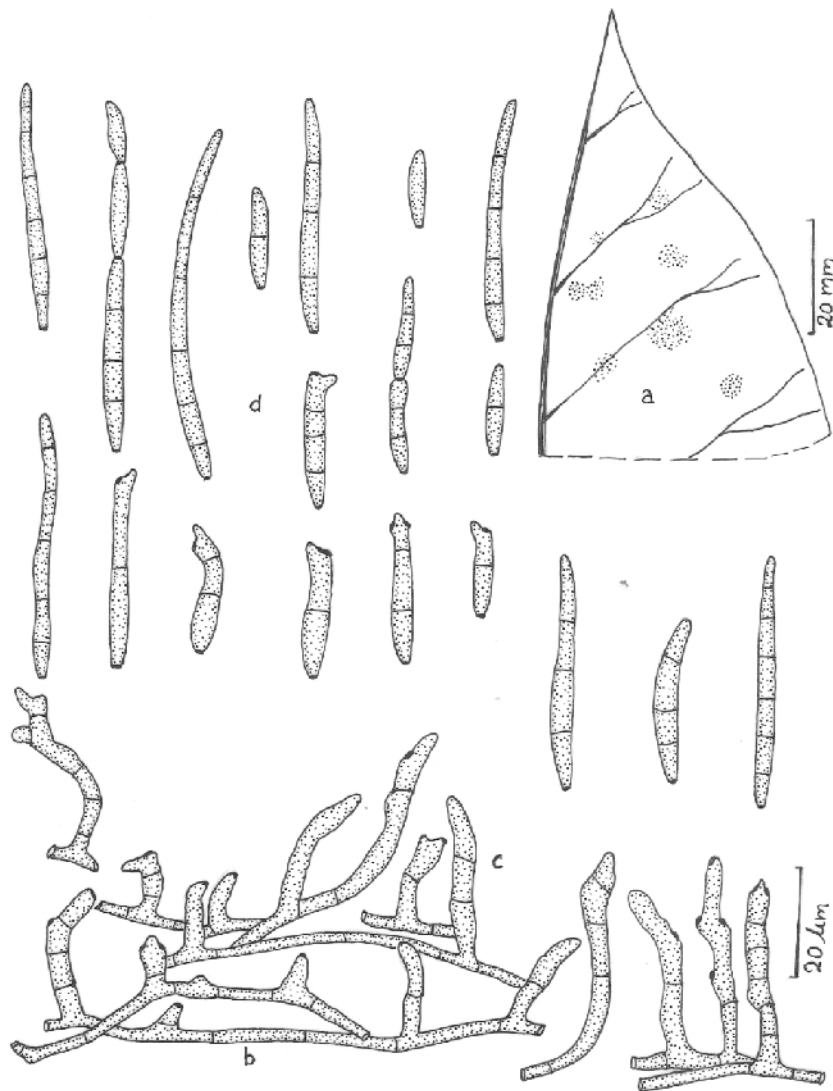


Fig. 1. *Pseudocercospora adinicola* (A.K. Kar and M. Mandal) Deighton, on living leaves of *Adina cordifolia* (Roxb.) Hook (a) Leaf spots (b) Mycelium (c) Conidiophores (d) Conidia Scales : a : 20mm, b-d : 20  $\mu$ m.

**2. *Pseudocercospora anogeissi* U. Braun and Kamal, Mycol. Progr. 2(3): 197, 2003 (Fig. 2)**

Leaf spots amphigenous, circular to sub circular, later coalescing to form irregular patches, scattered on entire leaf surface, upto 12 mm in diam. Colonies amphiphylous, effuse, dark brown. Mycelium secondary mycelium external, light olivaceous, branched, septate, 1.5-2.5  $\mu$ m wide. Stromata subepidermal, pseudoparenchymatous, well developed, olivaceous brown, 12-65  $\mu$ m diam. Conidiophores in small to large fascicles, arising from small to large stromata, rarely solitary, arising from superficial hyphae, erect, straight to moderately geniculate-sinuous, macronematous,

mononematous, unbranched to rarely branched, 0-3(6) transversely septate, smooth, thin walled, pale olivaceous, 9-62  $\times$  3-4  $\mu$ m. Conidiogenous cells integrated, terminal, polyblastic, non cicaterised. Conidia solitary, obclavate cylindrical, straight to slightly curved, dry, acropleurogenous, holoblastic, 2-7 transversely septate, thin and smooth walled, light olivaceous, apex obtuse, base obconically truncate, 12-76  $\times$  2.5-3.5 $\mu$ m

On living leaves of *Anogeissus pendula* Edgew. (Combretaceae) Dudhi forest, Sonebhadra, U.P. India Dec. 2009, Archana Singh, BHU Herb No. AS/9057, HCIO No.50127.

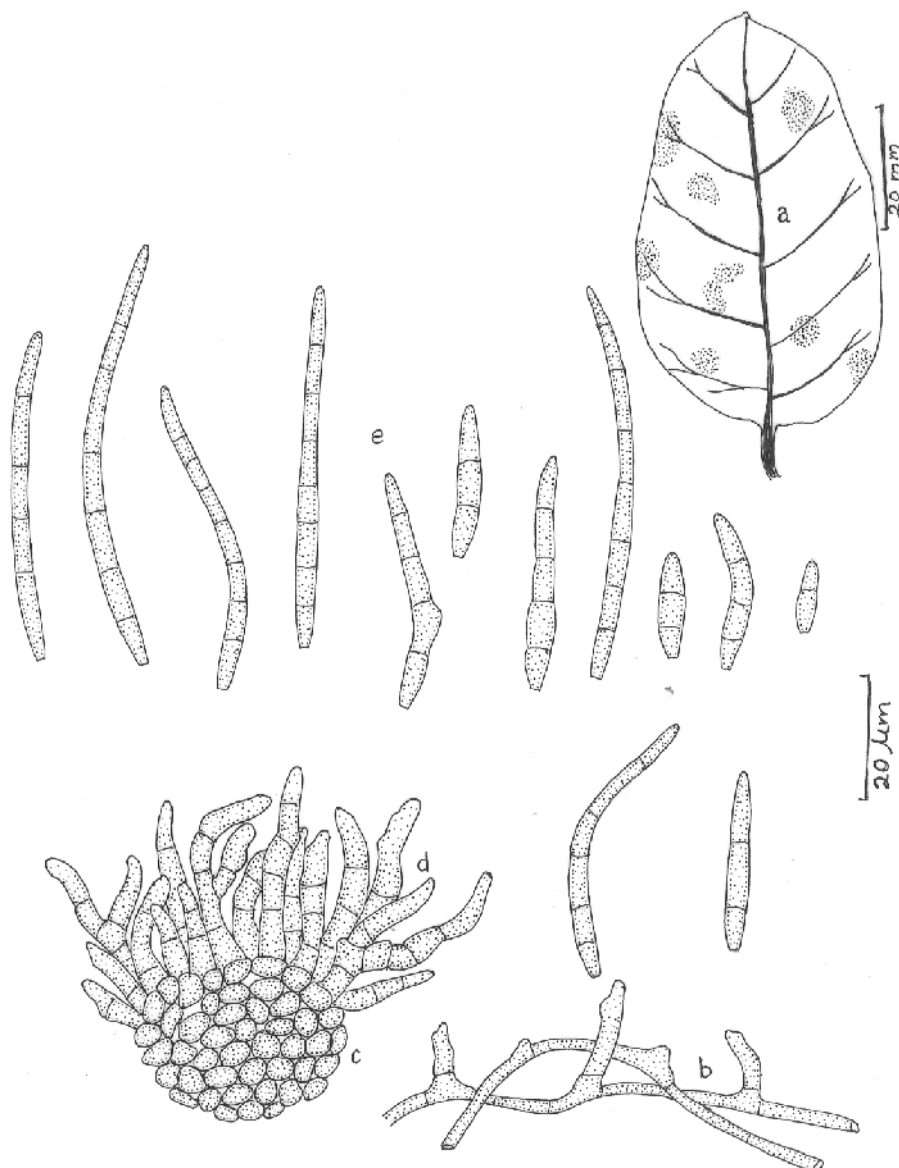


Fig. 2. *Pseudocercopora anogeissi* U. Braun and Kamal on living leaves of *Anogeissus pendula* Edgew. (a) Leaf spots (b) Mycelium (c) Stromata (d) Conidiophores (e) Conidia Scales : a : 20 mm, b-e : 20  $\mu$ m

**3. *Pseudocercospora formosana* (Yaman) Deighton, Mycol. Pap. 140:144, 1976 (Fig. 3)**

$\equiv$  *Cercospora formosana* W. Yamam., J. Soc. Trop. Agric. 6:600, 1934.

$\equiv$  *Cercospora lantanae-aculeatae* J.M. Yen, Rev. Mycol. 31: 124, 1966

$\equiv$  *Pseudocercospora lantanae-aculeatae* (J.M. Yen) J.M. Yen, Bull. Soc. Mycol. France 96: 33, 1980

$\equiv$  *Cercospora lantanae-camarae* J.M. Yen & Gilles, Cah. Maboke 9:106, (1971) 1993

$\equiv$  *Mycovellosiella lantanae* var. *verbenacearum* Bhalla, S.K. Singh & A.K. Srivast., Austral. Syst. Bot. 12:369, 1999

Leaf spots amphigenous, angular, discrete, vein limited, blackish brown on upper surface and light brown on lower

surface, upto 7mm in diam. Colonies hypophyllous, effuse, brown. Mycelium secondary mycelium external, subhyaline to very pale olivaceous, septate, branched, 1.5-2.5  $\mu$ m. Stromata absent. Conidiophores arising singly from external hyphae as lateral or terminal branches, macronematous, mononematous, straight to slightly curved, smooth walled, unbranched, 0-3 transversely septate, sometimes constricted at septa, geniculate, pale olivaceous brown, 7-40  $\times$  3-4  $\mu$ m. Conidiogenous cells integrated terminal, cylindrical, sympodial, polyblastic, non-cicatrizated. Conidia solitary, straight to slightly curved, dry, acropleurogenous, holoblastic, 1-8 transversely septate, thin walled, smooth walled, very pale olivaceous, tip sub-acute to obtuse, base obconically truncate, hilum unthickened 27-160  $\times$  2-3  $\mu$ m.

On living leaves of *Lantana camara* Linn. (Verbenaceae) Rihand dam forest, Pipari, Sonebhadra, U.P. India Nov. 2009, Archana Singh, BHU Herb No. AS/9051, HClO No.50128

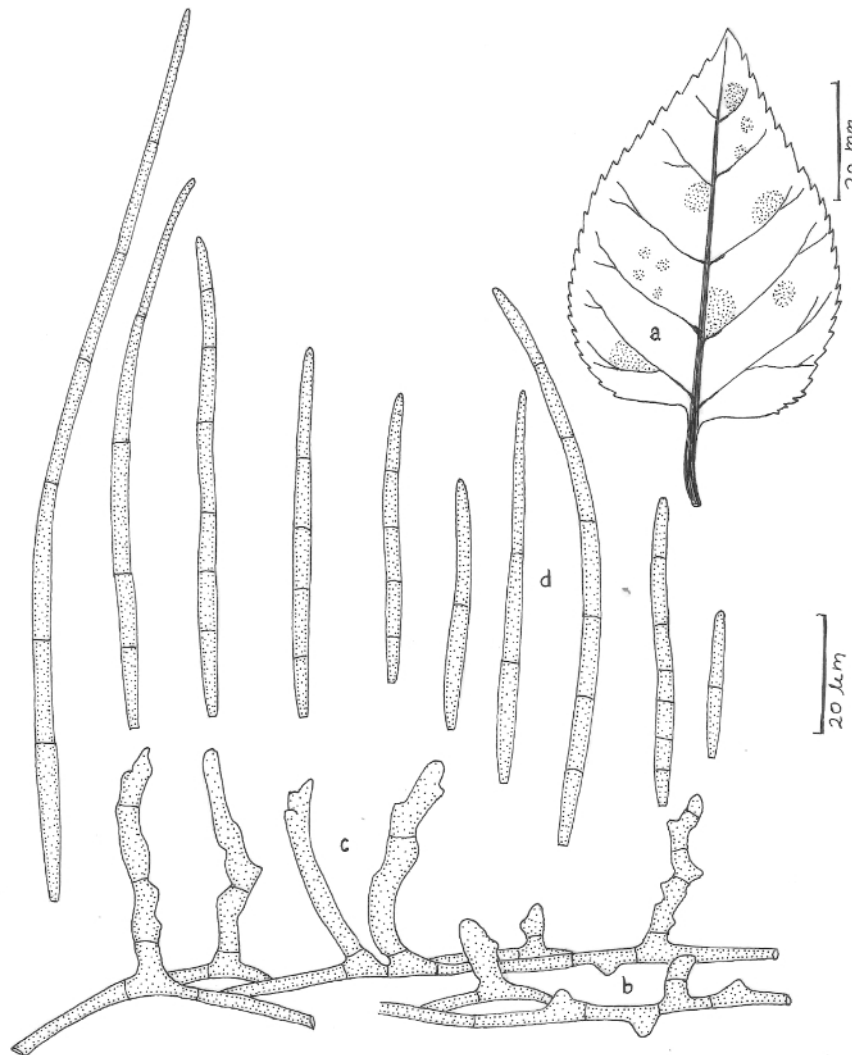


Fig. 3. *Pseudocercopora formosana* (Yaman) Deighton on living leaves of *Lantana camara* Linn. (a) Leaf spots (b) Mycelium (c) Conidiophores (d) Conidia Scales : a :m 20 mm, b-d : 20  $\mu$ m

**4. *Pseudocercospora malloti* (R.N. Kharwar, P.N. Singh and R.K. Chaudhary) U. Braun, *Schlechtendalia* 19: 69 (2009) (Fig. 4)**

$\equiv$  *Mycovellosiella malloti* Kharwar, P.N. Singh and R.K. Chaudhary, *Mycol. Res.* 100(6): 689, 1996

Leaf spots amphigenous, grayish brown, angular, later coalescing becoming irregular. Colonies amphiphylous, effuse. Mycelium mostly superficial, hyphae branched, septate, smooth walled, light olivaceous, 2-4  $\mu$ m wide. Stromata absent. Conidiophores arising singly from external hyphae as lateral or terminal branches, micronematous to semimicronematous, mononematous, straight to slightly

curved, smooth walled, unbranched, 0-1 septate, 5-15  $\times$  3-5  $\mu$ m. Conidiogenous cells integrated terminal, cylindrical, sympodial, polyblastic, cicatrized, scars conspicuously thickened. Conidia dry, holoblastic, acropleurogenous, solitary to catenate, simple to branched chains, obclavate cylindrical, straight to curved, smooth walled, pale olivaceous, 1-10 transversely septate, tip subacute to obtuse, base obconically clavate, hilum conspicuous and slightly thickened, 15-100  $\times$  2-4  $\mu$ m.

On living leaves of *Mallotus philippinensis* Muel (Euphorbiaceae) Rihand dam forest, Pipari, Sonbhadra, U.P. India Nov. 2009 Archana Singh, BHU Herb No. AS/9074, HClO No. 50132

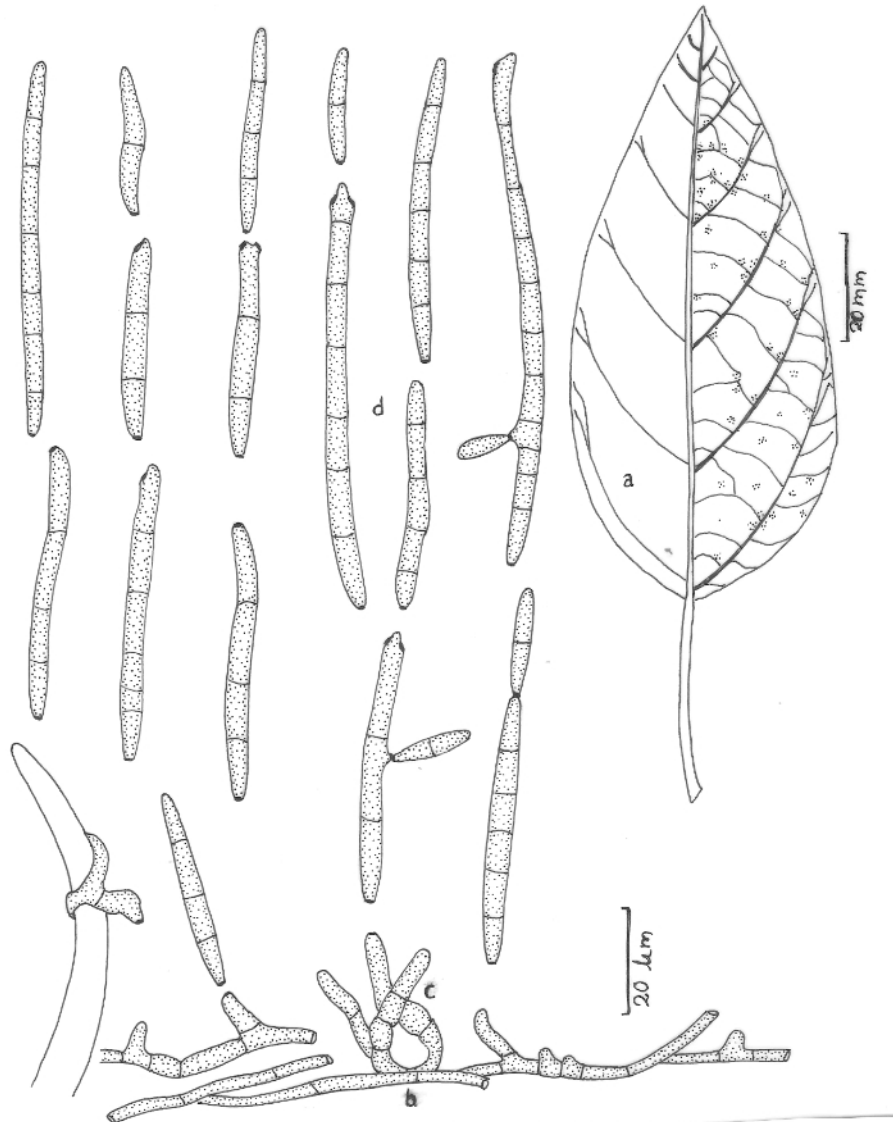


Fig. 4. *Pseudocercopora malloti* (R.N. Kharwar, P.N. Singh and R.K. Chaudhary) U. Braun on living leaves of *Mallotus philippinensis* Muel (a) Leaf spots (b) Mycelium (c) Conidiophores (d) Conidia Scales : a : 20 mm, b-d : 20  $\mu$ m

**5. *Pseudocercospora withaniae* (H. Syd. & P.Syd) Deighton, Mycol. Pap. 140: 155, 1976 (Fig. 5)**

$\equiv$  *Cercospora withaniae* (Syd. & P. Syd.) Deighton, Ann. Mycol. 10:444, 1912

Leaf spots amphigenous, circular to subcircular, discrete, pale brown in colour, scattered on entire leaf surface, upto 4mm in diam. Colonies hypophyllous, effuse velvety. Mycelium internal light olivaceous, branched septate. Stromata substomatal, well developed, pseudoparenchymatous, pale olivaceous, upto 30  $\mu$ m wide. Conidiophores arising in fascicle 12-30, straight to slightly

curved, macronematous, mononematous, unbranched, 0-1 transversely septate, olivaceous, 15-40  $\times$  3-5 $\mu$ m. Conidigenous cells integrated terminal, cylindrical, polyblastic, cicaterised. Conidia dry, holoblastic, acropleurogenous, solitary to occasionally catenate, obclavatocylindrical, straight to curved, smooth walled, light olivaceous, 1-5 transversely septate, tip obtuse, base obconically clavate, 25100  $\times$  4-5 $\mu$ m

On living leaves of *Withania somnifera* Dunal (Solanaceae) Dudhi forest, Sonebhadra, U.P. India, Feb 2010, Archana Singh, BHU Herb No. AS/9117, HClO No.50131

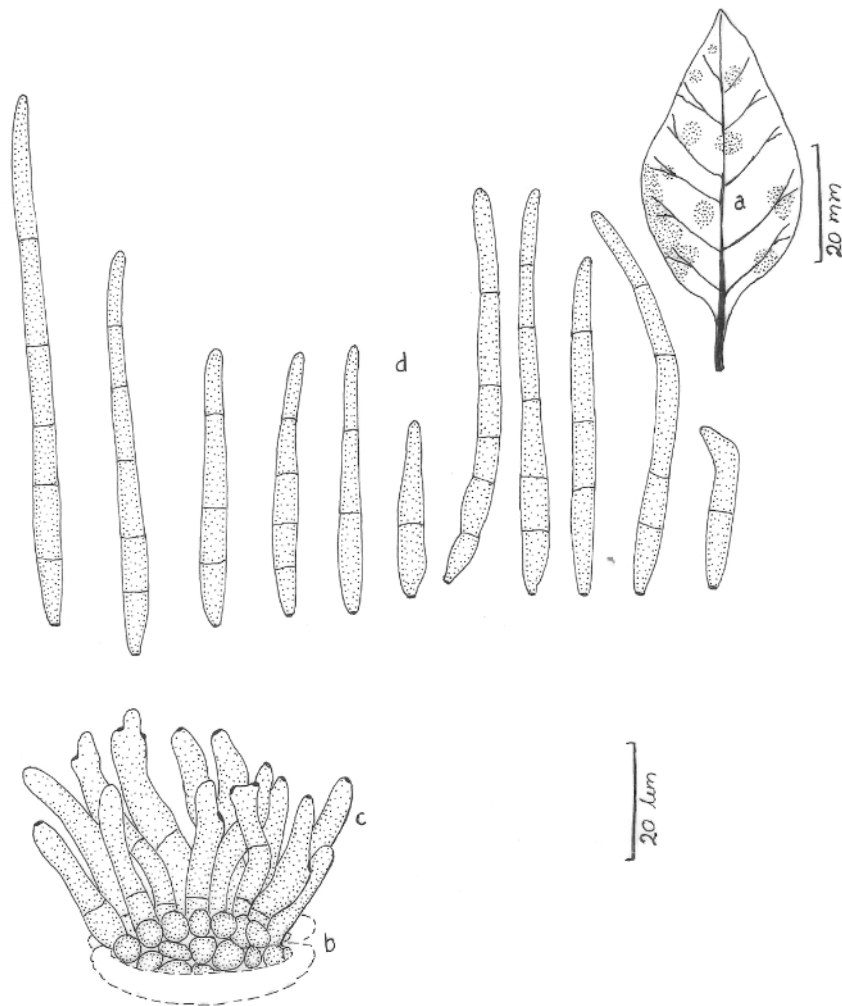


Fig. 5. *Pseudocercospora withaniae* (H. Syd. and P. Syd) Deighton on living leaves of *Withania somnifera* Dunal (a) Leaf spots (b) Stromata (c) Conidiophores (d) Conidia Scales : a : 20 mm, b-d : 20  $\mu$ m

**6. *Pseudocercospora sydowiana* (Chupp) U. Braun & P.W. Crous, *Schlechtendalia* 2:25, 1999 (Fig. 6)**

$\equiv$  *Cercospora sydowiana* Chupp, A monograph of the fungus genus *Cercospora*: 363, 1954

$\equiv$  *Cercospora woodfordiae* Syd., Ann. Crypto. Exot. 2 : 271, 1920 (nom. illeg.), homonym of *C. woodfordiae* Petch, 1922

$\equiv$  *Pseudocercospora woodfordiae* X.J. Liu & Y.L. Guo, Acta Mycol. Sin. 12:32, 1993 (nom. nov., as ' (Syd.) X.L. Liu & Y.L. Guo')

$\equiv$  *Phaeoisariopsis woodfordiae* M.K. Khan, R.K. Verma & Kamal, Indian Phytopathol. 45:31, 1992

Leaf spots amphigenous, circular to subcircular, discrete, dark brown in colour, scattered on entire leaf

surface, up to 4 mm in diam. Colonies hypophyllous, effuse, blackish brown. Mycelium internal, light olivaceous, branched, septate. Stromata subepidermal, well developed, pseudoparenchymatous, dark brown to black, up to 40  $\mu$ m. Conidiophores arising in fascicle 10-36, straight to slightly curved, macronematous, mononematous, unbranched to rarely branched, multiseptate, brown to dark brown, 20-170  $\times$  2.5-3.5  $\mu$ m. Conidiogenous cells integrated, terminal to intercalary, polyblastic, denticulate. Conidia solitary, obclavate-cylindrical, straight to slightly curved, dry, acropleurogenous, holoblastic, 2-6 septate, thin and smooth walled, light brown, tip obtuse, base obconically truncate, 32-75  $\times$  3-4  $\mu$ m

On living leaves of *Woodfordia fruticosa* (Linn) Jourz. (Lythraceae) Dudhi forest, Sonebhadra, U.P. India, Oct 2010, Archana Singh, BHU Herb No. AS/9073, HClO No. 50129

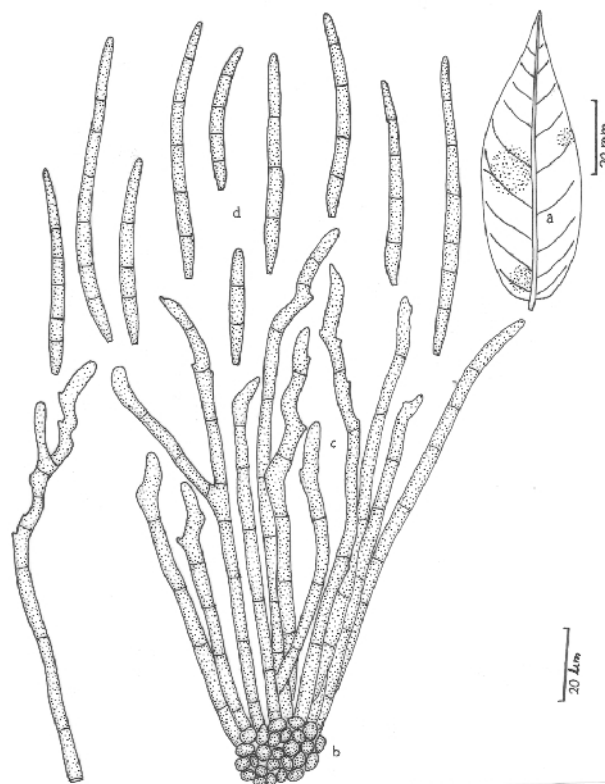
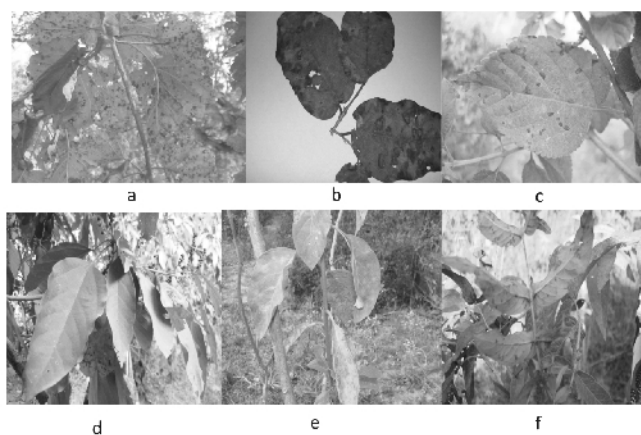


Fig. 6. *Pseudocercopora sydowiana* (Chupp) U. Braun and P.W. Crous on living leaves of *Woodfordia fruticosa* (Linn) Jourz..(a).Leaf spot (b) Stromata (c)Conodiophores (d) Conidia. Scales: a: 20mm, b-d: 20 µm.

**Fig 7. Symptoms of *Pseudocercopora* Speg. Infection on various medicinal plants**



- (a) *Pseudocercopora adinicola* (A.K.Kar and M. Mandal) Deighton, on living leaves of *Adina cordifolia* (Roxb.) Hook  
 (b) *Pseudocercopora anogeissi* U. Braun and Kamal on living leaves of *Anogeissus pendula* Edgew.  
 (c) *Pseudocercopora formosana* (Yaman) Deighton on living leaves of *Lantana camara* Linn.  
 (d) *Pseudocercopora malloti* (R.N. Kharwar, P.N. Singh and R.K.Chaudhary) U. Braun on living leaves of *Mallotus philippinensis* Muel  
 (e) *Pseudocercopora withaniae* (H. Syd. & P. Syd) Deighton on living leaves of *Withania somnifera* Dunal  
 (f) *Pseudocercopora sydowiana* (Chupp) U. Braun & P.W. Crous

on living leaves of *Woodfordia fruticosa* (Linn) Jourz.

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