
Studies on *Pseudocercospora* and *Curvularia*

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Pseudocercospora angustata (Chupp & Solheim) Deighton, *Pseudocercospora bombacina* (Ramakrishna & Ramakrishnan) Deighton and *Pseudocercospora vitis* (Lev.) Spegazzini, *Curvularia cymbopogonia* (Dodge) Groves & Sholks and *C. sorghina* Shivas & Shivan have been studied. They were collected from the different districts of West Bengal during the year 1985-1987 and they are all for the first time reported from the State of West Bengal.

Key words : Taxonomy, *Pseudocercospora*, *Curvularia*, West Bengal.

INTRODUCTION

Spegazzini erected the genus *Pseudocercospora* with large *Phragmidium* like conidia in the year 1910. He also showed that *Pseudocercospora vitis* (Lev.) Speg. as the type species of the genus. The genus *Pseudocercospora* is one of the largest number of *Cercospora*-like fungi. Deighton (1976, 1983, 1987) has critically studied the genus and laid down the points of demarcation from the other allied genera (*Cercoseptoria*, *Pantospora*, *Pseudocercospora*) by citing minute and important characters. A *Mycosphaerella* (perfect stage) has been described for several species of *Pseudocercospora*.

The genus *Curvularia* was founded by Boedijn in 1933 and cited *Curvularia lunata* (Wakker) Boedijn as the type species of the genus. The three genera *Bipolaris*,

Drechslera and *Curvularia* are closely related as is evident from the fact that many species now placed in these genera were originally kept in *Helminthosporium*. Intermediate forms, no doubt, will occur and present taxonomic difficulties. In *Curvularia lunata* (Wakker) Boedijn the type species, the development of the conidia is similar to what is seen in *Drechslera* and *Bipolaris* but the conidia are usually curved and there is invariably a differentiation into central cells which are darker and wider and end cells which are paler in colour and narrower (Subramanian, 1953). These species were listed in Fungi of India (Bilgrami *et al.*, 1981; Sarvoy *et al.* 1981).

OBSERVATIONS

Pseudocercospora angustata (Chupp & Solheim) Deighton Mycol. Pap. 140 : 139 (1976).

Synonym : *Cercospora angustata* Chupp & Solheim in Chupp. A Monograph of the Fungus Genus *Cercospora* : 280 (1953).

Leaf-spots formed on lamina, virulent, amphigenous, more prominent on the dorsal surface, angular to irregular, very often coalescent. greyish centre surrounded by deep brownish margin, 2-10 mm in extent; caespituli amphigenous, evenly distributed over the spots, well developed on lower surface, brownish : primary mycelium internal, pale olivaceous, septate and branched, 2.0-3.5 μ m wide; stroma amphigenous, well developed, substomatal, brown, compact, globose to sub-globose, composed of dark brownish hyphal cells, 3.5-4.0 μ m wide, stroma upto 30.0 μ m wide and 26.5 μ m high; conidiophore amphigenous, chiefly hyphophyllous, fasciculate, fascicles dense to very dense, in fascicles of 4-42 or more divergent, stalks emerging through the stomata, straight to undulate, pale olivaceous, simple or branched, smooth, thin-walled, non-geniculate, septate, septa not prominent, very rarely 1-2 septa, denticles subconic, often apex dilated 3.5-5.0 x 11.0-30.0 μ m; secondary mycelium external, profusely branched and septate, pale olivaceous, 2.0-3.0 μ m wide, originating from the base of the conidiophore fascicle and producing lateral branches; conidia obclavate-cylindric, pale olivaceous, pluriseptate (2-10 septa), straight to curved, smooth, tip subacute, base obconic-truncate, 2.5-5.0 x 11.0-70.0 μ m.

Specimen studied : on *Cassia fistula* Linn. (fam : Fabaceae), Rajbalhat, Hooghly, West Bengal, India, PCC 3376 (=IMI 299592), leg. T. K. De, 21 September, 1985.

Pseudocercospora bombacina (T. S. Ramakrishnan & K. Ramakrishnan) Deighton, Trans. Br. Mycol. Soc. 88(3) : 388 (1987).

Synonym : *Cercospora bombacina* T. S. Ramakrishan, Proc. Indian Acad. Sci. B. **32** : 212 (1950).

No definite leaf-spot, only indefinite brownish irregular areas, upto 6 mm wide ; caespituli amphigenous, brownish, uniformly distributed over the spots ; stroma sometimes very poorly developed or completely absent, sub-stomatal, globular to subglobular, brownish ; conidiophores amphigenous, chiefly epiphyllous, fasciculate, in fascicles of 2—7 divergent stalks emerging through the stomata, pale olivaceous to brownish, straight to bent, simple, septate (1-4 septa), denticulate, denticles very short and conic, $3.5-4.5 \times 19.0-30.0 \mu\text{m}$; secondary mycelium external, hyphae brownish to pale olivaceous, $2.5-3.0 \mu\text{m}$ wide ; branched and septate, originating from the base of the conidiophore fascicles and producing lateral secondary conidiophores ; conidia obclavate to cylindric, sub-hyaline, mostly curved, often straight, smooth, pluriseptate (2-8 septa), septa distinct, tip subobtuse, base obconic truncate, $3.0-3.5 \times 25.5-65.0 \mu\text{m}$.

Specimen studied : On *Bombax malabaricum* DC. (fam ; Malvaceae), Kalsawar, Burdwan, West Bengal, India, PCC 4901 (=IMI 302646), leg. T. K. De, 11 November, 1935.

Pseudocercospora vitis (Lev.) Spegazzini, An. Mus. nac. Hist. nat. B. Aires **20** : 438 (1910).

Synonym : *Septonema vitis* Leveille, Annls Sci. nat., Bot., ser. 3, **9** : 26 ; (1848).

Cladosporium vitis (Lev.) Saccardo, Myc. venet. n. 284 (1875) ; *Cercospora vitis* (Lev.) Saccardo, Nuovo G. bot. ital. **8** : 188 (1876) ; *Helminthosporium vitis* (Lev.) Pirotta (as 'Sacc.), Revue mycol. **11** : 185 (1889) ; *Phaeoisariopsis vitis* (Lev.) Sawada, Rep. Dep. Agric. Govt. Res. Inst. Formosa 2 (Descr. Cat. Formosan Fungi **11**) : 164 (1922) ; *Cercosporiopsis vitis* (Lev.) Miura, Flora of Manchuria and East Mongolia III Cryptogams, Fungi (Industr. Contr. S. Manch. Rly 27). 527 (1928) ; *Cladosporium viticolum* Casati, Flora **38** : 206 (1854) ; *Cercospora viticola* (Ces.) Saccardo, Syll. Fung. **4** : 458 (1886) ; *Cladosporium ampelinum* Passerini, Erb. critt. ital., ser. 2, n. 595 (1872). *Graphium clavisporum* Berkeley & Cooke, Grevillea **3** : 100 (1874) ; *Isariopsis clavispora* (Berk. & Cke) Saccardo, Syll. Fung. **4** : 631 (1836) *Cercospora vitis* (Lev.) Sacc. var. *rupestris* Ciferri, Annls mycol. **20** : 45 (1922).

Spots formed on lamina, amphigenous, better on dorsal surface, circular to irregular, sometimes coalescent forming larger spots, virulent, scattered, effuse, greyish brown centre surrounded by purplish margin, 2-10 mm in extent ; caespituli amphigenous, chiefly hypophyllous, uniformly distributed over the spots,

blackish brown; primary mycelium internal, pale olivaceous, branched and septate, $1.5 - 2.5 \mu\text{m}$ wide; stroma hypophyllous, substomatal, well developed, dark brown, globose, composed of swollen, compact brownish hyphal cells, $3.5 - 7.0 \mu\text{m}$ wide, stroma upto $33.0 \mu\text{m}$ wide and $30.0 \mu\text{m}$ high; conidiophore hypophyllous, arising from the stroma in dense fascicles of 80 or more stalks, straight to curved, pale olivaceous, simple, smooth, thick-walled, septa 0-3, denticulate, apex dilated, often a conidium is attached at the subconic tip of the conidiophore, $2.0 - 4.5 \times 15.0 - 95.0 \mu\text{m}$; secondary mycelium superficial, originating from the base of the conidiophore fascicles, septate and branched, olivaceous brown $2.0 - 3.0 \mu\text{m}$ wide, producing lateral and terminal secondary conidiophores; conidia obclavate, pale olivaceous, pluriseptate (1-8 septa), straight to curved, smooth, thin-walled, not constricted, tip sub-obtuse, base tapers to hilum $4.0 - 5.0 \times 30.0 - 60.0 \mu\text{m}$.

Specimen studied: on *Vitis* sp. (fam: Vitaceae), Diara, Hooghly, West Bengal, India, PCC 4890 (=IMI 322394), leg. T. K. De, 13 November, 1937.

Curvularia cymbopogonis (C. W. Dodge) Groves & Skolko, Canadian Journal of Research 23: 96 (1945)

Leaf spots amphigenous, more prominent on the upper surface, angular to irregular, often coalescent, brownish area with an indistinct margin, 0.5-5 mm in extent; caespituli amphigenous, brownish; stroma none; conidiophores erect, straight to flexuous, simple, thick-walled, smooth, narrower to the apex than the base, often swollen at the tip, mostly solitary, sometimes fasciculate, blackish brown, geniculate towards the apex, pluriseptate (3-7 septa), $3.5 - 5.5 \times 76.0 - 171.0 \mu\text{m}$; conidia ventricose fusiform, pale brown, the third cell from the base larger and darker than the others, mostly curved, occasionally straight, smooth, septa mostly 4, often 3, thick-walled, the apical cell with a rounded tip, the basal cell elongate-obconical and with a prominent short hyaline pedicel at the base, $35.0 - 65.0 \mu\text{m}$ long, $11.0 - 15.5 \mu\text{m}$ wide at the broadest part.

Specimen studied: On *Saccharum spontaneum* Linn. (Fam: Poaceae), Diara, Hooghly, West Bengal, India, PCC 4898 (=IMI 322399), leg. T. K. De, 13 November, 1987.

Curvularia sorghina Shivas & Sivan. Trans. Br. mycol. Soc. 88: 269 (1987).

Spots formed on lamina, amphigenous, more prominent on the dorsal surface, circular to irregular, sometimes coalescent, greyish white centre surrounded by deep brownish margin, 2-7 mm in extent; caespituli amphigenous, chiefly epiphyllous, deep brownish; stroma absent; conidiophores erect, emerging

through the stomata, simple, straight to flexuous, thick-walled, smooth, fasciculate or solitary, blackish brown, paler towards the apex, geniculate (1-3), pluriseptate (3-7 septa), often swollen at the tip, spore scar (1-4), sometimes somewhat swollen at the base, $3.5-4.5 \times 75.0-150.0 \mu\text{m}$; conidia clavate, pear-shaped, olive brown, the third cell from the base the darker and broader than the other cells, smooth, thick-walled, septa 3-4, distinct, $18.0-35.0 \mu\text{m}$ long, $9.5-15.0 \mu\text{m}$ wide at the broadest part.

Specimen studied : On *Pennisetum* sp. (Fam : Poaceae), Chinsurah, Hooghly, West Bengal, India, PCC 4897 (=IMI 302398), leg. T. K. De, 18 October, 1987.

ACKNOWLEDGEMENT

The authors are grateful to the Director, CAB, International Mycological Institute, Kew, Surrey, England for verification and confirmation of the associated fungi and to Dr. A. K. Kar, Retd. Professor and Head, Dept. of Botany, Presidency College, Calcutta 700 073 for his inspiration and discussion for preparation of this paper.

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(Accepted for publication 7 September 1994)