

Notes on cercosporoid fungi occurring on *Dodonaea* spp.

Pedro W. Crous* and Uwe Braun

*Department of Plant Pathology, University of Stellenbosch, Private Bag X1, Matieland, 76027 Republic of South Africa
Martin-Luther-Universität, FB. Biologie, Institut für Geobotanik und Botanischer Garten, Neuwerk 21, D-06099 Halle (Saale), Germany

Received 8 February 1996; revised 29 May 1996

Passalora dodonaeae Crous & U. Braun is newly described from leaves of *Dodonaea angustifolia* L. from South Africa. Type material of *Cercospora mitteriana* Syd. has been re-examined and this species reduced to synonymy with *Pseudocercospora mitteriana* Goh & W.H. Hsieh. *Pseudocercospora dodonaeae* Boesew. is also discussed, based on the re-examination of type material.

Keywords: *Cercospora mitteriana*, *Dodonaea*, *Passalora dodonaeae*, *Pseudocercospora*, systematics.

* To whom correspondence should be addressed.

Introduction

The present study arose from an attempt to name a collection of a cercosporoid fungus on *Dodonaea angustifolia* L. collected from the J.S. Marais Garden at Stellenbosch in South Africa. Pollack (1987) listed one species from *Dodonaea*, *Cercospora mitteriana* Syd., while Boesewinkel (1981) described *Pseudocercospora dodonaeae* Boesew., and Hsieh and Goh (1990) described *Pseudocercospora mitteriana* Goh & W.H. Hsieh from the same host. The South African collection had dematiaceous conidia with thickened hila, which were borne singly on fascicles of medium brown conidiophores with thickened, refractive scars. Although this collection could not be accommodated in *Pseudocercospora*, the conidial dimensions were similar to those of *P. mitteriana* and *C. mitteriana*. Furthermore, Chupp (1954) commented that the conidia of *C. mitteriana* were olivaceous, thus suggesting it to be inappropriately placed in *Cercospora*. These discrepancies justified a re-examination of the type specimens of these respective fungi.

Treatment of species

Chupp (1954), after examination of the type specimen of *Cercospora mitteriana* Syd., confirmed the observations of Sydow *et al.* (1937) that the conidia were subhyaline. Hsieh and Goh (1990) described a new species on *Dodonaea* as *Pseudocercospora mitteriana* Goh & W.H. Hsieh, using the same epithet. They also commented that *P. mitteriana* may be synonymous with *C. mitteriana*. The name *P. mitteriana* is legitimate as it is validly published with a Latin description although *C. mitteriana* was not definitely cited as synonym. The reallocation of *C. mitteriana* in *Pseudocercospora* would therefore produce a homonym. In the present study, types of both these fungi were examined. Conidia of *C. mitteriana* proved to be subcylindric to narrowly obclavate, pale olivaceous, and to have unthickened hila. Conidiophores were borne in fairly dense hypophyllous fascicles, and had inconspicuous conidial scars. These features are commonly associated with species of *Pseudocercospora*. The fungus represented by the type of *P. mitteriana* Goh & W.H. Hsieh is found to be the same as *Cercospora mitteriana* Syd. Both specimens are similar in their leaf symptoms, hypophyllous stromata, conidiophore and conidium dimensions and septation. *C. mitteriana* Syd. is therefore placed in synonymy under *P. mitteriana* Goh & W.H. Hsieh.

Pseudocercospora mitteriana Goh & W.H. Hsieh, in Hsieh & Goh, *Cercospora* and similar fungi from Taiwan p. 298 (1990) Figure 1.

Cercospora mitteriana Syd. *Ann. Mycol.* 35: 240 (1937).

Leaf spots angular to irregular, often vein-limited, becoming confluent, pale brown to tan with a slightly darker border, 1–4

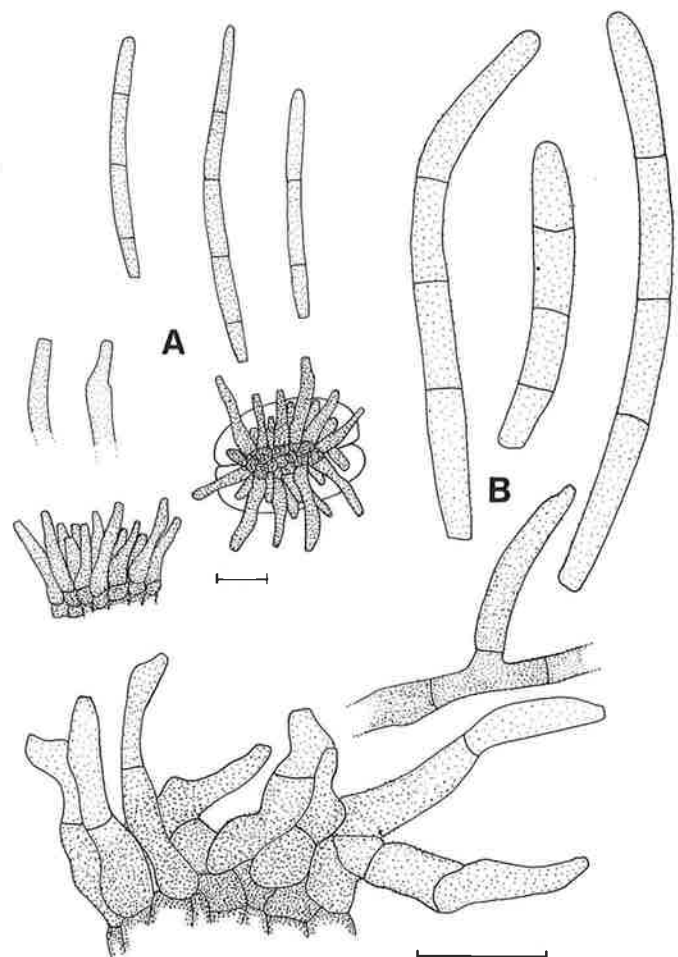


Figure 1 *Pseudocercospora mitteriana* Goh & W.H. Hsieh. A. Conidia and fasciculate conidiophores (GZU). B. Conidia and conidiophores (NCHUPP 155a) (scale bar: 10 µm).

mm diam. Fruiting bodies chiefly hypophyllous. Stromata medium to dark brown, substomatal becoming erumpent, 10–50 μm diam. Conidiophores in moderately rich fascicles, usually fairly dense, arising from stromata, straight, subcylindric to geniculate-sinuuous, flexuous, simple, 10–30 \times 2–5 μm 0–1-septate, pale olivaceous, smooth, with inconspicuous conidial scars. Conidiogenous cells terminal, pale olivaceous, smooth to finely verruculose, tapering to a subobtuse or swollen apex, 6–12 \times 2–3.5 μm . Conidia solitary, subcylindric to narrowly obclavate, 25–90 \times 2.5–4 μm , 2–7-septate, subhyaline to pale olivaceous, apex more or less obtuse, base truncate or somewhat obconically truncate, hilum neither thickened nor darkened.

Specimens examined: India, Jullundur, on leaves of *Dodonaea viscosa*, leg. J.H. Mitter, 25 Sept. 1933, (GZU) (holotype of *C. mitteriana* Syd.); Taiwan, Tailuke Hwalien Hsien, on leaves of *D. viscosa*, leg. T.K. Goh, 1 Feb. 1985 NCHUPP-155a (holotype of *P. mitteriana* Goh & Hsieh).

On examination of NCHUPP 155a and the type lodged at GZU, only some minor differences were observed between them. In some cases, conidiophores were found to occur singly on superficial hyphae, and some large stromata were conidiophores situated on the outside of spermogonia, which in turn had rod-shaped spermatia, 3–4 \times 1 μm .

Pseudocercospora mitteriana should also be compared with *P. dodonaeae* Boesew., which is described below, based on the re-examination of type material.

Pseudocercospora dodonaeae Boesewinkel Trans. Br. mycol. Soc. 77: 454 (1981) Figure 2.

Leaf spots amphigenous, light to medium brown, angular, 1–2 mm diam. Fruiting bodies hypophyllous. Stromata medium to

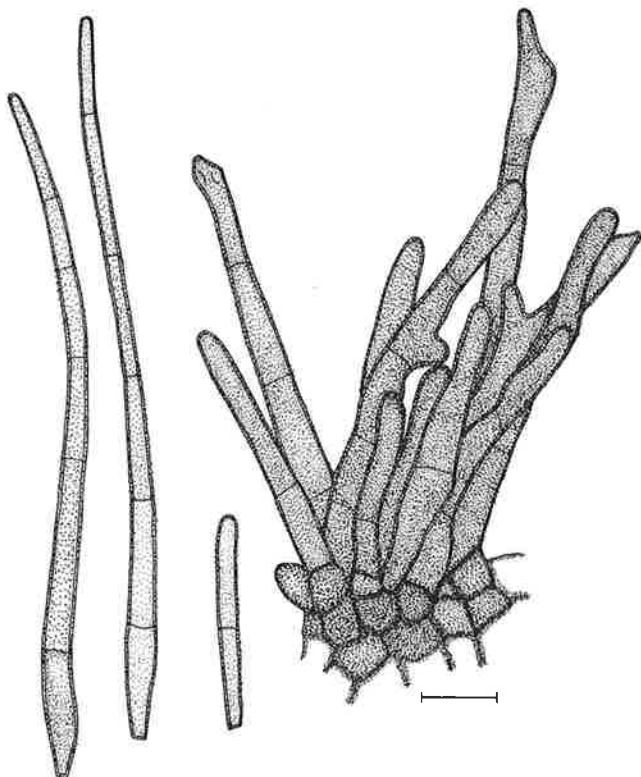


Figure 2 Conidia and conidiophores of *Pseudocercospora dodonaeae* Boesew. (PDD 41332) (scale bar: 10 μm).

dark brown, substomatal to erumpent, up to 80 μm diam.; mycelium internal to external, branched, septate, thick-walled, smooth, brown, 2.5–7 μm diam. Conidiophores in dense, divergent fascicles, arising through stomata, situated on a substomatal or erumpent stroma, straight or sinuous, rarely geniculate in upper part, brown, becoming lighter toward apex, cylindrical, 1–4-septate, 30–90 \times 3–5 μm . Conidiogenous cells light brown, smooth, tapering towards an obtuse or subtruncate apex, 15–40 \times 3.5–4 μm . Conidia solitary, narrowly obclavate, straight to slightly curved, thick-walled, 30–150 \times 2.5–4 μm , 1–6-septate, light brown, smooth to finely verruculose, apex subobtuse, base obconically truncate, hilum 2 μm wide, neither thickened nor darkened.

Specimen examined: New Zealand, Auckland, on leaves of *Dodonaea viscosa*, leg. H.J. Boesewinkel, Jul. 1978, PDD 41332 (holotype).

Boesewinkel (1981) separated *P. dodonaeae* from *P. mitteriana* by the presence of branched conidiophores in the former. An examination of the type of *P. dodonaeae* revealed that the conidiophores were not only branched and multi-septate, but also larger and darker pigmented than in *P. mitteriana*. Furthermore, conidia of *P. dodonaeae* were light brown, not pale olivaceous to almost hyaline as in *P. mitteriana*. Conidia also tended to be thick-walled, longer (30–150 \times 2.5–4 μm), obclavate with a prominently obconically truncate base. Conidia were thin-walled, shorter (25–90 \times 2.5–4 μm), subcylindric and lacked the prominently obconically truncate basal cell in *P. mitteriana*.

Passalora dodonaeae Crous & U. Braun sp. nov., Figure 3.

Maculae amphigenae, 3–15 mm diam., irregulares, brunneae, margine irregulariter diffuso cinctae. Mycelium saepe immersum; hyphae ramosae, septatae, crassitunicatae, leviae vel verruculosae, 3–4 μm latae, brunneae. Caespituli amphigeni, griseo-brunnei, usque ad 110 \times 80 μm . Stromata 20–40 μm diam., brunnea. Conidiophora numerosa, dense fasciculata, 25–40 \times 4–6 μm , 1–3-septata, simplicia, recta vel flexuosa, parietibus crassis, verruculosa, brunneus. Cellulae conidiogerae terminales, subbrunneae, verruculosae, rectae vel curvatae, apicem versus attenuatae, parietibus tenuibus et pallidiorae, apice irregulariter vel obtusis, 15–25 \times 4–6 μm . Cicatrices conidiis leviter fuscae et incrassatae. Conidia solitaria, olivacea, cylindrica-obclavata, crassitunicata, levia, 0–1-septata, curvata, apice obtusis, basi truncata vel obconice truncate, hilo fusco, 25–40 \times 3.5–4 μm . Spermogonia amphigena, usque ad 100 μm diam. Spermata hyalina, bacillariformes, 3–4 \times 1–1.5 μm .

Leaf spots amphigenous, 3–15 mm diam., irregular, rarely extending across the midrib of leaves, not confined by leaf veins, brown with an irregular, diffuse margin. Mycelium mostly internal, consisting of branched, septate, thick-walled, smooth to verruculose, 3–4 μm diam. brown hyphae. Caespituli amphigenous, grey-brown, reaching 110 μm wide, and 80 μm high. Conidiophores fasciculate, arising from brown stromata, 20–40 μm diam. fascicles dense, rich, conidiophores 25–40 \times 4–6 μm , 1–3-septate, unbranched, straight to flexuous, thick-walled, verruculose, medium brown. Conidiogenous cells terminal, light brown, verruculose, straight to curved, tapering towards an irregular or bluntly rounded apex, becoming thin-walled and lighter in colour towards the apex, 15–25 \times 4–6 μm with slightly darkened, thickened, refractive conidial scars. Conidia olivaceous, cylindrical-obclavate, thick-walled, smooth, 0–1-septate, curved, apex obtuse, base truncate to obconically truncate, with a darkened, refractive hilum, 25–40 \times 3.5–4 μm . Spermogonia amphigenous, mixed with caespituli on lesions, reaching 100 μm diam. Spermata hyaline, rod-shaped, 3–4 \times 1–1.5 μm diam.

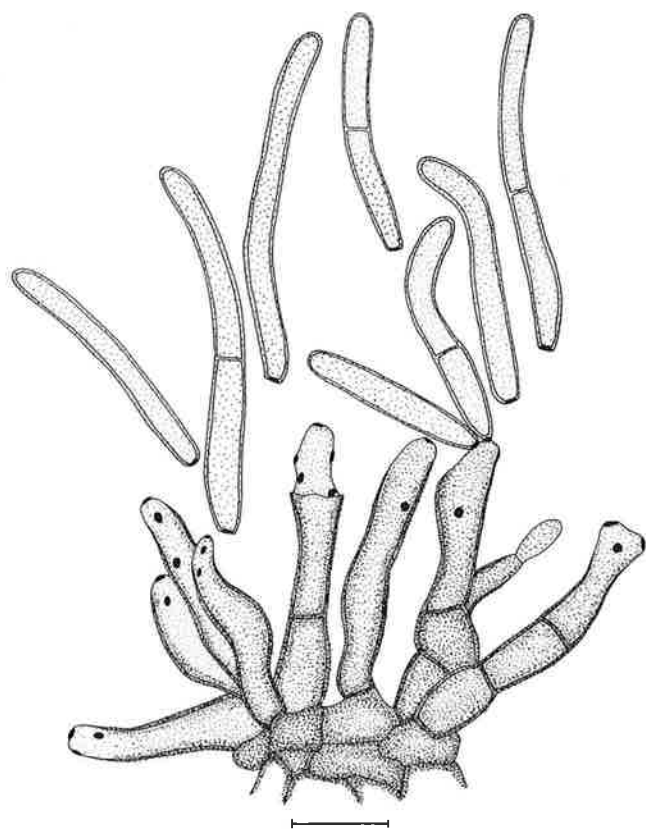


Figure 3 Conidia and conidiophores of *Passalora dodonaeae* Crous & U. Braun. (PREM 52935) (scale bar: 10 μ m).

Cultures on 2% malt-extract agar (MEA) (Oxoid) reaching 15 mm in diam. after 1 month at 25°C on the laboratory bench. Colonies dark green with a dirty-pink margin (underneath), aerial mycelium absent, surface irregular, distorted, dirty pink, with an irregularly lobed margin; sporulating after 1 month on MEA, but not on carnation-leaf agar (Crous *et al.* 1992). Teleomorph not observed or produced in culture.

Specimen examined: South Africa, Western Cape, Stellenbosch, J.S. Marais Garden, living leaves of *Dodonaea angustifolia*, P.W. Crous, August 1995, PREM 52935 (holotype), cultures ex type STE-U 1222, 1223, also lodged at IMI.

Passalora dodonaeae can be separated clearly as a distinct taxon from *P. mitteriana* and *P. dodonaeae* by the shorter, 0–1-septate, smooth, olivaceous conidia with thickened, refractive hila. Conidiophores are borne in amphigenous fascicles on substomatal stomata, and have refractive, darkened scars typical of *Passalora* (Crous & Braun 1996). As far as we could establish, this is the only species of *Passalora* known from this host. Conidiophore fascicles were also frequently associated with spermogonia, which indicates that *Passalora dodonaeae* may have a teleomorph that has yet to be discovered.

Acknowledgements

The authors gratefully acknowledge the assistance of the curators of GZU, PDD and NCHUPP for making materials available for study. The South African Foundation for Research Development (FRD) is also thanked for financial support provided to P.W.C.

References

- BOESEWINKEL, H.J. 1981. *Pseudocercospora dodonaeae* sp. nov. and a note on powdery mildew of *Dodonaea* in New Zealand. *Trans. Br. mycol. Soc.* 77: 453–455.
- CHUPP, C. 1954. A monograph of the fungus genus *Cercospora*. Ithaca, New York.
- CROUS, P.W. & BRAUN, U. 1996. Cercosporoid fungi from South Africa. *Mycotaxon* 57: 233–321.
- CROUS, P.W., PHILLIPS, A.J.L. & WINGFIELD, M.J. 1992. Effects of cultural conditions on vesicle and conidium morphology in species of *Cylindrocladium* and *Cylindrocladiella*. *Mycologia* 84: 497–504.
- HSIEH, W-H. & GOH, T-K. 1990. *Cercospora* and similar fungi from Taiwan. Maw Chang Book Company, Taiwan.
- POLLACK, F.G. 1987. An annotated compilation of *Cercospora* names. *Mycol. Mem.* 12: 1–212.
- SYDOW, H., MITTER, I.H. & TANDON, R.N. 1937. Fungi indici – III. *Ann. Mycol.* 35: 222–243.