

New species of *Pseudocercospora*, *Pseudocercospora*, *Ramularia* and *Stenella* (cercosporoid hyphomycetes)

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During the course of a monographic study of the genus *Cercospora*, several previously undescribed cercosporoid hyphomycetes were encountered, some of which are treated in the present paper. Ten new species of *Pseudocercospora* [on *Anogeissus* (Combretaceae), *Catalpa* (Bignoniaceae), *Cedrela* (Meliaceae), *Citrus* (Rutaceae), *Flacourtia* (Flacourtiaceae), *Gelsemium* (Loganiaceae), *Oenothera* (Onagraceae), *Ribes* (Grossulariaceae), *Roystonea* (Arecaceae) and *Vaccinium* (Ericaceae)], two species of *Pseudocercospora* [on *Solidago* (Asteraceae) and *Trichodesma* (Boraginaceae)], two species of *Stenella* [on *Cassia* (Leguminosae) and *Solidago* (Asteraceae)], and a new species of *Ramularia* on *Oplopanax* (Araliaceae) are described.

Taxonomic novelties: *Pseudocercospora anogeissi* U. Braun & Kamal, *P. catalpigena* U. Braun & Crous, *P. cedrelae-mexicanae* U. Braun & Crous, *P. citri* Crous & U. Braun, *P. flacourtiicola* U. Braun & Kamal, *P. gelsemiicola* U. Braun & Crous, *P. grossulariacearum* U. Braun & Crous, *P. oenotherae-speciosae* U. Braun & Crous, *P. roystoneae* U. Braun & Crous, *P. vaccinii-virgati* U. Braun & Crous, *Pseudocercospora ebbelsii* U. Braun & Crous, *P. latifoliae* U. Braun & Crous, *Ramularia oplopanacis* U. Braun, *Stenella cassiae-fistulae* U. Braun & Kamal, *S. haematitica* U. Braun & Crous.

During the course of monographic studies of cercosporoid hyphomycetes for a new annotated checklist of *Cercospora* and *Passalora* species (CROUS & BRAUN 2003), hundreds of type collections and other specimens were examined from numerous herbaria worldwide. Several of these specimens proved to be representative of new, undescribed species of *Pseudocercospora*, *Pseudocercospora*, *Ramularia* and *Stenella*. These taxa form the basis of the present paper, which also compares them to other species known from their respective host genera and families.

Material and methods

All collections have been examined, mounted in distilled water, by standard light microscopy (Olympus BX 50, Hamburg, Germany). Colourless structures have been stained with cotton blue. The collections examined are deposited at the herbaria BPI, CUP, HBG, IMI, NY and WSP (abbreviations according to HOLMGREN, HOLMGREN & BARNETT 1990).

New species

Pseudocercospora anogeissi U. Braun & Kamal, sp. nov.

Fig. 1

Etym.: Derived from the host genus.

Differt a *Cercospora acuminatae* stromatibus magnis, 20–100 μm latis, conidiophoris brevioribus, 5–30 μm longis, conidiis brevioribus, 20–50 μm longis, olivaceis.

Holotype: on *Anogeissus pendula* Edgew. (Combretaceae), INDIA, Madhya Pradesh, Tikamgarh, Dec. 1995, P.N. Singh (IMI 373105).

Leaf spots almost lacking or amphigenous, angular-irregular, 1–6 mm wide, often vein-limited, on the upper leaf surface brownish to reddish brown, on the lower leaf surface dull olivaceous to brown, margin indefinite. Caespituli amphigenous, punctiform, dark brown to blackish. Mycelium internal, occasionally with a few superficial hyphae, sparingly branched, 2–5 μm wide, septate, smooth, subhyaline to olivaceous-brown; stromata well-developed, 20–100 μm diam., substomatal to intraepidermal, olivaceous-brown, composed of swollen hyphal cells, 2–7 μm diam. Conidiophores in small to large fascicles, arising from small to large stromata, rarely solitary, arising from superficial hyphae, erect, straight to moderately geniculate-sinuous, unbranched, 5–30 x 3–6 μm , 0–1(3)-septate, pale olivaceous to olivaceous-brown, smooth, thin-walled; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–20 μm long; conidiogenous loci inconspicuous. Conidia solitary, obclavate-cylindrical, fusiform, 20–50 x 3–5 μm , 2–7-septate, olivaceous, smooth,

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thin-walled, apex obtuse, base obconically truncate, 1.5–2 μm wide, hila unthickened, not darkened.

Several cercosporoid species have been described from the Combretaceae. According to the original description and illustration, *Cercospora acuminatae* S. Das (DAS 1959), which was described from India on *Anogeissus acuminata*, appears to be a species of *Pseudocercospora*. It is, however, quite distinct from *P. anogeissi* sp. nov. in having longer conidiophores, 20–60 μm , in small, loose fascicles arising from internal hyphae (stromata lacking), and longer colourless conidia that are up to 90 μm long. *Pseudocercospora thiloae* U. Braun & F. Freire (in BRAUN, DAVID & FREIRE 1999) and *P. conicarpis* N. Pons, U. Braun & Crous (in CROUS & BRAUN 2003) are two morphologically similar species on other members of the Combretaceae from South America, which are, however, distinguished by having much smaller stromata (10–50 μm diam.), abundant external mycelium with solitary conidiophores and narrower conidia (2–4 μm wide). Numerous species of *Pseudocercospora* are known from *Terminalia* spp. (SUTTON 1994). *Pseudocercospora arjunjae* B. Sutton and *P. combretacearum* R.K. Verma & Kamal are two comparable species with large stromata, but the latter species differs from *P. anogeissi* in having much wider, verruculose, pluriseptate conidia, and *P. arjunjae* is distinguished by having cylindrical, verruculose conidia.

***Pseudocercospora catalpicola* U. Braun & Crous, sp. nov.** Fig. 2

Etym.: Derived from the host genus.

Differt a *P. catalpicola* stromatibus ad 120 μm latis, hyphis superficialibus nullis, conidiophoris semper fasciculatis et conidiis subcylindraceis.

Holotype: on *Catalpa* sp. (Bignoniaceae), USA, West Virginia, Mingo, Aug. 1902, W.A. Kellerman, US State Dept. of Agric., Pathol. Mycol. Coll. 64262 (HBG). Isotypes: BPI, NY.

Leaf spots amphigenous, subcircular to angular-irregular, 2–15 mm wide or confluent and larger, dingy grey to greyish white, with a narrow dull greyish brown, reddish brown, violet-black or black margin, sometimes with a diffuse yellowish to ochraceous or dull reddish brown halo. Caespituli amphigenous, punctiform, scattered to confluent, light to dark brown or blackish. Mycelium internal; stromata large, 20–120 μm diam. or confluent, yellowish to medium brown, immersed, intraepidermal, origin possibly substomatal, composed of swollen hyphal cells, 2–6 μm wide. Conidiophores in small to usually large fascicles, often sporodochial, loose to usually dense, often very dense, arising from stromata, erumpent, straight, subcylindrical-conical to slightly geniculate-sinuous, unbranched, 5–35 x 3–6 μm , 0–1-septate, subhyaline, pale olivaceous or yellowish, thin-walled, smooth; conidiophores usually reduced to conidiogenous cells; conidiogenous loci inconspicuous. Conidia solitary, cylindrical or subcylindrical, 30–105 x 3–5 μm , 3–16-septate, subhyaline to pale yellowish green or olivaceous (medium olivaceous-brown or yellowish brown in

mass), smooth, thin-walled, apex obtuse, usually broadly rounded, base short to long obconically truncate, occasionally rounded, 1.5–2.5 μm wide, hila unthickened, not darkened.

Pseudocercospora catalpicola U. Braun (BRAUN 1999), known from China and the USA on *Catalpa speciosa* and *Catalpa* sp., is easily distinguishable from *P. catalpicola* sp. nov. by having superficial mycelium with solitary conidiophores, much smaller stromata and narrower, obclavate-subcylindrical (-subacicular) conidia, with much smaller hila (1–2 μm wide). There are numerous other species of *Pseudocercospora* on various other hosts of the Bignoniaceae, e.g., *Pseudocercospora cybistacis* (Henn.) X.J. Liu & Y.L. Guo, *P. hansfordii* (Chupp) Deighton, *P. jahnii* (Syd.) U. Braun & Crous, *P. pallida* (Ellis & Everh.) H.D. Shin & U. Braun, *P. sordida* (Sacc.) Deighton, *P. tecomae-heterophyllae* (J.M. Yen) Y.L. Guo & Y.J. Liu, *P. tecomicola* (J.M. Yen) U. Braun & Bagyan, and *P. zeyheriae* (Henn.) Dianese et al., which are easily distinguishable from *P. catalpicola* by having obclavate conidia, small or lacking stromata or superficial hyphae with solitary conidiophores.

***Pseudocercospora cedrelae-mexicanae* U. Braun & Crous, sp. nov.** Fig. 3

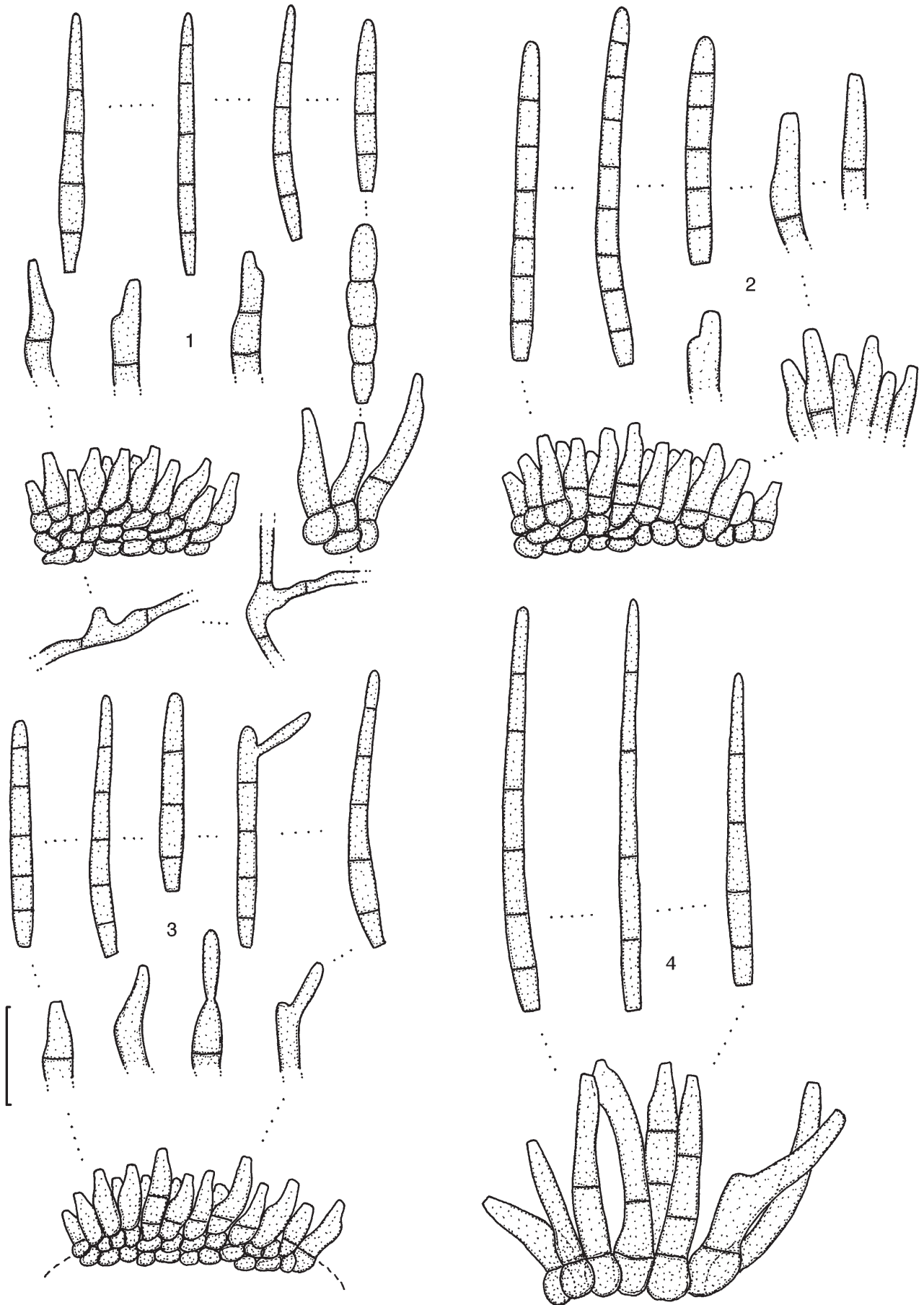
Etym.: Derived from the host species.

Differt a *P. cedrelae* stromatibus 20–80 μm latis, conidiophoris 5–25 μm longis, numerosis, dense fasciculatis, conidiis 20–50 μm longis.

Holotype: on *Cedrela mexicana* M. Roem. (Meliaceae), Venezuela, 19 Nov. 1970, R. Urtiaga 1334 (IMI 153011).

Leaf spots amphigenous, subcircular to angular-irregular, 1–12 mm wide or confluent and larger, dingy greenish to greyish white, margin indefinite, but mostly vein-limited. Mycelium internal; stromata 20–80 μm diam. or confluent and larger, immersed, origin substomatal or intraepidermal, olivaceous-brown, cells 2–6 μm wide. Caespituli amphigenous, punctiform, loose to dense, blackish, later dingy greenish brown by abundant conidial formation. Conidiophores in moderately large to very large fascicles, dense, arising from stromata, mostly forming well-developed sporodochia, erect, straight, subcylindrical-conical to geniculate-sinuous, unbranched, 5–25 x 2–4 μm , 0–1-septate, subhyaline to pale olivaceous or olivaceous-brown, smooth, thin-walled; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–20 μm long; conidiogenous loci inconspicuous. Conidia solitary, narrowly obclavate-cylindrical, 20–50 x 2–4 μm , 2–5-septate, subhyaline to pale olivaceous or olivaceous-brown, smooth, thin-walled, apex subobtuse, base obconically truncate, 1–2 μm wide, hila unthickened, not darkened.

The collection on *Cedrela mexicana* was originally identified as *Cercospora cedrelae* S. Chowdhury (CHOWDHURY 1961) [= *Pseudocercospora cedrelae* (S. Chowdhury) T.K. De]. The latter species, described from India on *Cedrela toona* Roxb. ex Rottl., differs from *P. cedrelae-mexicanae* sp. nov. in having much smaller stromata (10–30 μm wide), smaller, looser and longer conidiophore fascicles (up to 100 μm).



Figs 1-4: Conidiophore fascicles, conidiophores, conidia; 1 – *Pseudocercospora anogeissi*, 2 – *P. catalpigena*, 3 – *P. cedrelae-mexicanae*, 4 – *P. citri*. Scale: 20 μ m.

Type material of *P. cedrelae* (HCIO 26092) was not available and could not be compared, but another Indian specimen on *Cedrela toona*, the type host, was examined (IMI 135168). *Pseudocercospora subsessilis* (Syd. & P. Syd.) Deighton (= *Cercospora subsessilis* Syd. & P. Syd., see CHUPP 1954), common and widespread in tropical and subtropical areas on host species of the genera *Azadirachta*, *Melia* and *Swietenia*, is morphologically close to *P. cedrelae-mexicanae*, but differs in having distinct leaf spots with conspicuous, brown borders and longer conidia, up to 90 μm , with up to 10 septa.

***Pseudocercospora citri* Crous & U. Braun, sp. nov.**

Fig. 4

Etym.: Derived from the host genus.

Maculae amphigenae, subcirculares, modice brunneae, margine diffusio. Mycelium immersum; hyphae pallide brunneae, septatae, ramosae, leves, 3–4 μm latae. Caespituli amphigeni, grisei, ad 50 μm lati et 60 μm alti. Conidiophora laxa vel dense fasciculata, e stromate (ad 40 μm diam.) oriunda, pallide vel modice brunnea, levia, 0–3-septata, subcylindrica, recta vel curvata, raro ramosa, 10–40 x 3–5 μm ; cellulae conidiogenae integratae, terminales, non-ramosae, pallide brunneae, leviae, apicem versus attenuatae, locis truncatis, sympodialiter proliferates; cicatricibus inconspicuis. Conidia solitaria, pallide vel modice brunnea, levia, anguste obclavata, apice subobtusum, basi longe obconice truncata, recta vel curvata, 1–6-septata, 15–80 x 3–4 μm , hila non-incrassata, non-fuscata.

Holotype: on *Citrus* sp. (Rutaceae), Dominican Republic, intercepted at San Juan, Puerto Rico, 15 Feb. 1974, F. Rodriguez (BPI 439369).

Leaf spots amphigenous, sub-circular, medium brown with a diffuse border. Mycelium internal, consisting of pale brown, septate, branched, smooth hyphae, 3–4 μm wide. Caespituli amphigenous, grey, up to 50 μm wide and 60 μm high. Conidiophores aggregated in loose to dense fascicles, arising from brown stromata up to 40 μm wide; conidiophores pale to medium brown, smooth, 0–3-septate, subcylindrical, straight to variously curved, rarely branched, 10–40 x 3–5 μm ; conidiogenous cells integrated, terminal, unbranched, pale brown, smooth, tapering to flat-tipped apical loci, proliferating sympodially, 10–20 x 3–4 μm ; conidiogenous loci inconspicuous. Conidia solitary, pale to medium brown, smooth, narrowly obclavate, apex subobtusum, base long obconically subtruncate, straight to curved, 1–6-septate, 15–80 x 3–4 μm ; hila unthickened, not darkened.

Several species of *Pseudocercospora*, presently accommodated in this genus or elsewhere, occur on Rutaceae. These include *Pseudocercospora chloroxyli* (T.S. Ramakr. & G.S. Reddy) U. Braun, Bagyan. & Jagad., *P. clausenae* (Thirum. & Chupp) X.J. Liu & Y.L. Guo, *P. dictamni* (Fuckel) U. Braun & Crous, *P. evodiicola* (Boedijn) U. Braun, *P. fagarae* (W. Yamam.) Deighton, *P. murrayae* (A.K. Kar & M. Mandal) Deighton, *P. paramignya* (Thirum. & Chupp) Y.L. Guo, *P. xanthoxyli* (Cooke) Y.L. Guo & X.J. Liu, and *P. zanthoxylicola* Crous & U. Braun. These taxa can all be distinguished from *P. citri* based on their conidium morphology (length, width, shape and colour). The species with comparable conidium dimensions include *P. evodiicola* (10–90 x 3.5 μm),

P. xanthoxyli (15–65 x 2.5–4 μm) and *P. zanthoxylicola* (24–80 x 4–5 μm). *P. evodiicola* is distinct by having long, multiseptate conidiophores (10–90 x 3–5 μm), *P. xanthoxyli* by having shorter, 3–9-septate conidia with a different basal taper (more obconically truncate), and *P. zanthoxylicola* by its wider conidia with more abrupt basal taper (34–80 x 4–5 μm) (CHIDDARWAR 1959, GUO & HSIEH 1995, BRAUN 2001, CROUS & BRAUN 2001).

***Pseudocercospora flacourtiicola* U. Braun & Kamal, sp. nov.**

Fig. 5

Etym.: Derived from the host genus.

Maculae amphigenae, subcirculares vel irregulares, 1–6 mm latae, sordide griseo-albidae, margine tenui subnigro cinctae. Caespituli amphigeni, saepe epiphylli, punctiformes, subnigri. Mycelium internum; stromata immersa, substomatalia vel intraepidermalia, 10–60 μm lata, olivaceo-brunnea vel brunnea, ex cellulis 2–8 μm latis composita. Conidiophora laxa vel dense fasciculata, pauca vel numerosa, ex cellulis stromatibus oriunda, per stoma emergentia vel erumpentia, erecta, recta, subcylindrica vel geniculata-sinuosa, non-ramosa vel raro ramosa, (15)20–55 x 1.5–4 μm , 0–4-septata, pallide vel modice olivacea vel olivaceo-brunnea, levia, tenuitunicata; cellulae conidiogenae integratae, terminales vel conidiophora unicellulata, 5–20 μm longa; cicatrices conidiales inconspicuae. Conidia solitaria, anguste obclavata-subcylindrica, hyalina vel pallidissime olivacea, tenuitunicata, levia, apice obtuso vel subacuto, basi obconice truncata, 1–2 μm lata, hila non-incrassata, non-fuscata.

Holotype: on *Flacourtia indica* Merrill (Flacourtiaceae), Nepal, Chitvan, Narainghat, Jan. 1994, S.K. Singh (IMI 374719).

Leaf spots amphigenous, subcircular to irregular, 1–6 mm wide, dingy greyish white, with a narrow blackish margin or marginal line. Caespituli amphigenous, mainly epiphyllous, punctiform, blackish. Mycelium internal; stromata immersed, substomatal or intraepidermal, 10–60 μm wide, olivaceous-brown or brown, cells 2–8 μm diam. Conidiophores in small to moderately large fascicles, loose to dense, arising from stromata, through stomata or erumpent, erect, straight, subcylindrical to geniculate-sinuuous, unbranched or rarely branched, (15)20–55 x 1.5–4 μm , 0–4-septate, pale to medium olivaceous or olivaceous-brown, smooth, thin-walled; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–20 μm long; conidiogenous loci inconspicuous. Conidia solitary, narrowly obclavate-subcylindrical, subhyaline or very pale olivaceous, thin-walled, smooth, apex obtuse or subacute, base obconically truncate, 1–2 μm wide, hila unthickened, not darkened.

According to the original description, *Cercospora flacourtiicola* P.C. Gupta (GUPTA 1973) seems to be close to *P. flacourtiicola* sp. nov., although it has much longer conidia. However, the status of the former species is unclear. Type material was not available for examination. Based on its hyaline conidia, *C. flacourtiicola* could also be a true species of *Cercospora* s.str. The structure of the conidiogenous loci was, however, neither described nor illustrated, so this cannot be confirmed until type material is obtained.

***Pseudocercospora gelsemiicola* U. Braun & Crous, sp. nov.**

Fig. 6

Etym.: Derived from the host genus.

Differt a *P. torta* maculis distinctis, hyphis superficialibus cum conidiophoris solitariis, conidiis 2–4 μm latis et hilis 1 μm latis.

Holotype: on *Gelsemium sempervirens* (L.) W.T. Aiton (Loganiaceae), USA, Florida, La Crosse, 17 Jul. 1936, G.F. Weber 114779 (NY), as '*Cercospora torta*'. Paratype: on *G. sempervirens*, USA, Florida, Gainesville, 11 Aug. 1935, G.F. Weber 10879 (NY).

Leaf spots amphigenous, subcircular to irregular or diffuse, 4–10 mm wide, yellowish to ochraceous or brownish to reddish brown, margin indefinite, sometimes with a diffuse greenish olivaceous to olivaceous-brown halo. Caespituli amphigenous, finely punctiform, blackish. Mycelium internal as well as external, superficial hyphae sparingly branched, 1–2.5 μm wide, septate, subhyaline to pale olivaceous, smooth; stromata lacking to well-developed, substomatal to intraepidermal, 10–60 μm diam., olivaceous to olivaceous-brown. Conidiophores in small to moderately large fascicles, loose to dense, arising from internal hyphae or stromata, through stomata or erumpent, or solitary, arising from external hyphae, lateral (on the upper leaf surface usually in larger, denser fascicles, often even sporodochial; on the lower leaf surface usually in smaller, looser fascicles and also solitary), erect to decumbent (differentiation between decumbent conidiophores and superficial hyphae often difficult), straight, subcylindrical to geniculate-sinuuous, unbranched or occasionally irregularly branched, 5–50 x 2–5.5 μm , 0–4-septate, pale olivaceous, thin-walled, smooth; conidiogenous cells integrated, terminal, or conidiophores reduced to conidiogenous cells, 5–25 μm long; conidiogenous loci inconspicuous. Conidia solitary, narrowly obclavate-subacicular, filiform, 30–90 x 2–4 μm , 3–10-septate, subhyaline to pale olivaceous, thin-walled, smooth, apex subacute to subobtuse, base obconically truncate, 1 μm wide, hila unthickened, not darkened.

Pseudocercospora gelsemiicola sp. nov. is close to *P. torta* (Tracy & Earle) U. Braun & Crous (in CROUS & BRAUN 2003), a North American species on *Mitreola petiolata* Torr. & A. Gray, but differs in having quite distinct leaf spots, superficial hyphae with solitary conidiophores and narrower conidia with smaller hila (1–2 μm in *P. torta*).

***Pseudocercospora grossulariacearum* U. Braun & Crous, sp. nov.**

Fig. 7

Etym.: Derived from the host family.

Maculae nullae vel amphigenae, subcirculares vel irregulares, 1–8 mm diam., sordide olivaceae vel brunneae, deinde griseo-brunneae vel sordide griseae, margine indistincto. Caespituli hypophylli, punctiformes vel subeffusi, brunnei. Mycelium immersum et externum; hyphae sparse ramosae, 1.5–3 μm latae, septatae, subhyalinae, pallide olivaceae vel olivaceo-brunneae, leviae; stromata substomatalia vel intraepidermalia, 10–40 μm diam., olivaceo-brunnea. Conidiophora laxa vel dense fasciculata, pauca vel modice numerosa, ex cellulis stromatibus oriunda, vel solitaria, ex hyphis superficialibus lateraliter oriunda, erecta, recta, subcylindrica-conica vel leviter geniculata-sinuosa, non-ramosa, 5–35 x 2–3.5 μm , 0–1-septata, pallide olivacea vel modice

olivaceo-brunnea, tenuitunicata, levia; cellulae conidiogenae integratae, terminales vel conidiophora unicellulata, 5–25 μm longa; cicatrices conidiales inconspicuae. Conidia solitaria, acicularia, anguste obclavata-cylindrica, 20–100 x 1.5–4 μm , 3–10-septata, subhyalina vel pallide olivacea, levia, apice subobtusum vel subacutum, basi truncata vel obconice truncata, 1–2 μm lata, hila non-incrassata, non-fuscata.

Holotype: on *Ribes uva-crispa* (Grossulariaceae), USA, Alabama, Lee Co., Auburn, 18 Jul. 1896, F.S. Earle (NY), mixed infection together with *Cercospora ribis* Earle.

Leaf spots lacking or almost so or amphigenous, subcircular to irregular, 1–8 mm wide, dingy olivaceous to brownish, later greyish brown to dingy grey, margin indefinite. Caespituli hypophyllous, punctiform to subeffuse, brownish. Mycelium internal and external; superficial hyphae sparingly branched, 1.5–3 μm wide, septate, subhyaline to pale olivaceous or olivaceous-brown, smooth; stromata substomatal to intraepidermal, 10–40 μm diam., olivaceous-brown. Conidiophores in small to moderately large fascicles, loose to moderately dense, arising from stromata, or solitary, arising from superficial hyphae, erect, straight, subcylindrical-conical to slightly geniculate-sinuuous, unbranched, 5–35 x 2–3.5 μm , 0–1-septate, pale olivaceous to medium olivaceous-brown, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–25 μm long; conidiogenous loci inconspicuous. Conidia solitary, acicular, narrowly obclavate-cylindrical, 20–100 x 1.5–4 μm , 3–10-septate, subhyaline to pale olivaceous, thin-walled, smooth, apex subobtusum or subacute, base truncate or obconically truncate, 1–2 μm wide, hila unthickened, not darkened.

Pseudocercospora grossulariacearum sp. nov., the only species of *Pseudocercospora* that occurs on plants in the Grossulariaceae, has been found in the type collection of *Cercospora ribis*, which is a true *Cercospora s.str.* with conspicuously thickened, darkened conidiogenous loci and colourless conidia, indistinguishable from *Cercospora apii* Fresen. s.lat. The two species form mixed infections that were not recognised by CHUPP (1954). Long, pale, acicular conidia of *P. grossulariacearum* resemble those of *C. ribis*, but they are easily distinguishable by having unthickened, non-pigmented hila. The short, pale, thin-walled conidiophores of *P. grossulariacearum* are, however, not confusable with the thick-walled, brown, pluriseptate conidiophores with thickened, darkened conidiogenous loci of *C. ribis*.

***Pseudocercospora oenotherae-speciosae* U. Braun & Crous, sp. nov.**

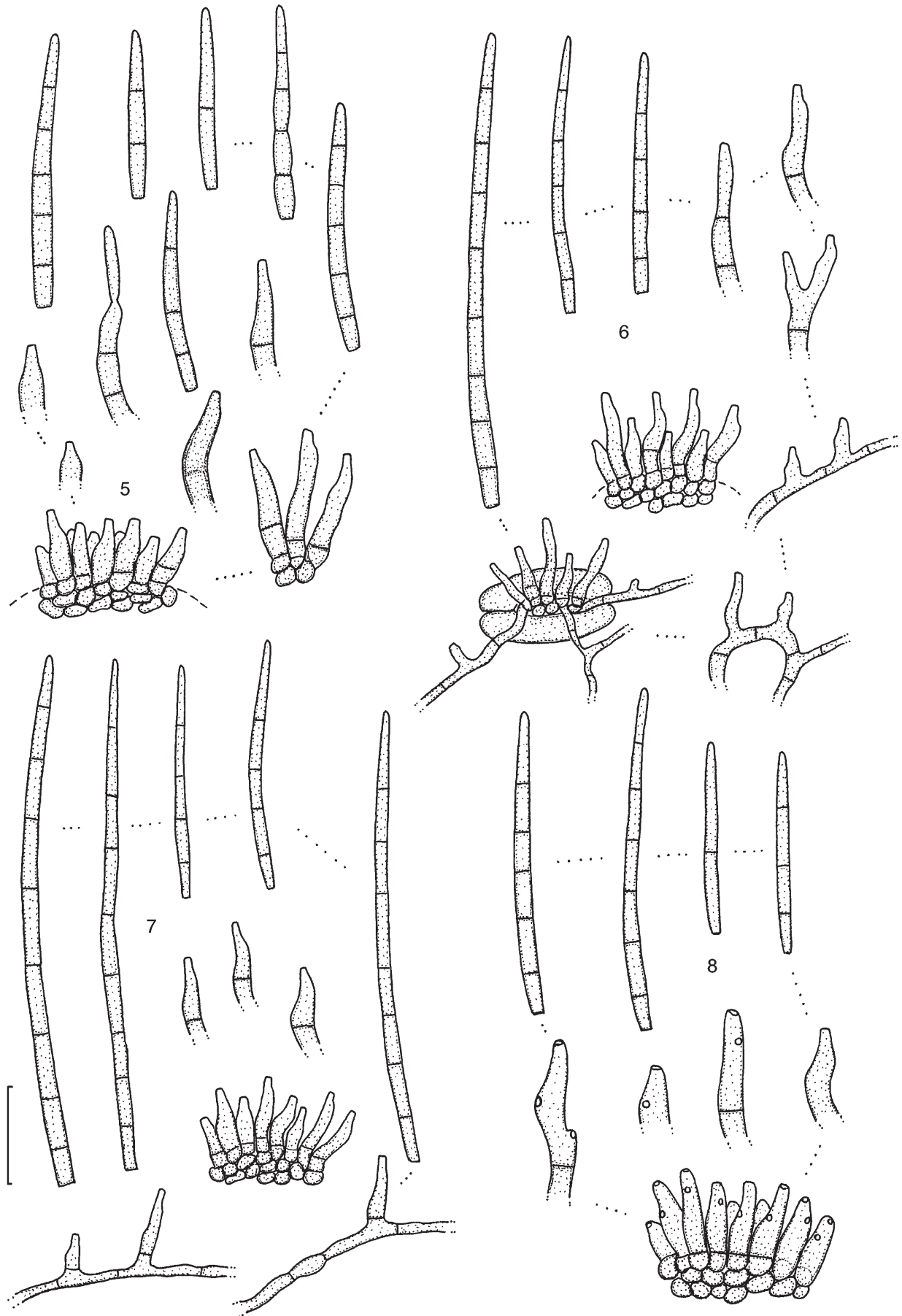
Fig. 8

Etym.: Derived from the host species.

Differt a *P. oenotherae* hyphis superficialibus et conidiophoris solitariis nullis, locis conidiogenis subconspicuis (paracercosporoidibus).

Holotype: on *Oenothera speciosa* Nutt. (Onagraceae), USA, Texas, San Antonio, 6 Mar. 1911, W.P. Carr, Barthol., Fungi Columb. 3410 (NY). Isotypes: Barthol., Fungi Columb. 3410 (e.g., HBG).

Additional material examined: on *Oenothera speciosa*, USA, Kansas, Butler Co., Latham, 26 Jul. 1957, C.T. Rogerson (NY) and USA, Kansas, Pottawatomie Co., North of Wamego, 8 Jul. 1952, C.T. Rogerson (NY).



Figs 5-8: Conidiophore fascicles, conidiophores, conidia; 5 – *Pseudocercospora flacourtiicola*, 6 – *P. gelsemiicola*, 7 – *P. grosulariacearum*, 8 – *P. oenotherae-speciosae*. Scale: 20 μ m.

Leaf spots amphigenous, subcircular to angular-irregular, 1–5 mm wide, at first dingy greenish, later brown, margin narrow, purplish-reddish to brown. Caespituli amphigenous, punctiform, scattered to dense, brown. Mycelium internal; stromata almost lacking or small, 10–35 μm diam., substomatal, yellowish brown to reddish brown, cells 2–6 μm diam. Conidiophores in small to moderately large fascicles, loose to dense, arising from stromata, emerging through stomata, erect, straight, subcylindrical to geniculate-sinuuous, unbranched, 10–40 x 2–6 μm , 0–1(2)-septate, pale olivaceous, yellowish green, later pale yellowish brown to reddish brown, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 10–25 μm long; conidiogenous loci subconspicuous (*Paracercospora*-like, i.e., only ultimate rim very slightly thickened and darkened), 1–2 μm wide, visible as minute circles. Conidia solitary, obclavate-cylindrical, 20–100 x 3–5 μm , 0–9-septate, pale olivaceous or olivaceous-brown, thin-walled, smooth, apex obtuse to subacute, base obconically truncate, 1–2 μm wide, hila unthickened, not darkened, at most ultimate rim slightly refractive.

Collections on *Oenothera speciosa* have usually been referred to as *Cercospora oenotherae* Ellis & Everh. However, *C. oenotherae* (\equiv *Pseudocercospora oenotherae* (Ellis & Everh.) U. Braun & Crous [in CROUS & BRAUN 2003]) is easily distinguishable from collections on *Oenothera speciosa* by having superficial hyphae with solitary conidiophores and quite inconspicuous conidiogenous loci. Type material of the latter species has been re-examined and compared (on *Oenothera biennis* L., USA, West Virginia, Fayette Co., 6 Oct. 1894, Nuttall 599, NY).

***Pseudocercospora roystoneae* U. Braun & Crous, sp. nov.** Fig. 9

Etym.: Derived from the host genus.

Differt a *P. carpentariae* stromatibus 10–50 μm latis, conidiophoris 5–60 μm longis et conidiis obclavatis-cylindratis vel late fusiformibus, (4)5–6(7) μm latis.

Holotype: on *Roystonea regia* O.F. Cook (Arecaceae), USA, Florida, Gainesville, 16 May 1957, J.L. Smith (CUP 41024).

On leaves (probably from seedlings), without definite leaf spots, large, diffuse discolorations, later forming necrotic patches, often large leaf segments or entire leaves discoloured, straw-coloured to brown or dingy greyish brown, margin indefinite. Caespituli amphigenous, punctiform, dark brown to black, scattered. Mycelium internal; stromata substomatal, 10–50 μm diam., brown. Conidiophores in small to moderately large fascicles, loose to dense, arising from stromata, emerging through stomata, erect, straight, subcylindrical to strongly geniculate-sinuuous, unbranched or with short lateral branchlets, 5–60 x 3–6 μm , 0–4-septate, pale olivaceous to medium olivaceous-brown, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–25 μm long; conidiogenous loci inconspicuous. Conidia solitary, obclavate-cylindrical to broadly

fusiform, 40–100 x (4)5–6(7) μm , 4–10-septate, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth, apex obtuse, base obconically truncate, 2–3.5 μm wide, hila unthickened, not darkened.

Pseudocercospora roystoneae sp. nov. is morphologically close to *P. carpentariae* Deighton (DEIGHTON 1987), described from Australia on *Carpentaria acuminata*, but differs in having much smaller stromata, longer conidiophores (up to 160 μm) and wider obclavate-cylindrical conidia, 6.5–8 μm .

***Pseudocercospora vaccinii-virgati* U. Braun & Crous, sp. nov.** Fig. 10

Etym.: Derived from the host species.

Differt a *P. vaccinii* maculis epiphyllis, rubro-purpureis, margine indistinctis, stromatibus nullis, conidiophoris non-fasciculatis et conidiis (30)60–120 x 2–3.5 μm , (3)5–10(12)-septatis.

Holotype: on *Vaccinium virgatum* Aiton (Ericaceae), USA, Florida, Gainesville, 21 Sept. 1936, G.F. Weber (NY).

Leaf spots epiphyllous, angular-irregular, 2–15 mm wide, reddish to purple, margin indefinite. Colonies hypophyllous, effuse, rather inconspicuous. Mycelium internal and external; superficial hyphae emerging through stomata, sparingly branched, 1–3 μm wide, septate, subhyaline to olivaceous-brown, smooth; stromata lacking. Conidiophores solitary, arising from superficial hyphae, lateral, occasionally emerging through stomata, erect, straight, subcylindrical to moderately geniculate-sinuuous, unbranched, 5–40 x 2–5 μm , 0–2-septate, subhyaline to olivaceous, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–25 μm long; conidiogenous loci inconspicuous. Conidia solitary, narrowly obclavate-filiform, (30)60–120 x 2–3.5 μm , (3)5–10 (12)-septate, subhyaline to pale olivaceous, smooth, thin-walled, apex subacute, base obconically truncate, 1–1.5(2) μm wide, unthickened, not darkened.

Pseudocercospora vaccinii (Katsuki & Tak. Kobay.) C. Nakash. & Tak. Kobay., the only other species of *Pseudocercospora* from *Vaccinium* species, is known from China and Japan (KATSUKI & KOBAYASHI 1975; NAKASHIMA & KOBAYASHI 2000). It differs from *P. vaccinii-virgati* in having quite distinct leaf spots (irregular, 5–7 mm wide, at first brown, later turning grey, with narrow brown border), well-developed stromata, fasciculate conidiophores and shorter conidia, 38–70 x 2.5–3.5 μm , 3–7-septate.

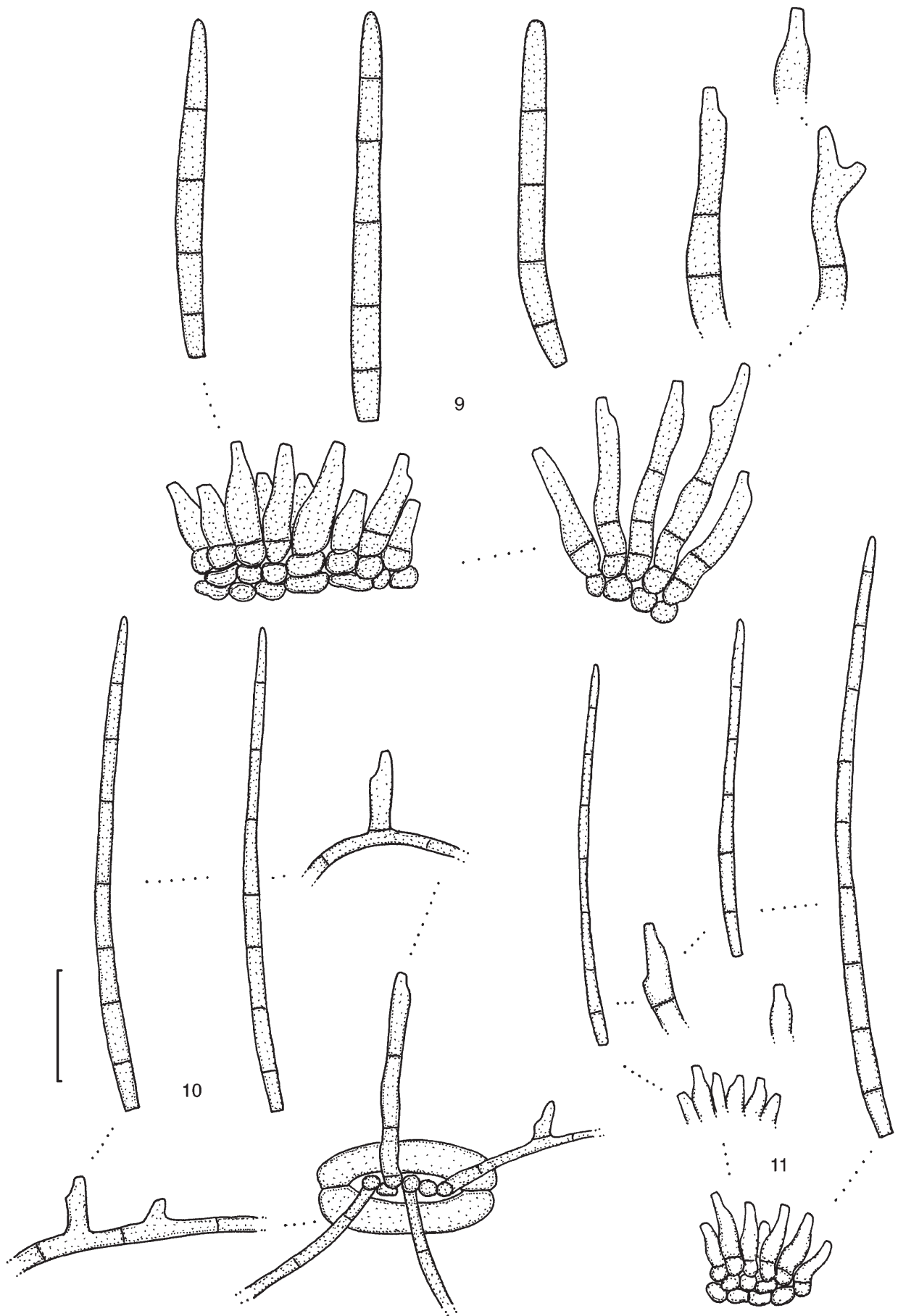
***Pseudocercospora ebbelsii* U. Braun & Crous, sp. nov.** Fig. 11

Etym.: Derived from D.L. Ebbels, the collector.

Differt a *P. lappulae* et *P. solenanthi* conidiis 3–10-septatis.

Holotype: on *Trichodesma zeylanicum* (Boraginaceae), Tanzania, 2 miles west of Shinyanga, Lubaga Research Station, 21 Apr. 1970, D.L. Ebbels 107 (IMI 151224).

Leaf spots lacking or almost so. Caespituli effuse or forming diffuse white patches on brown necrotic leaf segments or entire leaves becoming necrotic. Mycelium internal; stromata



Figs 9-11: Conidiophore fascicles, conidiophores, conidia; **9** – *Pseudocercospora roystoneae*, **10** – *P. vaccinii-virgati*, **11** – *Pseudocercosporella ebbelsii*. Scale: 20 μ m

lacking or small, 10–25 μm diam., colourless, substomatal, or confluent and forming effuse layers. Conidiophores in small to moderately large fascicles, loose to dense, arising from internal hyphae or stromata, emerging through stomata, erect, straight, subcylindrical-conical to flexuous, geniculate-sinuous, unbranched, 5–30 x 1.5–5 μm , 0–1(3)-septate, hyaline, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–20 μm long; conidiogenous loci inconspicuous, occasionally subdenticulate. Conidia solitary, narrowly obclavate-subcylindrical to acicular, 40–120 x 1–2.5 μm , indistinctly pluriseptate, mostly 3–10-septate, hyaline, thin-walled, smooth, apex subacute to subobtuse, base truncate to obconically truncate, 1 μm wide, hila unthickened, not darkened.

Two other species of *Pseudocercospora* are known from the Boraginaceae, namely *P. lappulae* (Dearn. & Bisby) U. Braun and *P. solenantheri* (Vasjagina) U. Braun (BRAUN 1995). *P. ebbelsii* sp. nov. differs from these two species in having pluriseptate conidia (3–10-septate). The conidia in *P. lappulae* are 0–3-septate, and *P. solenantheri* possesses 0–1-septate conidia. *Pseudocercospora trichodesmatis* (Govindu & Thirum.) U. Braun & Crous (in CROUS & BRAUN 2003), known from India on *Trichodesma zeylanicum*, is quite distinct from *Pseudocercospora ebbelsii* by having pigmented, much wider conidiophores and conidia (conidiophores 10–80 x 3–6 μm , conidia 4–9 μm wide).

***Pseudocercospora latifoliae* U. Braun & Crous, sp. nov.** Fig. 12

Etym.: Derived from the epithet of the host species.

Differt a *P. nivea* hyphis superficialibus cum conidiophoris solitariis, conidiophoris non numerosis, laxe fasciculatis, conidiis 20–85 x 2.5–4 μm , 1–8-septatis, hiliis 1–1.5 μm latis.

Holotype: on *Solidago latifolia* L. (Asteraceae), Canada, Ontario, Holland River Marsh, 7 Aug. 1930, H.S. Jackson et al., from 'Univ. Toronto Cryptog. Herb. 2073' (NY).

Paratype: on *Solidago latifolia*, Canada, Ontario, London, J. Dearness, Ellis & Everh., North Am. Fungi 3593 (NY).

Leaf spots amphigenous, angular to irregular, 1–5 mm wide, yellowish-ochraceous to brown, margin indefinite, sometimes with a diffuse yellowish halo. Caespituli hypophyllous, rather inconspicuous. Mycelium internal and external, superficial, emerging through stomata; hyphae sparingly branched, 1–3 μm wide, septate, hyaline, smooth; stromata absent or small, 10–30 μm diam., at first colourless, later turning reddish or pale brownish. Conidiophores in small to moderately large fascicles, loose to moderately dense, arising from internal hyphae or stromata, emerging through stomata or solitary, arising from superficial hyphae, lateral or rarely terminal, erect, straight, subcylindrical to geniculate-sinuous, unbranched, 10–40 x 2.5–6 μm , 0–1(2)-septate, hyaline, smooth, thin-walled; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–25 μm long; conidiogenous loci inconspicuous. Conidia solitary, obclavate-cylindrical, 20–85 x 2.5–4 μm , 1–8-septate, hyaline, thin-walled, smooth,

apex subobtuse to subacute, base obconically truncate, 1–1.5 μm wide, hila unthickened, not darkened.

Pseudocercospora nivea (Ellis & Barthol.) Deighton is a common North American species that occurs on various *Solidago* species. It is, however, easily distinguishable from *P. latifoliae* sp. nov. by having consistently internal mycelium, conidiophores arranged in much larger, denser fascicles, longer conidia that are up to 12-septate, and larger conidial hila, 1.5–2 μm (BRAUN 1995). All other species of *Pseudocercospora* described from various hosts of the Asteraceae (see BRAUN 1995) are clearly distinguished from *P. latifoliae*. *Pseudocercospora harcynica* U. Braun (BRAUN 1995) is a morphologically similar species, but quite distinct by having acicular-filiform conidia with truncate bases and lacking superficial hyphae.

***Ramularia olopanacis* U. Braun, sp. nov.** Fig. 13

Etym.: Derived from the host genus.

Differt a *R. repens* conidiophoris solitariis nullis, conidiis 15–40 x 2.5–5 μm , 0–3-septatis, semper verruculosis.

Holotype: on *Olopanax horridum* (Sm.) Miq. (Araliaceae), USA, Alaska, near Juneau, 26 Jul. 1952, R. Sprague (WSP 33583), mixed infection together with *Mycocentrospora acerina* (Hartig) Deighton (= *Cercospora daemonicola* R. Sprague).

Leaf spots lacking or diffuse to irregular, yellowish-ochraceous, brownish, shape and size variable, margin indefinite. Caespituli hypophyllous, punctiform, greyish white. Mycelium internal and occasionally also external; superficial hyphae sparingly branched, 1.5–3 μm wide, septate, hyaline, smooth; stromata almost lacking to well-developed, substomatal, 10–35 μm diam., hyaline, later turning yellowish to brownish, composed of swollen hyphal cells, 1.5–5 μm wide. Conidiophores in small to moderately large fascicles, loose to moderately dense, arising from internal hyphae or stromata, emerging through stomata, rarely erumpent through the cuticle, erect, straight, subcylindrical to geniculate-sinuous, unbranched or occasionally branched, 5–30 x 2–5 μm , 0–1-septate, hyaline, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–20 μm long; conidiogenous loci conspicuous, slightly thickened, darkened, 1–1.5 μm wide. Conidia solitary or in simple chains, short conidia narrowly ellipsoid-ovoid to subcylindrical, longer conidia cylindrical, (12)15–40 x 2.5–5 μm , 0–3-septate, hyaline, thin-walled, verruculose, apex obtuse, rounded to truncate, base obconically truncate, 1–1.5 μm wide, hila slightly thickened and darkened.

SHAW (1973) reported *Ramularia* sp. on *Olopanax horridum* from Washington (USA). BRAUN (1998) examined this material, deposited at WSP, but did not find any fruiting caused by a *Ramularia* sp. The material from Alaska is, however, a collection with abundant fructification. The *Ramularia* on *Olopanax* is morphologically close to *Ramularia repens*, a North American species on *Aralia* spp., but the latter species differs in having well-developed superficial mycelium with

solitary conidiophores and shorter conidia, 8–25 x 2–5 μm , 0–1-septate. Superficial hyphae have also been observed on *Oplopanax horridum*, but without any solitary conidiophores.

***Stenella cassiae-fistulae* U. Braun & Kamal, sp. nov.**

Fig. 14

Etym.: Derived from the host species.

Latin description: P. Abbasi & D.N. Shukla, Curr. Sci. 49(2): 71–72 (1980).

Holotypus: on *Cassia fistula* L. (Leguminosae), India, Uttar Pradesh, Gorakhpur, St. Andrew College, 4 Feb. 1979, P. Abbasi, PA 2 (IMI 235458).

= *Stenella cassiae* Abbasi & D.N. Shukla, Curr. Sci. 49(2): 71 (1980), nom. inval. (ICBN, Art. 37). [Jan. 1980].

= *Stenella cassiae* Kamal, R.P. Singh & P. Kumar, Sydowia 33: 164 (1980) p.p., nom. conf.

Additional material examined: on *Cassia fistula*, INDIA, Uttar Pradesh, Gorakhpur, 6 June 1976, Kamal, GPU 21 (IMI 204566); INDIA, Uttar Pradesh, Gorakhpur, 6 Nov. 1978, B. Rai, KR 89 (IMI 233406); INDIA, Uttar Pradesh, Gorakhpur, 17 Jan. 1981, A.N. Rai, KR 490 (IMI 254892); INDIA, Uttar Pradesh, Gorakhpur, 22 Oct. 1988, R.N. Chaudhary (IMI 333420); INDIA, Jabalpur, 23 Apr. 1980, V.R. Neelay 31 (IMI 248184); INDIA, West Bengal, Barrakpore, 17 Feb. 1985, P. Gosh 4011 (IMI 297814); INDIA, Jalongi (Murshidabad), 27 Jan., 1967, M. Mandal (IMI 135955); INDIA, Calcutta, 20 Nov. 1978, J.B. Roy (IMI 234130).

Leaf spots at first small, 0.25–1 mm wide, subcircular to angular-irregular, medium to dark brown, later confluent, forming larger patches, up to 20 mm wide or even covering large leaf segments as diffuse brown discolorations. Colonies hypophyllous, effuse, brown. Mycelium internal and external; stromata lacking or small, substomatal, 10–30 μm diam., brown; superficial hyphae emerging through stomata, creeping, more or less straight or only slightly undulate, sparingly branched, 1–4 μm wide, septate, thin-walled, subhyaline to pale olivaceous, brownish around conidiophores, verruculose. Conidiophores solitary, arising from superficial hyphae, lateral, occasionally in small, loose fascicles, arising from stromata, erect, straight, subcylindrical to setiform, only upper fertile portion geniculate-sinuuous, unbranched, 40–150 x 2–4.5 μm , pluriseptate, wall thin to slightly thickened, pale brown or medium to medium dark brown, paler towards the apex, ultimate tips often subhyaline; conidiogenous cells integrated, terminal, 10–40 μm long; conidiogenous loci conspicuous, occasionally subdenticulate, often apically densely aggregated, slightly thickened and darkened, 1–1.5 μm wide. Conidia solitary, cylindrical, narrowly obclavate-cylindrical, 15–100 x 2–6 μm , (0)3–15(22)-septate, occasionally somewhat constricted at the septa, verruculose, pale olivaceous to medium olivaceous-brown, apex obtuse or subobtuse, base short obconically truncate, hila 1–1.5 μm wide, slightly thickened and darkened; conidia sometimes dimorphic (narrow, thin-walled conidia, 2–4.5 μm wide are common, always present; wider conidia, 3–6 μm , with slightly thickened walls sometimes formed and intermixed).

The nomenclatural history of the *Stenella* on *Cassia fistula* is complicated. ABBASI & SHUKLA (1980) [Jan. 1980] described this species as *St. cassiae* from the Gorakhpur range (India, U.P.), but this name is invalid since no type collection was designated (ICBN, Art. 37.1). Original material collected by Abbasi has been found at IMI. KAMAL, SINGH & KUMAR (1980) [Dec. 1980] introduced the homonymous name *Stenella cassiae*, which is, however, a valid and legitimate name since *St. cassiae* Abbasi & D.N. Shukla is invalid. However, *St. cassiae* Kamal et al. is a confused name (nom. conf.). KAMAL, SINGH & KUMAR (1980) cited 'IMI 212608' as holotype, but this collection is an isotype of *Neocosmospora parva* Mahoney, collected from the Galapagos Islands, and does not belong to *St. cassiae* on *Cassia fistula* (J. David, IMI, in litt.). Thus, the latter name must formally be considered a nomenclatural synonym of *Neocosmospora parva*. A misprint of the IMI number can also be excluded since no collection with the data given in the protologue of *St. cassiae* (March 1976, R.P. Singh 302) could be found at IMI. Furthermore the data given in the protologue are confused since the collection data and the fungus under the IMI number cited do not coincide. Furthermore, KAMAL, SINGH & KUMAR (1980) described rather broad conidia, 3.2–8 μm , suggesting that the original description was based on two different elements, viz., the true *Stenella* on *Cassia fistula* (conidia 2–4.5(6) μm wide, conidiogenous loci and conidial hila 1–1.5 μm wide) and a second hyphomycete with much wider conidia (4–8 μm wide, conidiogenous loci and conidial hila 2–3 μm wide). A mixed collection composed of these two species has been found and examined (IMI 248184). The taxonomic affinity of the fungus with wide conidia and larger loci is unclear, and the material examined was too meagre to reach a final conclusion. The conidiogenous cells of this fungus are possibly polytretic. In any case, the name *St. cassiae* Kamal et al. cannot be applied to the true *Stenella* on *Cassia fistula*.

CHAUDHARY & CHAUDHARY (2003) described *Stenella cassiigena* ("cassigena") on *Cassia fistula* from India. This species differs from *Stenella cassiae-fistulae* in having catenate conidia (in simple or branched chains). The differences between *Stenella cassiigena* and *S. cassicola* S. Mishra, A.K. Srivast. & Kamal (MISHRA, SRIVASTAVA & KAMAL 1999) are, however, vague, since the conidia in the latter species are also formed in chains.

***Stenella haematitica* U. Braun & Crous, sp. nov.**

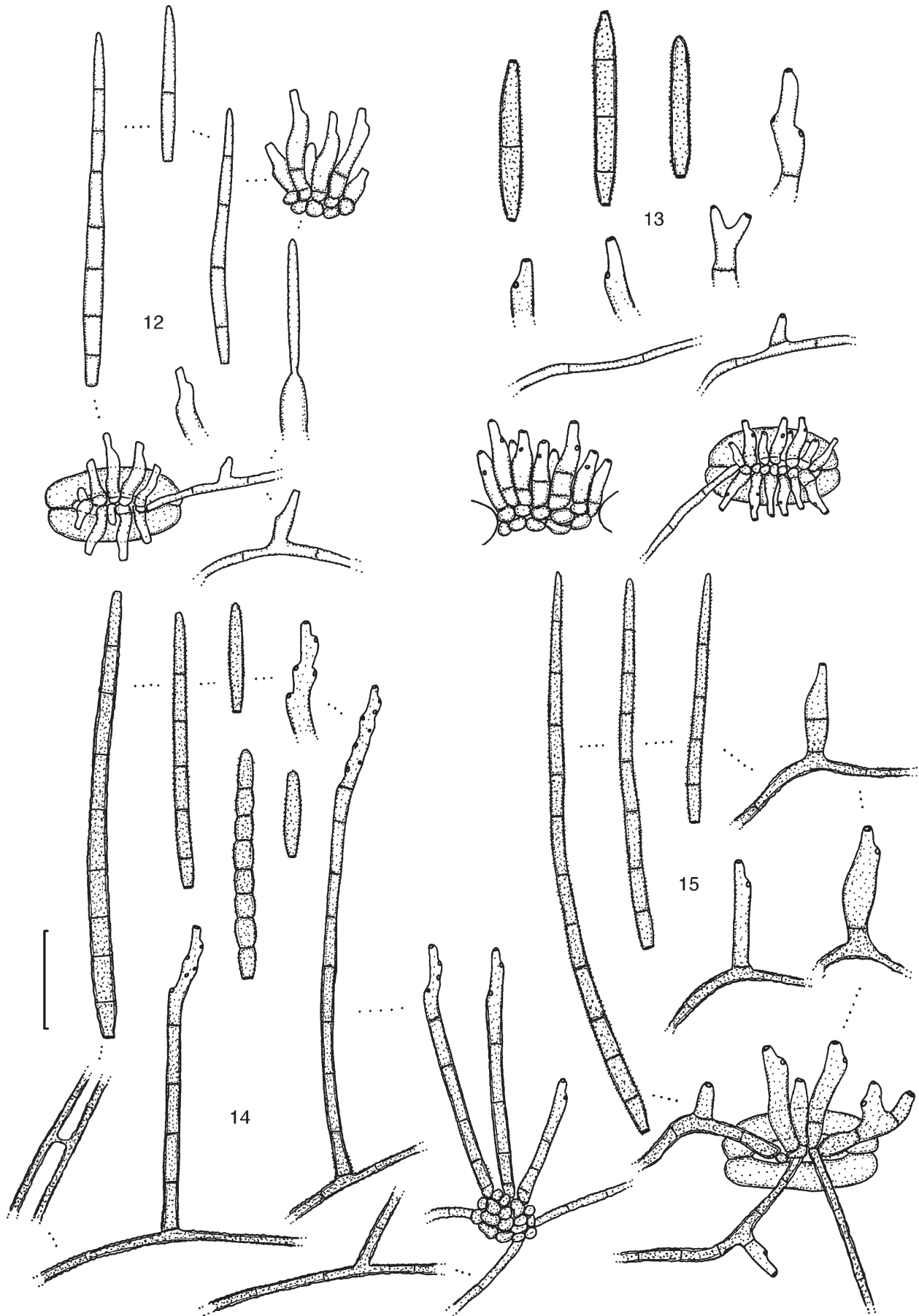
Fig. 15

Etym.: Derived from the colour of the colonies (haematitica = reddish brown).

Differt a *S. oligoneuri caespitulis rubescentis vel rubro-brunneis*, conidiophoris 10–50 x 2–6 μm et conidiis 50–260 x 2–4.5 μm .

Holotype: on *Solidago latifolia* L. (Asteraceae), USA, Wisconsin, Bridgeport, 1 Aug. 1914, J.J. Davis, Fungi Wisconsinenses Exsiccati 29 (NY), as '*Cercospora stomatica*'.

Isotypes: Fungi Wisconsin. Exs. 29 (e.g., WIS).



Figs 12-15: Conidiophore fascicles, conidiophores, conidia; **12** – *Pseudocercospora latifoliae*, **13** – *Ramularia oplopanacis*, **14** – *Stenella cassiae-fistulae*, **15** – *S. haematitica*. Scale: 20 μ m

Paratypes: on *Solidago latifolia*, USA, Wisconsin, Somers, Aug. 1897, J.J. Davis, Ellis & Everh., Fungi Columb. 1277 (NY); Canada, Ontario, London, 18 Aug. 1897, J. Dearness (NY).

Leaf spots amphigenous, angular-irregular, 1–5 mm wide or confluent and larger, up to 20 mm wide, margin indefinite, sometimes with a diffuse yellowish-ochraceous to pale brown halo. Colonies hypophyllous, effuse, reddish to reddish brown. Mycelium internal and external; superficial hyphae emerging through stomata, creeping, branched, 2–4 μm wide, septate, thin-walled, at first hyaline, later pale olivaceous, olivaceous-brown to reddish brown, verruculose; stromata lacking. Conidiophores in small, loose fascicles, arising from internal hyphae, emerging through stomata, or solitary, arising from superficial hyphae, lateral, rarely terminal, erect, straight, subcylindrical-conical to somewhat geniculate-sinuuous, unbranched, 10–50 x 2–6 μm , 0–2(3)-septate, at first hyaline, later pale to medium olivaceous, olivaceous-brown or reddish brown, thin-walled, smooth to verruculose; conidiogenous cells integrated terminal or conidiophores reduced to conidiogenous cells, 5–25 μm long; conidiogenous loci conspicuous, slightly thickened and darkened, (1) 1.5–2 μm wide. Conidia solitary, narrowly cylindrical to slightly obclavate, filiform, 50–260 x 2–4 μm , 3–15-septate, subhyaline, pale olivaceous to reddish brown, thin-walled, verruculose, apex subacute or subobtuse, base truncate to obconically truncate, 1.5–2 μm wide, hila slightly thickened and darkened.

Stenella oligoneuri (H.C. Greene) U. Braun & Crous (in CROUS & BRAUN 2003), a species of *Stenella* occurring on *Solidago*, differs from *S. haematitica* sp. nov. in having brown colonies without any reddish tinge, longer conidiophores (up to 100 μm), and much shorter conidia, 40–70 x 2.5–4 μm , 3–7-septate. *Stenella solidaginis* (Chupp & H.C. Greene) Crous & U. Braun (CROUS & BRAUN 2001), known from Asia and North America on *Solidago*, is quite distinct from *S. haematitica*. Leaf spots are lacking and the conidia are much smaller and wider, 15–50 x 3–5 μm , with 1–7 septa.

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