CERCOSPOROID FUNGI FROM BRAZIL. 1.

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ABSTRACT

This paper represents the first in a series dealing with the systematics of cercosporoid fungi from Brazil. The present study revises 22 Cercospora species reported or described from Brazil by Viégas in 1945. Several new combinations and synonymies are made in Passalora, Phaeoisariopsis, Pseudocercospora and Mycovellosiella. In addition, Mycosphaerella eugenicola is newly described as the teleomorph of Pseudocercospora sphaerellae-eugeniae (Sacc.) Crous, Alfenas & R.W. Baretto comb. nov. from leaves of Eugenia uniflora.

INTRODUCTION

Cercosporoid fungi are commonly associated with leaf spot diseases of numerous host plants world-wide. Other than just plant pathogens, some have also been found to be potential biocontrol agents of weeds and other exotic plants (Morris & Crous, 1994; Barreto & Evans, 1995). Although these fungi are common in Brazil and other countries in South America, they have generally been poorly studied from this region. The most significant treatment of these taxa from Brazil was undoubtedly
that of Viégas (1945), which was later incorporated into Chupp (1954). Since then, however, there have only been fragmented treatments of Brazilian cercosporoids by workers such as Deighton, Sutton, Braun and others (Ellis, 1976; Dianese, Sutton & Tessman, 1993; Dianese & Câmara, 1994; Medeiros & Dianese, 1994; Barreto & Evans, 1995; Crous & Alfenas, 1995; Crous & Braun, 1996; Inácio et al., 1996). The aim of this project, therefore, was to systematically revise records of this group of fungi from Brazil. The present study focuses on some specimens collected and described by Viégas, and lodged in the herbarium at Campinas (IACM).

SPECIES CONSIDERED


Although the illustration given by Viégas (1945) suggested that it could be a species of Passalora, the conidia were hyaline, acicular, with subacute apices and truncate bases, mostly straight, indistinctly multi-septate, 20-95 x 2-4 μm. Based on the hyaline conidia and scar structures, this species is best retained in Cercospora.


Leaf spots amphigenous, forming dark concentric lesions 10-20 mm long. Mycelium internal, composed of smooth, branched, hyaline hyphae, 3-4 μm diam. Caespituli fasciculate, amphigenous, brown. Conidiophores aggregated in loose fascicles, arising from the upper cells of a weakly developed substomatal stroma; conidiophores medium brown, smooth, subcylindrical, straight to variously curved, unbranched, 3-4-septate, 40-120 x 4-5 μm. Conidiogenous cells integrated, terminal, light brown, smooth, tapering to flat-tipped loci, proliferating sympodially, 10-25 x 3-4 μm. Conidia solitary, hyaline, smooth, guttulate, subcylindrical, apex subobtuse, base
narrowly obconically truncate, straight, 1-4-septate, 20-45 x 2-3.5 μm; hila thickened, darkened, refractive.


Chupp (1954) stated that he did not see the type specimen. A re-examination of the latter in this study, however, confirmed it to be a typical Cercospora species.


Fig. 1

Cercospora papayae Viégas & Chupp, Bol. da Soc. Brasil. de Agron. 8, 42. 1945. (homonym)


Leaf spots amphigenous, irregular to sub-circular, 5-15 mm diam., light brown on adaxial surface, light to median brown on the abaxial surface with a raised border; coloured margin absent. Mycelium internal, composed of smooth, branched, hyaline hyphae, 2-3 μm diam. Caespituli fasciculate, amphigenous, brown. Conidiophores aggregated in loose to dense fascicles, arising from the upper cells of a medium brown stroma up to 80 μm wide and 30 μm high; conidiophores medium brown, smooth, subcylindrical, straight to once geniculate, unbranched, 1-5-septate, 55-95 x 5-7 μm. Conidiogenous cells integrated, terminal, unbranched, medium to light brown, smooth, tapering to rounded apices, proliferating sympodially, subcylindrical, straight, rarely once geniculate, 25-40 x 5-8 μm. Conidia solitary, hyaline, smooth, guttulate, aciculate, apex subobtuse to subacute, base truncate, straight to curved, 1-18-septate, 40-190 x 3-5 μm; hila thickened, darkened, refractive.


Cercospora papayae Viégas & Chupp (1945) is a later homonym of C. papayae Hansf. (1943), which resulted in Chupp (1954) proposing a new name, C. mamaonis Viégas & Chupp for the former species. An examination of the type specimen of C. mamaonis (IACM 613) showed several inconsistencies with the descriptions of Viégas (1945) and Chupp (1954). Conidia were
acicular, and much larger than that given by Viégas (40-90 x 3.5-4 μm) and Chupp (10-45 x 2-3 μm). Chupp also referred to conidia as being cylindrical, but this may be due to him only observing small conidia. In the original illustration Viégas illustrated conidia as being obclavate to acicular with subacute apices and obconically truncate bases. *C. papayae* Hansf. is very similar, but Chupp stated that it had longer conidiophores (50-200 x 3.5-6 μm), and variously curved acicular conidia (20-75 x 3-5 μm). However, Chupp also accepted a Chinese description as representative of *C. papayae*, with conidia 40-188 x 4-6.5 μm. Ellis (1976) also stated conidia of *C. papayae* Hansf. were 45-170 x 4-5 μm. This suggests that *C. mamoanis* and *C. papayae* Hansf. are in fact synonymous.


Although we suspected that this may not be a true *Cercospora* species due to the relatively short conidiophores situated on a stroma as illustrated by Viégas (1945), his interpretation of the conidiophores were in fact incorrect (10-15 x 2.5-4 μm). Chupp (1954) correctly described them as light brown, straight, 30-150 x 2.5-4 μm, with a thickened apical conidial locus. Conidia were hyaline to subhyaline, multi-septate, subcylindrical to obclavate, 20-70 x 2-4 μm.


*Fig. 2 Cercospora arrabidaeae* Chupp & Viégas, *Bol. da Soc. Brasil. de Agron.* 8, 8. 1945.

*Leaf spots* amphigenous, irregular to sub-circular, 1-4 mm diam., dark brown with a diffuse, light brown margin. *Mycelium* internal, composed of finely verruculose, branched, light brown

Figs 1-3. Conidia and conidiogenous cells of *Cercospora* and *Passalora* spp. *Fig. 1. Cercospora papayae* (IACM 613). *Fig. 2. Passalora arrabidaeae* (IACM 37267). *Fig. 3. Passalora campinensis* (IACM 3727; scale bar = 10 μm).
hyphae, 3-4 μm diam. (Viégas also illustrated some superficial hyphae to be present). *Caespituli* fasciculate, hypophyllous, brown, up to 100 μm wide and 150 μm high. *Conidiophores* aggregated in loose to dense fascicles, arising from the upper cells of a medium brown stroma up to 60 μm wide and 30 μm high; conidiophores medium brown, finely verruculose, subcylindrical, straight to geniculate-sinuous, unbranched or branched above, 1-10-septate, 20-80 × 5-6 μm. *Conidiogenous cells* integrated, terminal, branched or not so, light to medium brown, finely verruculose, subcylindrical, tapering to rounded apices, or becoming slightly clavate near apex with several flat-tipped, thickened, refractive apical loci, proliferating sympodially, 20-40 × 5-6 μm. *Conidia* solitary, light brown, finely verruculose, guttulate, narrowly obclavate to subcylindrical, apex obtuse to subobtuse, base obconically truncate, straight to curved, 3-20-septate, 35-180 × 3.5-5 μm; hila thickened, darkened, refractive.


6. *Passalora campinensis* (Chupp & Viégas) Crous, Alfenas & R.W. Barreto comb. nov. Fig. 3


*Leaf spots* amphigenous, irregular to sub-circular, 2-4 mm diam., white-brown at centres, becoming medium brown towards a raised border; margin dark brown, diffuse. *Mycelium* internal, composed of smooth, branched, light brown hyphae, 3-4 μm diam. (Viégas also illustrated some superficial hyphae to be present). *Caespituli* fasciculate, hypophyllous, brown, up to 50 μm wide and 200 μm high. *Conidiophores* aggregated in loose fascicles, arising from the upper cells of a minute brown stroma up to 35 μm wide and 20 μm high; conidiophores medium brown, finely verruculose, cylindrical, straight to slightly curved, unbranched, 2-7-septate, 40-200 × 3-5 μm. *Conidiogenous cells* integrated, terminal, unbranched, light brown, smooth to finely verruculose, subcylindrical, tapering to rounded apices, with several flat-tipped, thickened, refractive apical loci, proliferating sympodially, 30-50 × 3-4 μm. *Conidia* solitary, light brown, smooth to finely verruculose, guttulate, obclavate, apex subobtuse, base obconically truncate, straight to slightly curved,
1-5-septate, 25-90 x 3.5-6 µm; hila thickened, darkened, refractive.


The obclavate conidia of *P. campinensis* (1-5-septate, 25-90 x 3.5-6 µm) are similar to those of *Passalora syzygii* (M. Mandal) B. Sutton & Crous (1-7-septate, 35-80 x 3-5 µm), which occurs on *Syzygium cumini* in India (Sutton & Crous, 1996). However, conidiophores and conidiogenous cells of *P. campinensis* (40-200 x 3-5 µm; 30-50 x 3-4 µm) are much longer and narrower than those of *P. syzygii* (50-90 x 4.5-6 µm; 10-17 x 5-6 µm). The two species are further distinguished in general symptomatology and pigmentation of their conidiophores and conidia.


Leaf spots amphigenous, irregular to angular, 1-5 mm diam., grey in centre, becoming dark brown towards an indistinct border; coloured margin absent. *Mycelium* internal, composed of smooth, branched, light brown hyphae, 3-4.5 µm diam. *Caespituli* sporodochial, acervuli-like, becoming fasciculate, amphigenous, brown, up to 270 µm wide and 170 µm high. *Conidiophores* aggregated in loose to very dense fascicles, arising from the upper cells of a minute brown stroma up to 150 µm wide and 70 µm high; conidiophores medium brown, finely verruculose to verruculose, cylindrical, straight to geniculate-sinuous, unbranched or branched above, 1-7-septate, 30-120 x 4-9 µm. *Conidiogenous cells* integrated, terminal and lateral, light to medium brown, finely verruculose, subcylindrical, tapering to rounded apices with thickened, refractive loci, proliferating sympodially, 20-45 x 4-8 µm. *Conidia* solitary, olivaceous to pale brown, smooth to finely verruculose, granular and guttulate, subcylindrical to obclavate, apex subobtuse, base obconically truncate, straight to curved, 1-5-septate, 20-65 x 4-6.5 µm; hila thickened, darkened, refractive.

8. Passalora fuligniosa (Ellis & Kellerm.) Crous, Alfenas & R.W. Barreto comb. nov. Fig. 5

*Cercospora fuligniosa* Ellis & Kellerm., *Jour. Mycol.* 3, 103. 1887.

Leaf spots amphigenous, irregular to sub-circular, 2-7 mm diam., dark brown with indistinct margins on adaxial surface, medium brown with a raised, dark brown border and margin on the abaxial surface. *Mycelium* internal, composed of smooth, branched, light brown hyphae, 2-3 μm diam. *Caespituli* fasciculate, hypophyllous, dark brown, up to 60 μm wide and 100 μm high. *Conidiophores* aggregated in dense fascicles, arising from the upper cells of a brown stroma up to 50 μm wide and 20 μm high; conidiophores medium to dark brown, finely verruculose, subcylindrical, straight to slightly curved, unbranched, 2-5-septate, 30-110 x 3-5 μm. *Conidiogenous cells* integrated, terminal, light to medium brown, finely verruculose, subcylindrical, tapering to flat-tipped, thickened, refractive apical loci, proliferating sympodially, 20-40 x 3-4 μm. *Conidia* solitary, olivaceous to pale brown, finely verruculose, guttulate, subcylindrical to narrowly obclavate, apex obtuse, base obconically truncate, straight to slightly curved, 1-3-septate, 25-70 x 3-5 μm; hila thickened, darkened, refractive.

Specimen: Minas Gerais, Belo Horizonte, Jardim Botanico, *Diospyros hispida*, 30 Jan. 1943, A.P. Viégas, IACM 4134 (holotype of *C. diaspyri*).

Several cercosporoid taxa with pigmented conidia have recently been described from this host (Hsieh & Goh, 1990; Crous & Braun, 1995). Chupp (1954), who examined Viégas's material, considered *C. diaspyri* to be a synonym of *C. fuligniosa*. The

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Figs 4-7. Conidia and conidiogenous cells of *Passalora* and *Phaeoramularia* spp. Fig. 4. *Passalora colubrinae* (IACM 267). Fig. 5. *Passalora fuligniosa* (IACM 4134). Fig. 6. *Phaeoramularia pyrostegiae* (IACM 167). Fig. 7. *Passalora ubatubensis* (IACM 3310; scale bar = 10 μm).
synonymy of *C. atra* with *C. fuligniosa* was earlier made by Ellis (1888). Saccardo & Sydow (1899) stated that the name *C. fuligniosa* is a typographical error, and suggested using the name *C. fulignosa*. However, since they used this name for a species occurring on *Ceanothus*, Chupp recommended that *C. atra* be used instead. In allocating this name to *Passalora*, we chose to retain the original name with its typographical error, as any further changes would have resulted in unnecessary confusion.

9. *Passalora ubatubensis* (Chupp & Viégas) Crous, Alfenas & R.W. Barreto comb. nov. Fig. 7

*Leaf spots* amphigenous, sub-circular to circular, 3-14 mm diam., light brown, border slightly raised, medium brown; coloured margin absent. *Mycelium* internal and external, composed of finely verruculose, branched, light brown hyphae, 3-4 μm diam. *Caespituli* fasciculate, hypophyllous, medium brown, up to 70 μm wide and 80 μm high. *Conidiophores* aggregated in loose fascicles, arising from the upper cells of a brown stroma up to 60 μm wide and 50 μm high; conidiophores medium brown, finely verruculose, subcylindrical, straight to slightly curved, unbranched, 6-12-septate, 110-300 x 4-6 μm. *Conidiogenous cells* integrated, terminal, light brown, smooth to finely verruculose, subcylindrical, tapering to rounded apices with flat-tipped, thickened, refractive loci, proliferating sympodially, 25-45 x 4-5 μm. *Conidia* solitary, olivaceous to light brown, finely verruculose, guttulate, subcylindrical, apex obtuse, base obconically truncate, straight to slightly curved, 4-8-septate, 40-110 x 4-6 μm; hila thickened, darkened, refractive.


10. *Passalora vicosae* (Muller & Chupp) Crous, Alfenas & R.W. Barreto comb. nov. Fig. 8

*Leaf spots* predominantly hypophyllous, irregular to angular, 3-5 mm diam., concolorous to light brown on both leaf surfaces, with black caespituli on the lower surface; margins indistinct.
Mycelium internal, composed of smooth, branched, hyaline, hyphae, 3-4 μm diam. Caespituli fasciculate, predominantly hypophyllous, black with white spore masses, up to 40 μm wide and 130 μm high. Conidiophores aggregated in loose to dense fascicles, arising from the upper cells of a reduced brown stroma; conidiophores medium to dark brown, finely verruculose, subcylindrical, straight to geniculate-sinuous, branched below or above, multi-septate, 60-180 x 5-6 μm. Conidiogenous cells integrated, terminal, light brown, finely verruculose, subcylindrical, tapering to rounded apices with flat-tipped, thickened, refractive loci, proliferating sympodially, 10-25 x 4-6 μm. Conidia solitary, olivaceous to pale brown, finely verruculose, guttulate, subcylindrical to narrowly obclavate, apex obtuse, base obconically truncate, straight to slightly curved, 1-5-septate, 25-100 x 4-6 μm; hila thickened, darkened, refractive.

Specimen: Minas Gerais, Viçosa-Escola, Manihot sp., 16 Apr. 1933, A.S. Muller, IACM 468 (holotype).

11. *Phaeoisariopsis luheae* (Chupp & Viégas) Crous, Alfenas & R.W. Barreto comb. nov. Fig. 9


Leaf spots epiphyllous, circular, light brown, 1-2 mm diam., border distinct, slightly raised, dark brown. Mycelium internal, composed of smooth, branched, olivaceous hyphae, 3-4 μm diam. Caespituli fasciculate, synnematal, hypophyllous, medium brown, up to 35 μm wide and 150 μm high. Conidiophores aggregated in dense synnemata, arising from the upper cells of a reduced brown stroma; conidiophores medium brown, smooth, subcylindrical, straight to geniculate-sinuous, 3-7-septate, 30-90 x 3-5 μm. Conidiogenous cells integrated, terminal, light to medium brown, smooth, subcylindrical, tapering to clavate apices with flattened, thickened, refractive loci, proliferating sympodially, 20-45 x 5-6 μm. Conidia solitary, olivaceous to light brown, smooth, guttulate, subcylindrical to obclavate, apex obtuse, base obconically truncate, straight to slightly curved, 1-7-septate, 20-85 x 4-6.5 μm; hila thickened, darkened, refractive.

Specimen: São Paulo, Campinas, Luhea sp., 12 Apr. 1942, A.P. Viégas, IACM 4021 (holotype).
Braun (1995) separated *Passalora* from *Phaeoisariopsis* by the latter genus having long, closely appressed synnematal conidiophores, as was the case with the type specimen of *P. luheae*.


*Leaf spots* amphigenous, sub-circular, 1-5 mm diam., pale green, becoming light brown, border raised, medium brown, margin absent or thin and dark brown. *Mycelium* internal, composed of smooth, branched, hyaline to light brown hyphae, 2-3.5 μm diam. *Caespituli* fasciculate, amphigenous, medium brown, up to 100 μm wide and 70 μm high. *Conidiophores* aggregated in very dense fascicles, arising from the upper cells of a brown stroma up to 80 μm wide and 50 μm high; conidiophores light to medium brown, smooth, subcylindrical, straight to slightly curved, unbranched, 1-3-septate, 35-70 x 4-6 μm. *Conidiogenous cells* integrated, terminal, light brown, smooth, subcylindrical, tapering to rounded apices with flat-tipped, thickened, refractive loci, proliferating sympodially, 15-25 x 4-6 μm. *Conidia* often catenulate, olivaceous to pale brown, smooth, guttulate, cylindrical, apex obtuse, base obconically truncate, straight to slightly curved, 2-12-septate, 25-170 x 3-4.5 μm; hila thickened, darkened, refractive.


*Cercospora aratanthes* P. Henn., *Hedwigia* 48, 18. 1909.

*Leaf spots* amphigenous, irregular, 2-12 mm diam., dark brown with an indistinct border; coloured margins absent. *Mycelium*

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Figs 8-11. Conidia and conidiogenous cells of *Passalora, Phaeoisariopsis* and *Pseudocercospora* spp. Fig. 8. *Passalora vicosae* (IACM 3478). Fig. 9. *Phaeoisariopsis luheae* (IACM 4021). Fig. 10. *Pseudocercospora aratanthes* (IACM 3606). Fig. 11. *Pseudocercospora bixae* (IACM 1510; scale bar = 10 μm).
internal and external, composed of smooth to finely verruculose, branched, light brown hyphae, 3-4 µm diam. *Caespituli* fasciculate, hypophyllous, brown, up to 150 µm wide and 50 µm high. *Conidiophores* aggregated in dense fascicles, arising from the upper cells of a brown stroma, up to 120 µm wide and 20 µm high; conidiophores light brown, finely verruculose, subcylindrical, straight to geniculate-sinuous, 0-3-septate, 15-30 x 3-4 µm. *Conidiogenous cells* integrated, terminal, light brown, finely verruculose, subcylindrical, tapering to truncate apices with inconspicuous loci, proliferating sympodially, 8-12 x 2-3.5 µm. *Conidia* solitary, olivaceous to pale brown, finely verruculose, guttulate, narrowly obclavate, apex subobtuse, base long obconically truncate, straight to curved, 2-10-septate, 35-110 x 2-3.5 µm; hila inconspicuous.


Although we have not seen the Brazilian type specimen of *P. artanthes* (Serra de Cantareira, São Paulo, *Artanthe* sp., A. Puttemans, No. 678, Mar. 1903), the Viégas collection corresponded closely with the description given by Chupp (1954), who also stated that this species is well distributed throughout Brazil.

14. *Pseudocercospora bixae* (Allesch. & F. Noack) Crous, Alfenas & R.W. Barreto comb. nov. Fig. 11

Leaf spots amphigenous, irregular to sub-circular, 3-15 mm diam., medium brown on the adaxial surface, borders distinct, often slightly raised. *Mycelium* internal, composed of smooth, branched, light brown hyphae, 3-4 µm diam. *Caespituli* fasciculate, amphigenous, dark brown, up to 25 µm wide and 60 µm high. *Conidiophores* aggregated in loose to dense fascicles.

Figs 12-14. Conidia and conidiogenous cells of *Pseudocercospora* spp. Fig. 12. *Pseudocercospora micranthae* (IACM 1921). Fig. 13. *Pseudocercospora tibouchinae* (IACM 605). Fig. 14. *Pseudocercospora urense* (IACM 703; scale bar = 10 µm).
arising from the upper cells of a medium brown stroma, up to 35 μm wide and 60 μm high; conidiophores medium brown, finely verruculose, unbranched, subcylindrical, straight to slightly curved, 1-3-septate, 30-80 x 3-4 μm. Conidiogenous cells integrated, terminal, light brown, finely verruculose, subcylindrical, tapering to truncate apices with inconspicuous loci, proliferating sympodially, 17-25 x 3-4 μm. Conidia solitary, olivaceous to pale brown, finely verruculose, guttulate, narrowly obclavate, apex subobtuse, base long obconically truncate, straight to slightly curved, 3-10-septate, 30-130 x (2-)3-4 μm; hila inconspicuous.

Specimen: São Paulo, Bixa orellana, 26 Apr. 1936, H.P. Krug, IACM 1510.

The type specimen of P. bixae, originally described from Brazil (Agron. de Campinas, Bixa orellana, F. Noack, Sept. 1897), was not examined in this study. However, the Viégas collection corresponded closely with the description given by Chupp (1954), who reported that this species was widely distributed throughout South America. Viégas described conidia as 30-130 x 3-4 μm, while Chupp reported them as 25-130 x 2-4 μm. Hsieh & Goh (1990) described P. bixicola Goh & W.H. Hsieh (conidia 3-6-septate, 30-60 x 2-3 μm), and stated that it was distinguishable from P. bixae by having obclavate-cylindrical conidia. However, Viégas (1945) also reported P. bixae to have obclavate-cylindrical conidia. The only difference between these species, therefore, is the longer conidia of P. bixae. Based on all the other similarities, however, it would be best to treat P. bixicola as synonym of P. bixae.

15. Pseudocercospora micranthae (Muller & Chupp) Crous,
     Alfenas & R.W. Barreto comb. nov. Fig. 12
Mycovellosoia micranthae (Muller & Chupp) Dianese & Furlanetto,
     Fitopatol. Bras. 21, 406. 1996.

Leaf spots amphigenous, irregular to sub-circular, 2-6 mm diam., medium brown, borders indistinct, margins absent. Mycelium internal and external, composed of finely verruculose, branched, light brown hyphae, 4-5 μm diam. Caespituli fasciculate, amphigenous, medium brown. Conidiophores arising singly from superficial mycelium, or aggregated in loose fascicles, arising
from the upper cells of a weakly developed brown stroma; conidiophores medium brown, finely verruculose, branched above, subcylindrical, straight to geniculate-sinuous, 2-6-septate, 40-100 x 3-5 μm. Conidiogenous cells integrated, terminal, unbranched, light brown, finely verruculose, subcylindrical, tapering to truncate or subtruncate apices with inconspicuous loci, proliferating sympodially, 10-45 x 3-5 μm. Conidia solitary, olivaceous to pale brown, finely verruculose, guttulate, narrowly obclavate, apex subobtuse, base obconically truncate, straight to curved, 4-11-septate, 45-180 x 3.5-6 μm; hila inconspicuous.

Specimen: Minas Gerais, Felipe dos Santos, Sida cordifolia, 12 Apr. 1936, H.P. Krug, IACM 1921.

The Brazilian type specimen cited by Chupp (1954) (Minas Gerais, Sida micrantha, A.S. Muller & O. Drummond, No. 881, 25 Jan. 1935) was not examined. However, the Viégas material and description correlated closely with that given by Chupp (1954), who referred to this species as occurring in three states in Brazil, namely Espirito Santo, Minas Gerais and São Paulo.


Specimen: São Paulo, Campinas, Punica granatum, 23 Mar. 1941, A.P. Viégas, IACM 3739.

Chupp (1954) referred to some collections that had catenulate conidia, suggesting that P. punicae may be heterogeneous. An examination of the Brazilian collection (IACM 3739) found this feature to be absent, thus being in agreement with Deighton (1976) who allocated it to Pseudocercospora. The Viégas collection was characterized by very dense, brown fascicles, and smooth, olivaceous, narrowly obclavate conidia, 2-8-septate, 20-100 x 2.5-5 μm with inconspicuous hila.


The Viégas specimen closely corresponded with the description and illustration of the type lodged at NTU-PPE (Hsieh & Goh, 1990).

*Fig. 13*  

*Leaf spots* amphigenous, irregular to sub-circular, 2-3 mm diam., dark brown on the adaxial surface, medium brown on the abaxial surface, with a light brown, raised border; coloured margins absent. *Mycelium* internal, composed of smooth, branched, light brown hyphae, 2.5-3.5 μm diam. *Caespituli* fasciculate to acervular-like, epiphyllous, brown, up to 100 μm wide and 150 μm high. *Conidiophores* aggregated in dense fascicles, arising from the upper cells of brown stroma up to 90 μm wide and 35 μm high; conidiophores mostly reduced to conidiogenous cells. *Conidiogenous cells* terminal, unbranched, light brown, smooth, subcylindrical, straight to slightly curved, tapering to truncate apices with inconspicuous loci, proliferating sympodially, 10-20 x 2-3 μm. *Conidia* solitary, light brown, smooth, guttulate, cylindrical, apex subobtuse, base narrowly obconically truncate, sigmoid, 3-6-septate, 40-120 x 2-3 μm; hila inconspicuous.


Deighton (1976) did not see the type specimen, but allocated *C. tibouchinae* to *Cercoseptoria* based on Viégas's illustration and description, and later (Deighton, 1987) placed it in *Pseudocercospora*. An examination of the type in the present study found it to be a good species of *Pseudocercospora*, of which *Cercoseptoria* is presently regarded to be a synonym (Deighton, 1987).

Fig. 14


Leaf spots amphigenous, irregular to angular, 1-2 mm diam., medium brown, borders indistinct. *Mycelium* internal and external, composed of finely verruculose, branched, light brown hyphae, 4-6 μm diam. *Caespituli* fasciculate, amphigenous, medium brown. *Conidiophores* arising singly from superficial mycelium, or aggregated in loose fascicles, arising from the upper cells of a poorly developed medium brown stroma; conidiophores frequently reduced to conidiogenous cells, medium brown, finely verruculose, 0-2-septate, subcylindrical, rarely doliiform, straight to geniculate-sinusuous, unbranched or branched, 10-75 x 3-7 μm. *Conidiogenous cells* terminal, unbranched, medium brown, finely verruculose, tapering to a rounded apex with inconspicuous loci, proliferating sympodially, 10-15 x 3-6 μm. *Conidia* solitary, light brown, finely verruculose, guttulate, subcylindrical to obclavate-cylindrical, apex obtuse, base obconically truncate, straight to slightly curved, 1-10-septate, 20-120 x 3-8 μm; hila inconspicuous.


Fig. 15


Leaf spots indistinct, amphigenous, circular, 2-4 mm diam., medium brown on the adaxial surface, margin indistinct, darker brown on the abaxial surface due to brown spore masses. *Mycelium* internal and external, composed of smooth, branched, medium brown hyphae, 4-6 μm diam. *Caespituli* reduced to conidiophores occurring on superficial hyphae, hypophyllous, dark brown, stromata absent. *Conidiophores* arising from superficial hyphae, medium brown, finely verruculose, 1-7-septate, subcylindrical, straight to variously curved, branched below or above, 30-100 x 5-7 μm. *Conidiogenous cells* terminal or lateral, unbranched, medium brown, finely verruculose, subcylindrical, straight to slightly curved, tapering to obtuse
Figs 15, 16. Conidia and conidiogenous cells of *Mycovellosiella* spp. Fig. 15. *Mycovellosiella peixotoae* (IACM 3342). Fig. 16. *Mycovellosiella rubida* (IACM 3742; scale bar = 10 μm).
apices with thickened, darkened loci, proliferating sympodially, 8-35 x 5-9 μm. *Conidia* catenate, chains simple, olivaceous to pale brown, smooth to finely verruculose, subcylindrical, apex obtuse, base obconically truncate, straight to curved, 1-8-septate, 25-90 x 4-6 μm; hila thickened, darkened, refractive.


*Leaf spots* indistinct, amphigenous, irregular, 1-4 mm diam., pale green on the adaxial surface, medium brown on the abaxial surface with indistinct borders; coloured margins absent. *Mycelium* internal and external, composed of smooth, branched, light brown hyphae, 5-6 μm diam. *Caespituli* fasciculate to non-fasciculate, hypophyllous, medium brown, forming hyphal threads that climb leaf hairs; stromata absent. *Conidiophores* arising singly from superficial hyphae, rarely occurring in loose fascicles, medium brown, finely verruculose, 1-6-septate, subcylindrical, straight to variously curved, branched below or above, 10-80 x 4-6 μm. *Conidiogenous cells* terminal or lateral, medium to light brown, finely verruculose, subcylindrical, apices clavate with thickened, darkened loci, proliferating sympodially, 10-35 x 4-6 μm. *Conidia* catenate, chains simple or branched, light to medium brown, smooth, granular to guttulate, cylindrical, apex subobtuse, base long obconically truncate or rounded, straight to slightly curved, 2-13-septate, 25-170 x 4-6 μm; hila thickened, darkened, refractive.

Specimen: Minas Gerais, Viçosa-Escola, *Croton floribundus*, 29 Apr. 1933, A.S. Muller, IACM 3742 (holotype). Chupp (1954) referred to the type as No. 503, and Viégas (1945) noted that a part of the type (isotype?) was designated as Fungi from Minas Gerais No. 503.

22. **Mycosphaerella eugenicola** Crous, Alfenas & R.W. Barreto sp. nov.  
   Anamorph: *Pseudocercospora sphaerellae-eugeniae* (Sacc.) Crous, Alfenas & R.W. Barreto comb. nov.  
   Fig. 17

Laesiones amphigenae, irregulares ad suborbiculares, 2-5 mm diam, medio brunneae. Pseudothecia hypophylla, nigra, subepidermalia, globosa, 80-100 μm diam. Ascii fasciculati, bitunicati, late ellipsoidae ad cylindracei, recti vel parum incurvati, 8-sporis, 35-45 x 9-13 μm. Ascosporae multi-seriatae, imbricatae, hyalinae, guttulatae, parietales tenuibus, rectae ad parum curvatae, fusoido-ellipsoidae, base obtusa et apice obtuso, mediano 1-septatae, ad septum constrictae, 20-28 x 3.5-4 μm.

Leaf spots amphigenous, irregular to sub-circular, 2-5 mm diam., medium brown with raised borders and red-brown margins. Pseudothecia hypophyllous, black, subepidermal, becoming erumpent, globose, 80-100 μm wide; apical ostiole 10-15 μm diam.; wall consisting of 3-4 layers of medium brown textura angularis. Asci ap paraphysate, fasciculate, bitunicate, subsessile, broadly ellipsoid to cylindrical, straight to incurved, 8-spored, 35-45 x 9-13 μm. Ascospores multi-seriate, overlapping, hyaline, guttulate, thin-walled, straight to slightly curved, fusoid-ellipsoidal with narrowly subobtuse ends, widest at septum, medianly 1-septate, constricted at septum, tapering towards both apices, 20-28 x 3.5-4 μm. Mycelium internal, composed of smooth, branched, light brown hyphae up to 4 μm diam. Caespituli fasciculate, hypophyllous, brown, situated on the upper cells of erumpent, substomatal pseudothecia. Conidiophores aggregated in loose fascicles, medium brown.

Fig. 17. Ascii, conidia and conidiophores of Mycosphaerella eugenicaola and its anamorph Pseudocercospora sphaerellae-eugeniae (IACM 2997; scale bar = 10 μm).
becoming lighter brown near the apex, finely verruculose, 0-2-septate, subcylindrical, straight to slightly curved, unbranched, 30-70 x 4-7 μm. *Conidiogenous cells* terminal, unbranched, light brown, finely verruculose, subcylindrical, straight to slightly curved, tapering to truncate apices with inconspicuous loci, proliferating sympodially, 20-45 x 4-6 μm. *Conidia* solitary, medium to light brown, finely verruculose, guttulate, subcylindrical to narrowly obclavate, apex obtuse, base obconically truncate, straight to slightly curved, 1-3-septate, 30-90 x 2-5 μm; hila unthickened, inconspicuous, 2 μm wide.


The taxonomy of this species is very confusing. Rangel (1916), cited a type specimen collected from *Eugenia uniflora* (Paqueta prope Rio de Janeiro, exs. 1020, Dec. 1913), and described a *Cercospora* sp. as the conidial state of *Mycosphaerella eugeniae* Rehm. Although a type was designated and a Latin description provided, no name was given for the anamorph. Saccardo (1931) validated it with the name *Cercosporina sphaerellae eugeniae* (Rangel) Sacc. Two combinations were subsequently proposed in *Cercospora* based on the original description, namely *Cercospora eugeniae* (Rangel) Chupp (Viégas, 1945; Chupp, 1954) and *Cercospora eugeniae* (Rangel) Chantarasrikul & Puckdeeindin (1969). Hsieh & Goh (1990) stated that the type specimen of *Cercospora eugeniae* Sawada (nom. illegit., no Latin) (Herb. NTU-PPE, May 1931, Yuching Taiwan Hsien, K. Sawada) was depauperate, but based on the illustration and original description given by Sawada, it should be seen as synonym of *C. eugeniae* (Rangel) Chupp (loc. cit.), which in all probability represented a *Pseudocercospora* sp. Although we have not located the Rangel type specimen in the present study, the Viégas specimen closely resembled the type description in symptomatology and morphology.

The specimen collected by Viégas (IACM 3342) has fascicles situated on top of erumpent pseudothecia. This is in agreement with the observations of Rangel (1916) who linked this anamorph to *Mycosphaerella eugeniae* Rehm. However, ascospores of the present collection were 20-28 x 3.5-4 μm, which were larger than those of *M. eugeniae* Rehm (15-17 x 2-2.5 μm), *M.*
aequatoriensis Petrak (12-23 x 3-4 μm), and M. vexans (Massee) Tomilin (8-9 x 3 μm) (Corlett, 1991). A new species of Mycosphaerella, M. eugenicola, is therefore described as the teleomorph of P. sphaerellae-eugeniae.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the assistance of the curator of IACM for providing the specimens that formed the basis of this study. The Department of Plant Pathology/Bioagro at the Federal University of Viçosa is thanked for providing laboratory facilities to the first author during a recent visit to Brazil, and Dr Uwe Braun (Martin Luther Univ., Halle, Germany) is thanked for reviewing the script.

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