

New species and new records of cercosporoid hyphomycetes from Cuba and Venezuela (Part 2)

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Examination of specimens of cercosporoid leaf-spotting hyphomycetes made between 1966 and 1970 in Cuba and Venezuela, now housed at K (previously deposited at IMI as “*Cercospora* sp.”), have been continued. Additionally examined Venezuelan collections, made between 2006 and 2010, are now deposited at HAL. Several species are new to Cuba and Venezuela, some new host plants are included, and the following new species and a new variety are introduced: *Cercosporella ambrosiae-artemisiifoliae*, *Passalora crotonis-gossypiifolii*, *P. solaniphila*, *P. stigmaphyllicola*, *Pseudocercospora calycophylli*, *P. coremioides*, *P. lonchocarpicola*, *P. lonchocarpigena*, *P. paullinae*, *P. picramniae*, *P. psidii* var. *varians*, *P. solanacea*, *P. teramnicola*, *P. trichiliae-hirtae*, *P. zuelaniae*, *Pseudocercosporella leonotidis*, *Zasmidium cubense*, *Z. genipae-americanae*. The new name *Pseudocercospora toonae-ciliatae* and the new combination *Zasmidium hyptiantherae* are proposed.

Key words – *Ascomycota* – *Cercospora* – *Cercosporella* – *Mycosphaerellaceae* – *Passalora* – *Pseudocercospora* – South America – West Indies – *Zasmidium*

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Introduction

Cercosporoid fungi are anamorphic ascomycetes [Ascomycota, Pezizomycotina, Dothideomycetidae, Capnodiales, 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. The second author of the this paper has collected cercosporoid anamorphs in Cuba and Venezuela since about 1966. Early collections were deposited at IMI as *Cercospora* sp. (recently completely transferred to K). These

specimens have recently 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 samples concerned have already been published (Braun & Urtiaga 2008, Braun et al. 2010). Braun & Urtiaga (2012) published results of examinations of further collections from Cuba and Venezuela, which are continued in the present paper. These results also supplement first contributions to

the knowledge of cercosporoid fungi of Cuba (Arnold 1986, Castañeda & Braun 1989, Braun & Castañeda 1991, Vilaró et al. 2006) and Venezuela (Chupp 1934, Pons 1984, 1988, 1993, 2004, 2007, Urtiaga 1986, García et al. 1996, Itturiaga & Minter 2006). Older data are summarized in Crous & Braun (2003).

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 ($\times 1000$ magnification) of conidia and other structures were made, with the extremes given in parentheses. All drawings have been prepared by the first author.

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 achyranthina Thirum. & Chupp

Material examined – VENEZUELA, Lara, Barquisimeto, on leaves of *Achyranthes aspera* var. *indica* L. [= *A. indica* (L.) Mill.] (*Amaranthaceae*), Feb. 2008, R. Urtiaga 108 (HAL 2529 F).

Notes – New to Venezuela. This species belongs to the *C. apii* s. lat. complex (Crous & Braun 2003).

Cercospora apii Fresen. s. lat. (*C. apii* complex, sensu Crous & Braun 2003)

Material examined – CUBA, Bayamo, on leaves of *Aloysia virgata* (Ruiz & Pav.) Pers. (*Verbenaceae*), 14 Sep. 1967, R. Urtiaga 918 (IMI 129468 = K(M) 176126); l.c., on leaves of *Atkinsia cubensis* (Britton & P. Wilson) R.A. Howard (*Malvaceae*), 13 Nov. 1966, R. Urtiaga 1018 (IMI 130165 = K(M) 176145); l.c., on leaves of *Eryngium foetidum* L. (*Apiaceae*), 9 Dec. 1965, R. Urtiaga 5 (IMI 116898 = K(M) 176129); l.c., 21 Oct. 1966, R. Urtiaga (IMI 123279 = K(M) 176130); l.c., 9 Dec. 1966, R. Urtiaga (IMI 124025 = K(M) 176131); l.c., 5

June 1967, R. Urtiaga A-604 (IMI 128002 = K(M) 176128); l.c., 5 June 1967, R. Urtiaga B-605 (IMI 128003 = K(M) 176127); l.c., on leaves of *Kallstroemia maxima* (L.) Hook. & Arn. (*Zygophyllaceae*), 4 Nov. 1966, R. Urtiaga (IMI 123393 = K(M) 176120); l.c., on leaves of *Polypodium punctatum* Thunb. (*Polypodiaceae*), 2 Jan. 1967, R. Urtiaga 1 (IMI 124326 = K(M) 176141); l.c., on dead stems of *Sesbania emerus* (Aubl.) Urb. (*Fabaceae*), 6 Mar. 1967, R. Urtiaga (IMI 126239 = K(M) 176149); Bayamo-Ote, on leaves of *Zanthoxylum martinicense* (Lam.) DC. (*Rutaceae*), 27 Apr. 1967, R. Urtiaga (IMI 127343 = K(M) 176136). VENEZUELA, Lara, Rio Claro, La Cuchilla, on leaves of *Scoparia* sp. (*Plantaginaceae*), June 2010, R. Urtiaga 390 (HAL 2524 F).

Notes – All collections from Cuba have been recorded by Urtiaga (1986) as *Cercospora* sp. *Aloysia virgata* is listed as host of *C. apii* s. lat. in Crous & Braun (2003). The Cuban material is characterized by fasciculate conidiophores, up to 250 μm long, and hyaline acicular conidia. *Atkinsia cubensis*, an endemic Cuban plant, is cited as host of *C. apii* s. lat. by Crous & Braun (2003). This collection is characterized as follows: leaf spots brown, greyish brown to dingy grey, shape and size variable, up to 50 mm diam., margin indefinite; caespituli hypophyllous, punctiform, dark brown to blackish; conidiophores fasciculate, divergent, 80–250 \times 3–7 μm , pluriseptate, cylindrical to slightly geniculate towards the apex, medium brown throughout or usually paler towards the tip, thin-walled, smooth; conidiogenous cells integrated, terminal or intercalary, 15–30 μm long, conidiogenous loci thickened and darkened, 2.5–4 μm diam.; conidia solitary, acicular, up to 150 \times 3–5 μm , hyaline, thin-walled, smooth, pluriseptate, distance between septa usually 4–12 μm , base truncate, hila thickened and darkened, 3–5 μm wide. *Kallstroemia maxima* was cited as host of *Cercospora* sp. in Arnold (1986). In this collection the fasciculate brown conidiophores are 30–140 \times 3–6 μm and produce acicular colourless conidia, 70–150 \times 3–4.5 μm . *Polypodium punctatum* and *Zanthoxylum martinicense* have not yet been listed as hosts of cercosporoid fungi (Crous & Braun 2003). The collection on *Zanthoxylum martinicense* is

characterized as follows: leaf spots amphigenous, subcircular to angular-irregular, 1–8 mm diam., at first yellowish to ochraceous or brownish, later greyish white, with narrow dark margin; stromata 10–50 µm diam.; conidiophores fasciculate, 20–120 × 3–6 µm, usually distinctly geniculate, olivaceous-brown or paler towards the tip; conidiogenous loci 1.5–2.5 µm diam.; conidia acicular, up to about 100 µm long and 2–3 µm wide. Pavgi & Singh (1970) described *Cercospora oxyphylli* Pavgi & U.P. Singh from India on *Zanthoxylum oxyphyllum* Edgew. The taxonomic affinity of this species is unclear (type material not available), but due to its conidia described as pigmented, and the original illustration, this species seems rather to belong to *Pseudocercospora*. The collection of *C. apii* s. lat. on *Scoparia* does not belong to the Indian *C. scopariae* Thirum. & Lacy, which is characterized by having very short conidiophores, 6–15 µm, and narrowly obclavate conidia (Chupp 1954, Vasudeva 1963). The conidiophores in the material from Venezuela are up to 120 µm long and the conidia are acicular.

Cercospora bidentis Tharp

Material examined – VENEZUELA, Lara, Rio Claro, La Cuchilla, on leaves of *Bidens squarrosa* Kunth (*Asteraceae*), Apr. 2009, R. Urtiaga 200 (HAL 2555 F).

Notes – Known from Venezuela on *Bidens pilosa* L. (Urtiaga 1986, Crous & Braun 2003, Iturriaga & Minter 2006), but on a new host species.

Cercospora brachiata Ellis & Everh.

Material examined – VENEZUELA, Lara, Barquisimeto, Parque Macuto, on leaves of *Amaranthus viridis* L. (*Amaranthaceae*), Oct. 2009, R. Urtiaga 294 (HAL 2535 F).

Notes – This is the second collection of this species on *A. viridis* from Venezuela (Braun & Urtiaga 2012). *C. brachiata* is known from Venezuela on *Amaranthus spinosus* L. and *A. tricolor* L. (= *A. dubius* Mart., nom. inval.).

Cercospora colei Boedijn

Material examined – CUBA, Bayamo, on leaves of *Plectranthus scutellarioides* (L.) R. Br. [= *Coleus blumei* Benth.] (*Lamiaceae*), 6

Mar. 1967, R. Urtiaga (IMI 126249 = K(M) 176155).

Notes – *Cercospora colei* was listed from Cuba in Crous & Braun (2003). This species is a true *Cercospora* s. str. distinct from the *C. apii* complex and well characterized by its small stromata, 10–50 µm diam., short, fasciculate conidiophores, 10–60 × 2–7 µm, and relatively short conidia, narrowly obclavate, subcylindrical to short acicular, 25–75 × 2.5–5 µm. *C. colei* was described from Indonesia on *Coleus atropurpureus* Benth. and *C. ×hybridus* Voss (Boedijn 1961), but both names are now considered to be synonyms of *Plectranthus scutellarioides*. Braun (2001) re-examined type material of this species and published an illustration (Braun 2001: 422, Fig. 4). *C. coleicola* Chupp & A.S. Mull. (Chupp 1954), described from Brazil on *Coleus* sp. (type material examined: CUP-MG 1109) is quite distinct from *C. colei* and well characterized by its lesions formed as dark to black spots on stems, large pustulate stromata, 30–80 µm diam. and acicular conidia. The identity of the type host, *Coleus* sp., and its relation to *Plectranthus scutellarioides* are unclear. *C. coleana* J.M. Yen & Lim (Yen & Lim 1980) on *Coleus* sp. in Singapore is also characterized by the formation of acicular conidia, but stromata are lacking or rudimentary and the conidiophores are formed in small fascicles. The latter species is a typical member of the *C. apii* complex. Two examined collections on *Plectranthus scutellarioides* (as *Coleus blumei*) coincide with *C. coleana* (Solomon Islands, 14 May 1978, E.H.C. McKenzie, GZU; Vanuatu, Santo, 4 May 1983, E.H.C. McKenzie, PDD 44145). A second collection from Cuba on *P. scutellarioides* (Bayamo, 6 Mar. 1967, R. Urtiaga, IMI 126250 = K(M) 176154) belongs possibly to *C. coleana* or it is a mixed infection of the latter species and *C. colei*.

Key to *Cercospora* spp. on former *Coleus* spp. (now *Plectranthus*):

1. Stromata medium-sized, 10–50 µm diam.; conidiophores relatively short, 10–60 × 2–7 µm; conidia narrowly obclavate-subcylindrical, occasionally some conidia short acicular, 25–75 × 2.5–5 µm *C. colei*
- 1* Stromata either lacking or rudimentary or very large, 30–80 µm diam.; conidiophores

- much longer, up to about 250 μm ; conidia acicular 2
2. Lesions on stems, dark to blackish; stromata very large, 30–80 μm diam. *C. coleicola*
- 2* Lesions formed as small, at first brown, later greyish white leaf spots; stromata lacking, rudimentary or small, 10–25 μm diam. *C. coleana*

Cercospora conyzoides Thirum. & Govindu

Fig. 1

Material examined – VENEZUELA, Lara, Sanare, Sabana Redonda Arriba, on leaves of *Ageratum conyzoides* L. (*Asteraceae*), Sep. 2010, R. Urtega 391 (HAL 2528 F).

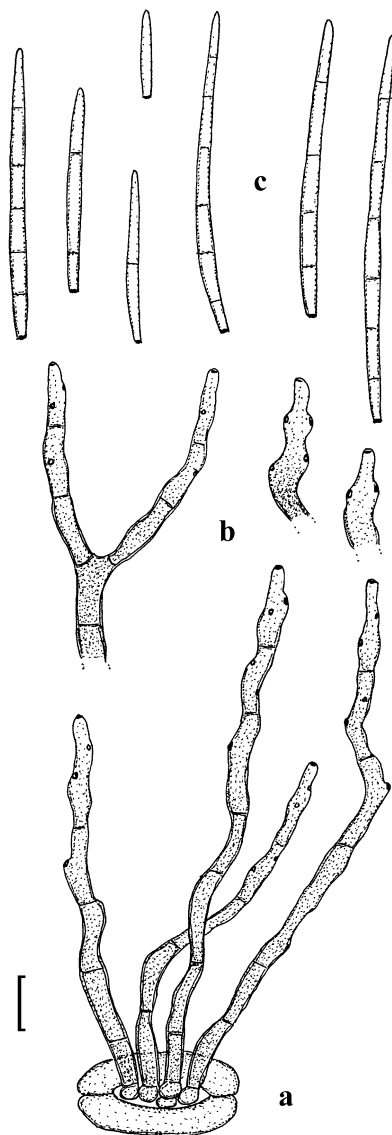


Fig. 1 – *Cercospora conyzoides*. Based on HAL 2528 F. **a** Conidiophore fascicle. **b** Conidiophore tips. **c** Conidia. – Bar = 10 μm .

Notes – This species, hitherto only known from the original description based on Indian material (Thirumalachar & Govindu 1957), is new to Venezuela. *Ageratum conyzoides* is native in tropical America and an invasive weed in different parts of the world, including Southeast Asia. The following description is based on the material from Venezuela:

Leaf spots at first rather indistinct, greyish green to olivaceous discolorations, later forming distinct leaf spots, subcircular to angular-irregular, yellowish brown to brown, 1–10 mm diam., margin indefinite. Caespituli amphigenous, not very conspicuous. Mycelium internal; stromata lacking, only with a few swollen hyphal cells, substomatal, subcircular in outline, brown, 2–6 μm diam. Conidiophores solitary or in small, divergent fascicles, 2–5, erect, straight to usually distinctly plurigeniculate-sinuuous, often with constrictions and swellings, simple or occasionally branched, 30–110 \times 3–6 μm , pluriseptate, cells 5–15 μm long, pale to medium olivaceous-brown or brown, paler towards the tip (pale olivaceous or subhyaline), thin-walled (up to 0.8 μm), smooth; conidiogenous cells integrated, terminal to intercalary, 10–30 μm long, with a single to several conidiogenous loci per cell, small, 0.8–1 μm diam., slightly thickened and darkened, less conspicuous than in most other *Cercospora* spp. Conidia solitary, narrowly obclavate, shorter conidia subcylindrical-ellipsoid to fusiform, long conidia almost acicular, (10–)15–80 \times (1.5–)2–3(–3.5) μm , (0–)1–7-septate, hyaline, thin-walled, smooth, apex obtuse to subacute, base obconically truncate, hila about 1 μm wide, slightly thickened and darkened.

Cercospora ageraticola Goh & W.H. Hsieh, described on *Ageratum houstonianum* Mill. from Taiwan, is very similar, but the conidiophores are much longer, up to 200 μm , and less geniculate, the conidiogenous loci are broader and the conidia are wider, 3–4.5 μm (Hsieh & Goh 1990). *C. agerati-conyzoidis* Bagyan., Jagad. & U. Braun (Bagyanarayana et al. 1991) on *A. conyzoides* in India belongs to the *C. apii* s. lat. complex (Crous & Braun 2003). The conidia are acicular with truncate base and the conidiophores are rather long, up to 250 μm . The following key comprises

Cercospora spp. on *Ageratum*:

1. Conidiophores up to 110 µm long, usually distinctly and often strongly geniculate-sinuous; conidiogenous loci not very conspicuous, small, about 0.8–1 µm diam.; conidia narrow, (1.5–)2–3(–3.5) µm; on *Ageratum conyzoides* *C. conyzoides*
- 1* Conidiophores longer, up to 250 µm, not or less geniculate-sinuous; conidiogenous loci broader, > 1 µm; conidia wider, 3–4.5 µm . 2
2. Conidia acicular, base truncate; on *Ageratum conyzoides* *C. agerati-conyzoidis*
- 2* Conidia acicular to obclavate, base truncate to obconically truncate; on *Ageratum houstonianum* *C. ageraticola*

***Cercospora erythrinicola* Tharp**

Material examined – VENEZUELA, Lara, Parque Macuto, on leaves of *Erythrina berteroana* Urb. (*Fabaceae*), Mar. 2008, R. Urtiaga 110 (HAL 2534 F).

Notes – New to Venezuela. Urtiaga (1986) recorded *Cercospora* sp. on this host from Venezuela.

***Cercospora geraisensis* Chupp**

Material examined – Cuba, Bayamo, on leaves of *Terminalia catappa* L. (*Combretaceae*), 23 Dec. 1966, R. Urtiaga (IMI 124076 = K(M) 176159).

Notes – Crous & Braun (2003) referred *C. geraisensis* to the *C. apii* complex and recorded this species from Cuba. Arnold (1986) listed *T. catappae* from Cuba as host of *Cercospora* sp.

***Cercospora guatemalensis* A.S. Mull. & Chupp**

Material examined – CUBA, Bayamo, on leaves of *Ocimum sanctum* L. (*Lamiaceae*), 5 June 1967, R. Urtiaga E-608 (IMI 128006a = K(M) 176153).

Notes – *C. guatemalensis* is known from Cuba (Crous & Braun 2003). This species belongs to the morphological *C. apii* s. lat. complex.

***Cercospora hyalospora* A.S. Mull. & Chupp (*nom. inval.*)**

(= *C. apii* s. lat.)

Material examined – VENEZUELA, Lara, Sanare, Sabana Redonda Arriba, on leaves of *Sida urens* L. (*Malvaceae*), June 2010, R.

Urtiaga 392 (HAL 2527 F).

Notes – This species has been recorded from Venezuela by Dennis (1970) on *Sida* sp. It differs from *C. sidicola* in forming distinct leaf spots.

***Cercospora mikaniicola* F. Stevens**

Material examined – VENEZUELA, Lara, Rio Claro, La Cuchilla, on leaves of *Mikania cordifolia* (L. f.) Willd. (*Asteraceae*), Apr. 2009, R. Urtiaga 201 (HAL 2551 F); Lara, Sanare, Sabana Redonda Arriba, on *M. cordifolia*, Apr. 2009, R. Urtiaga 259 (HAL 2562 F).

Notes – New to Venezuela (Crous & Braun 2003).

***Cercospora mucunicola* Gonz. Frag & Cif.**

(= *C. apii* s. lat.)

Material examined – VENEZUELA, Lara, Rio Claro, La Cuchilla, on leaves of *Dalechampia scandens* L. (*Euphorbiaceae*), Apr. 2009, R. Urtiaga 246 (HAL 2551 F).

Notes – see *Pseudocercospora euphorbiacearum*.

***Cercospora ricinella* Sacc. & Berl.**

Material examined – VENEZUELA, Lara, Sanare, Rio Claro, La Cuchilla, on leaves of *Ricinus communis* L. [seedlings and adult plants] (*Euphorbiaceae*), Apr. 2008, R. Urtiaga 211 & 248 (HAL 2542 F, 2543 F).

Notes – Known from Venezuela (Urtiaga 1986, Crous & Braun 2003, Iturriaga & Minter 2006).

***Cercospora* sp. (1)**

Fig. 2

Material examined – VENEZUELA, Lara, Villanueva, on leaves of *Vismia* sp. (*Hypericaceae*), Nov. 2008, R. Urtiaga 150 (HAL 2515 F).

Notes – *Cercospora vismiae* Syd. and *C. vismiicola* Chupp have been reallocated to the genus *Pseudocercospora*. The present collection belongs to a true *Cercospora* (s. str.), but not to *C. apii* s. lat. It is characterized as follows: Leaf spots amphigenous, subcircular to somewhat angular-irregular or oblong, 2–25 mm diam., light brown, ochraceous, later almost greyish white, surrounded by a narrow somewhat darker marginal line and a diffuse darker halo; caespituli hypophyllous, not very conspicuous; mycelium internal; stromata

lacking or only small, substomatal to intra-epidermal, 10–25 μm diam., brown; conidiophores solitary or in small, divergent fascicles (2–8), arising from internal hyphae or stromata, through stomata or erumpent, erect, straight, subcylindrical to usually strongly geniculate-sinuuous, unbranched, 20–250 \times 3–7 μm , pluriseptate, thin-walled, pale to medium brown throughout or paler towards the tip, smooth; conidiogenous cells integrated, terminal and intercalary, 10–25 μm long, with a single to usually several, sometimes numerous conidiogenous loci, thickened and darkened, 1.5–2.5 μm diam.; conidia solitary, narrowly obclavate, acicular, 20–80 \times 1.5–3 μm , pluriseptate, hyaline, thin-walled, smooth, apex subacute, base truncate to obconically truncate, hila (1–)1.5–2 μm wide, thickened and darkened. The material is not sufficient for a final description. Furthermore, *Cercospora* species with acicular conidia should only be described as new species when the identity as separate species has been proven by cultures and molecular sequence analyses (Groenewald et al. 2012). The taxonomy of this complex is intricate and many plurivorous species with insufficiently known host range are involved.

Cercospora sp. (2)

Material examined – VENEZUELA, Lara, Sanare, Sabana Redonda Arriba, on leaves of *Conyza canadensis* (L.) Cronquist (*Asteraceae*), June 2009, R. Urtiaga 261 (HAL 2563 F).

Notes – This collection is characterized as follows: Conidiophores in small to moderately large fascicles, distinctly geniculate, 50–160 \times 3–7 μm , pluriseptate, medium brown; conidiogenous cells terminal and intercalary, conidiogenous loci 2.5–4 μm diam.; conidia acicular, 40–180 \times 2.5–5 μm , relatively densely pluriseptate, hyaline, apex subacute to mostly obtuse, base truncate, hila 2–4 μm wide. *Cercospora nilghirensis* Govindu & Thirum. on *Conyza* spp. in India is similar, but has densely aggregated conidiophores and the conidia are at least partly obclavate with obconically truncate base (Vasudeva 1963). The North American *Cercospora erigeronicola* U. Braun & Rogerson (Braun & Rogerson 1993) on *Erigeron divergens* Torr. & A. Gray is a quite distinct species with cylindrical conidia. Furthermore,

C. bidentis Tharp has been recorded on *Conyza* sp. Identity and relation between *Cercospora* on *Bidens* and *Conyza* are, however, unclear. Cultures and molecular sequence data are necessary to elucidate the taxonomy of the taxa concerned.

Cercospora sidicola Ellis & Everh.

Material examined – VENEZUELA, Lara, Sanare, Sabana Redonda Arriba, on *Sida acuta* Burm. f. (*Malvaceae*), June 2010, R. Urtiaga 385 (HAL 2526 F).

Notes – New to Venezuela (Iturriaga & Minter 2006, Crous & Braun 2003).

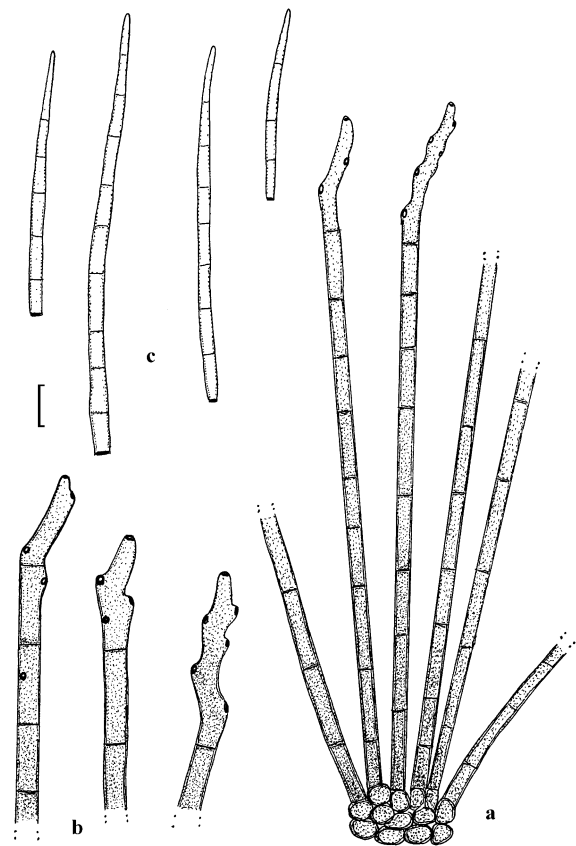


Fig. 2 – *Cercospora* sp. on *Vismia* sp. Based on HAL 2515 F. **a** Conidiophore fascicle. **b** Conidiophore tips. **c** Conidia. – Bar = 10 μm .

Cercospora solanicola G.F. Atk.

Material examined – CUBA, Rio Cauto, on leaves of *Solanum nigrum* L. (*Solanaceae*), 25 Aug. 1967, R. Urtiaga 788 (IMI 129025 = K(M) 176132).

Notes – Colonies in this collection are confined to stems and can morphologically be assigned to *C. solanicola* (Chupp 1954), a

species that belongs to the *C. apii* complex (Crous & Braun 2003).

***Cercospora talini* Syd. & P. Syd.**

Material examined – VENEZUELA, Lara, Barquisimeto, on leaves of *Talinum paniculatum* (Jacq.) Gaertn. [= *T. patens* (L.) Juss.] (*Portulacaceae*), Apr. 2009, R. Urtiaga 250 (HAL 2539 F).

Notes – This species, based on type material from Argentina, was first recorded from Venezuela in Chupp (1954). In the present collection, this fungus is possibly a secondary invader, associated with *Cladosporium* and additional fungi.

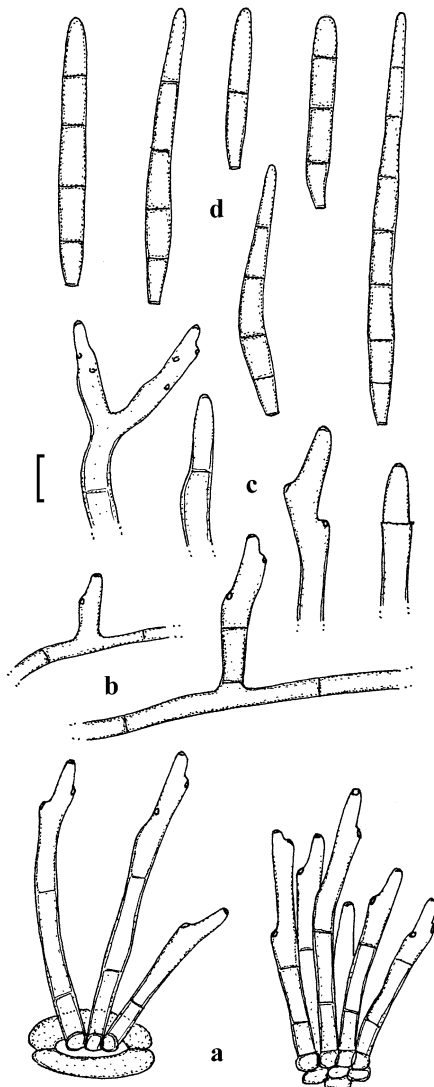


Fig. 3 – *Cercospora ambrosiae-artemisiifoliae*. Based on type material. **a** Conidiophore fascicles. **b** Solitary conidiophores arising from superficial hyphae. **c** Conidiophores. **d** Conidia. – Bar = 10 μ m.

***Cercospora volkameriae* Speg.**

Material examined – CUBA, Bayamo, on leaves of *Clerodendrum speciosissimum* C. Morren (*Lamiaceae*), 21 Jan. 1967, R. Urtiaga 3 (IMI 124815 = K(M) 176125).

Notes – *C. volkameriae* is a species of the *C. apii* s. lat. complex (Crous & Braun 2003), which is known from Cuba on *Clerodendrum splendens* G. Don (Arnold 1986).

***Cercospora ambrosiae-artemisiifoliae* U. Braun & Urtiaga, sp. nov.**

Fig. 3

Mycobank, MB 801952.

Etymology – epithet derived from the host species, *Ambrosia artemisiifolia*.

Differt ab omnibus speciebus Cercosporae ad hospites Asteracearum conidiophoris fasciculatis et etiam solitariis, ex hyphis superficialibus oriundis, subhyalinis, pallide olivaceis, pallide flavo-brunneis vel aureo-brunneis. Praeterea Passalorae ambrosiae superficiale similis, sed stromatibus minoribus, ad 30 μ m diam., conidiophoris fasciculatis et etiam solitariis, cicatricibus conidialibus convexis, non fuscatis et conidiis angustioribus, 3–6 μ m latis.

Leaf spots amphigenous, shape and size variable, subcircular to irregular, 2–10 mm diam. or expanded and larger, yellowish to ochraceous or greyish brown to medium brown, margin indefinite. Caespituli mainly hypophyllous, not very conspicuous, punctiform to subeffuse, greyish to brownish. Mycelium internal and external; superficial hyphae emerging through stomata, sparingly branched, 1–4 μ m wide, septate, thin-walled, smooth, subhyaline; stomata lacking or small, substomatal, 10–30 μ m diam., brownish. Conidiophores in small to moderately large fascicles, loose to moderately dense, arising from internal hyphae or stomata, emerging through stomata, or solitary, arising from superficial hyphae, lateral, erect, straight, subcylindrical to moderately geniculate-sinuuous, simple or occasionally branched, 20–90 \times 3–7 μ m, 0–5-septate, subhyaline to pale olivaceous, yellowish to golden brown below and paler towards the tip or faintly pigmented throughout, darker in mass, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores occasionally reduced to conidiogenous cells, 15–30 μ m long, proliferation sympodial, rarely

percurrent, conidiogenous loci (scars) conspicuous, 1.5–2 µm diam., somewhat bulging (convex), slightly thickened and refractive, but not darkened. Conidia formed singly, obclavate-cylindrical, 20–80 × 3–6 µm, 1–8-septate, subhyaline or with a very pale yellowish, greenish or olivaceous tinge, thin-walled, smooth, apex obtuse, base obconically truncate to rounded, hila 1.5–2 µm wide, slightly thickened and somewhat refractive.

Material examined – CUBA, Bayamo, on leaves of *Ambrosia artemisiifolia* L. (*Asteraceae*), 6 June 1966, R. Urriaga (IMI 119623 = K(M) 176119, **holotype**).

Notes – *Cercospora ambrosiae* Chupp was described from Colombia on *Ambrosia peruviana* Willd. (Chupp 1954). Crous & Braun (2001) re-examined type material and reallocated this species to *Passalora*. This species is known on *A. peruviana* from Colombia, Dominican Republic, Puerto Rico and Venezuela (Chupp 1954, Crous & Braun 2001, 2003). Records of *Passalora ambrosiae* (Chupp) Crous & U. Braun on *Ambrosia artemisiifolia* from Cuba (Crous & Braun 2003) are based on misidentifications and refer to a different species, described above as *Cercospora ambrosiae-artemisiifoliae*. *P. ambrosiae* is only superficially similar to the latter species and easily distinguishable by its larger stromata, up to 60 µm diam., lacking superficial hyphae, consistently fasciculate conidiophores (solitary conidiophores lacking), thickened and darkened conidiogenous loci and much broader conidia (6–10 µm). The fungus on *Ambrosia artemisiifolia* from Cuba represents a new undescribed species, but its generic affinity is difficult and must be discussed in detail. At first glance, it seems that this species might be ascribable to *Passalora* based on pigmented conidiophores, conspicuous conidiogenous loci and obclavate-cylindrical conidia. However, the structure of the conidiogenous loci does not agree with *Passalora* scars, which are planate, thickened and darkened throughout. The scars of the fungus on *Ambrosia artemisiifolia* are bulging, refractive, but not darkened, i.e. the wall of the loci is not darker than the surrounding wall of the conidiogenous cell, and rather coincide with conidiogenous loci of the genus *Cercospora*. Pigmented and solitary conidio-

phores arising from superficial hyphae are unusual in *Cercospora*, but known in several, mainly tropical-subtropical species, e.g. *C. crataevae* (Berk. & Broome) Petch, *C. hypoestis* Hansf., *C. polysciatis* (Henn.) Hansf., *C. rosea* G. Winter, *C. pseudoidium* Speg., *C. pyri* (Farl.) Karak. and *C. pyrina* Ellis & Everh. (Braun 1995b). Monophyly of *Cercospora* in its current circumscription is still unclear. Only a few cultures of *Cercospora* spp. are available, and comprehensive phylogenetic examinations of *Cercospora*, including pigmented taxa and species with superficial mycelium, have not yet been done. Thus, we follow the current taxonomic concept of the latter genus as outlined in Braun (1995b). Numerous *Cercospora* species on hosts belonging to the *Asteraceae* are known, including *C. cana* (Sacc.) Sacc. [= *C. virgaureae* (Thüm.) Allesch.], the type species, but all of them differ from *C. ambrosiae-artemisiifoliae* in having colourless conidiophores, consistently formed in fascicles, i.e. superficial hyphae with solitary conidiophores are not developed (Braun 1995b).

***Cercospora virgaureae* (Thüm.) Allesch.**

Material examined – VENEZUELA, Lara, Rio Claro, La Cuchilla, on leaves of *Conyza canadensis* (L.) Cronquist (*Asteraceae*), Apr. 2009, R. Urriaga 228 (HAL 2553 F); Lara, Sanare, Sabana Redonda Arriba, on *C. canadensis*, June 2009, R. Urriaga 260 (HAL 2564 F).

Notes – This species is new to Venezuela (Braun 1995b, Iturriaga & Minter 2006).

***Passalora crotonis-gossypifolii* U. Braun & Urriaga, sp. nov.** Fig. 4
Mycobank, MB 801953.

Etymology – epithet derived from the host species, *Croton gossypifolius*.

Passalora rubidae similis, sed conidiophoris semper non fasciculatis, hiliis 0.8–1.5 µm diam. et conidiis brevioribus et angustioribus, (8–)12–40(–50) × (2.5–)3–5(–5.5) µm, 0–3-septatis.

Leaf spots lacking, on the lower leaf surface only visible as dingy greyish brown to sooty patches caused by fungal colonies in the tomentum, subcircular to irregular, 2–8 mm diam. or confluent and larger. Mycelium

internal and external; superficial hyphae emerging through stomata, climbing leaf hairs, branched, septate, 1–5 µm wide, subhyaline to medium olivaceous-brown, smooth or almost so. Stromata lacking. Conidiophores solitary, arising from superficial hyphae, lateral or terminal, sometimes loosely aggregated, but true fascicles not formed, erect to decumbent, simple or branched, straight, subcylindrical to strongly geniculate-sinuuous, 5–100 × 3–6 µm, aseptate to pluriseptate, pale to medium olivaceous-brown or brown, thin-walled, smooth or almost so; conidiogenous cells integrated, terminal and intercalary, 8–25 µm long, with a single to mostly several conspicuous conidiogenous loci, slightly thickened and somewhat darkened, 0.8–1.5 µm diam. Conidia catenate, often in branched chains, mostly cylindrical or subcylindrical, short conidia sometimes ellipsoid-ovoid, longer conidia occasionally almost obclavate, (8–)12–40(–50) × (2.5–)3–5(–5.5) µm, 0–3-septate, pale olivaceous to olivaceous-brown, thin-walled, smooth or almost so, ends rounded to short obconically truncate, hila 0.8–1.5 µm wide, slightly thickened and darkened.

Material examined – VENEZUELA, Lara, Villanueva, on leaves of *Croton gossypifolius* Vahl (*Euphorbiaceae*), Nov. 2008, R. Urriaga 146 (HAL 2522 F, **holotype**).

Notes – Numerous *Passalora* species have been described on hosts of the genus *Croton*. The new species on *C. gossypifolius* from Venezuela is characterized by the formation of superficial hyphae with solitary conidiophores, i.e. it pertains to a group of *Passalora* species previously assigned to the genus *Mycovellosiella*, which is now considered a synonym of *Passalora* (Crous & Braun 2003). Three *Mycovellosiella*-like *Passalora* species are known on *Croton* spp., viz. *Passalora crotoniphila* (Speg.) Crous, *P. manaosensis* (Henn.) U. Braun & Crous and *P. rubida* Crous, Alfenas & R.W. Barreto, but all of them have much longer, pluriseptate conidia and except for the latter species also well-developed stromata and fasciculate conidiophores (Chupp 1954, Crous et al. 1999, 2000, Crous & Braun 2003). Superficial mycelium and solitary conidiophores are lacking in all other *Passalora* spp. on *Croton*, i.e. they are characterized by having conidiophores only

formed in fascicles. The conidia in *Passalora crotonifolia* (Cook) Crous, U. Braun & Alfenas are formed singly (Chupp 1954, Crous et al. 1999), whereas the conidia in all other species of this group are formed in chains, i.e. they are *Phaeoramularia*-like: *Passalora crotonis* (Ellis & Everh.) Crous & U. Braun, *P. crotonis-oligandri* (J.M. Yen & Gilles) Crous, U. Braun & Alfenas and *P. maritima* (Tracy & Earle) Crous & U. Braun (Chupp 1954, Yen 1971, Crous et al. 1999, Crous & Braun 2003). The species concerned are keyed out as follows

1. Superficial hyphae with solitary conidiophores developed 2
- 1* Superficial hyphae with solitary conidiophores lacking (conidiophores only formed in fascicles) 5
2. Conidia (8–)12–40(–50) × (2.5–)3–5(–5.5) µm, 0–3-septate; on *Croton gossypifolius*, Venezuela *P. crotonis-gossypifolii*
- 2* Conidia much longer, 20–170 µm, pluriseptate, (0–)1–13 3
3. Stromata and conidiophore fascicles lacking; conidia very long, 25–170 µm, up to 13-septate; on *Croton floribundus* and *C. peruvianus*, Brazil, Peru *P. rubida*
- 3* Stromata and fasciculate conidiophores developed; conidia shorter, up to about 100 µm, with up to 9 septa 4
4. Stromata very large, 30–150 µm diam.; conidiophores 25–200 µm long; conidia 3–8 µm wide; on *Croton* sp., Brazil, Venezuela *P. manaosensis*
- 4* Stromata smaller, up to about 40 µm diam.; conidiophores only 10–30 µm long; conidia narrower, (2.5–)3–4(–5) µm; on *Croton gossypifolius*, *C. glandulosus*, *Croton* sp., Brazil, Paraguay, USA, Venezuela *P. crotoniphila*
5. Conidia formed singly; on *Croton glandulosus*, USA *P. crotonifolia*
- 5* Conidia in chains 6
6. Caespituli epiphyllous; conidiophores short, 15–45 µm; conidia hyaline and small, 14–22 × 2–3 µm; on *Croton oligandrum*, Gabon *P. crotonis-oligandri*
- 6* Caespituli amphigenous, often hypophyllous; conidiophores much longer, up to 130 µm; conidia much larger, up to 120 × 7

- µm; on other species 7
7. Conidiophores loosely fasciculate; conidia smooth, 2–8-septate; on *Croton capitatus*, *C. lobatus*, *C. texensis*, *Croton* sp., Cuba, Ghana, Sudan, Trinidad and Tobago, USA, Venezuela *P. crotonis*
- 7* Conidiophores in dense, often coremioid fascicles; conidia finely verruculose, 1–5-septate; on *Croton glandulosus*, *C. maritimus*, *C. punctatus* and *Croton* sp., Dominican Republic, USA, Venezuela *P. maritima*

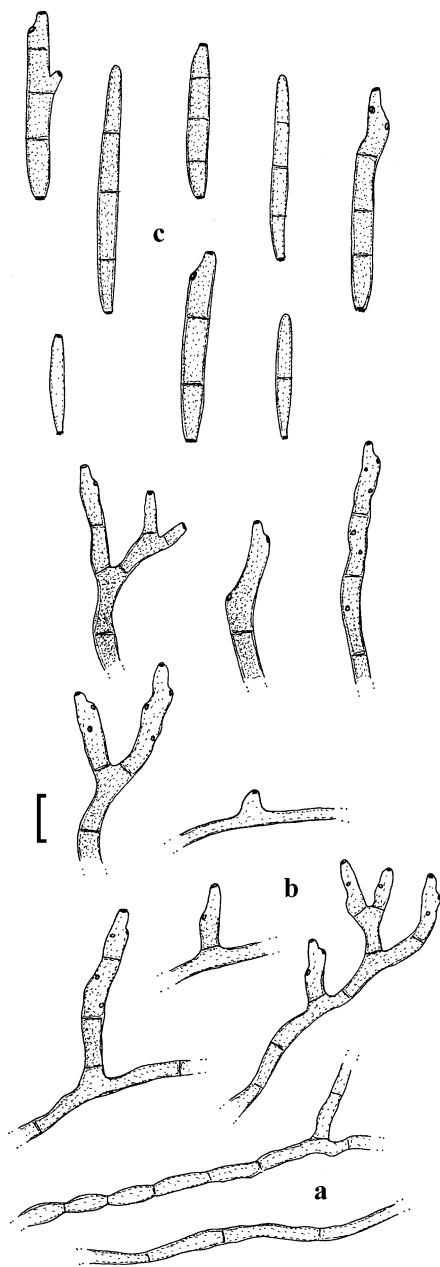


Fig. 4 – *Passalora crotonis-gossypifolii*. Based on type material. **a** Hyphae. **b** Solitary conidiophores arising from superficial hyphae. **c** Conidia. – Bar = 10 µm.

Passalora henningsii (Allesch.) R.F. Castañeda & U. Braun

≡ *Cercospora henningsii* Allesch.

Material examined – VENEZUELA, Lara, Villanueva, on leaves of *Manihot esculenta* Crantz (*Euphorbiaceae*), Nov. 2008, R. Urtiaga 140 (HAL 2520 F).

Notes – This species is listed from Venezuela in Crous & Braun (2003), but not included in Iturriaga & Minter (2006).

Passalora lemniscea (Cif.) U. Braun & Crous

≡ *Cercospora lemniscea* Cif.

= *Cercospora mikaniae* Ellis & Everh., non *Passalora mikaniae* (F. Stevens) U. Braun & F.O. Freire.

≡ *Passalora mikaniigena* U. Braun & Crous, nom. superfl.

Material examined – VENEZUELA, Lara, Sanare, Sabana Redonda Arriba, on leaves of *Mikania cordifolia* (L. f.) Willd. (*Asteraceae*), June 2009, R. Urtiaga 264 (HAL 2562 F).

Notes – New to Venezuela and new host species (Crous & Braun 2003, Iturriaga & Minter 2006).

Passalora solaniphila U. Braun & Urtiaga, **sp. nov.** Fig. 5

Mycobank, MB 801954.

Etymology – epithet derived from the host genus *Solanum* and -philus (-loving, Greek).

Passalorae aratai paulum similis, sed conidiis angustioribus, (2.5–)3–5 µm, et hilis quoque angustioribus, 1–2 µm.

Leaf spots amphigenous, subcircular to angular-irregular, 1–10 mm diam. or confluent and larger, on the upper leaf side conspicuous, at first greenish grey, olivaceous, later yellowish, ochraceous to light brown, margin indefinite or narrow and somewhat darker, hypophyllous spots less conspicuous or almost lacking, yellowish, later olivaceous, brown to greyish white by abundant fructification (fascicles of conidiophores and conidia). Caespituli hypophyllous, punctiform to dense, olivaceous, brown to greyish white by abundant conidial formation. Mycelium internal. Stromata lacking to well-developed, 10–70 µm diam., substomatal or occasionally intraepidermal, pale to medium brown or olivaceous-brown, cells 2–5

μm diam. Conidiophores in small to usually large fascicles, divergent to mostly dense, arising from internal hyphae or stromata, through stomata or occasionally erumpent, erect, straight, subcylindrical, subclavate or somewhat narrowed towards the tip, not to moderately geniculate-sinuous, unbranched, $10\text{--}50 \times (2.5\text{--})3\text{--}5(6) \mu\text{m}$, $0\text{--}2(3)$ -septate, subhyaline, pale olivaceous to olivaceous-brown, medium olivaceous-brown in mass, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, $5\text{--}30 \mu\text{m}$ long, with a single to mostly several conspicuous conidiogenous loci, $1\text{--}2 \mu\text{m}$ diam., slightly thickened and somewhat darkened. Conidia solitary, cylindrical or obclavate-cylindrical, $(10\text{--})15\text{--}60 \times (2.5\text{--})3\text{--}5 \mu\text{m}$, $(0\text{--})1\text{--}4(5)$ -septate, subhyaline to pale olivaceous, thin-walled, smooth to faintly rough-walled, apex obtuse, base rounded to short obconically truncate, hila $1\text{--}2 \mu\text{m}$ broad, slightly thickened and somewhat darkened.

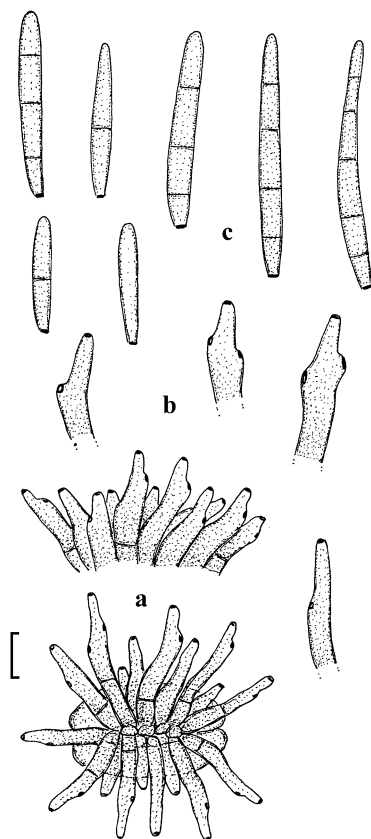


Fig. 5 – *Passalora solaniphila*. Based on type material. **a** Conidiophore fascicle. **b** Conidiophores. **c** Conidia. – Bar = $10 \mu\text{m}$.

Material examined – VENEZUELA, Lara, Barquisimeto, on leaves of *Solanum nigrum* L. (*Solanaceae*), Mar. 2008, R. Urriaga 112 (HAL 2532 F, **holotype**).

Notes – Due to conspicuous conidiogenous loci and pigmented cylindrical to obclavate-cylindrical conidia, this fungus on *Solanum nigrum* from Venezuela belongs in the genus *Passalora*. It is morphologically superficially similar to *Cercospora solanacea* Sacc. & Berl., but the latter species belongs in *Pseudocercospora* (see under *P. solanacea* in this paper). Two other comparable *Passalora* species with fasciculate conidiophores and conidia formed singly are known on *Solanum* spp., but the species concerned have quite distinct conidia which are above all much broader [*Passalora aratai* (Speg.) U. Braun, R. Delhey & M. Kiehr – conidia $6\text{--}14 \mu\text{m}$ wide, hila $1.5\text{--}3 \mu\text{m}$ diam. (Chupp 1954, Braun et al. 2001); *P. solani* (Seaver) U. Braun – conidia $12\text{--}32 \times 6\text{--}12 \mu\text{m}$, $0\text{--}1$ -septate (Braun 1992)]. *P. bruchiana* (Speg.) U. Braun & Crous is *Phaeoramularia*-like, i.e. the conidia are formed in chains (Chupp 1954, Crous & Braun 2003). There are numerous additional species of *Passalora* on *Solanum* spp., but all of them are quite distinct from *P. solaniphila* in forming superficial mycelium with solitary conidiophores, i.e. they are *Mycovellosiella*-like: *Passalora brachycarpa* (Syd.) U. Braun & Crous, *P. concors* (Casp.) U. Braun & Crous, *P. dulcamarae* (Peck) U. Braun & Crous, *P. incarnata* (Deighton) U. Braun & Crous, *P. natrassii* (Deighton) U. Braun & Crous, *P. paradoxa* (Munt.-Cvetk.) U. Braun & Crous, *P. solanacearum* (K. Bhalla, S.K. Singh & A.K. Srivast.) U. Braun & Crous, *P. solani-torvi* (Gonz. Frag. & Cif.) U. Braun & Crous, *P. tarrii* (Deighton) U. Braun & Crous (Chupp 1954, Deighton 1974, Crous & Braun 2003).

Passalora stigmaphyllicola U. Braun & Urriaga, **sp. nov.**

Fig. 6

Mycobank, MB 801956.

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

Passalorae peixotoae paulum similis, sed maculis foliorum et stromatibus cum conidiophoris fasciculatis formantibus et conidiis $20\text{--}55 \times 3\text{--}5.5 \mu\text{m}$, $1\text{--}5$ -septatis.

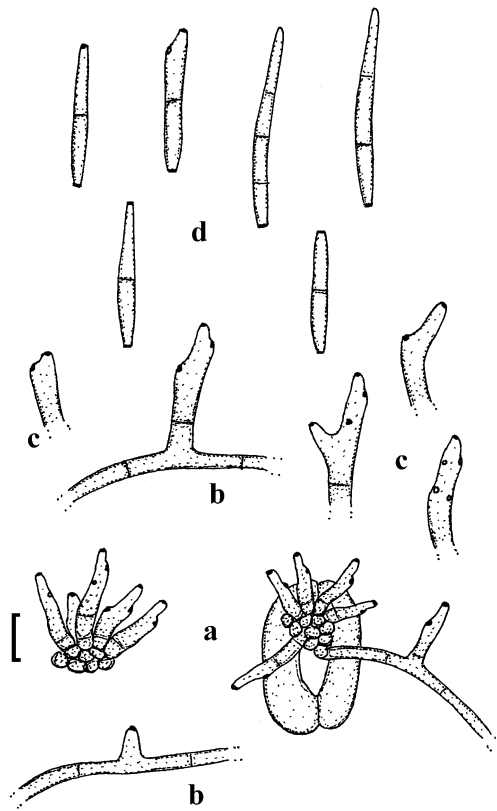


Fig. 6 – *Passalora stigmaphyllicola*. Based on type material. **a** Conidiophore fascicles. **b** Conidiophores arising from superficial hyphae. **c** Conidiophores. **d** Conidia. – Bar = 10 μ m.

Leaf spots amphigenous, subcircular to usually angular-irregular, 2–8 mm diam. or occasionally confluent and larger, pale to dark brown, later greyish brown to dingy grey, margin indefinite or narrow and darker, usually with a narrow to moderately broad diffuse purplish halo. Caespituli hypophyllous, inconspicuous. Mycelium internal and external, superficial, emerging through stomata; hyphae sparingly branched, 1–2.5 μ m wide, subhyaline to pale olivaceous, septate, smooth thin-walled. Stromata lacking or small to moderately large, 10–50 μ m, substomatal to intraepidermal, circular to somewhat angular-irregular in outline, brown, cells 2–8 μ m diam. Conidiophores in small to moderately large fascicles, loose to moderately dense, arising from internal hyphae or stomata, emerging through stomata or erumpent, or solitary, arising from superficial hyphae, lateral, erect, straight, subcylindrical-conical to slightly geniculate, unbranched or branched, 5–60 \times 2–6 μ m, 0–3-septate, pale olivaceous to olivaceous-brown, thin-walled,

smooth; conidiogenous cells integrated, terminal or conidiophores occasionally reduced to conidiogenous cells, 5–25 μ m long, conidiogenous loci conspicuous, 0.8–2 μ m diam., somewhat thickened and darkened. Conidia solitary to catenate, in simple or occasionally branched chains, cylindrical, ellipsoid-fusiform, short obclavate, 15–25 \times 2–3 μ m, 1–3-septate, subhyaline to very pale olivaceous, thin-walled, smooth, apex obtuse, subacute to subtruncate in catenate conidia, base short obconically truncate, hila 0.8–1.2 μ m diam., slightly thickened and darkened.

Material examined – CUBA, Bayamo, on leaves of *Stigmaphyllon sagraeanum* A. Juss. (*Malpighiaceae*), 26 Mar. 1966, R. Urtiaga (IMI 118051 = K(M) 176146, **holotype**); l.c., 20 Oct. 1966, R. Urtiaga (IMI 122811 = K(M) 176147, **paratype**).

Notes – *Passalora stigmaphyllicola* is a *Mycovellosiella*-like species, with solitary conidiophores arising from superficial mycelium. *P. stigmaphylli* (R.E.D. Baker & W.T. Dale) U. Braun & Crous on *Stigmaphyllon* species in Cuba and Trinidad is quite distinct from *P. stigmaphyllicola* by its very large stromata, fasciculate conidiophores, up to 100 μ m long (superficial hyphae and solitary conidiophores lacking) and conidia formed singly, 30–75 \times 3.5–6 μ m, 1–5-septate (Chupp 1954, Crous & Braun 2003). Several other *Passalora* species on hosts of other genera of the *Malpighiaceae* have been described. *P. peixotoae* (Chupp & Viégas) U. Braun & Crous on *Peixotoa reticulata* Griseb. (= *G. macrophylla* Griseb.) in Brazil is the only comparable species. However, leaf spots, stromata and fasciculate conidiophores are lacking in the latter species and the 1–5-septate conidia are 20–55 \times 3–5.5 μ m (Chupp 1954). Superficial hyphae with solitary conidiophores are lacking in all other species. In *Passalora bunchosiae* U. Braun & Crous (= *Cercospora bunchosiae* Chupp & A.S. Mull., nom. inval.) on *Bunchosia glandulifera* in Venezuela, *P. cornifoliae* (Chupp) U. Braun & Crous on *Bunchosia nitida* (Jacq.) A. Rich. (= *B. cornifolia* Kunth) in Colombia, *P. kreiseliana* U. Braun & Crous on *Malpighia glabra* L. in Jamaica and *P. malpighiae-glabrae* U. Braun & Crous on *M. glabra* in Florida, USA, the conidia are formed singly (Chupp 1954, Braun

et al. 2002, Crous & Braun 2003). *P. malphigiae* (U. Braun & Mouch.) U. Braun & Crous on *Malpighia glabra* (= *M. punicifolia* L.) in French Polynesia is characterized by catenate conidia which are shorter, $6\text{--}18 \times 1.5\text{--}3 \mu\text{m}$, hyaline or subhyaline and verruculose (Braun et al. 1999).

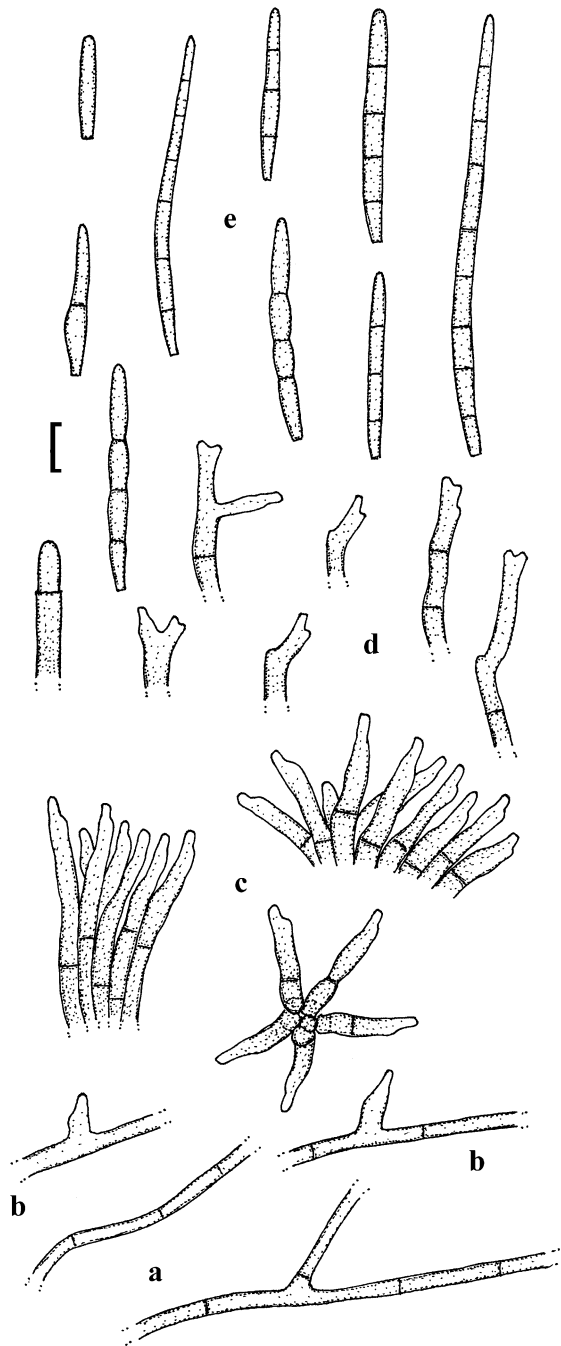


Fig. 7 – *Pseudocercospora calycophylli*. Based on type material. **a** Superficial hyphae. **b** Solitary conidiophores arising from superficial hyphae. **c** – Conidiophore fascicles. **d** Conidiophores. **e** Conidia. – Bar = 10 μm .

Pseudocercospora borrieriae (Ellis & Everh.) Deighton

≡ *Cercospora borrieriae* Ellis & Everh.

Material examined – VENEZUELA, Lara, Rio Claro, La Cuchilla, on leaves of *Spermacoce* sp. (*Borreria* sp.) (*Rubiaceae*), Apr. 2009 R. Urtiaga 226 (HAL 2538 F).

Notes – This species was not listed from Venezuela in Crous & Braun (2003), but recorded from this country by Dennis (1970) on *Spermacoce latifolia* Aubl. The present collection is characterized by having small to very large, loose to dense fascicles of long conidiophores, up to 200 μm and cylindrical to obclavate-cylindrical conidia, $30\text{--}100 \times 3.5\text{--}5(5.5) \mu\text{m}$, 3–10-septate.

Pseudocercospora calycophylli U. Braun & Urtiaga, **sp. nov.**

Fig. 7

Mycobank, MB 801957.

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

Pseudocercosporae cinchonicolae similis, sed hyphis superficialibus cum conidiophoris solitariis formantibus et hilis conidiorum angustioribus, 1–2 μm diam.

Leaf spots amphigenous, subcircular to usually angular-irregular, 2–12 mm diam. or confluent and larger, medium to dark brown on the upper leaf side, later brown below, margin indefinite or surrounded by somewhat darker veins. Caespitili amphigenous, finely punctiform on the upper side, less conspicuous below, scattered, dark brown to blackish. Mycelium internal and external, superficial hyphae only on the lower leaf surface, emerging through stomata, sparingly branched, 1.5–3 μm wide, septate, subhyaline to pale olivaceous, thin-walled, smooth; stomata lacking to well-developed, above all on the upper leaf side, immersed or substomatal, 10–40 μm diam., medium to dark brown, composed of swollen hyphal cells, 2–6 μm diam. Conidiophores in small to moderately large fascicles, loose to dense, arising from internal hyphae or usually from stomata, erumpent or emerging through stomata, occasionally with some solitary conidiophores arising from superficial hyphae, lateral, erect, straight, subcylindrical to distinctly geniculate-sinuous, mostly unbranched, only occasionally irregularly branched, $5\text{--}60 \times 2\text{--}5 \mu\text{m}$, 0–3-

septate, sometimes constricted at the septa, pale olivaceous to medium olivaceous-brown, thin-walled, smooth to faintly rough-walled; conidiophores reduced to conidiogenous cells or conidiogenous cells integrated, terminal, 5–30 µm long, proliferation sympodial, occasionally percurrent, conidiogenous loci inconspicuous or subdenticulate, but wall of the loci always unthickened and not darkened. Conidia formed singly, narrowly obclavate to subcylindrical, (10–)20–95(–120) × 2.5–4 µm, (0–)1–8(–10)-septate, subhyaline to pale olivaceous, thin-walled, smooth to faintly rough-walled, apex obtuse to subacute, base usually short obconically truncate, occasionally truncate, 1–2 µm wide, hila unthickened, not darkened.

Material examined – CUBA, Bayamo, on leaves of *Calycophyllum candidissimum* (Vahl) DC. (*Rubiaceae*, *Cinchonoideae*, *Calycophylleae*), 12 Apr. 1967, R. Urtiaga (IMI 126874a = K(M) 176139, **holotype**); CUBA, without locality, on *C. candidissimum*, 10 Jan. 1972, L.H. Isla 8 (IMI 163712 = K(M) 176140).

Notes – *P. calycophylli* is the first species of *Pseudocercospora* on a host of the genus *Calycophyllum*. Comparable species on allied genera of the *Calycophylleae* (*Rubiaceae*, *Cinchonoideae*) are unknown. Several *Pseudocercospora* species have been described on more distantly related hosts belonging to other tribes of the *Cinchonoideae*, including the morphological similar species *P. cinchonicola* (Boedijn) U. Braun on *Cinchona* sp. in Indonesia (Braun 2001), which differs from *P. calycophylli* in having consistently fasciculate conidiophores (superficial hyphae with solitary conidiophores lacking) and conidia with wider hila, (1.5–)2–2.5(–3) µm, and *P. hymenodictyi* (Petr.) Y.L. Guo & X.J. Liu on *Hymenodictyon orixense* (Roxb.) Mabb. (= *H. excelsum* (Roxb.) DC.) in Asia, characterized by its much wider conidia, 30–70 × 4–6.5 µm (Braun 1995a, Guo & Hsieh 1995). Other species are quite distinct [*P. cinchonae* (Ellis & Everh.) U. Braun & Crous on *Cinchona* spp. in Africa and North America, superficial hyphae lacking, conidiophores very short, conidia narrowly obclavate-cylindrical to linear, 25–80 × 2–3 µm (Chupp 1954, Crous & Braun 2003); *P. mussaendae* Katsuki on *Mussaenda parviflora*

Miq. in Japan, stromata lacking, conidiophores arising from decumbent threads, conidia 6–7 µm wide (Katsuki 1956, 1965); *P. philippinensis* (Tak. Kobay. & E.D. Guzman) U. Braun & Crous on *Mussaenda philippica* A. Rich., Philippines, superficial hyphae lacking, conidia wider, 4.5–5.5 µm (Kobayashi & Guzman 1988, Crous & Braun 2003)].

Pseudocercospora catappae (Henn.) X.J. Liu & Y.L. Guo

≡ *Cercospora catappae* Henn.

Material examined – VENEZUELA, Lara, Barquisimeto, zoological garden, on leaves of *Terminalia catappa* L. (*Combretaceae*), Jan. 2010, R. Urtiaga 314 (HAL 2558 F).

Notes – New to Venezuela (not listed in Urtiaga 1986, Crous & Braun 2003 and Iturriaga & Minter 2006).

Pseudocercospora cordiae-alliodorae U. Braun & Urtiaga

Material examined – VENEZUELA, Lara, Barquisimeto, zoological garden, on leaves of *Cordia toqueve* Aubl. (*Boraginaceae*), Apr. 2008, R. Urtiaga 126 (HAL 2513 F); l.c., on leaves of *Cordia alliodora* (Ruiz & Pav.) Oken, Mar. 2008, R. Urtiaga 118 (HAL 2523 F) and Apr. 2008, R. Urtiaga 127 (HAL 2514 F).

Notes – This species was described by Braun & Urtiaga (2012) based on material on *Cordia alliodora* collected in the zoological garden of Barquisimeto, Venezuela. The specimen on *Cordia toqueve*, collected in the zoological garden of Barquisimeto as well, is sparingly developed, but some superficial hyphae with solitary conidiophores, found in this material, and small conidia, 15–25 × 2.5–3 µm, 1–3(–4)-septate, agree well with type material of *P. cordiae-alliodorae*. *Cordia toqueve* is a new host for this species (Braun & Urtiaga 2012).

Pseudocercospora cordiana U. Braun & Urtiaga

Material examined – VENEZUELA, Lara, Parque Macuto, on leaves of *Cordia alba* (Jacq.) Roem. & Schult. [= *C. dentata* Poir.] (*Boraginaceae*), Mar. 2008, R. Urtiaga 114 (HAL 2533 F).

Notes – This species, recently described from Cuba (Braun & Urtiaga 2012), is new to Venezuela.

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

Mycobank, MB 801958.

Etymology – epithet referring to the coremium-like fascicles of conidiophores.

Pseudocercosporae richarsoniicolae valde similis, sed stromatibus nullis vel minoribus, 10–40 µm diam., fasciculis procerioribus et conidiophoris solitariis ex hyphis superficialibus oriundis bene evolutis.

Leaf spots amphigenous, about 5–10 mm diam., subcircular to somewhat irregular, yellowish, ochraceous to brown, margin indefinite. Caespituli hypophyllous, conspicuous, scattered, dark olivaceous-brown to almost blackish, visible as minute brush-like tufts or coremioid aggregations of conidiophores when viewed with a stereomicroscope. Mycelium internal and external; superficial hyphae emerging through stomata, sparingly branched, 1.5–5 µm wide, septate, subhyaline to pale olivaceous-brown, thin-walled, smooth or almost so; stomata lacking to moderately large, substomatal, 10–40 µm diam., medium to dark brown. Conidiophores in small to large fascicles, loose to very dense, coremium-like, densely appressed almost through or only in the lower half and splaying out in the upper half, sometimes solitary, arising from superficial hyphae, erect, straight, subcylindrical, filiform, barely geniculate-sinuous or only slightly to moderately so near the apex, 40–300 × 2.5–6 µm, pluriseptate, individual threads pale to medium olivaceous or olivaceous-brown, much darker in mass, thin-walled, smooth to faintly rough; conidiogenous cells integrated, terminal, occasionally intercalary, 10–30 µm long, conidiogenous loci inconspicuous, unthickened and not darkened, occasionally subdenticulate. Conidia solitary, obclavate-cylindrical, 25–100 × 4–6.5 µm, 3–12-septate, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth or almost so, apex obtuse, base obconically truncate, (1.5–)2–2.5(–3) µm wide, hila neither thickened nor darkened.

Material examined – VENEZUELA, Lara, Villanueva, on leaves of *Diodia* sp.

(*Rubiaceae, Rubioideae, Spermaceae*), Nov. 2008, R. Urtiaga 141 (HAL 2517 F, **holotype**).

Notes – The identification of the host plant caused some difficulties. In any case, it belongs to a genus and species of tribe *Spermaceae* as currently circumscribed (Groeninckx et al. 2009). *Richardia* (incl. *Richardsonia*) can be ruled out as the calyx of the flowers is 4-lobed. The host looks like a species of *Diodia* or *Spermaceae*, but since the capsules seem to be indehiscent, as far as discernable, it is rather a species of *Diodia*. Several morphologically similar *Pseudocercospora* spp. are known on related hosts of the *Spermaceae*. *P. richardsonicola* Crous & A.P.S. Câmara [≡ *Cercospora richardsoniae* Henn., non *Pseudocercospora richardsoniae* Crous & A.P.S. Câmara (as “(Ellis & Everh.) Crous & A.P.S. Câmara”)] on *Richardia* spp. in Brazil is morphologically very close, but the stromata are very large, up to 100 µm, pustulate, the conidiophore fascicles are also very large, up to 100 µm wide, and solitary conidiophores arising from superficial hyphae are not formed (Chupp 1954, Crous & Câmara 1998). *P. borrieriae* (Ellis & Everh.) Deighton, widespread on numerous host species of *Mitracarpus* and *Spermaceae*, is also comparable, but superficial mycelium with solitary conidiophores and coremium-like fascicles are lacking in this species and the conidia are much narrower, 2–4.5 µm (Chupp 1954, Vasudeva 1963). Several collections of *P. borrieriae* on *Mitracarpus* sp. and *Spermaceae* spp. from Brazil and Cuba, now deposited at HAL, have been examined. *P. hedyotis* (S. Singh) B. Sutton on *Hedyotis* spp. in India and Nepal is the third similar species, which is also distinguished by lacking solitary conidiophores and verruculose conidiophores and conidia (Singh 1980, Sutton 1994).

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

≡ *Cercospora costi* F. Stevens.

Material examined – VENEZUELA, Miranda, Guatope Pk., on leaves of *Costus* sp. (*Costaceae*), Feb. 1971, R. Urtiaga 1407 (IMI 156498); Lara, Villanueva, on leaves of *Costus* sp., Nov. 2008, R. Urtiaga 135 (HAL 2518 F).

Notes – Listed from Venezuela in Crous & Braun (2003) and recorded by Braun

& Urtiaga (2012), but lacking in Iturriaga & Minter (2006). The collection from 2008 is very rich (superficial hyphae with solitary conidiophores developed, conidiophores $5\text{--}30 \times 2\text{--}5 \mu\text{m}$, conidia $25\text{--}110 \times 2\text{--}4 \mu\text{m}$). Superficial hyphae with solitary conidiophores have also been observed in type material of this species that has been re-examined (on *Costus* sp., Panama, Gatun, 24 Aug. 1923, F.L. Stevens 1343, ILL 15148). *P. costina* (Syd. & P. Syd.) Deighton differs in having very broad, strongly curved conidia (Deighton 1976).

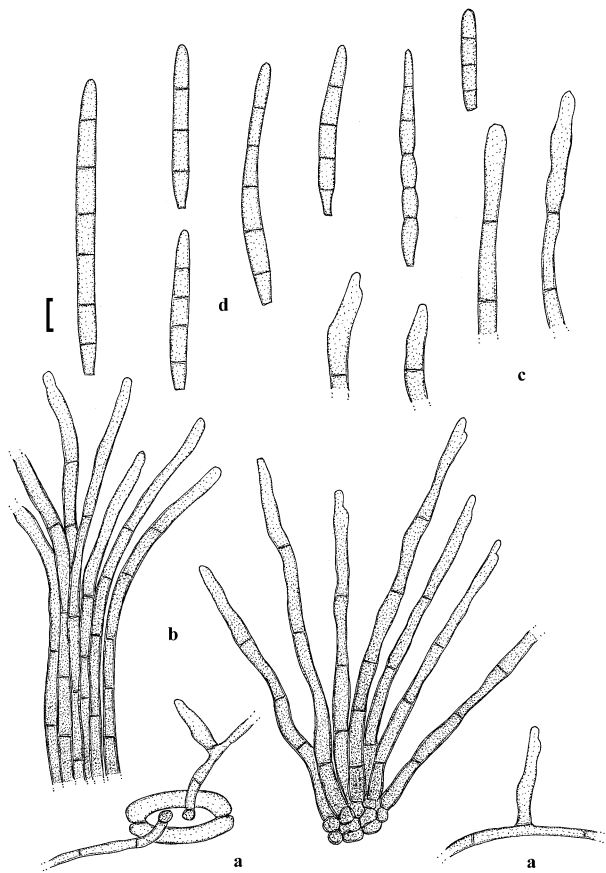


Fig. 8 – *Pseudocercospora coremioides*. Based on type material. **a** Superficial hyphae with solitary conidiophores. **b** Conidiophore fascicles. **c** Conidiophore tips. **d** Conidia. – Bar = 10 μm .

Pseudocercospora eupatorii-formosani U. Braun & Bagyan.

= *Cercospora eupatorii-formosani* Sawada, nom. inval.

Material examined – VENEZUELA, Lara, Barquisimeto, zoological garden, on leaves of *Chromolaena odorata* (L.) R.M. King & H.

Rob. (*Asteraceae*), Dec. 2009, R. Urtiaga 320 (HAL 2561 F).

Notes – New to Venezuela (Crous & Braun 2003, Iturriaga & Minter 2006). Superficial hyphae with solitary conidiophores may be present or lacking in this species (Bagyanarayana & Braun 1999). In the new collection from Venezuela, superficial mycelium has not been observed. The North American *Pseudocercospora eupatorii* (Peck) U. Braun & R.F. Castañeda is very similar and confusable, but differs in having much broader, robust conidiophores, $5\text{--}30 \times 3\text{--}8 \mu\text{m}$, and longer conidia, up to 190 μm , with up to 14 septa (detailed descriptions, illustrations and discussion in Bagyanarayana & Braun 1999).

Pseudocercospora euphorbiacearum U. Braun
= *Cercospora mucunicola* sensu Chupp (1954: 226–227).

= *Pseudocercospora mucunicola* (Gonz. Frag. & Cif.) Deighton, sensu Deighton (1976: 148).

Material examined – VENEZUELA, Lara, Rio Claro, La Cuchilla, on leaves of *Dalechampia scandens* L. (*Euphorbiaceae*), Apr. 2009, R. Urtiaga 246 (HAL 2551 F), mixed infection with *Cercospora mucunicola*.

Notes – The type host of *Cercospora mucunicola* was originally determined as “*Mucuna pruriens*”, but later corrected to *Dalechampia scandens* (Chupp 1954). Braun (2003) re-examined type material deposited at MA and found a mixed infection of a true *Cercospora* s. str. and a *Pseudocercospora*, confined the name *C. mucunicola* to the *Cercospora* element by lectotypification and introduced the new species *Pseudocercospora euphorbiacearum* for the *Pseudocercospora* involved. *C. mucunicola* is known from Venezuela (Dennis 1970, Urtiaga 1986, Iturriaga & Minter 2006). However, it is unclear if these records refer to the *Cercospora* or *Pseudocercospora* on *Dalechampia* or both species. The present record is, in any case, the first unequivocal record of *P. euphorbiacearum* from Venezuela.

Pseudocercospora genipicola U. Braun & Freire

Material examined – CUBA, Bayamo, on leaves of *Genipa americana* L. (*Rubiaceae*),

18 Mar. 1968, R. Uruga 1215 (IMI 132561 = K(M) 176138). VENEZUELA, Lara, Barquisimeto, zoological garden, on leaves of *G. americana*, Jan. 2008, R. Uruga 103 (HAL 2530 F).

Notes – *Pseudocercospora genipicola* was described from Brazil on *Genipa americana* (Braun & Freire 2002). Caespituli in the type material are mainly epiphyllous. Hypophyllous colonies, which are often deviating from epiphyllous ones in *Pseudocercospora* species, are almost lacking in the type collection from Brazil. The sample from Cuba is characterized by its well-developed fungal colonies on both sides of host leaves. Epiphyllous caespituli agree well with type material, but hypophyllous colonies are distinct. The material from Venezuela agrees well with type material from Brazil. An emended description of *P. genipicola* based on type material as well as sample from Cuba and Venezuela is necessary:

Leaf spots amphigenous, subcircular to angular-irregular, 2–10 mm diam., yellowish, ochraceous, brownish, later whitish, above all on the upper side of leaves, margin indefinite or narrow and darker. Caespituli amphigenous, distinctly punctiform on the upper leaf surface, dark brown to blackish, more delicate and less conspicuous below. Mycelium internal, occasionally with a few superficial hyphae on the lower leaf surface, sparingly branched, 1–3 μm wide, septate, thin-walled, smooth, pale olivaceous. Stromata well-developed, 10–100 μm diam., immersed and larger on the upper side, substomatal to intraepidermal and smaller below, olivaceous-brown, composed of swollen hyphal cells, 2–6 μm diam. Conidiophores in small to very large, sporodochial fascicles, loose to usually dense, arising from stromata, erumpent or (on the lower side) emerging through stomata, occasionally solitary, arising from superficial hyphae, erect, straight, subcylindrical to somewhat geniculate-sinuous, unbranched, 5–40 \times 2–5 μm , 0–2-septate, pale olivaceous to olivaceous-brown, thin-walled, smooth; conidiogenous cells integrated, either terminal or conidiophores reduced to conidiogenous cells, 5–25 μm long, conidiogenous loci inconspicuous, neither thickened nor darkened. Conidia solitary, obclavate-cylindrical, fusiform, small conidia sometimes ellipsoid-ovoid,

10–65 \times 2.5–4.5 μm , (0–)1–6-septate, subhyaline to pale olivaceous-brown, thin-walled, smooth, apex obtuse to subacute, base truncate to usually short obconically truncate, 1–2 μm wide, hila unthickened, not darkened.

Pseudocercospora jatropharum (Speg.) U. Braun

≡ *Cercospora jatropharum* Speg.

Material examined – CUBA, Bayamo, on leaves of *Jatropha* sp. [as “*integrifolia*”] (*Euphorbiaceae*), 1 Dec. 1966, R. Uruga (IMI 139309 = K(M) 176157); l.c., 23 Jul. 1966, R. Uruga (IMI 120950).

Notes – Braun (2000) examined the poor, almost exhausted type material of this species (on *Jatropha macrocarpa* Griseb., LPS 943), confirmed that it belongs to *Pseudocercospora*, but nothing could be added to Chupp’s (1954) description of this species. The present re-description is based on K(M) 176157: Leaf spots amphigenous, subcircular to angular-irregular, 1–5 mm diam., brown or with dingy grey center and brown border, sometimes vein-limed. Caespituli amphigenous, mainly hypophyllous, punctiform, scattered to dense, dark brown. Mycelium internal; stromata 10–60 μm diam., substomatal to erumpent, brown, cells 3–8 μm diam., thick-walled Conidiophores in small to moderately large fascicles, loose to usually dense, arising from stromata, emerging through stomata, erect, straight, subcylindrical to only slightly geniculate-sinuous, usually not branched, 10–150 \times 4–10 μm , continuous to pluriseptate, olivaceous, olivaceous-brown or pale brown, wall thin to slightly thickened, smooth; conidiogenous cells integrated, usually terminal, 10–30 μm long, conidiogenous loci (scars) inconspicuous. Conidia solitary, obclavate-subcylindrical, 30–100 \times 4.5–9 μm , 1–6-septate, usually pale olivaceous or brownish, thin-walled, smooth, apex obtuse, base obconically truncate, hila 1.5–2.5 μm wide, unthickened, not darkened.

Pseudocercospora jussiaeae (G.F. Atk.) Deighton

Material examined – VENEZUELA, Lara, Rio Claro, La Cuchilla, on leaves of *Ludwigia erecta* (L.) H. Hara [≡ *Jussiaea erecta* L.] (*Onagraceae*), Apr. 2009, R. Uruga 210 (HAL 2552 F).

Notes – This species is known from Venezuela (Chupp 1954, Crous & Braun 2003, Iturriaga & Minter 2006).

Pseudocercospora lippiae-albae U. Braun & R.F. Castañeda

Material examined – CUBA, without locality, on leaves of *Lippia alba* (Mill.) N.E. Br. ex Britton & P. Wilson (*Lamiaceae*), 1966, R. Urutiaga H 288/66 (IMI 120604 = K(M) 176124); Bayamo (Plant Pathology Laboratory), 15 Dec. 1965, R. Urutiaga (IMI 116895 = K(M) 176123); Bayamo, 8 May 1967, R. Urutiaga (IMI 127443 = K(M) 176122). VENEZUELA, Lara, Barquisimeto, on leaves of *Lippia nodiflora* L. (\equiv *Phyla nodiflora* (L.) Greene), Nov. 2006, R. Urutiaga (HAL 2170 F).

Notes – *Pseudocercospora lippiae-albae* was described by Castañeda & Braun (1989) from Cuba on *Lippia alba*. These collections are additional records of this species from Cuba and a first from Venezuela on a new host species. *P. lippiae-albae* is also known on *Lippia alba* (incl. *L. geminata* Kunth) from Brazil (Braun & Freire 2002) and Uruguay (material examined – Monte Video, Atahualpa, as *L. geminata*, Sep. 1930, Herter, Pl. Uruguayensis Exs. 1483, HBG, NY). The conidia in the present Cuban collection are somewhat longer than in all other specimens that have been examined (up to 110 μ m long, with up to 11 septa).

Pseudocercospora lonchocarpicola U. Braun & Urutiaga, **sp. nov.** Fig. 9
Mycobank, MB 801959.

P. lonchocarpi similis, sed conidiophoris longioribus et latioribus, ad $200 \times 10 \mu$ m, cellulis conidiogenis sympodialiter proliferantibus et conidiis brevioribus et latioribus, ad $80 \times 10 \mu$ m.

Leaf spots lacking or only with diffuse yellowish to brownish discolorations. Caespituli hypophyllous, formed on diffuse discolorations of the leaves, punctiform to effuse, loose to dense, brown. Mycelium internal and external, superficial; hyphae emerging through stomata, sparingly branched, usually straight, 2–5 μ m wide, septate, thin-walled, smooth, subhyaline to olivaceous-brown. Stromata lacking or only with aggregations of a few swollen hyphal cells, small, substomatal to

intraepidermal, brown, about 10–20 μ m diam., cells 4–10 μ m diam., brown.

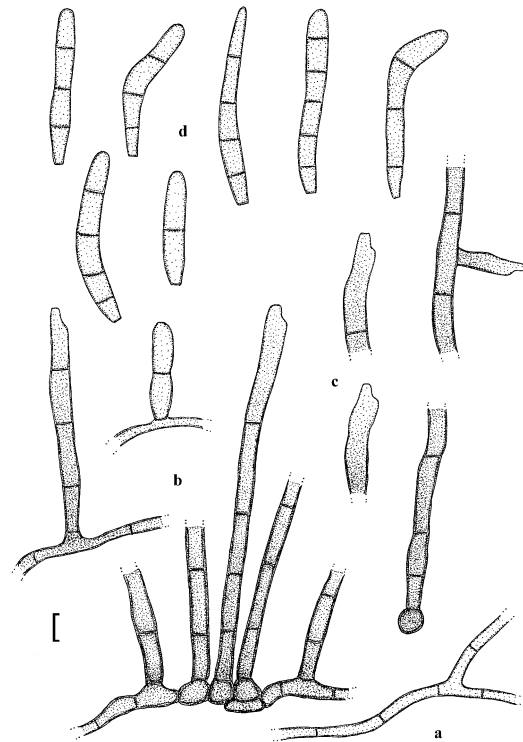


Fig. 9 – *Pseudocercospora lonchocarpicola*. Based on type material. **a** Superficial hypha. **b** Conidiophores arising from superficial hyphae and swollen hyphal cells. **c** Conidiophore tips. **d** Conidia. – Bar = 10 μ m.

Conidiophores solitary, arising from superficial hyphae, or in usually small and divergent, occasionally large and denser fascicles, arising from internal hyphae or aggregations of swollen hyphal cells, emerging through stomata or erumpent, erect, usually rather straight to slightly geniculate-sinuous, subcylindrical to subclavate, i.e. somewhat increasing in width towards the apex, unbranched or branched, above all near the apex, 30–200 \times 5–10 μ m, pluriseptate, pale to medium dark brown or paler towards the tip, wall smooth, up to 1.5 μ m wide, above all below; conidiogenous cells integrated, terminal, occasionally pleurogenous, 10–55 μ m long, conidiogenous loci neither thickened nor darkened. Conidia solitary, obclavate-cylindrical, subclavate to broadly fusoid, straight to distinctly curved, (30–)40–70(–80) \times (5–)6–9(–10) μ m, 1–5-, mostly 3-septate, subhyaline, pale olivaceous to brownish, thin-walled, smooth or almost so,

apex broadly rounded, base short obconically truncate, 2–3 μm wide, hila unthickened, not darkened.

Material examined – CUBA, Bayamo, on leaves of *Lonchocarpus domingensis* (Turpin ex Pers.) DC. (*Fabaceae*, *Millettieae*), 8 May 1967, R. Urtiaga 17 (IMI 127478 = K(M) 176151, **holotype**).

Notes – The genus *Lonchocarpus* belongs to the *Fabaceae* tribe *Millettieae* (Silva et al. 2012). *Pseudocercospora lonchocarpi* (J.A. Stev.) Crous & M.P.S. Câmara, known from Brazil, Guyana and Peru on various *Lonchocarpus* spp. (Crous & Braun 2003), is easily distinguishable from *P. lonchocarpicola* by its much shorter and narrower conidiophores, percurrently proliferating conidiogenous cells and much longer and narrower finely verruculose conidia, (30–)50–100(–120) \times 3–3.5(–4.5) μm with (1–)3–7(–13) septa (Chupp 1954, Crous & Câmara 1998). *Passalora amazonica* U. Braun (Braun 2003) is another cercosporoid hyphomycete described from Brazil on *Lonchocarpus* sp. The conidiogenous loci of this species are, however, thickened and darkened and the conidia are formed in chains. A few additional species of *Pseudocercospora* have been described on hosts of allied genera of the *Millettieae*, but all of them are morphologically quite distinct. *P. hardwarensis* (Naras.) U. Braun & Crous on *Tephrosia purpurea* (L.) Pers. in India and Myanmar (Crous & Braun 2003) is well characterized by having internal mycelium, consistently fasciculate conidiophores and narrower conidia, 20–80 \times 3–6 μm (Vasudeva 1963; several Indian collections examined, IMI 155984, 180785, 264177 and 91412), *P. ichthyomethiae* (Dearn. & Barthol.) U. Braun & Crous on *Piscidia piscipula* (L.) Sarg. in Cuba and Florida (Crous & Braun 2003) has uniformly fasciculate, often verruculose conidiophores with subdentate conidiogenous loci and much smaller conidia, 20–55 \times 2–3.5 μm (Chupp 1954; type material, DAOM, Dearness 5042, examined). *P. millettiae* Goh & W.H. Hsieh (Hsieh & Goh 1990), only known from Taiwan on *Callerya reticulata* (Benth.) Schot (\equiv *Millettia reticulata* Benth), possesses consistently fasciculate conidiophores, percurrently proliferating conidiogenous cells and much narrower, cylindrical conidia, 28–90 \times 3–

4.5 μm . *P. vataireae* (Henn.) U. Braun & F.O. Freire (Braun & Freire 2002) on *Derris* spp. in Brazil is characterized by having large stromata, 10–150 μm diam., conidiophores with monoblastic, determinate to mostly percurrently, rarely sympodially proliferating conidiogenous cells and narrower conidia, 30–90 \times 3–6 μm .

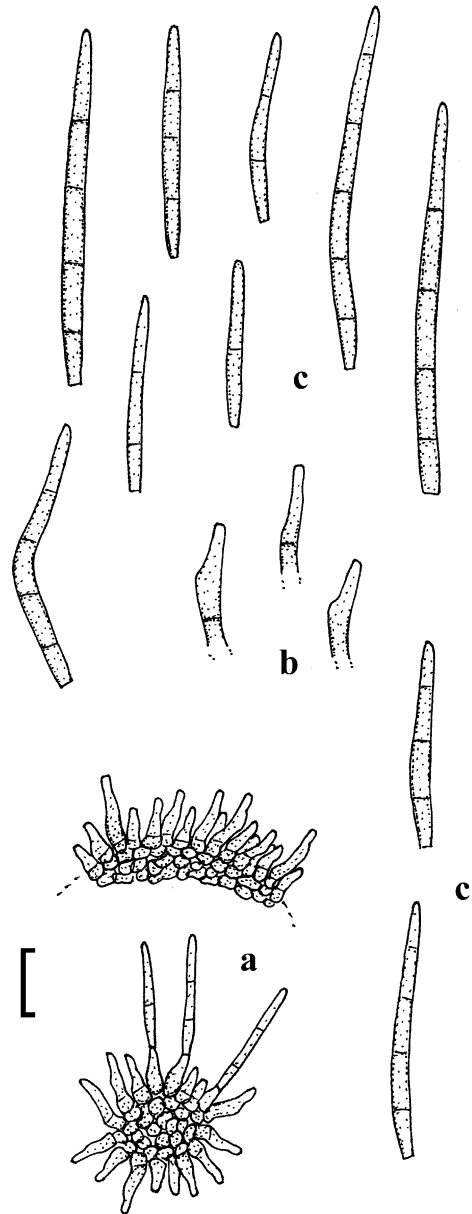


Fig. 10 – *Pseudocercospora lonchocarpigena*. Based on type material. **a** Conidiophore fascicles. **b** Conidiophores. **c** Conidia. – Bar = 10 μm .

Pseudocercospora lonchocarpigena U. Braun & Urtiaga, **sp. nov.** Fig. 10
Mycobank, MB 801960.

P. ichthyomethiae similis, sed stromatibus formantibus, 20–80 µm diam., conidiophoris laevibus et cellulis conidiogenis non denticulatis.

Leaf spots amphigenous, subcircular to irregular, 3–25 mm diam., often at tips and marginal, pale to medium brown, greyish brown to dingy grey, margin indefinite or with a very narrow darker marginal line. Mycelium internal. Stromata well-developed, 20–80 µm diam., olivaceous-brown, composed of swollen hyphal cells, 1.5–5 µm diam., immersed or substomatal on the lower leaf side. Caespituli amphigenous, dark brown to blackish, punctiform and conspicuous on the upper leaf surface, less conspicuous and finer below. Conidiophores numerous, in moderately large to large, almost sporodochial fascicles, loose to mostly dense, arising from stromata, erumpent or emerging through stomata, erect, subcylindrical or narrower towards the tip, straight to somewhat geniculate-sinuuous, unbranched, 5–25 × 1–3 µm, 0–1-septate, subhyaline to pale olivaceous, thin-walled, smooth; conidiophores usually reduced to conidiogenous cells or occasionally integrated, terminal, 5–20 µm long, conidiogenous loci inconspicuous, occasionally visible as truncate tip or lateral shoulder, but always unthickened and not darkened. Conidia solitary, subcylindrical, cylindrical-obclavate, 15–60 × (1–)1.5–2.5(–3) µm, 1–5-septate, subhyaline to very pale olivaceous, tips obtuse to subacute, base truncate to short obconically truncate, 1–2 µm wide, hila neither thickened nor darkened.

Material examined – CUBA, Bayamo, on leaves of *Lonchocarpus longipes* Urb. & Ekman (*Fabaceae*, *Millettieae*), 29 May 1967, R. Urtiaga M-566 (IMI 127924 = K(M) 176152, **holotype**).

Notes – *Pseudocercospora lonchocarpi* differs from *P. lonchocarpigena* in having percurrently proliferating conidiogenous cell and finely verruculose, much longer and wider conidia, (30–)50–100(–120) × 3–3.5(–4.5) µm (Crous & Câmara 1998). *P. lonchocarpicola*, described above, is quite distinct by superficial hyphae with solitary conidiophores and much wider conidia. *P. ichthyomethiae* is the only morphologically comparable species of *Pseudocercospora* on hosts of other genera belonging to the *Millettieae*. However, large

stromata are lacking in the latter species, the conidiophores are often verruculose and the conidiogenous loci are subdenticulate (Chupp 1954, Crous & Braun 2003). All other species – *P. hardwarensis*, *P. millettiae* and *P. vataireae* – are quite distinct by their much wider conidia (Braun & Freire 2002, Hsieh & Goh 1990, Vasudeva 1963).

Pseudocercospora lythracearum (Heald & F.A. Wolf) X.J. Liu & Y.L. Guo

≡ *Cercospora lythracearum* Heald & F.A. Wolf.

Material examined – VENEZUELA, Lara, Barquisimeto, on leaves of *Lagerstroemia speciosa* (L.) Pers. (*Lythraceae*), Dec. 2009, R. Urtiaga 323 (HAL 2570 F).

Notes – New to Venezuela (not listed in Urtiaga 1986, Crous & Braun 2003 and Iturriaga & Minter 2006).

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

Material examined – VENEZUELA, Lara, Dto. Moran, Santa Marta, on leaves of *Clidemia* sp. (*Melastomataceae*), Apr. 2009, R. Urtiaga 302 (HAL 2536 F).

Notes – First records of this species on *Clidemia hirta* (L.) D. Don were published in Braun & Urtiaga (2008).

Pseudocercospora mombin (Petr. & Cif.) Deighton

≡ *Cercospora mombin* Petr. & Cif.

Material examined – VENEZUELA, Lara, Macuto, Bosque, on leaves of *Spondias mombin* L. (*Anacardiaceae*), Dec. 2009, R. Urtiaga 313 (HAL 2571 F).

Notes – This is an additional collection of this species, which is known from Venezuela (Crous & Braun 2003, Iturriaga & Minter 2006, Braun & Urtiaga 2008), from a new region in this country.

Pseudocercospora musae (Zimm.) Deighton

≡ *Cercospora musae* Zimm.

Material examined – VENEZUELA, Lara, Villanueva, on leaves of *Musa acuminata* Colla (*Musaceae*), Nov. 2008, R. Urtiaga 148 (HAL 2519 F).

Notes – This species is known from Venezuela (Crous & Braun 2003), but *M.*

acuminata is probably a new host for this country. *P. musae* is not listed in Iturriaga & Minter (2006).

The identification of *Pseudocercospora* species on banana is not possible solely based on symptoms, and a differentiation using microscopical characters is also not easy. Braun et al. (1999) discussed *Pseudocercospora* on banana and provided a key to the species. Further detailed discussions on banana leaf spot diseases caused by *Pseudocercospora* have been published by Crous & Mourichon (2002) and Arzanlou et al. (2008) in connection with molecular studies on this group of species and in the latter case with the introduction of several morphologically very similar, but genetically clearly distinct new species. However, a supplemented key to the species concerned has not yet been published. As such a key may be useful for microscopical routine examinations and identification purposes, the following supplemented key, based on the key of Braun et al. (1999), has been prepared:

Key to *Pseudocercospora* spp. on *Musa* spp.

1. Conidia broadly obclavate-cylindrical (-fusiform), (20–)40–75 × (4–)5–8 µm
..... *P. musicola* U. Braun
- 1* Conidia narrower, 2–5(–6) µm 2
2. Superficial hyphae with solitary conidiophores present; fasciculate conidiophores very long, 30–120 µm and pluriseptate
P. musae-sapientis (A.K. Kar & M. Mandal) U. Braun & Mouch.
- 2* Superficial hyphae and solitary conidiophores lacking 3
3. Caespituli predominantly epiphyllous, sporodochial, up to 100 µm wide, composed of large stromata, up to 70 µm diam., and numerous densely arranged short conidiophores, 10–25 µm long, sympodially or up to 4 times percurrently proliferating; conidia subcylindrical, mostly 30–50 × 2.5–3 µm
..... *P. eumusae* Crous & Mour.
- 3* Conidiophores fasciculate, large sporodochia not formed, stromata smaller, percurrent proliferations lacking, conidia longer if cylindrical 4

4. Conidia obclavate-cylindrical, (2–)2.5–5(–6) µm wide 5
- 4* Conidia consistently cylindrical or subcylindrical, narrow, 2–3 µm 7
5. Conidiogenous loci visible as minute circles, rim very slightly thickened and darkened, hila with similar structure; conidia subhyaline
P. fijiensis (M. Morelet) Deighton (≡ *Paracercospora fijiensis* (M. Morelet) Deighton)
- 5* Conidiogenous loci and hila neither thickened nor darkened; conidia pale olivaceous to brownish 6
6. Conidiophores 0–1-septate, barely geniculate
..... *P. musae* (Zimm.) Deighton
- 6* Conidiophores 1–5-septate, usually pluriseptate throughout and geniculate-sinuous ...
P. fengshanensis (T.Y. Lin & J.M. Yen) J.M. Yen
7. Conidia very long, 80–120 × 2.5–4 µm
..... *P. longispora* Arzanlou & Crous
- 7* Conidia shorter, usually < 100 µm, and narrower, 2–3 µm 8
8. Conidia (30–)60–70(–83) µm long
..... *P. assamensis* Arzanlou & Crous
- 8* Conidia longer, (40–)78–95(–120) µm
..... *P. indonesiana* Arzanlou & Crous

Pseudocercospora nigricans (Cooke) Deighton

≡ *Cercospora nigricans* Cooke.

Material examined – VENEZUELA, Lara, Barquisimeto, on leaves of *Senna tora* (L.) Roxb. (*Fabaceae*), Jan. 2009, R. Urriaga 268 (HAL 2565 F).

Notes – Listed from Venezuela in Crous & Braun (2003), but lacking in Iturriaga & Minter (2006).

Pseudocercospora panacis (Thirum. & Chupp) Y.L. Guo & X.J. Liu

≡ *Cercospora panacis* Thirum. & Chupp.

Material examined – VENEZUELA, Lara, Barquisimeto, on leaves of *Polyscias guilfoylei* (W. Ball) L.H. Bailey (*Araliaceae*), June 2008, R. Urriaga 130 (HAL 2511 F).

Notes – New to Venezuela and new host species (Crous & Braun 2003). *P. panacis* is widespread on various hosts of the genus

Polyscias in Africa, Asia, Australia and Oceania (New Caledonia), but this species is new on *P. guilfoylei* and new for South America (Crous & Braun 2003). *P. guilfoylei* is a common host of *Pseudocercospora polysciatis* (S.H. Sun) J.M. Yen, known from Africa [Mauritius], Asia, Oceania and West Indies [Cuba] (Crous & Braun 2003). The latter species is distinguished from *P. panacis* by longer, frequently branched, pluriseptate conidiophores and the formation of superficial hyphae with solitary conidiophores. Braun (2003) discussed, described and illustrated *Pseudocercospora* spp. on *Polyscias* spp. in detail.

Pseudocercospora paulliniae U. Braun & Urtiaga, **sp. nov.** Fig. 11
MycoBank, MB 801961.

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

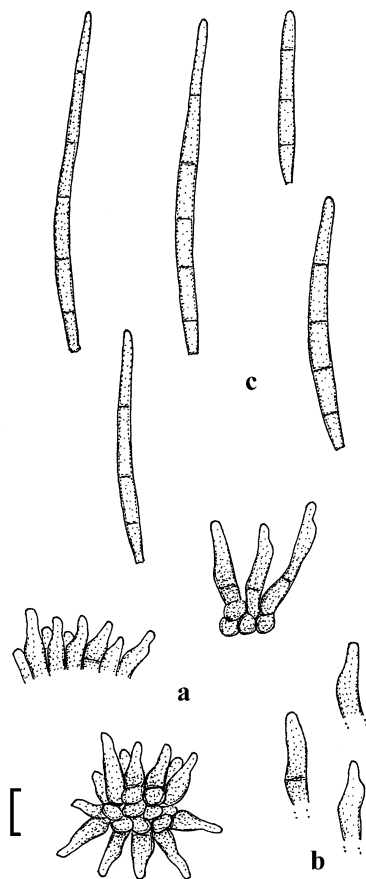


Fig. 11 – *Pseudocercospora paulliniae*. Based on type material. **a** Conidiophore fascicles. **b** Conidiophores. **c** Conidia. – Bar = 10 μ m.

Pseudocercospora pometiae valde similis, sed conidiis angustioribus, 2–4 μ m.

Leaf spots amphigenous, angular to irregular, partly vein-limited, 2–10 mm diam., medium brown, margin indefinite, occasionally with a diffuse yellowish halo. Caespituli amphigenous, punctiform, dark brown to blackish. Mycelium internal. Stromata on the upper leaf side immersed, on the lower side immersed to substomatal, occasionally somewhat erumpent, small to moderately large, 10–60 μ m diam. on the upper side, almost lacking or smaller below, olivaceous-brown, cells 2–7 μ m diam. Conidiophores in small, loose to moderately large and dense fascicles, arising from stromata, through stomata or erumpent, erect, straight, subcylindrical-conical to somewhat geniculate-sinuous, unbranched, 5–50 \times 2.5–5 μ m, often uniformly short (5–25 μ m), 0–3-septate, pale to medium olivaceous-brown, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 10–20 μ m long, conidiogenous loci inconspicuous. Conidia formed singly, narrowly obclavate, shorter conidia sometimes subcylindrical or cylindrical, 20–80 \times 2–4 μ m, (1–)3–7(–8)-septate, hyaline, subhyaline, pale olivaceous to olivaceous-brown, thin-walled, smooth, apex \pm pointed in obclavate conidia, subobtuse in cylindrical ones, base unthickened, not darkened.

Material examined – CUBA, Bayamo, on leaves of *Paullinia fuscescens* Kunth (*Sapindaceae*), 19 Apr. 1967, R. Urtiaga 22 (IMI 127210 = K(M) 176135, **holotype**).

Notes – The genus *Paullinia* belongs to the family *Sapindaceae* subfam. *Sapindoideae*. Some *Pseudocercospora* spp. on host of this family are morphologically rather similar. *P. pometiae* U. Braun & R.G. Shivas on *Pometia pinnata* J.R. Forst. & G. Forst. in Vanuatu is very similar, but has somewhat wider conidia, 3–5 μ m (McTaggart et al. 2008). *P. cupaniae* (Syd.) U. Braun & F.O. Freire on *Cupania guatemalensis* (Turcz.) Radlk. in Costa Rica (stromata larger, up to 100 μ m, conidia only 15–55 μ m long) and *P. talisiae* U. Braun & F.O. Freire on *Talisia esculenta* (A.St.-Hil.) Radlk. in Brazil (lesions quite distinct, conidia partly in chains, shorter and wider, 15–55 \times 3–5 μ m) are two additional species with obvious morphological similarity (Chupp 1954, Braun

& Freire 2002). *P. mitteriana* Goh & W.H. Hsieh (= *Cercospora mitteriana* Syd.) on *Dodonaea viscosa* Jacq. (subfam. *Dodonaeoideae*) in Asia is also similar, but the longer conidia are distinctly linear and possess obtuse tips (Chupp 1954, Hsieh & Goh 1990, Crous & Braun 1996). *P. dodonaeae* Boesew. on the same host in New Zealand has quite distinct lesions and pale brown conidia up to 150 µm long (Crous & Braun 1996). All other *Pseudocercospora* spp. on hosts of the *Sapindaceae* subgen. *Sapindoideae* are morphologically easily distinguishable: *P. allophyli* (Hansf.) Deighton on *Allophylus* spp. [with superficial mycelium and solitary conidiophores, fascicles lacking], *P. allophylina* Goh & W.H. Hsieh on *Allophylus timorensis* (DC.) Blume, Taiwan [conidiophores up to 500 µm long], *P. allophylorum* (A.K. Kar & M. Mandal) Bagyan., U. Braun & Jagad. (= *P. allophylicola* Deighton) on *Allophylus cobbe* (L.) Raeusch. and *A. africanus* P. Beauv. in Asia and Africa [conidiophores very long, up to 150 µm], *P. deinbolliae* Deighton on *Deinbollia* spp. in Africa [lesions distinct, conidia ± cylindrical, up to 130 µm long], *P. nephelii* B. Sutton & Peregrine on *Nephelium lappaceum* L. in Brunei [conidia ± cylindrical, verruculose, 60–85 µm long], *P. sapindimarginati* (T.S. Ramakr. & K. Ramakr.) U. Braun, Bagyan. & Jagad. on *Sapindus* spp. and *Koelreuteria paniculata* Laxm. [conidia 3–7 µm wide], *P. thouiniaie* (F. Stevens) U. Braun & Crous on *Thouinia stricta* Radlk., Puerto Rico and Virgin Islands [conidiophores very long, up to 500 µm, conidia 5–8 µm wide], and *P. zambalesica* (Petr.) U. Braun on *Allophylus macrostachys* Radlk. [with superficial hyphae and solitary conidiophores] (Chupp 1954, Deighton 1987, Hsieh & Goh 1990, Guo & Hsieh 1995, Braun 1999, Crous & Braun 1996, Peregrine et al. 2000, Braun & Freire 2002, McTaggart et al. 2008). *Cercospora sapindi* F.L. Tai is a genuine species of *Cercospora* s. str. (Guo et al. 2005). The generic affinity of *Cercospora sapindi* Obreg.-Bot. on *Sapindus saponaria* L., known from Colombia and Panama, is unclear (type material not available), but according to olivaceous conidia this species seems to belong in *Pseudocercospora*. The later species differs from *P. paullinae* in having quite distinct lesions,

conidiophores with hyaline tips and conidia with obtuse apex (Chupp 1954, Crous & Braun 2003). Furthermore, there are two comparable species on maple (*Sapindaceae*, subfam. *Hippocastanoideae*): *P. acericola* (Woron.) Y.L. Guo & X.J. Liu on *Acer* spp. in Asia and Europe [stromata absent, external hyphae with solitary conidiophores developed] and *P. sphendamphila* Kirschner on *Acer oblongum* Wall. ex DC. (incl. *A. albo-purpurascens* Hayata) in Taiwan [conidia ± cylindrical, only 2 µm wide] (Chupp 1954, Guo & Hsieh 1995, Kirschner et al. 2009).

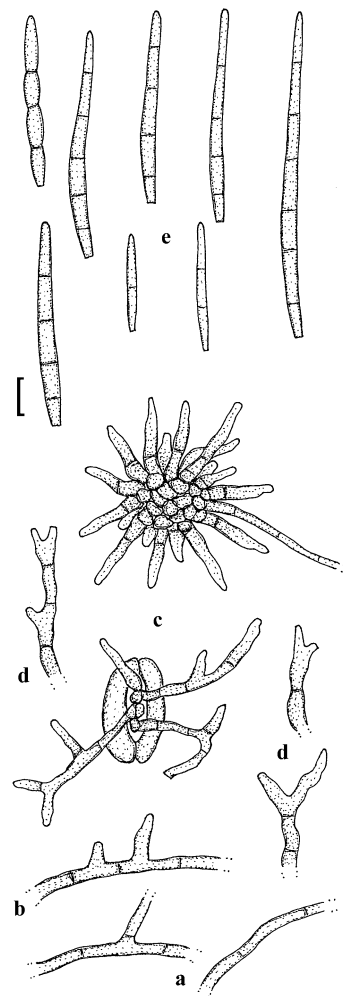


Fig. 12 – *Pseudocercospora picramniae*. Based on type material. **a** Superficial hyphae. **b** Solitary conidiophores arising from a superficial hypha. **c** Conidiophore fascicles. **d** Conidiophore. **e** Conidia. – Bar = 10 µm.

Pseudocercospora picramniae U. Braun & Urtiaga, **sp. nov.** Fig. 12
Mycobank, MB 801963.

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

Differt a paene omnibus speciebus *Pseudocercosporae* ad *Simaroubaceas* hyphis superficialibus cum conidiophoris solitariis evolutis et a *P. bruceae* (cum hyphis superficialis) stromatibus evolutis, conidiophoris fasciculatis et conidiis angustioribus, 2–4.5 μm .

Leaf spots amphigenous, subcircular to angular-irregular, 1–20 mm diam., ochraceous, pale to medium dark brown, later greyish brown to dingy greyish white, margin indefinite or with a narrow darker border, occasionally somewhat raised, sometimes with a narrow, dark purple to violet halo. Mycelium internal and external; superficial hyphae emerging through stomata, branched, septate, 1–3.5 μm wide, thin-walled, smooth or almost so, subhyaline to olivaceous-brown. Stromata lacking to well-developed, immersed to substomatal, 10–60 μm diam., medium brown or olivaceous-brown, cells 2–7 μm diam. Conidiophores solitary, arising from superficial hyphae, lateral, or in small, loose to large and dense fascicles, arising from internal hyphae or stomata, through stomata or erumpent, erect, straight, subcylindrical-conical to distinctly geniculate-sinuuous, simple or often irregularly branched, 5–60 \times 2–5 μm , 0–4-septate, pale to medium olivaceous-brown or brown, thin-walled, smooth; conidiogenous cells integrated, terminal, 5–25 μm long; conidiogenous loci inconspicuous to subdenticulate, but always unthickened and not darkened. Conidia solitary, narrowly obclavate to obclavate-cylindrical, 18–85 \times 2–4.5 μm , 1–8-septate, subhyaline to pale olivaceous-brown, smooth or almost so, apex obtuse, occasionally subacute, base short obconically truncate, 1–1.5(–2) μm wide, hila neither thickened nor darkened.

Material examined – CUBA, Bayamo, on leaves of *Picramnia pentandra* Sw. (*Picramniaceae*), 12 Apr. 1967, R. Urtiaga (IMI 126873 = K(M) 176133, **holotype**).

Notes – This is the first species of *Pseudocercospora* on a host of the family *Picramniaceae*. Previously *Picramnia* was assigned to the family *Simaroubaceae*. *P. bruceae* (Petch) Y.L. Guo & X.J. Liu on *Brucea* spp. in Asia is the only species of *Pseudocercospora* on a host belonging to the latter family with formation of superficial mycelium with solitary conidiophores, but it differs from *P. picramniae* in having broader

conidia, 3–5.5 μm . Furthermore, stromata and fasciculate conidiophores are lacking in this species (Chupp 1954, Guo & Hsieh 1995). All other *Pseudocercospora* spp. on hosts of the *Simaroubaceae* are distinguished from *P. picramniae* by lacking superficial mycelium and consistently fasciculate conidiophores [*P. ailanthicola* (Patwardhan) Deighton, *P. ailanthigena* H.S. Rao, Archana Singh & Kamal, *P. quinlingensis* Y.L. Guo, *P. simaroubae* U. Braun & F.O. Freire (Chupp 1954, Guo & Hsieh 1995, Rao et al. 1996, Liu et al. 1998, Braun & Freire 2002)].

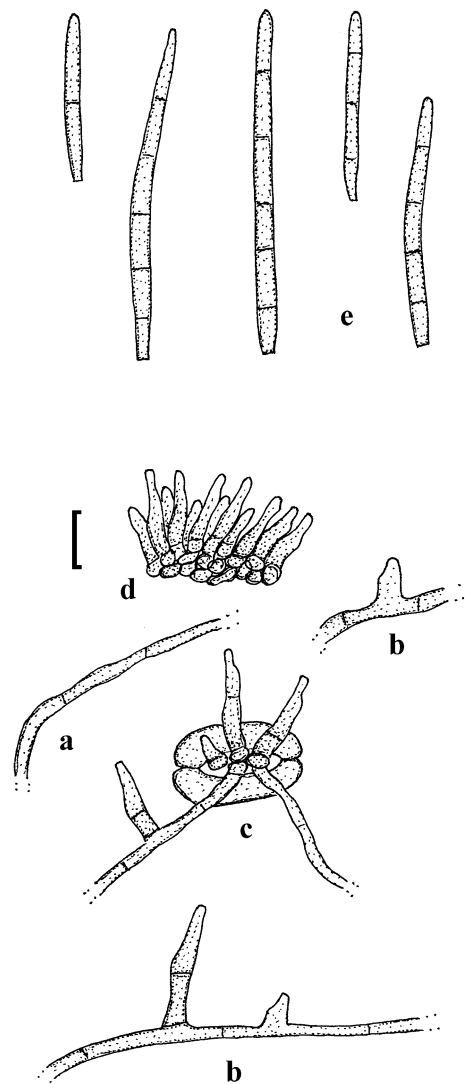


Fig. 13 – *Pseudocercospora psidii* var. *varians*. Based on type material. **a** Hypha. **b** Solitary conidiophores arising from superficial hyphae. **c** Conidiophore and hyphae emerging through stomata. **d** Conidiophore fascicle. **e** Conidia. – Bar = 10 μm .

***Pseudocercospora piperis* (Pat.) Deighton**

≡ *Cercospora piperis* Pat.

Material examined – VENEZUELA, Lara, Villanueva, on leaves of *Piper* sp. (*Piperaceae*), Nov. 2008, R. Urtiaga 134 (HAL 2516 F).

Notes – This species is known from Venezuela (Chupp 1954, Crous & Braun 2003).

***Pseudocercospora psidii* (Rangel) R.F. Castañeda & U. Braun var. *varians* U. Braun & Urtiaga var. nov.** Fig. 13

MycoBank, MB 801967.

Differt a var. *psidii* hyphis superficialibus cum conidiophoris solitariis evolutis, hypophyllis.

Distinct from var. *psidii* by forming superficial hyphae with solitary conidiophores on the lower leaf surface.

Etymology – referring to the variable fructification ranging from solitary conidiophores arising from superficial hyphae to fascicles of conidiophores.

Material examined – VENEZUELA, Lara, Barquisimeto, market, on leaves of *Psidium guajava* L. (*Myrtaceae*), Mar. 2012, R. Urtiaga 460 (HAL 2510 F, **holotype**); Lara, Barquisimeto, zoological garden, Jan. 2010, R. Urtiaga 315 (HAL 2556 F). INDIA, Andhra Pradesh, Yellore, Mahabubnagar, Jan. 1992, Bagyanarayana & Jagadeeswar (HAL, s.n.).

Notes – *Pseudocercospora psidii* s. lat. is redescribed as follows: Leaf spots amphigenous, subcircular, angular-irregular to somewhat diffuse, 1–7 mm diam or confluent and larger, brown, greyish brown, reddish brown to dingy grey or greyish white, margin indefinite or narrow, dark brown, blackish or purple, occasionally vein-limited. Caespituli amphigenous, punctiform, dark brown to blackish, distinct or not very conspicuous. Mycelium internal, external hyphae lacking (var. *psidii*) or internal and external, with well-developed superficial hyphae on the lower leaf surface (var. *varians*), branched, 1.5–4 µm wide, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth; stromata lacking to well-developed, 10–50 µm diam., subglobose to somewhat irregular, immersed or substomatal, medium to dark brown, cells 2–5 µm diam. Conidiophores strictly in small, loose

to moderately large and dense fascicles, arising from internal hyphae or stromata, erumpent or through stomata (var. *psidii*), or also with solitary conidiophores, arising from superficial hyphae, lateral, rarely terminal (var. *varians*), erect, straight, subcylindrical-conical to geniculate-sinuous, mostly not branched, 5–45 × (2–)2.5–5(–6) µm, 0–3-septate, pale olivaceous to medium olivaceous-brown, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–20 µm long, conidiogenous loci inconspicuous or occasionally subdenticulate. Conidia solitary narrowly obclavate-cylindrical, (15–)20–70(–80) × (1.5–)2–3.5(–4) µm, (1–)3–7(–9)-septate, subhyaline to pale olivaceous, thin-walled, smooth, apex obtuse to subacute, base obconically truncate, 1–1.5(–2) µm wide, hila neither thickened nor darkened.

Pseudocercospora psidii is not listed from Venezuela in Crous & Braun (2003). Abundant superficial hyphae with solitary conidiophores are formed in the present collection of *P. psidii* from Venezuela. In the type material of this species from Brazil, in a collection on common guava from Cuba (Castañeda & U. Braun 1989), in Chinese samples described by Guo & Hsieh (1995), and in additional samples examined by Crous (1999), superficial mycelium is absent and conidiophores are only formed in fascicles arising from stromata. Sarbajna & Chattopadhyay (1991) recorded an Indian collection on *P. guajava* and described and illustrated superficial hyphae with solitary conidiophores. Due to the formation of superficial hyphae and solitary conidiophores, Bagyanarayana et al (1995) identified an Indian collection on common guava (Andhra Pradesh, Yellore, Mahabubnagar, Jan. 1992, Bagyanarayana & Jagadeeswar, HAL, s.n.) as *Pseudocercospora sawadae* (W. Yamam.) Goh & W.H. Hsieh (record also cited in Kamal 2010), which is, however, a misidentification. This collection and probably most or even all Indian collections referred to as *P. sawadae* seem to belong to *P. psidii* and represent samples with superficial mycelium. Such deviating collections with hypophyllous fructification, superficial mycelium and solitary conidiophores are described as a new variety of *P. psidii*. Absence or presence of superficial mycelium

and solitary conidiophores render the differentiation between *P. psidii* and *P. sawadae* difficult and cause confusion. The true *P. sawadae* is distinguished from *P. psidii* by the following characters: distinct leaf spots, stromata and well-developed fascicles of conidiophores lacking, conidia wider, 3–5 µm, and hila wider, 1.5–2 µm [conidia (1.5–)2–3.5(–4) µm and hila 1–1.5 µm wide in *P. psidii*]. The present redescription of *P. psidii*, which is based on collections from Cuba, India and Venezuela, shall help to avoid further confusion.

***Pseudocercospora rhinocarpi* U. Braun & Crous**

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

Material examined – VENEZUELA, Lara, Macuto, Bosque, on leaves of *Anacardium excelsum* (Bertero ex Kunth) Skeels [≡ *A. rhinocarpus* DC., nom. illeg.] (*Anacardiaceae*), Dec. 2009, R. Urtiaga 310 (HAL 2557 F).

Notes – The original description of this species, published by Braun and Crous in Crous & Braun (2003), was based on type material from Venezuela (CUP-VZ 2047). This is the second collection of this species.

Pseudocercospora riachuelii* (Speg.) Deighton var. *riachuelii

Material examined – VENEZUELA, Lara, Rio Claro, Cuchilla, on leaves of *Cissus verticillata* (L.) Nicolson & C.E. Jarvis [= *C. sicyoides* L.] (*Vitaceae*), Apr. 2009, R. Urtiaga 203 (HAL 2550); l.c., June 2010, R. Urtiaga 379 (HAL 2525 F).

Notes – Known from Venezuela (Urtiaga 1986, Crous & Braun 2003). These collections belong to the typical variety characterized by lacking superficial mycelium.

***Pseudocercospora solanacea* U. Braun, sp. nov.**

Mycobank, MB 493087.

≡ *Pseudocercospora solanacea* B.K. Gupta & Kamal, Indian Phytopathol. 42: 391, “1989” 1990, nom. inval. (Art. 37.6).

≡ *Pseudocercospora solanacea* (B.K. Gupta & Kamal) U. Braun, A monograph of *Cercospora*, *Ramularia* and allied genera

(phytopathogenic hyphomycetes), Vol. 1: 198, 1995 [as *P. solanacea* B.K. Gupta & Kamal ex U. Braun, in MycoBank].

Latin description – Gupta & Kamal, Indian Phytopathol. 42: 391, “1989” 1990.

Material examined – INDIA, U.P., Gorakhpur, on *Solanum nigrum* L. (*Solanaceae*), Kamal, KS 150 (IMI 238212, **holotype**, now K[M]).

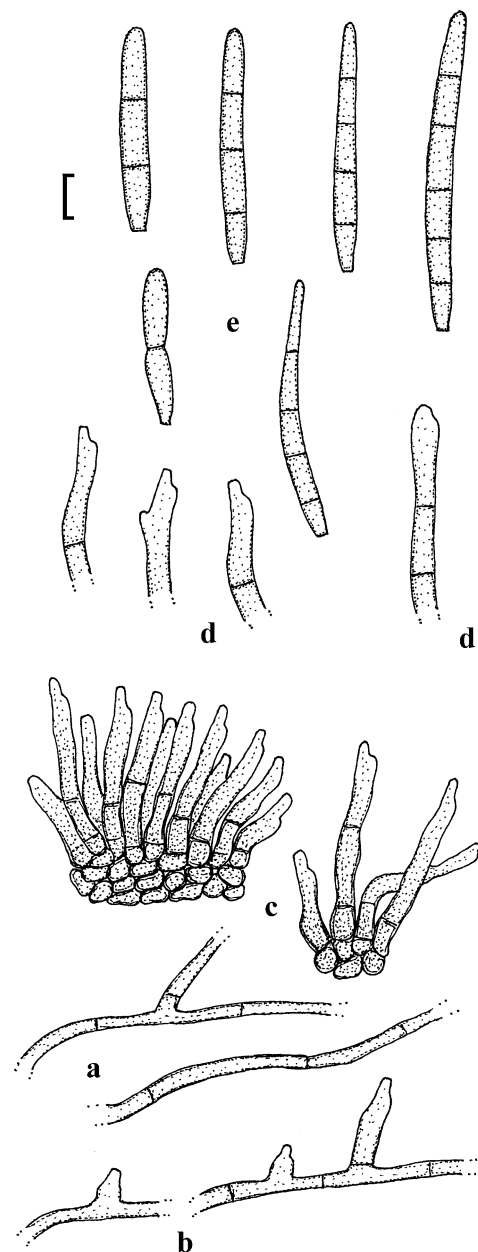


Fig. 14 – *Pseudocercospora trichophila* var. *punctata* (= *Cercospora solanacea*). Based on CUP-VZ 2927. **a** Hyphae. **b** Solitary conidiophores arising from superficial hyphae. **c** Conidiophore fascicles. **d** Conidiophores. **e** Conidia. – Bar = 10 µm.

Notes – Gupta & Kamal (1990) described *Pseudocercospora solanacea*, cited a single collection (IMI 237162), but failed to indicate “holotype” (or “type”), which is necessary since 1990 for genera and taxa below this rank in order to be validly published [in the original publication of Gupta & Kamal, “1989” was given as year, but it was effectively issued in 1990]. Braun (1995b) examined the latter material, introduced the combination *Pseudocercospora solanacea* (B.K. Gupta & Kamal) U. Braun and cited IMI 237162 as holotype. With regard to the validity of the latter name, there is a discrepancy between Index Fungorum, in which this combination is classified to be invalid, and MycoBank, in which this name is corrected to “*Pseudocercospora solanacea*” cited as B.K. Gupta & Kamal ex U. Braun” and classified as “orthographic variant” and valid name. A formal validation of this name was not performed by Braun (1995b) since it was unknown at that time that this species had not been published in 1989. In order to clarify the confused nomenclatural situation, the latter name is formally validated once more. *Pseudocercospora leonotidis* B.K. Gupta & Kamal is another invalid name published by Gupta & Kamal (1990). Braun (1995b) re-examined potential type material of this species and published a full description and new illustration, but failed to validate this name formally:

Pseudocercospora leonotidis B.K. Gupta & Kamal ex U. Braun, **sp. nov.**
MycoBank, MB 125145.

≡ *Pseudocercospora leonotidis* B.K. Gupta & Kamal, Indian Phytopathol. 42: 389, “1989” 1990, nom. inval. (Art. 37.6).

Latin and English description: Gupta & Kamal (1990: 389).

Material examined – INDIA, U.P., Gorakhpur, on *Leonotis nepetifolia* R. Br. (*Solanaceae*), Kamal, KS 84 (IMI 237162, **holotype**, now K[M]).

The name *Pseudocercospora solanacea* influences the nomenclature of *Cercospora solanacea* Sacc. & Berl. This name has been misinterpreted for a long time due to Chupp’s (1954) insufficient description and interpretation. Unfortunately type material of *C. solanacea*, deposited at PAD, is currently not available for a re-examination. However, sev-

eral collections determined by Chupp as *C. solanacea*, deposited at CUP, have been examined. Chupp (1954) cited type material of this species. It is not quite clear but possible that he had examined and compared this collection. Chupp’s specimens, including a sample from Venezuela, have been examined. *C. solanacea* proved to be a species of the genus *Pseudocercospora* (conidiogenous loci and hila of the conidia neither thickened nor darkened), conspecific with *P. trichophila* (F. Stevens) Deighton. Braun & Urtiaga (2012) introduced *P. trichophila* var. *punctata* U. Braun & Urtiaga for collections with epiphyllous punctiform caespitili and well-developed stromata. This variety is identical with *C. solanacea*, i.e. the latter name must be reduced to synonymy with *P. trichophila* var. *punctata*. *C. solanacea* is older than *C. trichophila*, but its epithet is blocked under *Pseudocercospora*:

Pseudocercospora trichophila var. ***punctata***
U. Braun & Urtiaga

= *Cercospora solanacea* Sacc. & Berl., Atti Reale Ist. Veneto Sci. Lett. Arti VI, 3: 721, 1885, **syn. nov.**

Material examined – VENEZUELA, road La Guira–Caracas, on leaves of *Solanum erianthum* var. *adulterinum* (Ham. ex G. Don) R.E.D. Baker & N.W. Simmonds [= *S. hazenii* Britton] (*Solanaceae*), 3 Mar. 1939, A.S. Muller & H.H. Whetzel (CUP-VZ 2927). PUERTO RICO, Rio Pietras, on *S. erianthum* D. Don (= *S. verbascifolium* L.), 7 Jan. 1917, J.A. Stevenson (CUP 41246). TRINIDAD, North Coast Road, on *S. erianthum*, 15 Nov. 1947, R.E.D. Baker (CUP 37506). USA, Florida, Miami, on *S. erianthum*, 4 Feb. 1921, J.A. Stevenson (CUP 41247).

The examined collections of *P. trichophila* var. *punctata* (= *C. solanacea*) from CUP are characterized as follows: Leaf spots amphigenous, conspicuous on the upper leaf side, less conspicuous below, angular-irregular, 1–6 mm diam. or confluent and larger, pale to medium dark brown, reddish brown to almost black, often vein-limited. Caespituli amphigenous, conspicuously punctiform on the upper leaf surface, dark brown to blackish, inconspicuous below. Mycelium internal and external; hyphae subhyaline to pale olivaceous, 1.5–5 µm wide. Stromata epiphyllous, 20–60

µm diam., subcircular to somewhat irregular in outline, brown. Conidiophores on the upper side in small to moderately large fascicles, loose to dense, arising from stromata, erumpent, erect, or solitary, arising from superficial hyphae, straight, subcylindrical or somewhat attenuated towards the tip to moderately geniculate-sinuuous, usually unbranched, 10–60 × 3–7 µm, 0–3-septate, pale to medium olivaceous or olivaceous-brown, darker in mass, thin-walled, smooth; conidiogenous cells integrated, terminal, 10–25 µm long, conidiogenous loci inconspicuous, occasionally subdenticulate. Conidia cylindrical or obclavate-cylindrical, 20–60 × 4–6 µm, 1–6-septate, subhyaline to pale olivaceous, thin-walled, smooth, apex obtuse to subacute, base short obconically truncate, hila 1–2 µm wide, neither thickened nor darkened.

Records of *C. solanacea* from India on *Solanum melongena* L. (material examined: BPI 441388 and CUP s.n., Herb. Crypt. Ind. Orient. Exs., III. Indian Cercosporae, Fasc. 1, No. 41) and *S. nigrum* L. (material examined: BPI 457102 and CUP s.n., Herb. Crypt. Ind. Orient. Exs., III. Indian Cercosporae, Fasc. 1, No. 42) are based on misidentifications and must be corrected to *Paracercospora egenula* (Syd.) Deighton (≡ *Pseudocercospora egenula* (Syd.) U. Braun & Crous) and *Pseudocercospora atomarginalis* (G.F. Atk.) Deighton, respectively. A collection on *Solanum erianthum* (= *S. verbascifolium*) from Taiwan (material examined: Taipeh, 26 Oct. 1933, W. Yamamoto ex herb. Univ. Imp. Taihokuensis, BPI 441389), determined as *C. solanacea*, proved to be *Pseudocercospora trichophila* var. *trichophila* as already stated by Hsieh & Goh (1990), based on a duplicate of this specimen deposited at NTU-PPE.

An additional specimen recently collected in Venezuela [Rio Claro, Cuchilla, on leaves of *Solanum erianthum*, Apr. 2009, R. Urtiaga 197 (HAL 2541 F)] proved to be *P. trichophila* var. *trichophila* showing that both varieties may occur on the same host species in the same region.

Pseudocercospora struthanthi U. Braun, F.O. Freire & N. Pons

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

Material examined – VENEZUELA, Lara, Las Brujitas, on leaves of *Phthirusa stelis* (L.) Kuijt [incl. *P. anastyla* Rizz.] (*Loranthaceae*), Apr. 2010, R. Urtiaga 124 (HAL 2512 F).

Notes – *Phthirusa stelis* is a new host species. The description of *Pseudocercospora struthanthi* was based on type material of the invalid *Cercospora struthanthi* (on *Struthanthus* sp. from Venezuela) and a collection from Brazil, also on *Struthanthus* sp. (Braun & Freire 2002). Braun & Freire (2004) added new Brazilian specimens on *Phoradendron* sp. (*Viscaceae*) and *Struthanthus* sp. (distributed as “U. Braun, Fungi sel. exs. 27”), and Braun et al. (2010) published a record of this species from Brazil on *Tripodanthus* sp. (also *Loranthaceae*). *Phthirusa stelis* has numerous synonyms in *Loranthus* as well as *Struthanthus*. It is possible that the type material (*Struthanthus* sp.) represents a species of *Phthirusa*. The present material agrees very well with type material and the original description (conidia 15–65 × 2.5–4.5 µm), except for a few superficial hyphae formed on the leaf surface and many germinated conidia, partly with microcyclic conidiogenesis.

Pseudocercospora taichungensis Goh & W.H. Hsieh

Fig. 15

Leaf spots amphigenous, subcircular to somewhat angular-irregular, about 5–20 mm diam., often zonate, pale to medium brown or greyish brown, with a narrow dark border or marginal line, dark brown to blackish. Caespituli amphigenous, mainly hypophyllous, distinctly punctiform, dark brown to blackish. Mycelium internal; hyphae branched, 1.5–2.5 µm wide, septate, subhyaline or pale, thin-walled, smooth. Stromata well-developed, substomatal to intraepidermal, erumpent, subcircular to somewhat irregular in outline, 20–80 µm diam., olivaceous-brown to brown, cells 1.5–6 µm diam., outline circular to angular. Conidiophores very numerous, in dense, almost sporodochial fascicles, arising from stromata, erect, straight, subcylindrical-conical to slightly geniculate, unbranched, 5–25 × 1.5–3.5 µm, 0(–1)-septate, subhyaline to very pale olivaceous, medium olivaceous in mass, thin-walled, smooth; conidiophores usually reduced to conidiogenous cells, conidiogenous loci

inconspicuous. Conidia obclavate-cylindrical, 15–45 × 2–3 μm, 0–4-septate, subhyaline to very pale olivaceous, thin-walled, smooth, apex acute to subobtuse, base truncate to usually short obconically truncate, 1–1.5(–2) μm wide, hila neither thickened nor darkened.

Material examined – VENEZUELA, Lara; Barquisimeto, zoological garden, on leaves of *Senna atomaria* (L.) H.S. Irwin & Barneby (*Fabaceae*), Jan. 2010, R. Urtiaga 312 (HAL 2559 F).

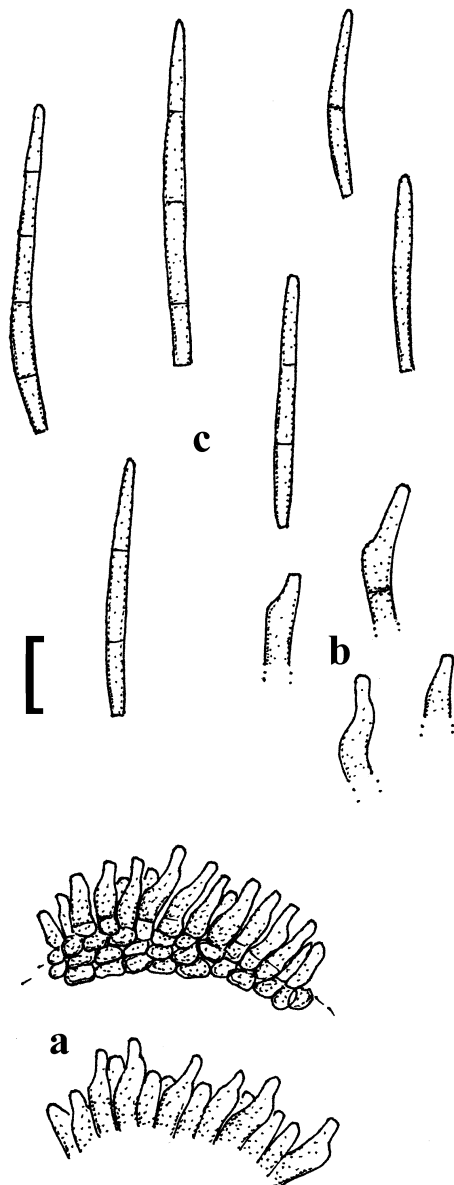


Fig. 15 – *Pseudocercospora taichungensis*. Based on HAL 2559 F. **a** Conidiophore fascicles. **b** Conidiophores. **c** Conidia. – Bar = 10 μm.

Notes – Several species of *Pseudocercospora* have been described on hosts belonging to *Cassia* and *Senna*, and have been discussed, illustrated and keyed out in Braun (1989). *P. cassiigena* (J.M. Yen & Lim) Yen on *Senna alata* (L.) Roxb. in Singapore (Yen & Lim 1980) is the only comparable, morphologically similar species treated in Braun (1989), but differs from the present collection from Venezuela in having quite distinct leaf spots (angular-irregular, vein-limited, brown, not zonate, only 1–4 mm diam), indistinct caespituli, smaller stromata (25–40 μm diam.), pale brown conidiophores, only 6–11 μm long, and pale olivaceous-brown conidia. Hsieh & Goh (1990) described *Pseudocercospora taichungensis* on *Cassia fistula* from Taiwan. Caespituli (conidiomata), conidiophores and conidia of the collections on *Senna atomaria* from Venezuela agree well with *P. taichungensis*, except for much larger leaf spots. In spite of distinct lesions, different host species and localities in Asia and South America, respectively, this collection is tentatively assigned to the latter species.

Pseudocercospora teramnicola U. Braun & Urtiaga, **sp. nov.** Fig. 16
Mycobank, MB 801968.

Etymology: epithet derived from the host genus, *Teramnus*.

Pseudocercosporae calopogonii et *P. puerariicola* similis, sed lesionibus valde distinctis et hyphis superficialibus cum conidiophoris solitariis evolutis.

Lesions amphigenous, formed as small angular-irregular darker discolorations mainly caused by the fructification. Colonies amphigenous, punctiform to subeffuse, dark brown to blackish. Mycelium internal and external; superficial hyphae branched, septate, 2–5 μm wide, subhyaline to medium brown, thin-walled, smooth; stromata lacking to well-developed, immersed to substomatal, 10–60 μm diam. or sometimes even larger, brown, cells 2–6 μm wide. Conidiophores in small to large, loose to dense fascicles, arising from internal hyphal or stromata, or associated with immature ascomata (initials), sometimes arising from them, or conidiophores solitary, arising from superficial hyphae, lateral, erect to decumbent, shape and size variable, straight,

cylindrical-conical to strongly geniculate-sinuous, usually unbranched, $5\text{--}110 \times 3\text{--}5 \mu\text{m}$, continuous to pluriseptate, pale to medium olivaceous-brown or brown throughout or paler towards the tip, thin-walled, smooth; conidiogenous cells intergrated, terminal or intercalary, $5\text{--}30 \mu\text{m}$ long, conidiogenous loci inconspicuous to subdenticulate, but wall of the loci always unthickened and not darkened. Conidia solitary, obclavate(-cylindrical), short conidia sometimes cylindrical-ellipsoid or almost obovoid, $20\text{--}80 \times 2.5\text{--}5 \mu\text{m}$, 1–7-septate, subhyaline to pale olivaceous, apex obtuse to subacute, base short obconically truncate, $1\text{--}2 \mu\text{m}$ wide, hila neither thickened nor darkened.

Material examined – CUBA, Bayamo, on leaves of *Teramnus labialis* (L. f.) Spreng. (*Fabaceae*), Dec. 1967, R. Urtiaga 1066 (IMI 131169 = K(M) 176148, **holotype**).

Notes – The genus *Teramnus* belongs to the phaseoloid legumes (tribe *Phaseoleae*), and is, according to molecular phylogenetic studies (Lee & Hymowitz 2001, Stefanović et al. 2009), part of subtribe *Glycininae*. *Cercospora teramnicola* Ragun. & K. Ramakr. (Ragunathan & Ramakrishnan 1965) is insufficiently known, and type material of this species could not be traced. However, based on the original description and illustration, the latter species is in any case not identical with the new *Pseudocercospora* on this host from Cuba (stromata lacking or almost so, superficial mycelium not developed, conidiophores very long, about $70\text{--}150 \mu\text{m}$, often branched, conidia $12\text{--}45 \times 3\text{--}6 \mu\text{m}$, subhyaline). The conidiogenous loci were described to be prominent, which was used in this paper in various other cases as circumscription for thickened and darkened scars of true *Cercospora* species, whereas the loci in former *Cercospora* spp. which now belong to *Pseudocercospora* were described to be indistinct or not described at all. Hence, *C. teramnicola* is undoubtedly a true *Cercospora* or maybe a *Passalora* due to small obclavate conidia. Most *Pseudocercospora* species on hosts of allied genera are easily distinguishable from *P. teramnicola* by lacking superficial hyphae and some additional differences: *P. boringuensis* (E. Young) Deighton on *Calopogonium* spp. (conidiophores up to $200 \mu\text{m}$

long, conidia $30\text{--}55 \times 4\text{--}7 \mu\text{m}$), *P. calopogonii* (F. Stevens & Solh.) Deighton on *Calopogonium* spp. (conidiophores and conidia rather similar, lesions quite distinct), *P. cruenta* (Sacc.) Deighton (also recorded on *Calopogonium*, *Glycine* and *Pueraria*; conidiophores shorter, lesions quite distinct), *P. glycines* (Cooke) Deighton on *Glycine* spp. (numerous, short, densely arranged conidiophores arising from large stromata in sporodochial conidiomata, conidia only $1.5\text{--}3 \mu\text{m}$ wide), *P. monoica* (Ellis & Everh.) Deighton on *Amphicarpaea* spp. (also with sporodochial conidiomata), *P. pachyrrhizi* Sawada & Katsuku on *Pachyrrhizus erosus* (L.) Urb. (similar to *P. glycines*, but conidia only $1.5\text{--}2.5 \mu\text{m}$ wide), *P. puerariae* (Syd. & P. Syd.) Deighton (conidiophores up to $350 \mu\text{m}$ long, conidia $4\text{--}9 \mu\text{m}$ wide), *P. puerariicola* (W. Yamam.) Deighton on *Pueraria* spp. (lesions quite distinct) [Chupp 1954, Deighton 1976, Yen & Lim 1980, Hsieh & Goh 1990, Guo & Hsieh 1995].

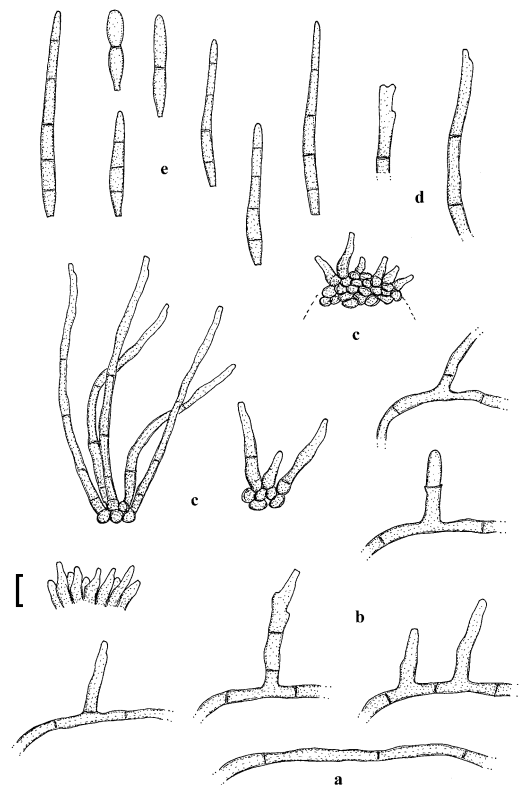


Fig. 16 – *Pseudocercospora teramnicola*. Based on type material. **a** Hypha. **b** Solitary conidiophore arising from superficial hyphae. **c** Conidiophore fascicles. **d** Conidiophore fascicles. **e** Conidia. – Bar = $10 \mu\text{m}$.

P. puerariina (J.M. Yen) Y.M. Yen on *Pueraria phaseoloides* (Roxb.) Benth. in Singapore is characterized by having well-developed superficial mycelium with solitary conidiophores, but stromata are lacking and the acicular-obclavate conidia are 90–200 µm long. Among more distantly related *Pseudocercospora* species on hosts of *Phaseolus*, *Vigna* and allied genera, there are a few with superficial hyphae and solitary conidiophores, but all of them are clearly distinct from *P. teramnicola*. Stromata and fasciculate conidiophores are absent in *P. phaseolicola* Goh & W.H. Hsieh, fascicles of conidiophores are formed in *P. shihmensis* (J.M. Yen) J.M. Yen but stromata are lacking, *P. vignicola* (J.-M. Yen, A.K. Kar & B.K. Das) U. Braun has short conidiophores and narrowly cylindrical-filiform conidia, and *P. vignigena* J.M. Yen, A.K. Kar & B.K. Das is characterized by its cylindrical conidia, 4–6 µm wide (Yen & Lim 1980, Yen et al. 1982a, Hsieh & Goh 1990, Braun et al. 1999). The latter authors provided a key to *Pseudocercospora* spp. on *Phaseolus* and allied genera.

Pseudocercospora trichiliae-hirtae U. Braun & Urtiaga, **sp. nov.** Fig. 17
MycoBank, MB 801969.

Etymology: name derived from the host species, *Trichilia hirta*.

Pseudocercosporae swieteniae valde similis, sed maculis foliorum indistinctis, conidiophoris saepe ramosis, conidiis latoribus, (2.5–)3–5(–5.5) µm, hilis latoribus, 1.5–2 µm. Differt a *P. amooriae* et *P. meliicola* maculis foliorum indistinctis, conidiophoris saepe ramosis et conidiis brevioribus, (10–)20–70 µm, 1–7-septatis.

Leaf spots lacking or almost so, or only forming diffuse, irregular discolorations. Colonies amphigenous, mainly hypophyllous, thin, subcircular to irregular in shape or effuse, dark greyish brown to sooty. Mycelium internal and external; superficial hyphae emerging through stomata, sparingly developed to abundant, sparingly branched, 1.5–3 µm wide, septate, hyaline, subhyaline to pale olivaceous thin-walled, smooth; stromata lacking or small, substomatal, 10–25 µm diam., olivaceous-brown, or somewhat erumpent aggregations of swollen hyphal cells, up to 40 µm diam.

Conidiophores in small to moderately large fascicles, mostly loose, arising from internal hyphae or stromata, through stomata, or solitary, arising from superficial hyphae, erect, straight, subcylindrical to usually slightly to strongly geniculate-sinuous, often branched, 5–70 × 2.5–6 µm, pale olivaceous to medium olivaceous-brown, 0–4-septate, often constricted at the septa, thin-walled (wall up to 0.75 µm wide), smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–25 µm long, conidiogenous loci inconspicuous or subdenticulate, but always unthickened and not darkened. Conidia solitary, obclavate-cylindrical, (10–)20–70 × (2.5–)3–5(–5.5) µm, 1–7-septate, distance between septa about 8–15 µm, subhyaline to pale olivaceous, smooth or almost so, apex obtuse to subacute, base short obconically truncate, 1.5–2 µm wide, hilum neither thickened nor darkened.

Material examined – CUBA, Bayamo, on leaves of *Trichilia hirta* L. (*Meliaceae*), 28 Jan. 1967, R. Urtiaga 9 (IMI 125049 = K(M) 176142, **holotype**); l.c., on *T. hirta*, without date, R. Urtiaga 1161 (IMI 131876 = K(M) 176143, **paratype**).

Notes – *Pseudocercospora trichiliae* (U. Braun) U. Braun (≡ *Cercostigmia trichiliae* U. Braun) on *Heynea trijuga* Roxb. (= *Trichilia connaroides* (Wight & Arn.) Benth.) is a quite distinct species with sporodochial conidiomata, percurrently proliferating conidiogenous cells and pale conidiophores and conidia (Mehrotra & Verma 1994, Braun 1995a). Several other *Pseudocercospora* spp. have been described on hosts of various genera belonging to the *Meliaceae*. The South African *P. ekebergiae* (Crous & B. Sutton) U. Braun & Crous is also a former *Cercostigmia* with percurrently proliferating conidiogenous cells (Braun & Hill 2002). *Pseudocercospora aphanamixidis* M.K. Khan, M.S. Khan & Kamal on *Aphanamixis* sp. in India (Khan et al. 1994), *P. cedrelae* (S. Chowdhury) T. De on *Toona ciliata* M. Roem. (≡ *Cedrella toona* Roxb. ex Rottler & Willd.) in India (Chowdhury 1961, Braun et al. 2003), *P. cedrelae-mexicanae* U. Braun & Crous on *Cedrela odorata* L. (= *C. mexicana* M. Roem.) in Venezuela (Braun et al. 2003), *P. didymochetonis* (Wakef.) Y.L. Guo on *Dysoxylum richii* C. DC., Fiji (Chupp 1954,

Guo 1999), *P. subsessilis* (Syd. & P. Syd.) Deighton (incl. *Pseudocercospora meliae* A.N. Rai & Kamal, ?*P. meliacearum* C.D. Sharma et al., *P. sagarensis* S.A. Firdousi et al., *Pseudocercospora indica* A.N. Rai, B. Rai & Kamal, *P. meliae* S.R. Chowdhury & Chandal), widespread on *Azadirachta* spp. (Chupp 1954, Hsieh & Goh 1990, Guo & Hsieh 1995, Kamal 2010), and *P. toonae* M.D. Mehrotra & R.K. Verma (= *P. toonae* Y.L. Guo & X.J. Liu) on *Toona sinensis* (A. Juss.) M. Roem. in China and India (Guo & Hsieh 1995) are distinguished from *P. trichiliae-hirtae* by consistently fasciculate conidiophores, i.e. superficial hyphae with solitary conidiophores are lacking.

Four comparable *Pseudocercospora* spp. on Meliaceous hosts characterized by the formation of superficial hyphae with solitary conidiophores are known, but all of them form distinct leaf spots. *P. swieteniae* U. Braun & Urtiaga on *Swietenia macrophylla* King in Venezuela (Braun & Urtiaga 2008) is morphologically very close to *P. trichiliae-hirtae* but differs in having unbranched conidiophores and narrower conidia, 2.5–4 µm wide, with narrower hila, 1–1.5 µm. *P. amoorae* A.K. Das on *Aphanamixis polystachya* (Wall.) R. Parker (= *Amoora rohituca* (Roxb.) Wight & Arn.) in India (Das 1991) and *P. meliicola* J.M. Yen, A.K. Kar & B.K. Das on *Azadirachta indica* A. Juss. (= *Melia azadirachta* L.) in India (Yen et al. 1982c) are characterized by usually unbranched conidiophores and longer, pluriseptate conidia, up to 120 µm. *Pseudocercospora toonae-ciliatae* U. Braun, **nom. nov.**, MycoBank, MB 801970 (Bas.: *Cercoseptoria cedrelae* J.M. Yen, A.K. Kar & B.K. Das, Mycotaxon 16: 82, 1982, non *Pseudocercospora cedrelae* (S. Chowdhury) T.K. De, 1992) on *Toona ciliata* is easily distinguishable from *P. trichiliae-hirtae* by its intraepidermal stromata and cylindrical-filiform conidia with truncate base that are longer and narrower, 50–80 × 2–2.5 µm (Yen et al. 1982c). *Cercoseptoria* is an established synonym of *Pseudocercospora*, but *Cercoseptoria cedrelae* has not yet been reallocated to the latter genus, although morphologically quite distinct from all other *Pseudocercospora* species on *Toona* and other Meliaceous hosts.

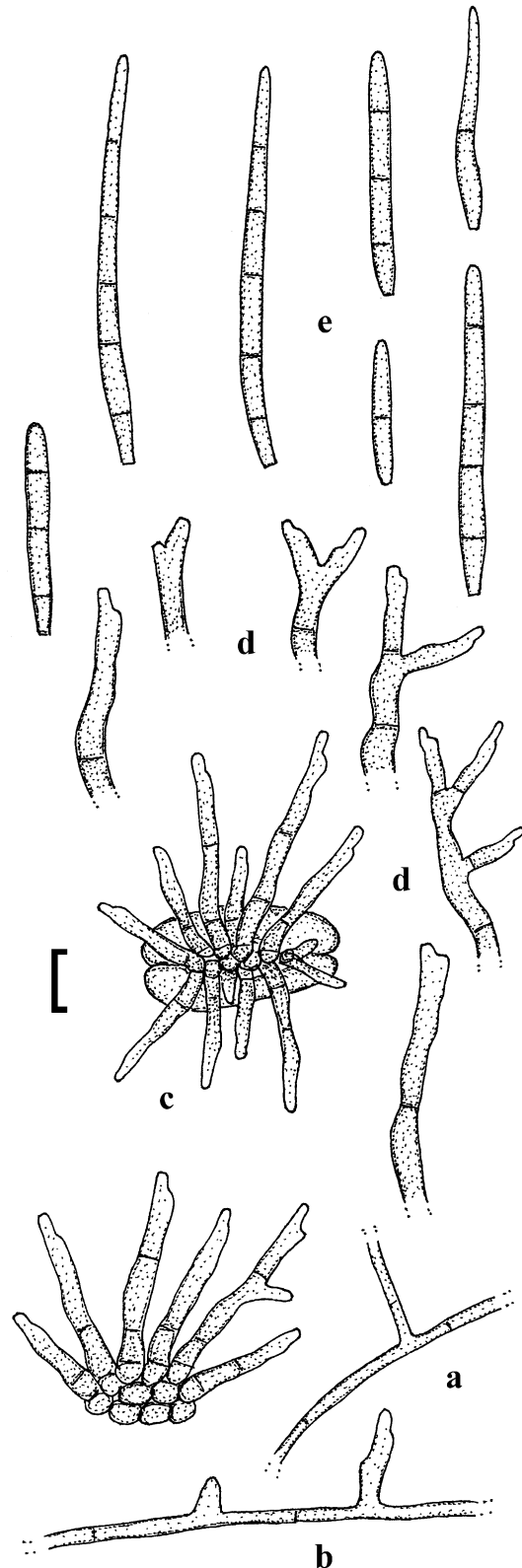


Fig. 17 – *Pseudocercospora trichiliae-hirtae*. Based on type material. **a** Hypha. **b** Solitary conidiophore arising from superficial hyphae. **c** Conidiophore fascicle. **d** Conidiophores. **e** Conidia. – Bar = 10 µm.

Pseudocercospora trichostigmatis (F. Stevens)
Deighton

≡ *Cercospora trichostigmatis* F. Stevens.

Material examined – VENEZUELA, Lara, Barquisimeto, zoological garden, on leaves of *Trichostigma octandrum* (L.) H. Walter (*Phytolaccaceae*), Jan. 2008, R. Urtiaga 102 (HAL 2531 F); l.c., Nov. 2009, R. Urtiaga 297 (HAL 2537 F).

Notes – New to Venezuela (Crous & Braun 2003, Iturriaga & Minter 2006).

Pseudocercospora zuelaniae U. Braun & Urtiaga, **sp. nov.** Fig. 18
Mycobank, MB 801971.

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

Differt ab omnibus speciebus *Pseudocercosporae* ad *Samydaceas* (*P. caseariae*, *P. caseariigena*, *P. cylindrosporioides*, *P. dovyalidis*, *P. samydacearum*) hyphis superficialibus evolutis.

Leaf spots amphigenous, subcircular to angular-irregular, 2–20 mm diam., pale to dark brown, later greyish brown to dingy greyish white, margin indefinite or limited by darker veins or a narrow dark border, dark brown to blackish, in addition often with a diffuse reddish to purple-violet halo. Caespituli epiphyllous, punctiform, dark brown to blackish, scattered. Mycelium internal and external; superficial hyphae amphigenous, emerging through stomata, straight to sinuous, branched, 1–3.5 µm wide, septate, subhyaline to pale olivaceous-brown, smooth, thin-walled; stromata on the upper side, intraepidermal, brown, 10–40 µm diam., immersed to slightly erumpent, subcircular to somewhat irregular in outline, cells 2–5 µm diam. Conidiophores in small to moderately large, usually loose fascicles, arising from internal hyphae or stromata on the upper leaf side, erumpent (solitary conidiophores arising from superficial hyphae not observed), subcylindrical or somewhat attenuated towards the tip, straight to strongly geniculate-sinuous, unbranched or occasionally irregularly branched, 10–70 × 2.5–5 µm, 0–6-septate, thin-walled, smooth, pale to medium olivaceous or olivaceous-brown; conidiogenous cells integrated, terminal, occasionally conidiophores reduced to conidiogenous cells, 5–25 µm long, conidiogenous loci inconspicuous to subdentate, but always unthickened and not darkened. Conidia formed singly, obclavate-cylindrical, short conidia sometimes ellipsoid-subcylindrical or fusiform, (10–)20–65 × 2–4.5 µm, (0–)1–5(–6)-septate, subhyaline to very pale olivaceous or olivaceous-brown, smooth, thin-walled, apex obtuse to subacute, base short obconically truncate, 1–2 µm wide, hila neither thickened nor darkened.

Material examined – CUBA, Alegria del Pio, Niquero, on leaves of *Zuelania guidonia* (Sw.) Britton & Millsp. (*Samydaceae* [= *Salicaceae* tribe *Samydeae*]), 18 Mar. 1968, R. Urtiaga 1167 (IMI 132514 = K(M) 176156, **holotype**).

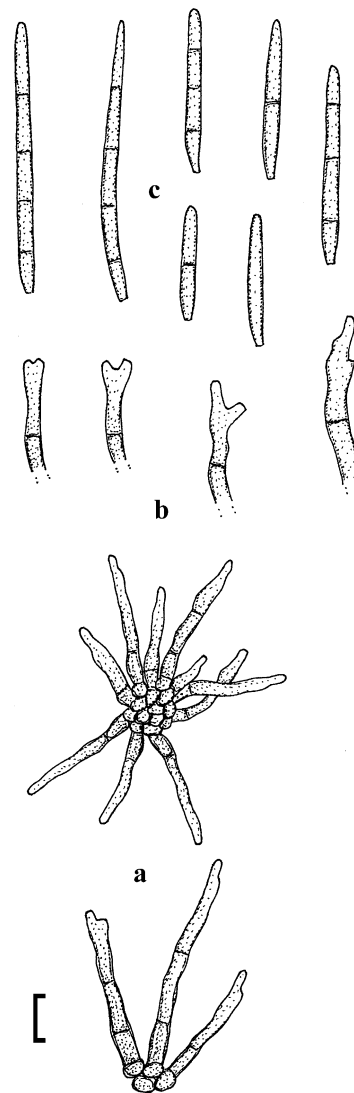


Fig. 18 – *Pseudocercospora zuelaniae*. Based on type material. **a** Conidiophore fascicles. **b** Conidiophores. **c** Conidia. – Bar = 10 µm.

Notes – The genus *Zuelania* was previously assigned to the family *Flacourtiaceae*, which is now considered a synonym of the *Salicaceae*. Within the latter family it belongs in the tribe *Samydeae*. In a recently published phylogenetic examination, William (2012) emphasized to recognize this group as a separate family – *Samydaceae*. *Pseudocercospora zuelaniae* is characterized by the formation of epiphyllous as well as hypophyllous superficial mycelium, but without any solitary conidiophores arising from such external hyphae. On the lower side, additional distinctly verruculose, *Zasmidium*-like hyphae have been observed. Superficial mycelium is lacking in all other *Pseudocercospora* spp. on hosts belonging to this tribe or family. Furthermore, *P. caseariae* (F. Stevens) U. Braun & Sivapalan differs in having much shorter conidiophores (5–20 µm) and wider conidia (4–6.5 µm), *P. caseariigena* H.S.G. Rao, S. Chandra & Kamal is well characterized by its very long (up to 126.5 µm), pluriseptate, often branched conidiophores and very long conidia (up to 140 µm), *P. cylindrosporioides* (Solheim & Chupp) Y.L. Guo & X.J. Liu has densely arranged, short conidiophores arising from well-developed stromata and cylindrical to almost acicular conidia, *P. dovyalidis* (Chupp & Doidge) Deighton, recorded on *Guidonia tomentosa* (Roxb.) Kurz [= *Casearia tomentosa* Roxb.] (Crous & Braun 2003), possesses narrowly linear-cylindrical to subacicular conidia, and *P. samydacearum* A.K. Singh, Kamal & S.K. Singh (incl. *Cercoseptoria caseariae* Abbasi, R. Kumar & Kamal) is easily distinguishable by its large stromata, up to 80 µm diam., shorter conidiophores (5–30 µm) and longer pluriseptate conidia (Chupp 1954, Singh et al. 1985, Rao et al. 1995, Braun & Sivapalan 1999). *P. flacourtiicola* U. Braun & Kamal on *Flacourtia indica* (Burm. f.) Merrill in Nepal is a rather similar species, but superficial mycelium is not formed (Braun et al. 2003). Other *Pseudocercospora* species on former flacourtiaceous hosts are also distinct from *P. zuelaniae* by lacking superficial hyphae and some additional differences: *P. kiggelariae* (Syd.) Crous & U. Braun on *Kiggelaria africana* L. in South Africa forms large stromata with numerous densely fasciculate conidiophores and narrowly

cylindrical-filiform conidia and *P. pangiiicola* U. Braun & Sivapalan from Brunei on *Pangium edule* Reinw. has much broader hila, 2–3.5 µm (Chupp 1954, Crous & Braun 1994, Braun & Sivapalan 1999).

***Ramularia occidentalis* Ellis & Kellerm.**

= *Ramularia pratensis* var. *angustiformis* U. Braun.

Material examined – VENEZUELA, Rio Claro, La Cunchilla, on leaves of *Rumex patientia* L. (*Polygonaceae*), Apr. 2009, R. Urtiaga 239 (HAL 2540 F).

Notes – New host and new to Venezuela (Braun 1998). The conidiophores in this collection on *Rumex patientia* are only 1.5–3 µm wide, and the conidia are 5–30 × (1–)1.5–2(–2.5) µm, which agrees well with *Ramularia occidentalis*. However, in typical collections of the latter species, leaf spots are lacking or diffuse, expanded, yellowish, ochraceous to brownish, finally grey. The specimen on *Rumex patientia* has distinct leaf spots, rather agreeing with lesions formed by *Ramularia pratensis* Sacc. Based on distinct, *Ramularia pratensis*-like leaf spots and narrow conidia, a North American collection on *Rumex acetosella* was described as *R. pratensis* var. *angustiformis* (Braun 1998). This variety should be reduced to synonymy with *Ramularia occidentalis*. Typical collections of the latter species without distinct leaf spots are also known from North America on *Rumex acetosella* (Braun 1998). The taxonomic value of differences in the lesions is unclear and may be influenced by reactions of particular hosts. *Ramularia indica* K.L. Kothari, M.K. Bhatn. & N.S. Bhatt (= *R. pakistanica* S.A. Khan & M. Kamal), known from India and Pakistan on *Rumex dentatus* L., has narrow conidiophores and conidia, agreeing with those of *Ramularia occidentalis*, but due to distinct leaf spots Braun (1998) treated this fungus as variety of the later species. The relation between *Ramularia indica* and *R. occidentalis* is not quite clear, but the Asian species should be maintained as a separate species, at least tentatively.

***Stenella araguata* Syd.**

Material examined – VENEZUELA, La-

ra, Rio Claro, La Cuchilla, on leaves of *Pithecellobium dulce* (Roxb.) Benth. (*Fabaceae*), Apr. 2009, R. Urtiaga 235 (HAL 2554 F).

Notes – This is a new collection of this species, which was described on type material from Venezuela.

Zasmidium cubense U. Braun & Urtiaga, **sp. nov.** Fig. 19

MycoBank, MB 801972.

Etymology – epithet referring to Cuba.

Zasmidium oliganthis valde similis sed maculis foliorum formantibus et conidiophoris aequabiliter latis vel apicem versus attenuatis.

Leaf spots amphigenous, subcircular to angular-irregular, 1–5 mm diam. or confluent and larger, darker brown on the upper leaf surface, paler brown below, margin indefinite, sometimes vein-limited. Colonies hyphophyllous, inconspicuous. Mycelium internal and external; hyphae emerging through stomata, superficial, sometimes climbing leaf hairs, branched, 1.5–4 μm wide, septate, subhyaline to pale olivaceous, thin-walled, verruculose. Stromata lacking. Conidiophores solitary, arising from superficial hyphae, lateral, rarely terminal, erect, straight, conical, subcylindrical and straight to distinctly geniculate-sinuous, unbranched, width uniform throughout or attenuated towards the tip, 5–45 \times 2–5 μm , 0–3-septate, pale olivaceous to olivaceous-brown, thin-walled, smooth to faintly rough-walled; conidiophores reduced to conidiogenous cells or integrated, terminal to intercalary, 5–30 μm long, conidiogenous loci conspicuous, usually several per cell, slightly thickened and darkened, in front view visible as minute dark circle, 1–1.5 μm diam. Conidia solitary, cylindrical, subacicular to almost obclavate, 15–60 \times 2.5–4 μm , (0–)1–6-septate, subhyaline to pale olivaceous or brownish, thin-walled, verruculose, apex obtuse to subacute, base truncate to short obconically truncate, 1.5–3 μm wide, hilum very slightly thickened and somewhat darkened-refractive.

Material examined – CUBA, Bayamo, on leaves of *Koanophyllon villosum* (Sw.) R.M. King & H. Rob. [= *Eupatorium villosum* Sw.] (*Asteraceae*), 18 May 1967, R. Urtiaga C-503 (IMI 127702 = K(M) 176158, **holotype**).

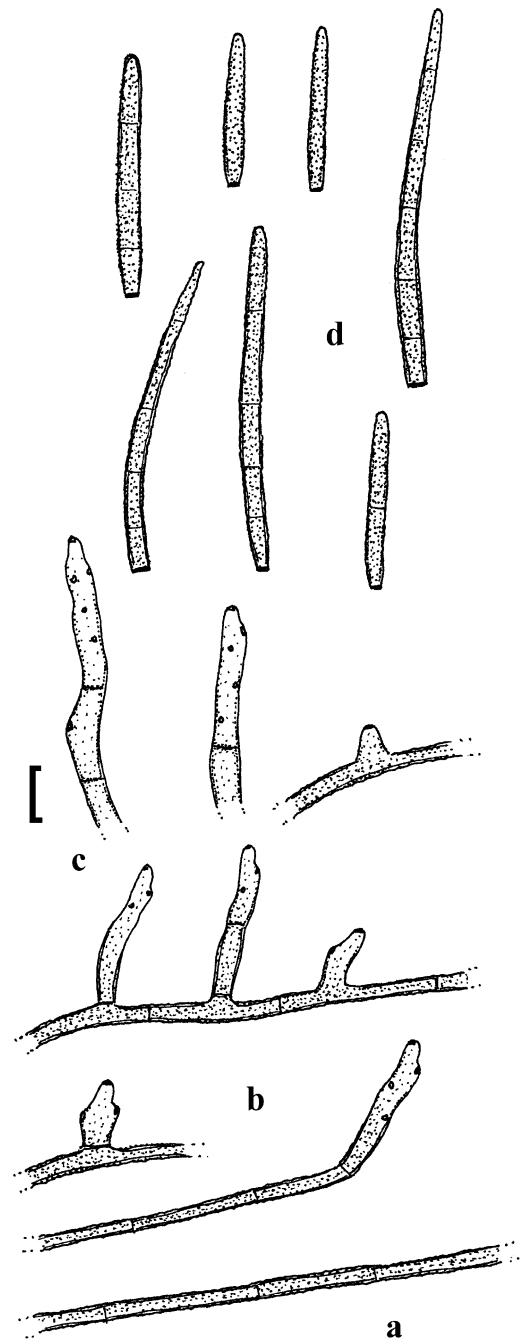


Fig. 19 – *Zasmidium cubense*. Based on type material. **a** Hyphae. **b** Solitary conidiophores arising from superficial hyphae. **c** Conidiophores. **d** Conidia. – Bar = 10 μm .

Notes – Several *Zasmidium* species have been described on host plants belonging to the *Asteraceae*. *Z. oliganthis* (R.E.D. Baker & W.T. Dale) U. Braun & Crous, described on *Oliganthes condensata* (Less.) Sch. Bip. from Trinidad, is morphologically close to *Z.*

cubense but leaf spots are lacking in the latter species and the conidiophores are wider near the apex (Chupp 1954, Braun et al. 2010). The other species are quite distinct from *Z. cubense* and easily distinguishable by obvious differences in the characters of conidiophores and conidia. *Z. haematitica* U. Braun & Crous on *Solidago flexicaulis* L. [= *S. latifolia* L.] in North America is characterized by its very long, pluriseptate conidia, 50–260 × 2–4.5 µm (Braun et al. 2003); *Z. kansense* (Syd. & P. Syd.) U. Braun on *Cirsium* spp. in North America is distinguished by its very long conidiophores, 200–500 µm, and broad conidia, 5–7 µm (Chupp 1954, Braun et al. 2010); *Z. oligoneuri* (H.C. Greene) U. Braun & Crous on *Solidago riddellii* Frank in the USA has long conidiophores, up to 115 µm, emerging through stomata, and long, uniformly obclavate conidia, 40–70 × 2.5–4 µm (Crous & Braun 2003); and in *Z. solidaginis* (Chupp & H.C. Greene) U. Braun on several *Solidago* spp. in Asia (India and Japan) and North America, leaf spots are lacking and stomata as well as fasciculate conidiophores are formed (Chupp 1954, Crous & Braun 2001, Kamal 2010).

Zasmidium genipae-americanae U. Braun & Urtiaga, **sp. nov.** Fig. 20
Mycobank, MB 801973.

Etymology – epithet derived from the host species, *Genipa americana*.

Zasmidium coffeae, *Z. naucleae*, *Z. plectroniae*, *Z. xeromphigeni* et *Z. hyptiantherae similis*, sed conidiis valde longioribus, ad 220 µm, et ad 14-septatis.

On living leaves, lesions amphigenous, subcircular to mostly angular-irregular, sometimes confluent, 1–5(–10) mm diam., ochraceous, pale to medium brown, later becoming pale, margin indefinite or limited by somewhat darker veins. Colonies amphigenous, punctiform, scattered, delicate, dark brown to blackish. Mycelium internal and external; superficial hyphae emerging through stomata or arising from stomata, richly developed on the lower leaf surface, less abundant above, sparingly branched, straight and rigid to somewhat sinuous, 1–3 µm wide, septate, thin-walled, subhyaline to pale olivaceous-brown, verruculose. Stromata well-developed, im-

mersed to substomatal, 10–60 µm diam., brown, composed of swollen hyphal cells, 2–8 µm diam., wall somewhat thickened. Conidiophores solitary, arising from superficial hyphae, lateral, rarely terminal, with 1–2 conidiophores per cell, as well as aggregated in small to moderately large fascicles, loose, arising from stomata, through stomata or erumpent, erect, straight, subcylindrical to moderately geniculate-sinuous, unbranched, 5–35 × 2–4 µm, 0–1-septate, pale to medium olivaceous or olivaceous-brown throughout or with paler tips, thin-walled, almost smooth to somewhat rough-walled; conidiophores mostly reduced to conidiogenous cells, or conidiogenous cells occasionally integrated, terminal, 5–25 µm long, with a single to usually several conspicuous conidiogenous loci, circular in outline, slightly thickened and darkened, 1–1.5 µm diam. Conidia formed singly, narrowly obclavate, cylindrical to acicular, 15–80 × 2–4 µm, (0–)1–7-septate, subhyaline to olivaceous-brown, thin-walled, almost smooth to verruculose, apex subacute to obtuse, base truncate to short obconically truncate, rarely long obconically truncate, 1–2 µm wide, hila slightly thickened and darkened.

Material examined – VENEZUELA, Lara, on leaves of *Genipa americana* L. (*Rubiaceae*), 22 Jan. 1970, R. Urtiaga 928 (IMI 146238 = K(M) 176137, **holotype**).

Notes – Several species of *Zasmidium* have been described on hosts belonging to the *Rubiaceae*, but all of them occur on hosts of other genera, are only known from Asia (India and Nepal) and morphologically quite distinct. Stromata and fasciculate conidiophores are lacking in the Indian species *Zasmidium canthii* (J.M. Yen, A.K. Kar & B.K. Das) Kamal on *Canthium didymum* C.F. Gaert. (Yen et al. 1982a, Kamal 2010: 238) and *Z. wendlandiicola* (U. Braun & Crous) Kamal & U. Braun on *Wendlandia exserta* (Roxb.) DC. (Crous & Braun 2003, Kamal 2010: 238). *Z. rubiacearum* (S. Chaudhary, N. Sharma & Kamal) Kamal (Chaudhary et al. 2002, Kamal 2010: 247) on *Wendlandia tinctoria* (Roxb.) DC. has very small stomata composed of a few swollen hyphal cells, much longer conidiophores, up to 113.5 µm, and longer conidia, up to 100.5 µm. *Z. meynae-laxiflorae* (K. Srivast., A.K. Srivast. & Kamal) P.

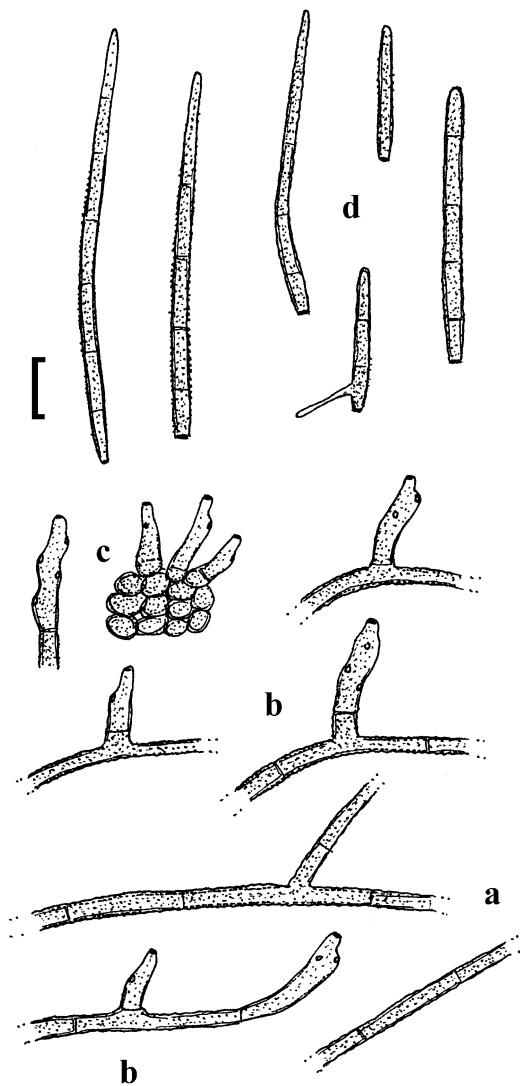


Fig. 20 – *Zasmidium genipae-americanae*. Based on type material. **a** Hyphae. **b** Solitary conidiophores arising from superficial hyphae. **c** Conidiophore fascicle. **d** Conidia. – Bar = 10 μm .

Phengsintham, K.D. Hyde & U. Braun on *Meyna laxiflora* Robyns in Asia (Srivastava et al. 1995, Phengsintham et al. 2009) is distinguished from the new species by its much longer conidiophores, up to about 100 μm and conidia partly formed in chains. *Z. vanguardiae* (M.J. Thirum. & Mishra) Kamal (Kamal 2010: 252) on *Meyna spinosa* Roxb. ex Link is quite distinct by having catenate cladosporioid conidia. All other species of *Zasmidium* on rubiaceous hosts form well-developed stromata, but differ from *Z. genipae-americanae* in having much longer, pluriseptate conidia, up to about

220 μm and about 14 septa [viz. the India species *Z. coffeae* (J.M. Yen, A.K. Kar & B.K. Das) Kamal on *Coffea bengalensis* B. Heyne ex Schult. (Yen et al. 1982b, Kamal 2010), *Z. naucleae* (A.K. Das) Kamal on *Nauclea excelsa* Blume (Das 1990, Kamal 2010: 238), *Z. plectroniae* (K.M. Ponnappa) Kamal on *Canthium coromandelicum* (Burm. f.) Alston (= *Plectronia parviflora* (Lam.) Bedd.) (Ponappa 1968, Kamal 2010: 246) and *Z. xeromphigenum* (Y.M. Yen, A.K. Kar & B.K. Das) Kamal on *Tamilnadia uliginosa* (Retz.) Tirveng. & Sastre (Yen et al. 1982b, Kamal 2010: 252)]. *Stenella hyptiantherae*, described from Nepal on *Hyptianthera stricta* (Roxb. ex Schult.) Wight & Arn., belongs to this group of species with very long, pluriseptate conidia as well. Based on cercosporoid conidia and planate conidiogenous loci and hila, this species undoubtedly belongs to *Zasmidium*, but has not yet been reallocated:

Zasmidium hyptiantherae (S.K. Singh, Arch. Singh & Kamal) U. Braun, **comb. nov.**
Mycobank MB 801974.

Bas.: *Stenella hyptiantherae* S.K. Singh, Arch. Singh & Kamal, Mycol. Res. 101(5): 533, 1997.

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