

CERCOSPOROID FUNGI FROM BRAZIL. 2.

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ABSTRACT

This contribution deals with the systematics of cercosporoid fungi from Brazil. Four *Cercospora* species from Brazil, and one from the USA are treated. New combinations and names are proposed in *Passalora*, *Phaeoramularia* and *Pseudocercospora*.

INTRODUCTION

In his monograph of the genus *Cercospora*, Chupp (1954) listed several *Cercospora* spp. that were described from Brazil by Viégas (1945). In recent years, however, the concept of *Cercospora* has been re-evaluated, and nearly 50 segregate genera distinguished from *Cercospora sensu lato* based on a combination of factors including their conidium and conidiophore morphology, pigmentation, type of conidioma, presence or absence of superficial mycelium, and nature of the conidial hila and abscission scars on the conidiogenous cells (Braun, 1995).

Subsequent to Chupp (1954), several workers have treated some cercosporoid fungi from Brazil (Dianese, Sutton & Tessman,

1993; Dianese & Câmara, 1994; Medeiros & Dianese, 1994; Barreto & Evans, 1995; Crous & Alfenas, 1995). Recently, more attention has been given to the systematic revision of the Brazilian cercosporoids (Inácio *et al.*, 1996; Crous *et al.*, 1997). The present study gives an account of four Brazilian and one North American species that are lodged at the National USDA Herbarium, Beltsville Maryland, USA (BPI).

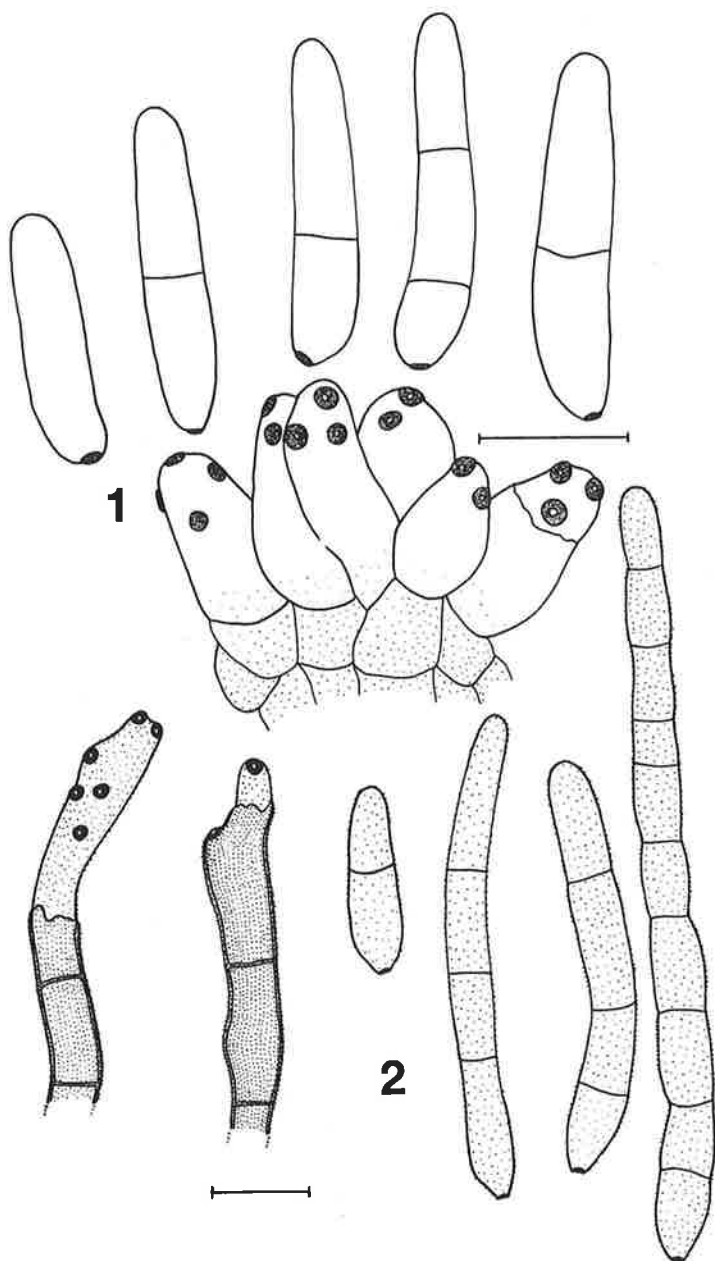
SPECIES TREATED

1. *Passalora urostigmatis* (Henn.) Crous & M.P.S. Câmara
 comb. nov. Fig. 1
Cercospora urostigmatis Henn., *Hedwigia* 41: 117. 1902.

Leaf spots amphigenous, circular, 2-10 mm diam., dark brown on adaxial surface, with a sunken appearance and inconspicuous border. *Mycelium* predominantly internal, composed of smooth, branched, hyaline hyphae, 2-3 µm diam. *Caespituli* fasciculate, hypophyllous, pale brown on leaves, up to 80 µm wide and 40 µm high. *Conidiophores* mostly reduced to conidiogenous cells, or 1-septate, aggregated in dense fascicles, arising from the upper cells of a minute light brown stroma; conidiophores subhyaline to pale olivaceous at the base, finely verruculose, subcylindrical to obclavate, straight to slightly curved, unbranched, sometimes rejuvenating enteroblastically, tapering to obtuse apices, with several thickened, slightly darkened, refractive apical loci, proliferating sympodially, 10-25 x 5-7 µm. *Conidia* solitary, subhyaline to pale olivaceous, smooth, subcylindrical, apex obtuse, base obconic, straight to slightly curved, 0-1(-3)-septate, (11-)17-25(-35) x (3-)4-5(-5.5) µm; hila slightly thickened, darkened throughout, refractive.

Specimen: Brazil, São Paulo, Serra da Cantareira, on leaves of *Urostigma* sp. (Moraceae), A. Puttemans, 3 Apr. 1901, A. Puttemans Fungi S. Paulensis 187, BPI 442107 (holotype).

Figs. 1, 2. Conidia and conidiophores of (1) *Passalora urostigmatis* (BPI 442107), and (2) *Passalora cordylines* (BPI 435225). Bars = 10 µm.



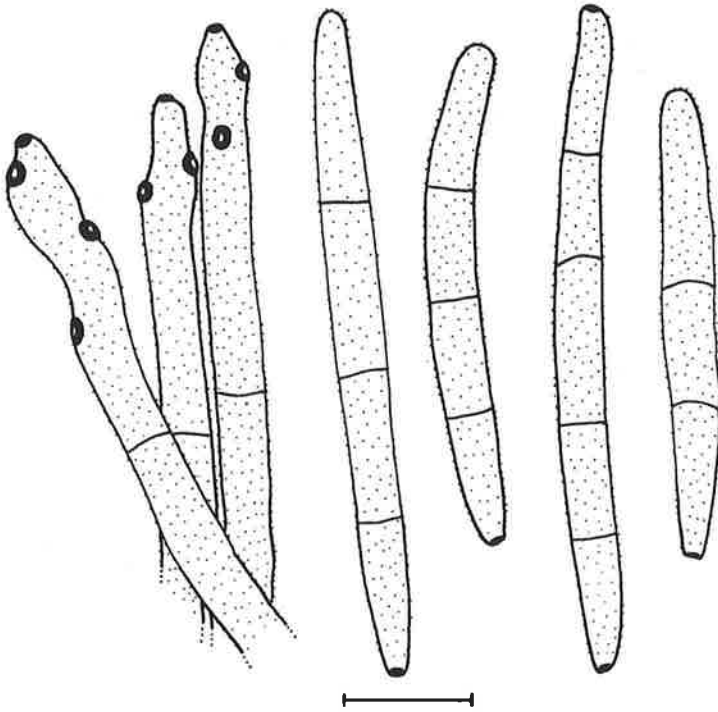


Fig. 3. Conidia and conidiophores of *Phaeoramularia adenocalymmae* (BPI 432404). Bar = 10 μ m.

In his treatment of *Cercospora* and segregate genera, Braun (1995) lists a single species from Moraceae, namely *C. antiaridis* Hansf. The latter species is quite distinct from *P. urostigmatis* by having different conidial hila, divergent fascicles with longer conidiophores (up to 150 μ m), and larger (40-130 x 4-6 μ m), 1-6-septate conidia. Chupp (1954) also records *P. urostigmatis* (as *Cercospora urostigmatis*) from Venezuela, and it is possible that it has a wider distribution in South America.

2. *Passalora cordyline* (Henn.) Crous & M.P.S. Câmara comb. nov.

Cercospora cordyline Henn., *Hedwigia* 41: 117. 1902.

Cercospora cordyline Speg., *Rev. Mus. La Plata* 15: 45. 1908.

Fig. 2

Leaf spots amphigenous, circular, 2-8 mm diam., brown to dark red-brown, with a dark brown to black border; frequently

coalescing into larger spots. *Mycelium* internal, composed of smooth to finely verruculose, branched, light brown hyphae, 3-4 μm diam. *Caespituli* fasciculate, amphigenous, dark brown on leaves, up to 120 μm wide. *Conidiophores* densely aggregated, arising from the upper cells of a brown stroma; conidiophores medium brown, finely verruculose to verruculose, subcylindrical, straight to geniculate-sinuous, unbranched, 1-7-septate, 30-75 x 3-5 μm . *Conidiogenous cells* integrated, terminal, unbranched, light brown, finely verruculose, subcylindrical, tapering to rounded apices, with several thickened, darkened, refractive apical loci, proliferating sympodially, and frequently rejuvenating enteroblastically, 5-30 x 4-4.5 μm . *Conidia* solitary, medium brown, finely verruculose, subcylindrical to obclavate, apex obtuse, base obconically truncate, straight to curved, (1-)3-8(-10)-septate, frequently constricted at septa, (25-)45-75(-100) x (4-)5-6 μm ; hila slightly thickened, darkened, refractive (Chupp lists some conidia to be up to 175 μm in length).

Specimen: Brazil, São Paulo, Botanic Garden, *Cordyline dracenoides* (Agavaceae), A. Puttemans, Mar. 1901, A. Puttemans Fungi S. Paulensis 286, BPI 435225 (holotype).

Passalora cordyline (Henn.) Crous & M.P.S. Câmara and its later homonym, *Cercospora cordyline* Speng. were both collected from the same location, and represent the same fungus *vide* Chupp (1954).

3. *Phaeoramularia adenocalymmae* (A.S. Mull. & Chupp)

Crous & M.P.S. Câmara comb. nov.

Fig. 3

Cercospora adenocalymmae A.S. Mull. & Chupp, *Arq. do Inst. de Biol. Vegetal* 1: 213. 1935.

Leaf spots amphigenous, sub-circular, 0.5-4 mm diam., grey on adaxial surface, surrounded by a raised, dark brown border, and a thin, red-purple margin. *Mycelium* internal, composed of smooth to finely verruculose, branched, light brown hyphae, 3-4 μm diam. *Caespituli* fasciculate, predominantly hypophyllous, brown, up to 130 μm wide and 100 μm high. *Conidiophores* aggregated in dense fascicles, arising from the upper cells of a brown stroma; conidiophores light brown, finely verruculose, subcylindrical, straight to slightly curved, unbranched, 1-5-septate, 25-75 x 4-5 μm . *Conidiogenous cells* terminal,

unbranched, light brown, finely verruculose, tapering to flat-tipped, thickened, refractive apical loci, proliferating sympodially, 10-35 x 4-4.5 μm . *Conidia* rarely catenulate, chains simple, finely verruculose, light brown, cylindro-obclavate, apex obtuse, base long obconically truncate, straight to slightly curved, (1-)3-8(-10)-septate, (30-)50-100(-150) x 3.5-4(-4.5) μm ; hila thickened, darkened, refractive.

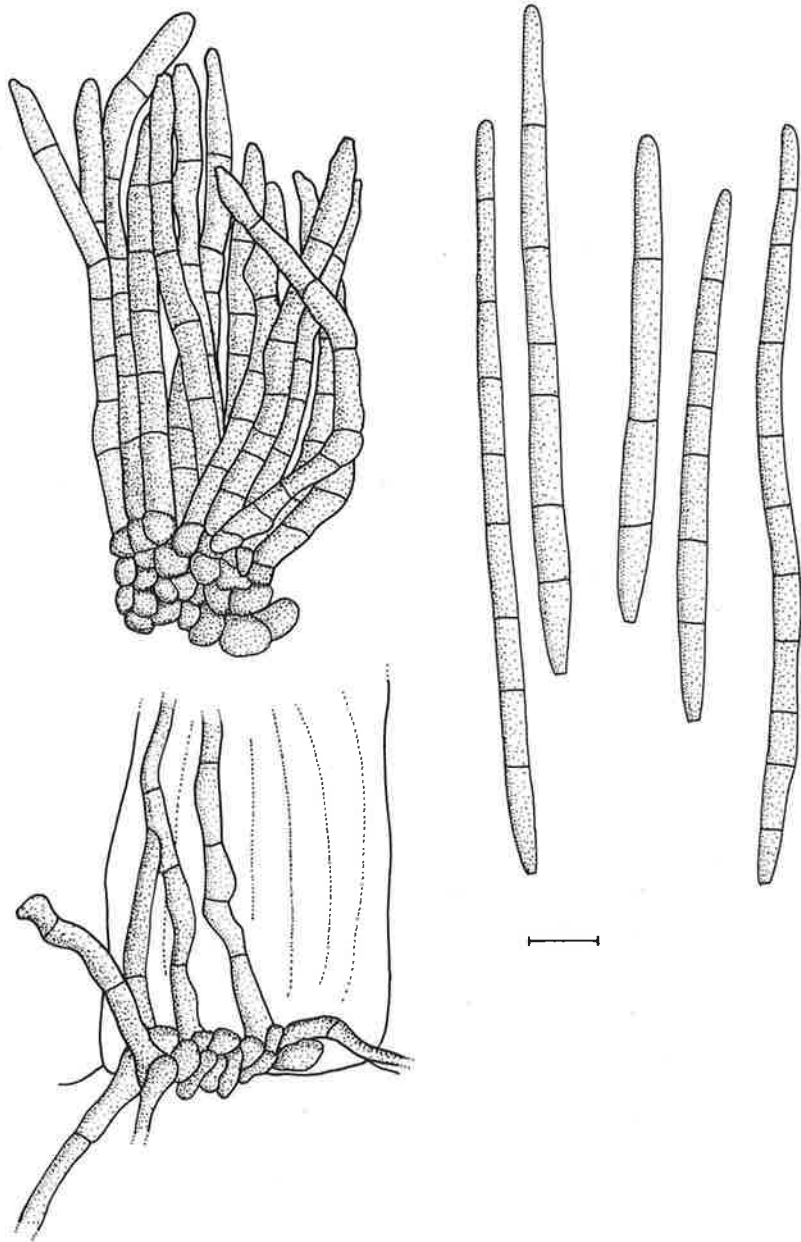
Specimen: Brazil, Espirito Santo, Vargem Alta, *Adenocalymma bracteatum* (Bignoniaceae), S. C. da Silva, 18 Aug. 1938, Herb. Phytopathol. Serv. Def. San. Vegetal Est. ES, No. 322, BPI 432404.

Chupp (1954) reports this species from two states in Brazil, namely Espirito Santo and Minas Gerais. Although the type was not located in the present study, the specimen examined was annotated by Chupp as *Cercospora adenocalymmae* A.S. Mull. & Chupp, and closely fits his description of this species.

4. *Pseudocercospora richardsoniae* (Ellis & Everh.) Crous & M.P.S. Câmara comb. nov. Fig. 4
Cercospora richardsoniae Ellis & Everh., *Jour. Mycol.* **8**: 72. 1902.
Cercospora carveriana Sacc. & D. Sacc., *Syll. Fung.* **18**: 607. 1906
 (*nom. superfl.*).

Leaf spots amphigenous, indistinct. *Mycelium* internal and external, composed of finely verruculose, branched, light to medium brown hyphae, 3.5-4 μm diam., frequently constricted at septa, and climbing leaf hairs. *Caespituli* fasciculate, amphigenous, medium brown on leaves, up to 60 μm wide and 110 μm high. *Conidiophores* arising singly from superficial mycelium, or aggregated in dense fascicles, arising from the upper cells of a light brown stroma up to 40 μm wide; conidiophores medium brown, finely verruculose, subcylindrical, straight to geniculate-sinuuous, unbranched, 3-10-septate, 30-80 x 4.5-5.5 μm . *Conidiogenous cells* terminal, unbranched, medium brown, finely verruculose, tapering to flat-tipped, inconspicuous apical loci, proliferating sympodially, 10-20 x 3-5 μm . *Conidia* solitary, pale brown, finely verruculose, narrowly obclavate, apex obtuse, base long obconically truncate,

Fig. 4. Conidia and conidiophores of *Pseudocercospora richardsoniae* (BPI 440390). Bar = 10 μm .



straight to slightly curved, (1-)4-7(-12)-septate, (30-)65-100(-130) x (2-)3-3.5(-4.5) μm ; hila inconspicuous.

Specimen: USA, Tuskegee, Ala., on *Richardsonia glabra* (Rubiaceae), G.W. Graver, 31 Aug. 1900, Ellis & Everhart's Fungi Columbiani No. 1612, BPI 440390 (holotype), BPI 440389 (isotype).

Pseudocercospora richardsoniae and *Cercospora richardsoniae* Henn. both occur on species of *Richardsonia* in the southern part of the USA (Alabama) and Brazil (São Paulo), respectively. These two taxa are further compared and discussed below.

5. *Pseudocercospora lonchocarpi* (J.A. Stev.) Crous & M.P.S.

Câmara comb. nov.

Fig. 5

Cercospora lonchocarpi J.A. Stev., *Mycologia* **38**: 532. 1946.

Leaf spots amphigenous, irregular, 2-20 mm diam., grey to light brown on adaxial surface, surrounded by a thin, dark brown border; lesions becoming confluent with age. *Mycelium* internal and external, composed of smooth, branched, pale olivaceous hyphae, 2.5-3 μm diam. *Caespituli* fasciculate, predominantly epiphyllous, dark brown on leaves, up to 80 μm wide and 100 μm high. *Conidiophores* aggregated in dense fascicles, arising from the upper cells of a brown stroma; conidiophores medium brown, finely verruculose, subcylindrical, straight to geniculate-sinuous, unbranched, 3-6-septate, 25-75 x 3-4.5 μm . *Conidiogenous cells* terminal, unbranched, olivaceous to light brown, finely verruculose, tapering to inconspicuous, flat-tipped apical loci, proliferating sympodially, or 1-3 times enteroblastically and percurrently, 5-25 x 2.5-3 μm . *Conidia* solitary, pale olivaceous to light brown, finely verruculose, subcylindrical to narrowly obclavate, apex subobtuse, base long obconically truncate, straight to curved, (1-)3-7(-13)-septate, (30-)50-100(-120) x 3-3.5(-4.5) μm ; hila inconspicuous.

Specimens: Brazil, Pará, Belém, on fields of the Inst. Agr. do Norte, on *Lonchocarpus utilis* (Fabaceae), A.W. Archer, No. H-464, 14 Feb. 1945, BPI 437873 (holotype); Pará, Belém, on fields of the Inst. Agr. do Norte, on *Lonchocarpus urucu* (Fabaceae), A.W. Archer, No. H-428, 6 Jul. 1942, BPI 437872 (paratype).

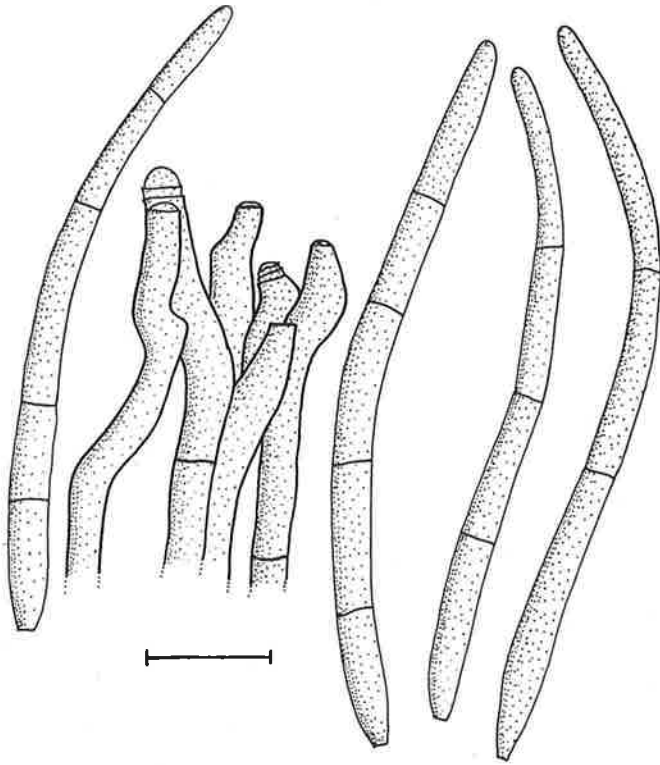


Fig. 5. Conidia and conidiophores of *Pseudocercospora lonchocarpi* (BPI 437873). Bar = 10 μ m.

6. *Pseudocercospora richardsoniicola* Crous & M.P.S. Câmara
 nom. nov. Fig. 6
Cercospora richardsoniae Henn., *Hedwigia* 41: 117. 1902 (non *C.*
richardsoniae Ellis & Everh.).

Leaf spots amphigenous, irregular to circular, 5-12 mm diam., light brown, with a raised, dark brown border, coalescing with age. *Mycelium* internal and external, composed of finely verruculose, branched, light brown hyphae, 2.5-4 μ m diam. *Caespituli* fasciculate, amphigenous, medium brown on leaves, up to 100 μ m wide and 250 μ m high. *Conidiophores* aggregated

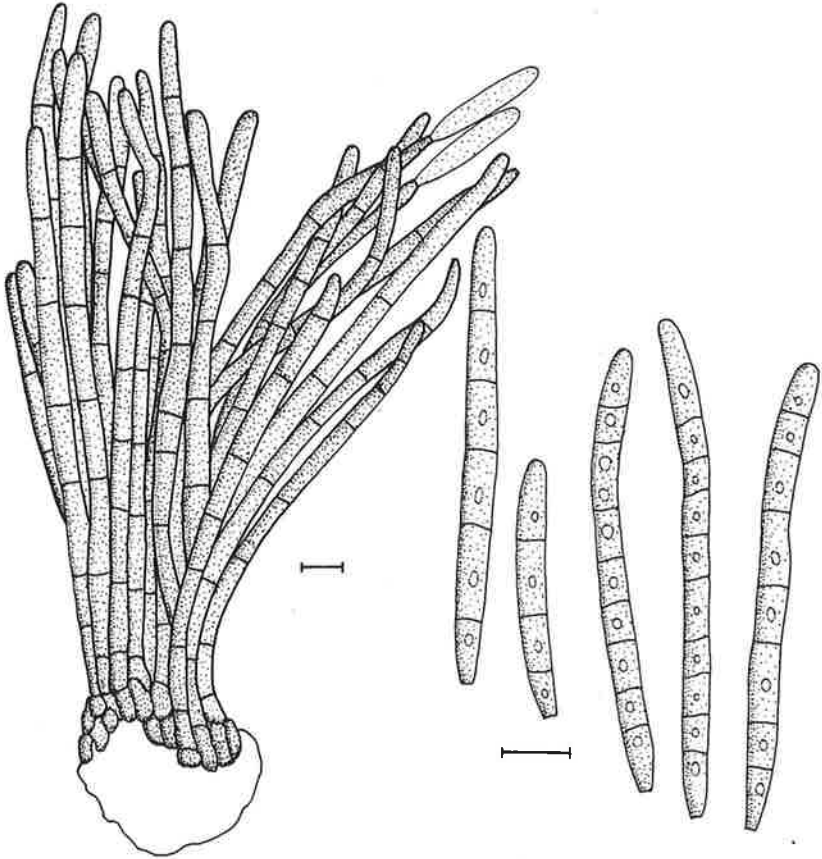


Fig. 6. Conidia and conidiophores of *Pseudocercospora richardsoniicola* (BPI 440387). Bars = 10 μ m.

in dense, divergent fascicles, arising from the upper cells of a medium brown stroma up to 100 μ m wide; conidiophores medium brown, finely verruculose, cylindrical, straight to slightly curved, unbranched, 3-14-septate, 40-200 x 3.5-5.5 μ m. *Conidiogenous cells* terminal, unbranched, medium brown, finely verruculose, tapering to rounded apices, rejuvenating enteroblastically near apex, proliferating sympodially, 15-35 x 3.5-5.5 μ m. *Conidia* solitary, light brown, finely verruculose, guttulate, subcylindrical to obclavate, apex obtuse, base

obconically truncate, straight to slightly curved, (4-)6-9(-11)-septate, (30-)50-80(-150) x 4-5(-6) μm ; hila inconspicuous.

Specimens: Brazil, São Paulo, Botanic Garden, on *Richardsonia* sp. (Rubiaceae), A. Puttemans, 4 Feb. 1901, A. Puttemans Fungi S. Paulensis No. 166, BPI 440387 (holotype); São Paulo, Cantareira, on *Richardsonia brasiliensis*, J.G. Carneiro, 7 Apr. 1932, Inst. Biol. São Paulo Herb. Secç. de Fitopatol. No. 422, BPI 440388.

Two cercosporoid species were described from *Richardsonia* with the same epithet, namely *Cercospora richardsoniae* Ellis & Everh. (1902) from the USA, and *Cercospora richardsoniae* Henn. (1902) from Brazil. Saccardo (1906) proposed a new name for the species described by Ellis & Everhart, namely *C. carveriana* Sacc. & D. Sacc. This was a nomenclatural error, as the species described by Ellis & Everhart appeared in January, and the Hennings species in June, thus making the latter one a homonym of the former. To avoid further confusion, however, Chupp (1954) decided to retain the two species epithets accepted by Saccardo. Proposing two new combinations for these names in *Pseudocercospora* would, however, create two illegitimate names. The epithet described by Ellis & Everhart is thus retained, while a new name is proposed for the later homonym described by Hennings.

The two species can firstly be distinguished by the inconspicuous leaf spots of *Pseudocercospora richardsoniae*, as opposed to the distinct ones of *P. richardsoniicola*. Morphologically they are also distinct with *P. richardsoniicola* having large stromata with conspicuous fascicles, long conidiophores (up to 200 μm), and wider (up to 6 μm), more cylindrical conidia with short obconic bases. In contrast, fascicles of *P. richardsoniae* are inconspicuous, conidiophores are shorter (up to 80 μm), and conidia are narrower (up to 4.5 μm), with long obconically truncate bases.

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