New species and new records of cercosporoid hyphomycetes from Cuba and Venezuela (Part 1)

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Numerous cercosporoid leaf-spotting hyphomycetes have been continuously collected in Venezuela and several new species and records have been published. Additional specimens, including various collections made between 1966 and 1970 in Cuba and Venezuela, are treated in this paper. The latter material is now housed at K (previously deposited at IMI as “Cercospora sp.”). Venezuelan collections made between about 1990 and 2012 (most of them since 2006) are now deposited at HAL. Several species are new to Venezuela, some new host plants are included, and the following new species and new varieties are introduced: Cercospora hadroanthi, Passalora emmeorhizae, P. melochiae, Pseudocercospora andirae, P. cordiae-allidiorae, P. cordigena, P. crescentiae, P. gonolobicola, P. jahnii var. amaculata, P. pehricola, P. rauvolfae-tetraphyllae, P. trichophila var. punctata, Zasmidium asclepiadis. The new combinations Pseudocercospora trichophila var. solaniasperi and Zasmidium gongronematis are proposed.

Key words – Ascomycota – Cercospora – Mycosphaerellaceae – Pseudocercospora – South America

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Introduction
Cercosporoid fungi are anamorphic ascomycetes [Ascomycota, Pezizomycotina, Dothideomycetidae, Capnodiidae, Mycosphaerellaceae (Schoch et al. 2006)] and represent one of the largest and most diverse groups of hyphomycetes causing a wide range of diseases of wild as well as numerous cultivated plants. Most of them were previously assigned to a single genus, Cercospora Fresen., which was later variously split into smaller units (e.g., Deighton 1967, 1973, 1974, 1976, 1979, Braun 1993). Several of the segregated genera gained wide acceptance, e.g. Pseudocercospora Speg., whereas the circumscription and application of other genera, e.g. Passalora Fr., remains debatable up to now. Recent molecular sequence analyses, based on increasing data sets and a broader sampling, indicate that generic delimitations within cercosporoid genera are not yet fully perceived and far from being finally established. In the present paper we follow generic concepts outlined in Crous & Braun (2003).

Cercosporoid hyphomycetes are widespread, almost cosmopolitan fungi with an exceptional diversity in tropical and subtropical regions. Venezuela is a tropical country with a great biodiversity of vascular plant, and accordingly a similarly high diversity of folio-icolous fungi. The exploration of this fungal group is, however, far from being complete, i.e., the cercosporoid hyphomycetes from Venezuela are insufficiently known. A first
contribution to the knowledge of cercosporoid fungi of Venezuela was published by Chupp (1934), and descriptions and records from this work were also used for his monograph of Cercospora (Chupp 1954). Pons (1984, 1988, 1993, 2004, 2007) and García et al. (1996) added further Venezuelan records of cercosporoids and a few new taxa. These data were also used for the preparation of the annotated world checklist of Cercospora species published by Crous & Braun (2003), which is, therefore, also an important reference list for this fungal group in Venezuela. The second author of the present paper has collected cercosporoid anamorphs since about 1966. Early collections from Cuba and Venezuela were deposited at IMI as Cercospora sp. (recently completely transferred to K). A first set out of these specimens has been sent on loan to the first author to be determined and for further treatment. Venezuelan collections made between about 1990 and 2012 (most of them since 2006) have been directly sent to the first author and are now deposited at HAL. First results of examinations of the collections concerned have already been published by Braun & Urtiaga (2008) and Braun et al. (2010). Additional results, including new species and new varieties, new records for Venezuela and new host species, are included in the present publication, which will be continued as numerous additional collections have not yet been examined.

Methods
Sporulating structures were mounted in distilled water without any staining, and examined using oil immersion (bright field and phase contrast), with standard light microscopy (Olympus BX 50, Hamburg, Germany). Thirty measurements (× 1000 magnification) of conidia and other structures were made, with the extremes given in parentheses.

Results and discussion
New records of cercosporoid hyphomycetes from Cuba and Venezuela and descriptions of new species and new varieties are listed in alphabetical order by genus and species. Discussion and comments are added to each taxon.

Cercospora apií Fresen. s. lat. (C. apií complex, sensu Crous & Braun 2003)
Notes – The collection on Plumeria rubra is a sparse sample with little fructification (stromata intraepidermal, brown, 10–50 µm diam., conidiophores fasciculate, 4–7 µm wide, conidiogenous loci 2.5–3.5 µm diam., conidia acicular, colourless, 3–4 µm wide). A specific Cercospora on Plumeria spp. has not been described. The Cercospora on Plumeria rubra is associated with an Asteromella state (pycnidia 30–75 µm diam., with an irregular terminal porus, conidia bacilliform, 2–4 × 0.8–1.2 µm). There is no specific Cercospora described on Spondias and this specimen belongs to the morphological C. apií complex. C. verniciferae Chupp & Viégas on Rhus vernicifera DC. in Brazil coincides morphologically with the fungus on Spondias.

Cercospora beticola Sacc.
Material examined – VENEZUELA, Lara, Barquisimeto, market, on leaves of Beta vulgaris var. cicla L. (Chenopodiaceae), Jan. 2011, R. Urtiaga 430 (HAL 2481 F).
Notes – Known from Venezuela (Crous & Braun 2003).

Cercospora brachiata Ellis & Everh.
Known from Venezuela (Crous & Braun 2003).

Cercospora coffeicola Berk. & Cooke
Material examined – VENEZUELA, Lara, Sanare, Sabana Redonda Arriba, on leaves of Coffea arabica L. (Rubiaceae), Sep. 2010, R. Urtiaga 423 (HAL 2495 F).
Notes – Known from Venezuela (Crous & Braun 2003).

Cercospora cyperigena U. Braun & Crous
Material examined – VENEZUELA, Lara, Barquisimeto, on leaves of *Cyperus rotundifolius* L. (Cyperaceae), Nov. 2010, R. Urtiaga 427 (HAL 2472 F); l.c., May 2011, R. Urtiaga 441 (HAL 2471 F).

Notes – This species, hitherto only known from the type collection, was described from Africa (Tanzania), on *Cyperus* sp. (Crous & Braun 2003: 151). This species is new to Venezuela and was found on a new host. The current material agrees perfectly with the type material. The conidiophores are very short, 5–15 × 3–5 µm, 0(–1)-septate, densely fasciculate, and emerge through stomata. The conidia are long and narrow, 1.5–2.5 µm, and scars and hila are small, 1–2 µm diam.

*Cercospora hadroanthi* U. Braun & Urtiaga, sp. nov.  Fig. 1

MycoBank, MB 800018.

Etymology – epithet derived from the host genus, *Hadroanthus*.

*Cercosporae tabebuiae-impetiginosae similis, sed laesionibus distinctis, stromatibus distincte minoribus, 10–50 µm diam., conidiophoris longioribus, ad 200 µm, cicatricibus conspicuis et conidiis longioribus, ad 100 µm.*

Leaf spots large, amphigenous, subcircular to irregular, up to 25 mm diam., grey to greyish white, with narrow dark brown margin. Caespituli amphigenous, punctiform, dark brown. Mycelium internal; stromata submature, 10–50 µm diam., brown, cells 2–6 µm diam. Conidiophores in small to usually moderately large, divergent to moderately dense fascicles (5–30), arising from stromata, erect, straight, subcylindrical to moderately geniculate, unbranched, 20–90 µm long and 2.5–4 µm wide, medium brown throughout or tips somewhat paler, wall thin to slightly thickened, smooth, pluriseptate; conidiogenous cells integrated, terminal and intercalary, 10–25 µm long, almost straight to distinctly geniculate, with 1–6 conspicuous conidiogenous loci (scars), circular in front view, brown, 1.5–3.5 µm diam., thickened and darkened. Conidia formed singly, long conidia acicular to obclavate-oblong, short conidia fusiform-subcylindrical, 20–90 × 2.5–4 µm, usually 3–8-septate, colourless to faintly greenish, smooth, apex acute or subacute, base truncate to usually short obconically truncate, basal hilum 1–3 µm diam., thickened and darkened.


Notes – *Hadroanthus* is not yet known as a host genus of *Cercospora* species, but several species of the closely related genus *Tabebuia* have been recorded as a host. *Tabebuia* sp. has been listed as host of *C. apii* s. lat. (Crous & Braun 2003). These authors recommended to assign *Cercospora* collections on hosts of new families, genera or species, which are morphologically indistinguishable from *C. apii*, to *C. apii* s. lat. (≡ *C. apii* complex) since specialized as well as plurivorous taxa are involved in this complex. In such cases, the taxonomy can only be elucidated on the base of cultures and molecular sequence analyses. True collections of *C. apii* s. str. as well as s. lat. are characterized by having acicular conidia with truncate base. However, *C. hadroanthi* is easily distinguishable from this complex by having conidia with obconically truncate base. In this respect, *C. hadroanthi* resembles *C. tabebuiae-impetiginosae* Inácio & Dianese (Inácio & Dianese 1998), described from Brazil on *Hadroanthus impetiginosus* (Mart. ex DC.) Mattos (≡ *Tabebuia impetiginosa* (Mart. ex DC.) Standl.), but the latter species is easily distinguishable by its very large stromata, up to 107 µm diam., rather short conidiophores, up to 60 µm, in large, dense fascicles, rather inconspicuous conidiogenous loci and shorter conidia. *Tabebuia* spp. have also been recorded as hosts of *C. tecomae* Viégas & Chupp, described on *Tecoma* sp. from Brazil (Viégas 1945, Chupp 1954, Crous & Braun 2003). The latter species is, however, part of the *C. apii* complex with acicular conidia (base truncate) and differs additionally in having broader conidiophores (4–6 µm) and much shorter conidia (usually 25–50 µm long).

*Cercospora lactucae-sativae* Sawada

Fig. 1 – *Cercospora hadroanthi*. Based on type material. a Conidiophore fascicle. b Conidiophores. c Conidia. – Bar = 10 µm.

Notes – Known from Venezuela (Crous & Braun 2003).

*Cercospora mikaniicola* F. Stevens

Material examined – VENEZUELA, Lara, Sanare, Sabana Redonda Arriba, on leaves of *Mikania* sp. (Asteraceae), Sep. 2010, R. Urtiaga 402 (HAL 2493 F).

Notes – New to Venezuela (not listed in Crous & Braun 2003).

*Passalora capsicicola* (Vassiljevsky) U. Braun & F. Freire

≡ *Cercospora capsicicola* Vassiljevsky.
≡ *Phaeoramularia capsicicola* (Vassiljevsky) Deighton.


Notes – New to Venezuela (not listed in Crous & Braun 2003).

*Passalora emmeorhizae* U. Braun & Urtiaga, sp. nov. Fig. 2

MycoBank, MB 800006.

Etymology – epithet derived from the host genus, *Emmeorhiza*.

Differs from *Passalora cephalanthi* et a P. oldenlandiae conidiis valde brevirioribus et latoribus.

Leaf spots almost indistinct, or diffuse to subcircular-irregular, yellowish, olivaceous to brownish, about 2–8 mm diam., margin indefinite. Caespituli amphigenous, but mainly hypophyllous, punctiform to subeffuse, olivaceous-brown to medium brown. Mycelium
internal; stromata lacking or only with small substomatal hyphal aggregations, 10–30 µm diam., brown. Conidiophores in small, loose to moderately large and dense fascicles, arising from stromata, emerging through stomata, erect, straight, subcylindrical-conical to distinctly geniculate-sinuous, unbranched, 10–60 × 3–7 µm, 0–3-septate, pale olivaceous to olivaceous-brown, medium olivaceous-brown in mass, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 10–25 µm long, conidiogenous loci (scars) conspicuous, somewhat thickened and darkened, 1.5–2 µm diam. Conidia in chains, ellipsoid-ovoid to cylindrical, 15–50 × 4–7 µm, 0–4-septate, subhyaline pale olivaceous to olivaceous-brown, thin-walled, smooth, apex rounded to obconically truncate, base obconically truncate, hila 1.5–2 µm wide, slightly thickened and somewhat darkened.


Notes – Passalora emmeorhizae is characterized by lacking superficial mycelium, fasciculate conidiophores and catenate conidia, i.e. it belongs to a group of species previously assigned to the genus Phaeoramularia Munt.-Cvetk., which is currently considered a synonym of Passalora. Species of the latter genus on Emmeorhiza are unknown, but three comparable Phaeoramularia-like species have been described from other hosts of the Rubiaceae, viz. P. cephalanthi (Ellis & Kellerm.) U. Braun & Crous on Cephalanthus in North America (Chupp 1954, Crous & Braun 2003), and P. oldenlandiae (Hansf.) U. Braun on Borreria and Oldenlandia in Africa (Chupp 1954, Ellis 1976, Crous & Braun 2003), which are morphologically quite distinct by their very long and narrow, plurisepate conidia (10–100 × 2–4.5 µm in P. cephalanthi and 22–90 × 3–5 µm in P. oldenlandiae), as well as P. pseudo-
capnoides O.L. Pereira & R.W. Barreto on Mitracarpus hirtus (L.) DC. in Brazil, which differs in having much narrower conidia (2–4 µm wide, Pereira & Barreto 2005).

**Passalora melochiae** U. Braun & Urtiaga, *sp. nov.* Fig. 3

MycoBank, MB 800007.

Etymology – epithet derived from the host genus, *Melochia*.

Passalorae meridianae similis, sed fasciculis conidiophorum minoribus, laxioribus, conidiophoris brevioribus, ad 50 µm, conidii brevioribus et latioribus, ad 70 × 6 µm, saepe 2–7-septatis.

Leaf spots amphigenous, subcircular to somewhat irregular, 1–4 mm diam., centre ochraceous to greyish white, margin narrow, purple-red to brown, sometimes with diffuse purple halo. Caespituli amphigenous, punctiform, dark brown to blackish, scattered. Mycelium internal; epiphyllous stromata intraepidermal, hypophyllous stromata subtomental, 10–40 µm diam., subcircular, elliptical-oval to somewhat irregular in outline, medium brown, cells 2–6 µm diam. Conidiophores in small to moderately large fascicles, arising from stromata, erumpent or emerging through stomata, erect, subcylindrical-conical, straight to slightly geniculate-sinuous, unbranched, 10–50 × 2.5–6 µm, 0–2-septate, thin-walled, smooth, sub-hyaline, pale olivaceous, light brown, medium olivaceous-brown in mass; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 10–35 µm long, conidiogenous loci (scars) conspicuous, circular, 1–2 µm diam., slightly thickened and darkened. Conidia formed singly or in short chains, cylindrical or subcylindrical, 20–70 × 3–5.5 µm, (0–)2–7(–8)-septate, subhyaline, pale olivaceous, olivaceous to light brown in mass, apex obtuse to truncate in catenate conidia, base short obconically truncate, hila 1–2 µm wide, somewhat thickened and darkened.

Material examined – CUBA, Bayamo, on leaves of *Melochia pyramidata* L. (*Malvaceae, Sterculioideae*), 8 May 1967, R. Urtiaga (IMI 127445 = K(M) 173070, holotype); Bayamo, on leaves of *M. pyramidata*, 29 May 1967, R. Urtiaga (IMI 126779 = K(M) 173071).

Notes – *Passalora melochiae* is characterized by forming catenate conidia, i.e. this species belongs to a group of *Passalora* species previously assigned to *Phaeoramularia*. *P. meridiana* (Chupp) U. Braun & Crous on *Helicteres* spp. (Chupp 1954, Crous & Braun 2003) is the only comparable species on a host of the *Sterculioideae* (= *Sterculiaceae*), but differs in having large, dense, coremoid fascicles, much longer conidiophores, up to at least 120 µm, and much longer and narrower conidia, up to 125 × 2.5–4 µm with up to 11 septa. *P. helicteris-viscidae* Phengsintham, Chukeatire, K.D. Hyde & U. Braun (Phengsintham et al. 2010) is also characterized by catenate conidia, which are, however, quite distinct by being short and narrow, 8–44 × 1–3 µm, 0–4-septate and hyaline. Other species are *Mycovellosiella*-like, i.e. with superficial hyphae and solitary conidiophores [*Passalora sterculiaeearum* U. Braun & Crous (Braun & Crous 2007), *P. dombayae* (Crous & U. Braun) Crous & U. Braun (Crous & Braun 2003)], or the conidia are consistently formed singly [*P. helicteris* (Soni, Dadwal & Jamaluddin) Poornam Srivast. (Soni et al. 1984)].

**Pseudocercospora andirae** U. Braun & Urtiaga, *sp. nov.* Fig. 4

MycoBank, MB 800008.

Etymology – epithet derived from the host genus, *Andira*.

Pseudocercosporae vataireae similis, sed stromatibus minoribus, 10–50 µm diam., conidiophoris laevibus, saepe geniculosus-sinuosus. Differt a *P. stevensii* ad *Andira laesioperispora* var. *laeviuscula* Soni et al. 2010) is also characterized by forming catenate conidia, i.e. this species belongs to a group of *Passalora* species previously assigned to *Phaeoramularia*. *P. meridiana* (Chupp) U. Braun & Crous on *Helicteres* spp. (Chupp 1954, Crous & Braun 2003) is the only comparable species on a host of the *Sterculioideae* (= *Sterculiaceae*), but differs in having large, dense, coremoid fascicles, much longer conidiophores, up to at least 120 µm, and much longer and narrower conidia, up to 125 × 2.5–4 µm with up to 11 septa. *P. helicteris-viscidae* Phengsintham, Chukeatire, K.D. Hyde & U. Braun (Phengsintham et al. 2010) is also characterized by catenate conidia, which are, however, quite distinct by being short and narrow, 8–44 × 1–3 µm, 0–4-septate and hyaline. Other species are *Mycovellosiella*-like, i.e. with superficial hyphae and solitary conidiophores [*Passalora sterculiaeearum* U. Braun & Crous (Braun & Crous 2007), *P. dombayae* (Crous & U. Braun) Crous & U. Braun (Crous & Braun 2003)], or the conidia are consistently formed singly [*P. helicteris* (Soni, Dadwal & Jamaluddin) Poornam Srivast. (Soni et al. 1984)].

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Fig. 3 – *Passalora melochiae*. Based on type material. a Conidiophore fascicles. b Conidiophores. c – conidia. – Bar = 10 µm.

wide, septate, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth; stromata substomatal or intraepidermal, subcircular to elongated or somewhat irregular in outline, medium to dark olivaceous-brown, hypophyllous stromata 10–50 µm diam., epiphyllous ones up to 80 µm diam., cells 2.5–7 µm diam. Conidiophores in small to moderately large, loose to dense fascicles, arising from stromata, through stomata or solitary, arising from superficial hyphae, lateral, rarely single conidiophores emerging through stoma
ta, erect, straight, subcylindrical-conical to geniculate-sinuous, simple or occasionally branched, 10–70(–80) × 3–5 µm, 0–5-septate, pale to medium olivaceous or olivaceous-brown, thin-walled, smooth or almost so; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 10–25 µm long, conidiogenous loci inconspicuous to denticle-like, but always unthickened and not darkened. Conidia formed singly, obclavate-subcylindrical, short conidia occasionally fusiform, (15–)25–80 × (2.5–)3–5(–6) µm, (1–)3–8-septate, pale olivaceous to olivaceous-brown, thin-walled, smooth to faintly rough-walled, apex subobtuse, base short obconically truncate, 1–2 µm wide, hilum neither thickened nor darkened.

Material examined – VENEZUELA, La

Notes – *Pseudocercospora stevensii* (E. Yong) U. Braun & Crous (Chupp 1954, Crous & Braun 2003) is known from South America on *Andira* spp., including *A. surinamensis*. Type material of this species has been examined (on *Andira* sp., Puerto Rico, Dos Bocas, below Utuado, 30 Dec. 1913, F.L. Stevens, ILL 6008 and PC). This species is, however, quite distinct from *P. andirae* (leaf spots lacking or only with indistinct small reddish brown spots, mycelium internal, superficial hyphae with solitary conidiophores not formed and conidiophores very long, about
Fig. 4 – *Pseudocercospora andirae*. Based on type material. **a** Superficial hyphae with solitary conidiophores. **b** Conidiophore fascicles. **c** Conidiophores emerging through a stoma. **d** Conidiophores. **e** Conidia. **f** Germinating conidia – Bar = 10 µm.

50–200 µm, mostly in dense, often almost coremioid fascicles). In phylogenetic analyses, the genus *Andira* clustered in a basal unresolved position within the aeschynomenoid group (*Dalbergieae* and *Aeschynomeneae*, see Doyle et al. 2000). Among *Pseudocercospora* spp. on hosts of closely as well as distantly allied genera of the *Dalbergieae* and *Aeschynomeneae*, there are only few comparable species. *P. vataireae* (Henn.) U. Braun & Freire (Braun & Freire 2002) on *Derris* spp. in Brazil is morphologically similar by forming solitary conidiophores arising from superficial hyphae, but this species forms much larger stromata, up to 150 µm diam., and the conidiophores are usually subcylindrical and straight, i.e. non-geniculate, verruculose towards the tip and often percurrently proliferating. In other species, viz. *P. dalbergiae* (S.H. Sun) J.M. Yen on *Dalbergia* spp. in Asia (Hsieh & Goh 1990, Guo et al. 1995), *P. pongamiae-pinnatae* Raghu Ram & Mallaiah on *Pongamia* sp. in India (Raghu Ram & Mallaiah 1993) and *P. pterocarpica* (J.M. Yen) J.M. Yen var. *pterocarpica* and var. *guzmanii* (Tak. Kobay.) U. Braun on *Pterocarpus* spp. in Asia and Oceania (Yen & Lim 1980, Braun et al. 1999, Crous & Braun 2003), superficial hyphae and solitary conidiophores are lacking. In addition, the conidia in *P. dalbergiae* and *P. pongamiae-pinnatae* are much narrower, 2–3 µm, and in *P. pterocarpica* they are much wider, (4–)5–8(–10) µm. The South American *P. lonchocarpi* (J.A. Stev.) Crous & M.P.S Câmara (Crous & Câmara 1998) forms superficial mycelium, but without any solitary conidiophores. Furthermore, the conidiogenous cells are often percurrent and the verruculose conidia of this species are much longer and narrower, (30–) 50–100(–120) × (2–)3–3.5(–4.5) µm (Chupp 1954, Crous & Câmara 1998).

*Pseudocercospora atromarginalis* (G.F. Atk.) Deighton

≡ *Cercospora atromarginalis* G.F. Atk.


Notes – New to Venezuela (not listed in Crous & Braun 2003).
**Pseudocercospora cordiae-alliodorae** U. Braun & Urtiaga. *sp. nov.* Fig. 5

MycoBank, MB 800009.

Etymology – epithet derived from the host species, *Cordia alliodora*.

Pseudocercosporae cordicolae similis, sed conidiis valde brevioribus et latoribus, 12–40 × 2–4 µm, modo 1–4-septatis.

Leaf spots lacking or only with diffuse greyish brown discolorations, rather inconspicuous. Colonies hypophyllous, effuse, olivaceous-brown, but rather inconspicuous. Mycelium internal and external, hyphae superficial, emerging through stomata, also climbing leaf hairs, branched, sometimes anastomosing.

Conidiophores solitary, arising from superficial hyphae, lateral, erect, straight, subcylindrical to conical or somewhat geniculate or curved-sinuous, unbranched, 4–25 × 2–4 µm, 0(–1)-septate, subhyaline, pale olivaceous to olivaceous-brown, thin-walled, smooth; conidiophores usually reduced to conidiogenous cells, conidiogenous loci inconspicuous. Conidia formed singly, obclavate-cylindrical, short conidia sometimes ellipsoid-fusiform, 12–40 × 2–4 µm, 1–4-septate, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth; conidiophores usually reduced to conidiogenous cells, conidiogenous loci inconspicuous. Conidia formed singly, obclavate-cylindrical, short conidia sometimes ellipsoid-fusiform, 12–40 × 2–4 µm, 1–4-septate, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth; conidiophores usually reduced to conidiogenous cells, conidiogenous loci inconspicuous. Conidia formed singly, obclavate-cylindrical, short conidia sometimes ellipsoid-fusiform, 12–40 × 2–4 µm, 1–4-septate, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth; conidiophores usually reduced to conidiogenous cells, conidiogenous loci inconspicuous. Conidia formed singly, obclavate-cylindrical, short conidia sometimes ellipsoid-fusiform, 12–40 × 2–4 µm, 1–4-septate, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth; conidiophores usually reduced to conidiogenous cells, conidiogenous loci inconspicuous. Conidia formed singly, obclavate-cylindrical, short conidia sometimes ellipsoid-fusiform, 12–40 × 2–4 µm, 1–4-septate, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth; conidiophores usually reduced to conidiogenous cells, conidiogenous loci inconspicuous.

Notes – The Asian *Pseudocercospora cordicola* (J.M. Yen) J.M. Yen (Yen & Lim 1980) is a comparable species, but differs from the new South American *P. cordiae-alliodorae* in having much longer and narrower conidia, about 80–125 × 1.5–2.5 µm, with 4–8 septa.

**Pseudocercospora cordigena** U. Braun & Urtiaga. *sp. nov.* Fig. 6

MycoBank, MB 800010.

Etymology – epithet derived from the host genus, *Cordia*. Pseudocercosporae cordianae similis, sed conidiophoris latoribus (3–6 µm) et conidiis latoribus, 4–8 µm, 0–7-septatis.

Leaf spots amphigenous, angular-irregular, often vein-limited, darker brown on the upper leaf surface, paler brown below, 1–8 mm diam. or confluent and larger, margin not differentiated, but often with yellowish to ochraceous halo. Caespituli amphigenous, usually epiphyllous, rather inconspicuous. Mycelium internal; stromata small to well developed, 15–45 µm, intraepidermal on the upper side, hypophyllous stromata also sub-stomatal, subcircular to somewhat irregular in outline, medium to dark olivaceous-brown, cells circular to angular in outline, 3–8 µm diam. Conidiophores in small to moderately large fascicles, arising from stromata, erect, straight, unbranched to somewhat curved or slightly geniculate-sinuous, almost cylindrical, somewhat attenuated towards the tip or subclavate, 8–25 × 3–6 µm, up to 55 µm long with still attached young conidia, pale to medium olivaceous-brown throughout or paler towards the tip, subhyaline to very pale olivaceous, young conidiophores sometimes subhyaline, wall thin to slightly thickened (up to 0.75 µm), smooth; conidiogenous cells integrated, terminal or conidiophores one-celled, i.e. reduced to conidiogenous cells, 8–20 µm long, conidiogenous loci inconspicuous. Conidia formed singly, obclavate, young conidia subcylindrical, broadly fusiform or subclavate, often long attached at conidiogenous cells, 25–70–90 × 4–8 µm, 0–7-septate, pale to medium olivaceous or olivaceous-brown, wall up to 0.75 µm wide, smooth, apex obtuse, rounded, base short obconically truncate, 2–3.5 µm wide, hila neither thickened nor darkened.

Material examined – CUBA, Bayamo, on leaves of *Cordia dentata* Poir. (*Boraginaceae*), May 2011, R. Urtiaga (HAL 2464 F, holotype).

Notes – Crous et al. (2000) described *Pseudocercospora cordiana* Crous & Bench. from Brazil on *Cordia goeldiana* Huber. This species is superficially similar, but has narrower conidiophores, only 2.5–4 µm wide, and narrower conidia, (30–)40–46 µm long and only 2–3 µm wide and 1–3(–5)-septate. Two other *Pseudocercospora* species described on *Cordia* spp. are morphologically distinct. *P. cordiae* Kamal & R.P. Singh (Kamal & Singh 1980) differs in having longer, pluriseptate
conidiophores, 54–90 µm, and smaller conidia, 21.5–30 × 3.5–4.5 µm, and *P. cordiicola* (J.M. Yen) J. M. Yen (Yen & Lim 1980) is characterized by lacking stromata, superficial hyphae with solitary conidiophores and very long and narrow conidia, 80–125 × 1.5–2.5 µm.

**Pseudocercospora costi** (F. Stevens) U. Braun & Crous

≡ *Cercospora costi* F. Stevens.

Material examined – VENEZUELA, Lara, Sanare, Sabana Redonda Arriba, on leaves of *Costus* sp. (Zingiberaceae), Sep. 2010, R. Urtiaga 424 (HAL 2489 F).

Notes – This species was described from Panama and is known from Venezuela on *Costus* sp. (Crous & Braun 2003).

**Pseudocercospora crescentiae** U. Braun & Urtiaga, sp. nov. Fig. 7

Mycobank, MB 800011.

Etymology – epithet derived from the host genus, *Crescentia*. Pseudocercosporae tabebuiae-rosealbae valde similis, sed caespitulis epiphyllis et hypophyllis distincte dimorphis, conidiophoris interdum ramosis et conidiis ad basim breve obconice truncatis.

Leaf spots amphigenous, subcircular to angular-irregular, 1–10 mm diam., rarely larger, brown, greyish brown, later becoming very pale, grey-brown to greyish white, with narrow brown margin. Caespituli amphigenous, on the upper leaf surface conspicuously punctiform, dark brown to blackish, on the lower side punctiform to subeffuse. Mycelium internal; epiphyllous stromata large, 30–70 µm diam., intraepidermal, dark olivaceous-brown to brown, cells rounded to angular in outline, 2–7 µm diam., stromata on the lower side lacking or smaller, 10–50 µm diam., mostly substomatal. Conidiophores fasciculate, fascicles dimorphic, on the upper leaf surface always in large, dense, erumpent sporodochial conidiomata, straight to slightly geniculate-sinuous, unbranched, subcylindrical-conical, 5–25 × 2–4.5 µm, 0–1-septate, on the lower side in smaller, mostly loose fascicles, usually emerging through stomata, erect to decumbent, almost straight, cylindrical to mostly distinctly

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**Fig. 5** – *Pseudocercospora cordiae-alliodorae*. Based on type material. a Superficial hyphae. b Hyphae emerging through a stoma. c Superficial hyphae with solitary conidiophores. d Conidiophores. e Conidia – Bar = 10 µm.
Fig. 6 – *Pseudocercospora cordiigena*. Based on type material. **a** Conidiophore fascicles. **b** Conidiophores. **c** Conidia. – Bar = 10 µm.

Conidiophores geniculate-sinuous, simple or often branched, 10–60 × 2.5–6 µm, 0–4-septate, pale to somewhat darker olivaceous-brown, thin-walled, smooth or almost so; conidiogenous cells integrated, terminal or occasionally intercalary, 10–30 µm long, conidiogenous loci (scars) inconspicuous. Conidia solitary, obclavate-subcylindrical, short conidia sometimes cylindrical-fusiform, 12–60 × (1.5–)2–4(–4.5) µm, 1–5-septate, subhyaline to pale olivaceous, thin-walled, smooth, apex obtuse to subacute, base short obconically truncate, in short conidiomata, hila 1–2 µm diam., neither thickened nor darkened.


Fig. 7 – *Pseudocercospora crescentiae*. Based on type material. **a** Conidiophore fascicles. **b** Conidiophores. **c** Conidia. – Bar = 10 µm.

1954), *P. tecomae-heterophyllae* (J.M. Yen Y.L. Guo & X.J. Liu (Guo & Hsieh 1995)]. Among species with well-developed stromata, *Pseudocercospora crescentiae* is close to *P. jahnnii* (Syd.) U. Braun & Crous (Chupp 1954, Crous & Braun 2003) and *P. tabebuiae-roseoalbae* Inácio & Dianese (Inácio & Dianese 1998). However, the latter two species do not form comparable dimorphic conidiophore fascicles. The unbranched conidiophores always arise from stromata. Other species with larger stromata are easily distinguishable: *P. catalpigena* U. Braun & Crous (conidia cylindrical; Braun et al. 2003), *P. catalpicola* U. Braun (superficial hyphae with solitary conidiophores developed; Braun 1999), *P. stereospermicola* Srisk. & Sivan. (longer conidia, 50–110 µm, with up to 10 septa; Sriskantha & Sivanesan 1980), *P. tabebuiae-caraibae* Inácio & Dianese (with large lesions, up to 30 µm diam., conidiophores 4–6 µm wide, conidia up to 100 µm long, with up to eight septa; Inácio & Dianese 2006), *P. zeyheriae* (Henn.) Dianese, Furlanetto & L.T.P. Santos (stromata large, 60–240 µm diam., conidia up to 100 µm long, with up to 13 septa, superficial hyphae with solitary conidiophores developed; Dianese et al. 1999).

**Pseudocercospora cruenta** (Sacc.) Deighton


Notes – Known from Venezuela (Crous & Braun 2003). This species is widespread and common on various legumes.

**Pseudocercospora durantae** N. Pons, U. Braun & Crous

≡ *Cercospora durantae* Chupp & A.S. Mull., nom. inval.


Notes – Pons et al. (in Crous & Braun 2003: 168) validated *Cercospora durantae*. Type material of this species is from Venezuela on *Duranta mutisii*. *D. erecta* is known as host
of this species from Florida, USA. This is the first record on the latter host from Venezuela. Morphological characters of the present material agrees perfectly with the type of this species.

**Pseudocercospora gonolobicol**a U. Braun & Urtiaga, sp. nov.  Fig. 8

Mycobank, MB 800012.

Etymology – epithet derived from the host genus, *Gonolobus*.

Differs a *Cercospora gonolobi* hyphis superficialibus cum conidiophoris solitariis, conidiophoris valde brevioribus, 3–25 µm, 0–1(–2)-septatis et conidiis angustioribus, 2–4 µm.

Lesions diffuse to angular-irregular, up to 20 mm diam., sometimes vein-limited, yellowish, olivaceous to brownish, margin indefinite. Colonies amphigenous, epiphyllous caespituli punctiform, dark brown, scattered, hypophyllous colonies effuse to aggregated, dingy greyish to olivaceous-brown. Mycelium internal and external, superficial hyphae mainly hypophyllous, emerging through stomata, sometimes forming ropes, sparingly branched, 1.5–4 µm wide, subhyaline to pale olivaceous, later olivaceous-brown, septate, thin-walled, smooth; stroma mainly hypophyllous, irregular in outline, 2.5–7 µm diam. Conidiophores in small to moderately large fascicles, arising from stroma, erumpent, or conidiophores solitary, arising from superficial hyphae, lateral, erect, straight, subcylindrical-conical to moderately geniculate-sinuous, unbranched, 3–25 × 2–5 µm, 0–1(–2)-septate, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores often aseptate, i.e. reduced to conidiogenous cells, 2–20 µm long, conidiogenous loci inconspicuous. Conidia formed singly, narrowly obclavate-cylindrical, short conidia sometimes ellipsoid-fusiform, 15–70 × 2–4 µm, (1)–2–6(–7)-septate, subhyaline to pale olivaceous, thin-walled, smooth, apex subacute or subobtuse, base short obconically truncate, (1)–1.5–2 µm wide, hila neither thickened nor darkened.


Notes – *Cercospora gonolobi* W.W. Ray has been described from North America (USA, Oklahoma) on *Gonolobus laevis* Michx. (= *Cynanchum albae* (Michx.) Pers.).

The generic affinity of this species is still unresolved, but due to pigmented conidia (Chupp 1954) this species undoubtedly does not belong to *Cercospora* s. str. In any case, *C. gonolobi* is morphologically quite distinct by lacking superficial mycelium and by its much longer, pluriseptate conidia (up to 80 µm) which are also wider (4–5 µm). There is no comparable species among numerous *Pseudocercospora* species described from hosts of the *Asclepiadaceae*. Guo & Hsieh (1995) recorded, described and illustrated *P. marsdeniae* (Hansf.) Deighton from China on *Dregea sinensis* Hemsl., characterized by having fasciculate conidiophores arising from stromata as well as solitary conidiophores arising from superficial hyphae, but conidiophores and conidia are much longer and above all broader (3–6.5 µm) than those of *P. gonolobicola*. However, the Chinese collection on *Dregea sinensis* is undoubtedly not conspecific with the African *P. marsdeniae*, which does not form any superficial hyphae (Chupp 1954, Deighton 1976), and probably represents a separate undescribed species.

**Pseudocercospora jahnii** (Syd.) U. Braun & Crous var. *jahnii*  Fig. 9

≡ *Cercospora jahnii* Syd.
≡ *Pseudocercospora tabebuiicola*–*roseoalbae* Inácio & Dianese.

Leaf spots amphigenous, subcircular to angular-irregular, 2–15 mm diam., pale or dull brown, greyish brown, finally greyish white, with darker margin, brown to reddish brown. Caespituli hypophyllous, rarely amphigenous, delicately to distinctly punctiform, scattered to aggregated, blackish brown, greyish black. Mycelium internal and external; superficial hyphae branched, septate, thin-walled, smooth, 1.5–3 µm wide, pale olivaceous to olivaceous-
Fig. 8 – *Pseudocercospora gonolobicola*. Based on type material. a Conidiophore fascicles. b Superficial hyphae with solitary conidiophores. c Conidiophores. d Conidia. – Bar = 10 µm.

Brown; stromata lacking or small to moderately large, 10–50 µm diam., substomatal or intradermal, brown, subglobose to irregularly shaped, cells subcircular to angular in outline, 2–6 µm diam. Conidiophores in small, loose to moderately large, dense fascicles, arising from internal hyphae or stromata, emerging through stomata or erumpent through the cuticle, erect, occasionally decumbent, almost straight, subcylindrical to strongly geniculate-sinuous, usually simple or branched, 5–40(–60) × 2–5 µm, 0–3-septate, pale olivaceous to medium olivaceous-brown, thin-walled, smooth; conidiogenous cells integrated, usually terminal, 4–30 µm long, conidiogenous loci (scar) inconspicuous or visible as truncate tips, but neither thickened nor darkened. Conidia solitary, obclavate-cylindrical, (10–)15–65 × 2.5–5 µm, 1–7(–8)-septate, pale olivaceous to olivaceous-brown, thin-walled, smooth, apex obtuse or only slightly pointed, base obconically truncate, hila 1–2 µm wide, unthickened, not darkened.


Notes – *Pseudocercospora jahnii* occurs on several species of *Tabebuia* and related genera and is rather widespread in Central and South America, and also known from Asia (India). *P. tabebuiae-roseovalbae* (Inácio & Dianese 1998: 703) and *Cercoseptoria tabebuicola* (Kamal et al. 1986: 456) are morphologically not clearly distinguishable from *P. jahnii*. Collections on *Hadroanthus serratifolius* and *Spathodea campanulata* are also morphologically indistinguishable from *P.
Fig. 9 – *Pseudocercospora jahnii* var. *jahnii* on *Spathodea campanulata*. Based on K(M) 179309. a Conidiophore fascicles. b Superficial hyphae with solitary conidiophores. c Conidiophores. d Conidia. – Bar = 10 µm.

*jahnii*. Due to its wide host range and distribution, it is possible that this species represents a complex of closely allied, morphologically barely distinguishable cryptic species. However, this problem can only be solved on the base of cultures and molecular sequence analyses as well as inoculation experiment.

*Pseudocercospora jahnii* var. *amaculata* U. Braun & Urtiaga, var. nov. Fig. 10

MycoBank, MB 800019.

Etymology – derived from the lack of leaf spots.

Distinct from var. *jahnii* by lacking leaf spots.


Notes – Conidiophores and conidia in the collections on *Tabebuia shaferi* agree well with *Pseudocercospora jahnii*, but typical collections of this species form distinct leaf spots. We prefer to introduce a variety for collections without distinct lesions.

*Pseudocercospora marcelliana* (Chupp) U. Braun & Crous Fig. 11

≡ *Cercospora marcelliana* Chupp


Notes – This species, described from Venezuela on *Solanum nudum* Dunal [= *S. micranthum* Willd. ex Roem. & Schult. (Chupp 1954)], is *Cercoseptoria*-like, i.e. with sporodochial conidiomata, numerous densely arranged very short conidiophores, and hyaline or very pale, narrowly cylindrical-filiform to acicular, pluriseptate conidia. In the present collection, the conidiophores are 5–25 × 1.5–3.5 µm, and the conidia are 30–110 × 2–3.5 µm, 3–11-septate. *S. torvum* is a new host for this species.

*Pseudocercospora mikaniigena* J.M. Yen & Lim Fig. 12

≡ *Asperisporium mikaniigena* (J.M. Yen & Lim) R.W. Barreto

Leaf spots amphigenous, subcircular to
angular-irregular, brownish to greyish brown or dingy grey, 1–6 mm diam., margin indefinite or with narrow darker marginal line. Caespituli hypophyllous, punctiform, medium to dark brown or blackish brown. Mycelium internal. Stromata lacking or small, substomatal, brown, 10–25 µm diam. Conidiophores in small to moderately large fascicles, divergent to dense, very dense fascicles sometimes subcoremioid, arising from substomatal hyphae or stromata, emerging through stomata, erect, straight, subcylindrical-filiform to moderately geniculate-sinuous, unbranched, 30–110 × 2.5–5 µm, continuous to pluriseptate, pale to medium brown or olivaceous-brown, paler towards the tip, thin-walled, smooth; conidiogenous cells integrated, terminal, 10–50 µm long, conidiogenous loci inconspicuous to subdenticulate, but always unthickened and not darkened. Conidia solitary, obclavate-subcylindrical, 30–75 × 3–5 µm, 3–7-septate, pale olivaceous to olivaceous-brown, thin-walled, smooth, apex obtuse to subacute, base short to longer obconically truncate, 1.5–2 µm wide, hila neither thickened nor darkened.

Material examined – VENEZUELA, Lara, Sanare, Sabana Redonda Arriba, on leaves of Mikania cordifolia (L. f.) Willd. (Asteraceae), Sep. 2010, R. Urtiaga 409 (HAL 2492 F).

Notes – Pseudocercospora mikaniigena, described from Malaysia on Mikania cordata (Burm. f.) B.L. Rob., and later recorded from Brazil (Yen & Lim 1983, Barreto & Evans 1995), is close to P. plunkettii (Chupp) R.F. Castañeda & U. Braun (lectotype material examined – on Mikania cordifolia, Mexico, CUP 40596), but the conidiophores of the latter species are much shorter, 10–40 µm long, never coremioid, and the conidia are somewhat narrower. The collection from Venezuela is morphologically close to the original description, except for lacking superficial hyphae with solitary conidiophores. This species is new to Venezuela.

Pseudocercospora mirandensis (Chupp) R.F. Castañeda & U. Braun
≡ Cercospora mirandensis Chupp.

Material examined – VENEZUELA, La-
Fig. 11 – *Pseudocercospora marcelliana*. Based on HAL 2486 F. **a** Conidiophore fascicle. **b** Conidiophores. **c** Conidia. – Bar = 10 µm. Fig. 11 – *Pseudocercospora marcelliana*. Based on HAL 2486 F. **a** Conidiophore fascicle. **b** Conidiophores. **c** Conidia. – Bar = 10 µm.

ra, Sanare, Sabana Redonda Arriba, on leaves of *Miconia* sp. (Melastomataceae), Sep. 2010, R. Urtiaga 396 (HAL 2484 F).

Notes – This species was described from Venezuela on *Miconia ibaguensis* (Bonpl.) Triana. Type material has been examined (Edo Miranda, Santa Lucia, 13 Apr. 1939, Whetzel & Muller, CUP 3093). Braun & Urtiaga (2008) recorded this species from Venezuela on *Clidemia hirta* (L.) D. Don. The present collection on *Miconia* sp. differs from other samples in almost lacking a lesion.

*Pseudocercospora ocimicola* (Petr. & Cif.) Deighton

≡ *Cercospora ocimicola* Petr. & Cif.

≡ *C. hyptidicola* Chupp & A.S. Mull., nom. inval.


Notes – This species is known from Venezuela on *Hyptis* spp. (Braun & Urtiaga 2008). *Ocimum sanctum* is a new host for this country.

*Pseudocercospora palicourea* (Petr. & Cif.) U. Braun

≡ *Cercospora palicourea* Petr. & Cif.

Material examined – VENEZUELA, Lara, Sanare, Sabana Redonda Arriba, on leaves
**Fig. 12** – *Pseudocercospora mikaniigena*. Based on HAL 2484 F. **a** Conidiophore fascicles. **b** Conidiophores. **c** Conidia. – Bar = 10 µm.

Notes – New host species and new to Venezuela. This collection agrees well with *P. palicoureaeina* (conidiophores in fascicles, arising from stromata, 10–40 µm diam., 10–60 × 2.5–5 µm, conidia obclavate-subcylindrical, 30–65 × 3–4.5 µm, 3–6-septate). *P. palicoureae* O.L. Pereira & R.W. Barreto (Pereira & Barreto 2006), described from Brazil on *Palicourea marcgravii* A. St.-Hill, is characterized by its distinct lesions, lacking stromata, conidiophores solitary or formed in small fascicles emerging through stomata and much longer conidia, up to 115 µm.

*Pseudocercospora pancratii* (Ellis & Everh.) U. Braun & R.F. Castañeda

≡ *Cercospora pancratii* Ellis & Everh.

≡ *Cercospora hymenocalidis* Pat.

Material examined – VENEZUELA, Lara, Barquisimeto, on leaves of *Hymenocallis tubiflora* Salisb. (*Amaryllidaceae*), Nov. 2010, R. Urtiaga 428 (HAL 2474 F); l.c., on leaves of *Hymenocallis* sp., Sep. 2010, R. Urtiaga 419 (HAL 2473 F).

Notes – New to Venezuela and new host species (Crous & Braun 2003). *P. pancratii* is widespread on various hosts of the *Amarylli*
**Pseudocercospora pehriicola** U. Braun & Urtiaga, sp. nov.  Fig. 13

Mycobank, MB 800013.

Etymology – epithet derived from the host genus, *Pehria*.

Pseudocercosporae lagerstroemiigenae valde similis, sed hospite distintico, maculis differentibus, hyphis superficialibus sparse evolutis, laxis. Differt a *P. pehriae* hyphis superficialibus cum conidiophoris solitariis et stromatibus formantibus, conidiophoris brevioribus, 10–50 µm, et conidiis angustioribus, 2–3.5 µm.

Leaf spots amphigenous, circular to somewhat irregular, 2–10 mm diam., occasionally zonate, brownish, greyish brown to grey or finally greyish white, with a very narrow dark marginal line, occasionally purple and slightly raised. Caespituli amphigenous, delicately punctiform on the upper side, scattered to aggregated, less conspicuous on the lower surface, dark brown to blackish. Mycelium internal and partly external; superficial hyphae emerging through stomata, sparingly developed, more abundant on the lower surface, sparingly branched, septate, subhyaline to pale olivaceous or olivaceous-brown, smooth, 1–4 µm wide. Stromata lacking to well-developed, 10–60 µm diam., on the upper side intraepidermal and larger, substomatal and smaller below, medium to dark brown or olivaceous-brown, cells 3–6 µm diam. Conidiophores in fascicles, epiphyllyous fascicles rather large and dense, hypophyllous ones smaller and looser, individual conidiophores almost straight to usually distinctly and strongly geniculate-sinuous, unbranched, 10–50 × 1.5–4 µm, aseptate to sparingly septate, pale to medium olivaceous or olivaceous-brown, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 10–25 µm long, conidiogenous loci inconspicuous. Conidia formed singly, narrowly obclavate-filiform, occasionally subacicular, 35–80 × 2–3.5 µm, indistinctly 3–8-septate, hyaline, subhyaline to very pale olivaceous, thin-walled, smooth, apex acute to subobtuse, base usually obconically truncate, occasionally truncate, 1–1.5 µm wide, hila neither thickened nor darkened.

Material examined – VENEZUELA, Carabobo State, Miranda, on leaves of *Pehria compacta* (Rusby) Sprague (Lythraceae), Apr. 2011, R. Urtiaga 434 (HAL 2483 F, holotype).

Notes – Braun & Urtiaga (2008) described *Pseudocercospora pehriae* on *Pehria compacta* from Venezuela. This species is, however, quite distinct from *P. pehriicola* by lacking superficial mycelium and stromata, very long conidiophores, up to 150 µm, and broadly obclavate-cylindrical conidia, 20–70 × 4–7 µm. Several additional *Pseudocercospora* species on hosts belonging to diverse genera of the Lythraceae are known. The Asian *P. lagerstroemiigena* Goh & W.H. Hsieh on *Lagerstroemia speciosa* (Hsieh & Goh 1990) is very similar, but differs in forming different lesions and well-developed superficial hyphae, partly dense and aggregated in ropes. *P. lagerstroemiae-lanceolatae* U. Braun & Crous (Crous & Braun 2003) and *P. lythri* H.D. Shin & U. Braun (Shin & Kim 2001) are two species that form superficial mycelium, but the former differs in having very long, pluriseptate conidiophores, up to 100 µm, and the latter has wider conidia, 3–5 µm. In other species with similarly narrow conidia, the conidiophores are consistently fasciculate, i.e. solitary conidiophores and superficial hyphae are lacking, viz. *P. cupheae* (Syd.) U. Braun, *P. lythracearum* (Heald & F.A. Wolf) X.J. Liu & Y.L. Guo (incl. *P. lagerstroemiae-subcostatae* (Sawada) Goh & W.H. Hsieh), *P. nesae* (Ellis & Everh.) U. Braun, *P. woodfordigena* U. Braun & Crous (Chupp 1954, Hsieh & Goh 1990, Guo & Hsieh 1995). *P. sydowiana* (Chupp) U. Braun & Crous is characterized by its very long conidiophores, up to 260 µm, and broad conidia 20–70 × 4–7 µm, and *P. lagerstroemiae-parviflorae* H.S.G. Rao, S. Narayan & Bhartiya has very long, pluriseptate conidiophores, up to 204 µm, and somewhat wider conidia, 3–5 µm (Chupp 1954, Goh & Hsieh 1990, Rao et al. 1996).

**Pseudocercospora punicae** (Henn.) Deighton

≡ *Cercospora punicae* Henn.

Material examined – VENEZUELA, Lara, Barquisimeto, on leaves of *Punica graminatum* L. (*Punicaceae*), Sep. 2010, R. Urtiaga 404 (HAL 2485 F).
Fig. 13 – Pseudocercospora pehricola. Based on type material. a Superficial hyphae. b Superficial hyphae with solitary conidiophores. c Conidiophore fascicle. d Conidiophores and hyphae emerging through a stoma. e Conidiophores, f Conidia – Bar = 10 µm.

Notes – Known from Venezuela (Crous & Braun 2003).

Pseudocercospora rauvolviae-tetraphyllae U. Braun & Urtiaga, sp. nov. Fig. 14 MycoBank, MB 800014.

Etymology – epithet derived from the host species, Rauvolfia tetraphylla.

Differt ab omnibus speciebus Pseudocercosporae ad Bignoniaceas (P. liebenbergii, P. rauvolviae, P. rauvolviae-serpentinae et P. serpentinae) caespitis epiphyllis et hypophyllis distincte dimorphis (caespitulis epiphyllis punctiformibus, stromatibus intraepidermalibus bene evolutis, 15–60 µm diam., conidiophoris numerosis, dense fasciculatis; caespitulis hypophyllis indistinctis, stromatibus nullis vel parvis, substomatalibus, conidiophoris parvis, laxe fasciculatis, interdum valde ramosis, hyphis superficialibus cum conidiophoris solitariis formantibus).

Leaf spots amphigenous, angular-irregular, 1–10 mm diam., on the upper leaf surface at first brown to dark brown, later with pale centre, greyish brown to dingy grey, with a narrow to moderately broad darker margin, on the lower side paler brown and margin indefinite. Caespituli amphigenous, on the upper side punctiform, dark brown to blackish, scattered to aggregated, below rather inconspicuous. Mycelium internal and external on the lower surface; superficial hyphae emerging through stomata, straight to sinuous, branched, 1–4 µm wide, septate, subhyaline to pale olivaceous-brown, smooth; stromata on the upper side well-developed, intraepidermal, brown, 15–60 µm diam., erumpent, subcircular to somewhat irregular in outline, lacking or
only small below, substomatal, cells 2–5 µm diam. Conidiophores on the upper leaf surface in small to moderately large, often dense fascicles, arising from stromata, erumpent, on the lower side in smaller and usually looser fascicles, arising from internal hyphae or small stromata, emerging through stomata, or solitary, arising from superficial hyphae, lateral, straight, subcylindrical, subclavate or slightly attenuated towards the tip, unbranched or hypophyllously sometimes slightly to strongly branched, (5–)10–40 × 2–5 µm, 0–2-septate, thin-walled, smooth, pale to medium olivaceous or olivaceous-brown; conidiogenous

**Fig. 14** – *Pseudocercospora rauvolfiae-tetraphyllae*. Based on type material. a Conidiophore fascicles. b Hypha with solitary conidiophore. c Conidiophores and hyphae emerging through a stoma. d Conidiophores. e Conidia – Bar = 10 µm.
cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–30 µm long, conidiogenous loci inconspicuous. Conidia formed singly, obclavate-cylindrical, short conidia sometimes ellipsoid-subcylindrical or fusoid, 15–80 × 2–4.5 µm, 1–7-septate, sub-hyaline to pale olivaceous or olivaceous-brown, smooth, apex obtuse to subacute, base short obconically truncate, 1.5–2 µm wide, hila neither thickened nor darkened.


Notes – This species, known from Cuba and Venezuela on Rauvolfia tetraphylla, differs from all other species of Pseudocercospora on Rauvolfia spp. in forming characteristically dimorphic fructification, i.e. with obvious differences between epiphyllous and hypophyllous caespituli. On the upper leaf surface, well-developed intraepidermal stromata with large, dense fascicles of conidiophores are developed, whereas on the lower side stromata are lacking or small, substomatal, and the conidiophores, sometimes distinctly branched, are formed in small, divergent fascicles and superficial hyphae with solitary conidiophores are also developed. In P. rauwolfiae Deighton (Deighton 1983), described from Africa (Guinea and Sierra Leone) on Rauvolfia vomitoria Afzel., superficial hyphae with solitary conidiophores are lacking and the conidiophores are longer, up to 85 µm, mostly 30–50 µm. The Indian P. serpentinae (Pandotra & Husain) Deighton (Deighton 1976, 1983) on R. serpentina (L.) Benth. ex Kurz is characterized by lacking stromata, effuse hypophyllous colonies, frequently branched conidiophores and abundant superficial hyphae with solitary conidiophores. P. rauwolfiae-serpentinae H.S. Rao, Arch. Singh & Kamal (Rao et al. 1995), also described on R. serpentina from India, is close to P. rauwolfiae (conidiophores arising from stromata, superficial hyphae lacking) and was reduced to synonymy with the latter species in Kamal (2010). However, P. rauwolfiae-serpentinae should rather be separated from the African species due to its much shorter conidiophores and conidia. P. liebenbergii (Syd.) Deighton, confined to R. caffra Sond. in South Africa, is quite distinct from P. rauwolfiae-tetraphyllae. The conidiophores often proliferate percurrently, the conidia become rough-walled, and superficial hyphae are lacking (Chupp 1954, Deighton 1976, Crous & Braun 1996). Chupp (1954) recorded this species from Venezuela on Rauvolfia sp. The material concerned has not been seen, but it is possible that this record refers to P. rauwolfiae-tetraphyllae.

Pseudocercospora tibouchinae (Viégas) Deighton Fig. 15
≡ Cercospora tibouchinae Viégas.
≡ Cercoseptoria tibouchinae (Viégas) Deighton

Material examined – VENEZUELA, La- ra, Sanare, Sabana Redonda Arriba, on leaves of Tibouchina longifolia (Vahl) Baill. (Melastomataceae), Sep. 2010, R. Urtiaga 407 (HAL 2490 F).

Notes – This species has been described from Brazil on Tibouchina sp. Type material was re-examined and redescribed by Crous et al. (1997). This is the first record of this species from Venezuela, and T. longifolia is a new host species (Crous & Braun 2003). The material from Venezuela agrees well with type material of this species (conidiophores arising from well-developed stromata, short and aseptate, 5–20 × 2–3 µm, forming sporodochial conidiomata; conidia solitary, narrowly cylindrical-filiform to somewhat acicular, up to 90 × 2–3.5 µm, pluriseptate, apex obtuse to subacute, base truncate to short obconically truncate).

Pseudocercospora trichophila var. punctata U. Braun & Urtiaga, var. nov. Fig. 16 MycoBank, MB 800018.

Etymology: the name of the variety refers to the presence of punctiform epiphyllous caes-pituli.

Differt a var. trichophila caespitulis amphigenis, in epiphylo punctiformibus, e stromatibus, 10–50 µm diam., et conidiophoris fas-
Leaf spots amphigenous, 2–8 mm diam., subcircular to angular-irregular, brownish, greyish brown, dingy grey, with narrow darker border or halo on the upper leaf surface, hypophyllous leaf spots less conspicuous, with indistinct margin. Caespituli amphigenous, on the upper leaf surface punctiform, dark brown, effuse and less conspicuous below. Mycelium internal and external, superficial hyphae usually lacking on the upper side, abundant below, emerging through stomata, sparingly branched, 1–3.5 µm wide, septate, hyaline, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth; stromata small to well-developed on the upper side, intrae-epidermal, 10–50 µm diam., medium to dark olivaceous-brown, lacking or very small below. Conidiophores on the upper side in small to moderately large fascicles, loose to dense, arising from stromata, erect, straight, subcylindrical to geniculate-sinuous, unbranched, 10–70 × 3–5 µm, pale olivaceous to medium olivaceous-brown, 0–4-septate, thin-walled, smooth, on the lower side solitary, arising from superficial hyphae, lateral, occasionally terminal, short, 3–25 × 2.5–5 µm, conical-subcylindrical, 0–1-septate; conidiogenous cells

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Fig. 15 – *Pseudocercospora tibouchinae*. Based on HAL 2490 F. a Conidiophore fascicle. b Conidiophores. c Conidia. – Bar = 10 µm.
integrated, terminal or conidiophores reduced to conidiogenous cells, 3–20 μm long, conidiogenous loci inconspicuous or subdenticate, but always unthickened and not darkened. Conidial solitary, subcylindrical or oblavate-cylindrical, (10–)25–90(–110) × (2.5–)3–5 μm, (1–)3–10(–12)-septate, distance between septa 6–18 μm, subhyaline to pale olivaceous, apex obtuse, rounded to somewhat pointed, base obconically truncate, 1–1.5(–)2 μm wide, hila neither thickened nor darkened.


Notes – Deighton (1976) examined type material and numerous other collections of Pseudocercospora on Solanum spp. and provided a detailed description and some drawings of the morphologically variable Pseudocercospora trichophila (F. Stevens) Deighton, reduced several Cercospora spp. to synonymy with the latter species and discussed it in detail. In the type material of P. trichophila and its synonyms, colonies are chiefly hypophyllous, stromata are lacking and the conidiophores are formed singly, arising from superficial hyphae. In the present collection from Venezuela, the hypophyllous fructification agrees perfectly with typical P. trichophila, but additional epiphyllous caespituli are formed which are punctiform, composed of immersed stromata and fasciculate conidiophores. The conidia agree with those in typical collections of P. trichophila. We prefer to assign such collections with additional fasciculate conidiophores arising from stromata to a special morphological variety of the latter species. Var. punctata undoubtedly occurs on other Solanum spp. as well. Hsieh & Goh (1990: 321, Fig. 243) illustrated, for instance, an agreeing collection from Taiwan on Solanum aculeatissimum Jacq. Conidia in var. trichophila are (3–)4–5(–)7 μm wide. Collections on Solanum asperum Rich. (Brazil and Trinidad), described as Cercospora solani-asperi (Trinidad, Arima Forest Reserve, 25 Oct. 1947, W.T. Dale, Fungi of Trinidad 1729, IMI 24507, type, examined), are barely distinct from P. trichophila, but due to somewhat narrower conidia, Deighton (1976) introduced the combination Pseudocercospora solani-asperi and tentatively maintained it as separate species. However, the latter is barely more than an additional variety of the morphologically variable P. trichophila.:


Pseudocercospora capsellae (Ellis & Everh.) Deighton

Material examined – VENEZUELA, Lara, Barquisimeto, market, on leaves of Brassica rapa subsp. pekinensis Kitam. (Brassicaceae), Jul. 2011, R. Urtiaga 446 (HAL 2476 F).

Notes – New to Venezuela (Braun 1995, IMI Descriptions of Fungi and Bacteria 161, Sheet 1605, 2004).

Zasmidium asclepiadis U. Braun & Urtiaga, sp. nov. Fig. 17

MycoBank, MB 800015.

Etymology – epithet derived from the host genus, Asclepias.

Differt ab omnibus speciebus Zasmidia (et Stenellae) ad Asclepiadaceae (Z. ceropegiae, Z. cynanchi, Z. gongronematis, Z. pentatropidis et Z. telosmae) conidiophoris valde brevioribus, modo 5–40 μm longis et conidiphoris simplicibus, 0–2-septatis.

On living and faded leaves, lesions subcircular or with diffuse, irregular discolorations, brownish to reddish. Colonies hypophyllous, effuse, thin, grey to dingy greyish brown, in older colonies hyphae, conidiophores and conidia sometimes with a reddish tinge. Mycelium internal and external; superficial hyphae emerging through stoma, sparingly branched, septate, thin-walled, vegetative hyphae 1–3 μm wide, hyaline to very pale olivaceous, rough-walled, fertile hyphae or hyphal cells with conidiophores somewhat wider, darker and mostly more or less smooth; stromata lacking. Conidiophores solitary, arising from superficial hyphae, lateral, rarely

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Fig. 16 – *Pseudocercospora trichophila* var. *punctata*. Based on type material. **a** Superficial hyphae with solitary conidiophores. **b** Conidiophore fascicles. **c** Conidiophores. **d** Conidia. – Bar = 10 µm.

terminal, with 1–2(–3) conidiophores per cell, occasionally with a few fasciculate conidiophores emerging through stomata, erect, straight, subcylindrical to moderately geniculate-sinuous, simple or sometimes once to olivaceous, olivaceous-brown, brown or reddish brown, thin-walled, smooth, later several times branched, 5–40 × 2.5–6 µm, unbranched conidiophores 0–2-septate, longer branched conidiophores often with additional septa, pigmentation variable, subhyaline, pale sometimes somewhat rough-walled; conidiophores integrated, terminal, conidiophores aseptate, i.e. reduced to conidiogenous cells, or conidiogenous cells integrated in superficial hyphae, with lateral peg-like protuberances, 5–20 µm long, with a single to several conspicuous conidiogenous loci, circular in outline, thickened and darkened, 1–1.5 µm diam. Conidia formed singly, rarely in short chains, narrowly cylindrical-obclavate, short conidia sometimes narrowly ellipsoid-fusoid, (6–) 10–60(–100) × 2–3.5 µm, (0–) 1–6(–8)-septate, hyaline or subhyaline, thin-walled, smooth, apex subacute to subobtuse, base short obconically truncate, 1–1.5 µm wide, hila slightly thickened and darkened.


Notes – Several species of *Zasmidium* have been described on hosts belonging to the *Asclepiadaceae*, but all of them have much longer, plurisepatate conidiophores. Furthermore, *Zasmidium gongronematis* (J.M. Yen & Gilles) U. Braun comb. nov. (Bas.: *Cercospora gongronematis* J.M. Yen & Gilles, Bull. Trimest. Soc. Mycol. France 137: 69, 1974; MycoBank, MB 800043), a typical *Zasmidium* with planate conidiogenous loci and conidial hila, differs from *Z. asclepiadis* in having broader (4–5 µm), cylindrical conidia (Yen 1975). *Z. pentatropidis* (K. Srivast., A.K. Srivast. & Kamal) Kamal (Kamal 2010) and *Z.
Fig. 17 – Zasmidium asclepiadis. Based on type material. a Superficial hyphae with solitary conidiophores. b Conidiophores and hyphae emerging through a stoma. c Conidiophores. d Conidia. – Bar = 10 µm.

telosmae (K. Srivast., A.K. Srivast. & Kamal) Kamal (Kamal 2010) are characterized by having verruculose conidia, which are also wider (3–6 µm) in the latter species. In Stenella ceropegiae M.S. Patil & Sawant (Patil & Sawant 1991) on Ceropegia bulbosa Roxb. in India, the conidiophores are formed in fascicles, but superficial hyphae with solitary conidiophores are lacking. The Indian S. cynanchi J.M. Yen, A.K. Kar & B.K. Das (Yen et al. 1982b) is characterized by its small, 7–23 x 2.5–3.5 µm, 0–1-septate conidia. The latter two species have not yet been re-examined. Type material was not available. Therefore, the generic affinity of these species is still unclear.

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