Cercospora species and similar fungi of South Africa

P. W. CROUS AND U. BRAUN

1Department of Plant Pathology, University of Stellenbosch, 7600 Stellenbosch, South Africa
2Martin-Luther-Universität, FB. Biologie, Institut für Geobotanik und Botanischer Garten, Neuwerk 21, D-06099 Halle (Saale), Germany

This contribution is the second of a series aimed at revising South African records of cercosporoid fungi. The present study describes six species, proposes one new combination, and reports one new record for South Africa. Two species of Ramularia, R. greciae-occidentalis and R. zinniae are described from Grevia occidentalis and Zinnia peruviana respectively. Mycoelosollis dichondrae is described from Dichondra repens, and M. berkeleyae-maritimae from Berkleya maritima, while Fulzia berkeleyae is transferred to Mycoelosollis. Pseudocercospora diospyri-lycioides and Paracercospora scopoliae are described from Diospyros lycioides and Scopolia zygieri respectively, and Cercospora hypotesis noted as a new record on Hypoestes forskalii.

A recent examination of cercosporoid specimens lodged at the National Collection of Fungi in Pretoria (PREM), revealed several as yet undescribed or unreported species of Cercospora Fresen. and related genera. Because South African records of these fungi have not been revised since the study of Chupp & Doige (1948), a systematic revision of specimens lodged at PREM was undertaken. In the first contribution of the present series (Crous & Braun, 1994), seven species and one variety were described and new combinations proposed for four others. The present study describes an additional six species, proposes one new combination and reports one new record for South Africa.

Cercosporella hypotesis Hansf., Proc. Linn. Soc. Lond. 158: 49 (1947). Leaf spots not clearly defined, visible as irregular light brown areas on upper surface; grey-white on lower surface, 3–6 mm diam. Mycelium internal and external; primary hyphae smooth, hyaline, giving rise to minute stromata situated over stomata, 20–35 × 10–15 µm; secondary hyphae giving rise to single conidiophores. Conidiophores smooth, 40–90 µm wide, 20–50 µm high. Conidiogenous cells 1-2-septate. Conidiogenous cells integrated, hyaline, smooth, proliferating sympodially, with thickened, refractive conidial scars, subseptate to Septe., with a rounded apex and subtruncate base, 1-6-septate, 25–75 × 3–4 µm, with thickened, refractive rila (Fig. 1).


Cercosporella hypotesis is a new record for South Africa, being known from its type collection on Hypoestes verticillaris (L. f.) Soland. ex Roem. & Schult. collected in Zaire, Africa. Our collection of C. hypotesis is unusual for Cercosporella, in having secondary, superficial mycelium, that gives rise to solitary conidiophores. This peculiarity was neither mentioned in the original description of this fungus, nor by Deighton (1973).
Fulvia Cif. was originally seen as a synonym of Cladosporium
by von Arx (1973), but later (von Arx, 1983), regarded as a
synonym of Mycocellosiella, which he distinguished from
Cladosporium. Deighton (1974), however, distinguished Fulvia
from Mycocellosiella on the basis of the former having
secondary mycelium which does not climb leaf hairs, and
which is loosely fasciculate. Pons & Sutton (1988) stated
that many species of Mycocellosiella do not climb leaf hairs, and
form loose ropes of hyphae which is a characteristic of Fulvia.
An examination of the type of C. berkheya sp. Syd. showed this
taxon to fall in the Mycocellosiella/Fulvia complex. We are,
however, in agreement with the observations of Pons &
Sutton (1988), and therefore follow von Arx (1983), and
realocate this species to Mycocellosiella.

Mycocellosiella berkheya-maritimaе Crous & U. Braun
sp. nov.

Mycocellosiella berkheyaе (Syd.) U. Braun & Crous comb.
nov.


Fulvia berkheyaе (Syd.) M. B. Ellis, More Dematiaceous Hypho-

Colonies hypophyllous, velvety, effuse, olivaceous brown.
Mycelium internal and external: internal mycelium hyaline to
olivaceous, 3–3.5 μm wide; secondary mycelium arising from
primary mycelium through stroma or from weakly developed
stromata, smooth, medium brown, septate, branched, 5–9 μm
wide. Conidiophores fasciculate or solitary on secondary
mycelium, simple or branched, often constricted at septa,
smooth, medium brown, up to 300 μm long, 4–9 μm wide.
Conidiogenous cells terminal, becoming intercalary, straight or
geniculate-sinuous, indeterminate, regenerating enteroblasti-
cally via irregular, transverse annihilations, smooth to finely
verruculose, 15–45 × 5–10 μm, sympodial, with slightly protuberant,
thickened, refractive, widely spaced conidial scars, 2–3 μm wide. Conidia solitary or catenate, obclavate to
cylindrical or irregularly shaped, apices obtuse to broadly
rounded, bases obconically truncate, with or without lateral
branches, straight or curved, mostly constricted at septa,
medium brown, smooth to finely verruculose, 15–
60(–110) × 6–11 μm, 1.5-septate, with slightly protuberant,
thickened, refractive hila (Fig. 2).

R.S.A.: Natal, Crandom, Berkheya sp., J. B. Pole Evans,
PREM 6852, ex Herb. Sydow at S (holotype).

Leaf spots amphigenous, 1–7 mm diam., circular to irregular,
brown on upper surface, with a raised, dark brown margin;
light brown on lower surface, spots coalescing with age.
Mycelium: primary hyphae internal; secondary mycelium
external, light brown, smooth, up to 6 μm diam., giving rise
to brown, superficial stromata on the upper surface, 30–60 ×
20–40 μm, and single conidiophores on the lower leaf surface.
Casestipitale epiphyllous, situated over stroma, 30–130 μm
wide, 100–150 μm high. Conidiophores occurring singly on
secondary mycelium, or aggregated in fascicles situated on
stromata, light brown, smooth, straight, cylindrical to
geniculate sinuous, 2–6-septate, 40–100 × 4–5 μm. Conidiogenous
cells smooth, olivaceous, straight, cylindrical to
geniculate, 20–45 × 4–5 μm, with thickened, refractive co-
nidial scars. Conidia single, olivaceous, smooth, straight or
curved, forming lateral conidial branches, obclavate to
subcylindrical with a rounded apex and obconically sub-
truncate base, 35–130 × 4–5 μm, 3-10-septate, with thickened,
refractive hila (Fig. 3).

Mycocellosiella berkheyaе-maritimaе is unusual in having
well-developed fascicles. However, this has been reported for
another species of Mycocellosiella, M. concors (Casp.) Deighton
(1974). The conidia are also rather Cercosporinae-like and form
singly, which is not very common in Mycocellosiella.

M. berkheyaе-maritimaе is quite distinct from M. berkheyaе
(Syd.) U. Braun & Crous, which is known from a collection of
Berkheya in South Africa, and has been treated above.
Mycovellosiella dichondrae Crous & U. Braun sp. nov.

Mycovellosiella dichondrae is a typical species of the genus characterized by having covered conidia and fasciculate conidiophores originating from stromata, or single conidiophores forming separately on the brown, smooth, secondary mycelium. As far as we could establish, no other species of Myovellosiella has thus far been described from this host.

Paracerospora scolopiae Crous & U. Braun sp. nov.

Paracerospora scolopiae is discrete, amphiogenous, dark brown, angular, confined by leaf veins, 1–5 mm diam. Mycelium internal, giving rise to minute, brown stromata, 20–30 x 10–15 μm. Conidiophores are hyaline, smooth, straight, subcylindrical to cylindrical, 12–25 μm x 3–4 μm, with thickened, refractive conidial scars. Conidia catenoid, in simple or branched chains, ovate or oval, subcylindrical-fusiform, smooth, 1–4 septate, 18–80 x 2–4 μm, frequently also forming short lateral branches; hila thickened, refractive (Fig. 4).
circles with a slightly thickened and darkened rim when viewed from the front. Conidia solitary, pale olivaceous, straight to strongly curved, subcylindrical or obclavate-acicular, tapering from an obconically subtruncate base to a rounded apex, smooth, 3-20-septate, 35-200 x 2-4 µm, with inconspicuous, narrowly thickened conidial hila; aggregating as strings of white cirri on the leaf surface (Fig. 5).

*Paracercospora scolopiae* is characterized by its almost straight conidiphores without conspicuous geniculations, and the conidial scars that are flattened against the sides of the conidigenous cells. The conidial scars are almost unthickened, but are refractive, conspicuous loci, seen as minute circles with a slight thickening and darkened rim. This type of conidial scar does not agree with that observed in *Cercospora*. The conidia also have narrowly thickened hila, which suggest that this collection is best accommodated in *Paracercospora* (Deighton, 1979). As far as we could establish, no related fungi are presently known from *Scolopia*.

**Pseudocercospora diospyri-lycioides** Crous & U. Braun sp. nov.

*Maculae* amphigenae, orbiculares vel leniter angulares, brunneae, 1-5 mm laeae, margine atrobrunneo cinetae. *Myelium* saepe immersum; stromata subimpressa, 15-40 x 10-15 µm, olivaceae. *Casptihi* amphigeni, modice brunnel, 25-50 x 20-35 µm. *Conidiophora* (= cellularae conidiogenae) paucis in fasciculum densum aggregata, per stoma emergentia, subcylindrica, ampulliformes vel leniter genulata-sinuosa, 10-15 x 2-3 µm, pallide olivacea, monoblastica vel polyblastica, symphydiale; cicatrices conidiales inconspicuae, non incrasatae. Conidia solitaria, pallidissime olivacea, laevia, angustae cylindrica vel subcylindrica, ad apicem rotundata, basi subtruncata, 0-8 septata, 20-110 x 1,5-2 µm.

R.S.A.: Transvaal, Pretoria, Roodeplaat, Experimental Farm, Vegetable & Ornamental Research Institute, *Diospyros* lycioides var.

**Ramularia grewiae-occidentalis** Crous & U. Braun sp. nov.


**Fig. 5.** *Paracercospora scolopiae*. Fasciculate conidiphores and conidigenous cells with minutely thickened loci, giving rise to olivaceous conidia (PREM 51122, holotype; bar = 10 µm; P. Crous del.).

**Fig. 6.** *Pseudocercospora diospyri-lycioides*. Fasciculate conidiphores and conidia (PREM 51106, holotype; bar = 10 µm; P. Crous del.).

*Leaf spots* amphigenous, discrete, circular to slightly irregular, brown with a dark brown margin, 1-5 mm diam. *Myelium* mostly internal, giving rise to olivaceous stromata situated over stomata, 15-40 µm wide, 10-15 µm high. *Casptihi* amphigenous, medium brown, 25-50 µm wide, 20-35 µm high. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous* cells arising from stromata through stomata, in small and dense fascicles, subcylindrical, ampulliform to slightly genulate-sinuous, 10-15 x 2-3 µm, pale olivaceous, monoblastic to polyblastic, proliferating symphydially; conidial scars unthickened, inconspicuous. Conidia solitary, pale olivaceous, smooth, narrowly cylindrical to subcylinrical with a rounded apex and subtruncate base, 0-8-septate, 20-110 x 1,5-2 µm (Fig. 6).

Several *Pseudocercospora* species have been recorded from *Diospyros* L. in Asia (cf. Hsieh & Goh, 1990). *P. diospyri-lycioides* is close to *P. diospyri-erianthae* Goh & Hsieh, but differs in having smaller conidiophore fascicles and narrower conidia. *P. kaki* Goh & W. H. Hsieh possesses very large stromata with numerous conidiophores and wider, subcylindrical conidia. *P. diospyri-morrisontanae* Goh & W. H. Hsieh and *P. diospyricola* Goh & W. H. Hsieh are distinguished by superficial mycelium with secondary conidiophores.
Leaf spots amphigenous, discrete, circular to irregular, brown with a dark brown margin, evenly dispersed, 1–15 mm diam. Mycelium: primary hyphae internal; secondary mycelium external, hyaline, smooth, up to 2 μm wide, forming solitary conidiophores. Conidiophores reduced to conidiogenous cells. Conidiogenous cells hyaline, smooth, solitary, forming on secondary mycelium, integrated, elongating sympodially, straight, subcylindrical to geniculate sinuous, 10–15 × 2.5–4 μm with refractive, thickened scars. Conidia catenate, in simple or branched chains, hyaline, smooth, subcylindrical-fusiform, 5–25 × 1.5–2 μm, 0–3-septate, with refractive, slightly thickened hila (Fig. 7).

Ramularia greuwiae-occidentalis is presently the only species of the genus known to occur on Grewia. It is characterized by having hyaline structures and catenate conidia with thickened, darkened scars. The superficial, secondary mycelium is not uncommon of Ramularia. Although Deighton (1974) proposed to include such species in Mucovellisella, the latter genus should be confined to taxa with coloured structures (cf. Braun, 1990). R. greuwiae-occidentalis can be distinguished from R. greuwiae Lacy & Thirum. (= Mucovellisella greuwiae (Srivast. & Mehta) Deighton), which has solitary, large, wide, obclavate-fusiform conidia (Thirumalachar & Lacy, 1951; Deighton, 1979).

Ramularia zinniae Crous & U. Braun sp. nov.

Maculae amphigenous, orbicularis, 3–7 mm diam, pallide brunnea vel grisea, margine atrobrunnei cinetae. Mycelium immersum; stromata subostomata vel intraepidermalia, 10–30 μm diam, hyalina, sape lentiter erumpentia. Caspti saepe hypophylli, 10–30 × 10–20 μm. Conidiophora (saepe = cellularia conidiogenea) hyalina, laxe fasciculata, per stoma emergentia vel per cuticulam erumpentia. Cellulae conidiogeneae is conidiophoris incorporatae, hyalinae, sympodia, rectae, subcylindraceae vel geniculatae-sinuosae, 5–20 × 2–3 μm; cistae conidia in conidia, minutae, lentiter incassatae, fuscae. Conidia hyalina, catenata, raro ramicatenata, subcylindrica-fusiformia, 5–25–30 × 1–2 (–2.5) μm, laevia, 0–1 septata, hila lenisse incassata, fusca.


Leaf spots amphigenous, discrete, circular, 3–7 mm diam., light brown to grey, surrounded by a dark brown margin. Mycelium internal, forming loose hyphal aggregations; stromata subostomatal and intraepidermal (also in the surrounding cells of the stomatal openings), 10–30 μm diam., colourless, often slightly erumpent. Caspti predominantly hypophyllous, 10–30 μm wide, 10–20 μm high. Conidiophores hyaline, arranged in loose fascicles, arising from stoma, or erumpent through the cuticle of epidermal cells, mostly reduced to conidiogenous cells. Conidiogenous cells hyaline, integrated, elongating sympodially, straight and subcylindrical to geniculate sinuous, 5–20 × 2–3 μm, with minute refractive, slightly thickened scars. Conidia hyaline, catenate, in simple, seldomly branched chains, subcylindrical-fusiform, 5–25 (–30) × 1–2 (–2.5) μm, smooth, 0–1-septate, with minute, thickened, refractive hila (Fig. 8).

Ramularia zinniae is the only species of Ramularia presently known from this host. It is also a typical Ramularia species with simple or branched, conidial chains. Structures also vary from being hyaline to having a slight greenish tinge. The size and thickening of the conidial scars in Ramularia depend directly on the width of the conidia and their hila. Although the conidial scars and hila of R. zinniae are minute, they are still conspicuous.

The authors gratefully acknowledge the assistance of Ms A. P. Baxter and I. Rong at the National Collection of Fungi, Pretoria (PREM) for placing specimens at our disposal for study.
REFERENCES


(Accepted 16 May 1994)


