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Pseudocercospora epidendri sp. nov. on the neotropical orchid, *Epidendrum secundum* from Brazil

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Abstract — A new leaf spot disease was observed on the orchid species *Epidendrum secundum* in "high altitude grasslands" of Araponga, Minas Gerais State, Brazil. Inoculation tests on healthy plants confirmed the pathogenicity of this fungus. *Pseudocercospora epidendri* sp. nov., the causal agent of the leaf spot disease of *E. secundum*, is described, illustrated, and compared with allied *Pseudocercospora* species on hosts of the family *Orchidaceae*.

Key words — cercosporoid hyphomycetes, phytopathology, plant disease, tropical fungi

Introduction

Epidendrum secundum is an orchid species with epiphytical or terrestrial habitat, characteristic of the Brazilian "high altitude grasslands" (Plate 1) and the Brazilian Cerrado (Caiafa & Silva 2005, Neto et al. 2007). In 2002, exploratory research was begun with the goal of describing the phytopathogenic mycodiversity associated with *Orchidaceae* in the state of Minas Gerais (Pereira et al. 2002, Pereira & Barreto 2004, Silva & Pereira 2007, 2008, Silva et al. 2008, Lopes et al. 2009, Pereira & Silva 2009). During an initial botanical survey in the "high altitude grasslands" of Parque Estadual da Serra do Brigadeiro in Araponga in Minas Gerais State, Brazil, samples of the orchid *E. secundum* with leaf spots caused by a cercosporoid hyphomycete were collected (Plate 2–3). Our morphological characterization showed that the leaf-spotting fungus represented a new species of *Pseudocercospora,* which we describe, illustrate, and discuss below.

Material & methods

Samples of infected *E. secundum* leaves were collected, photographed (SONY DSC-H9 digital camera), dried in a plant press, and deposited at the herbarium of Universidade Federal de Viçosa (VIC). Fungal samples were removed from fresh

Plate 1. Terrestrial *Epidendrum secundum* in the "high altitude grasslands" of the Parque Estadual da Serra do Brigadeiro, Araponga, State of Minas Gerais, Brazil.

leaf spots under an Olympus SZX7 stereomicroscope and mounted on glass slides with lactophenol. Material was also hand sectioned for stromata observation and measurements. Structures were observed, measured (30 of each structural type), and illustrated under 400× magnification using an Olympus BX 50 light microscope fitted with a drawing tube. To determine pathogenicity, the fungus was isolated directly onto PDA, brought into pure culture, and grown at 27°C for 20 days. Culture disks taken

Plate 2-3. *Pseudocercospora epidendri*. Detail of infected leaf, showing delimited and irregular necrotic spots. 2. Adaxial leaf surface. 3. Abaxial leaf surface.

from colony borders were used to inoculate four healthy young and mature leaves of three *E. secundum* plants. The inoculated plants were maintained in moist chambers for three days and then transferred to a greenhouse at 25°C and 70–80% humidity. Healthy leaves, on which only PDA plugs were placed, served as control. This assay was carried in three replications.

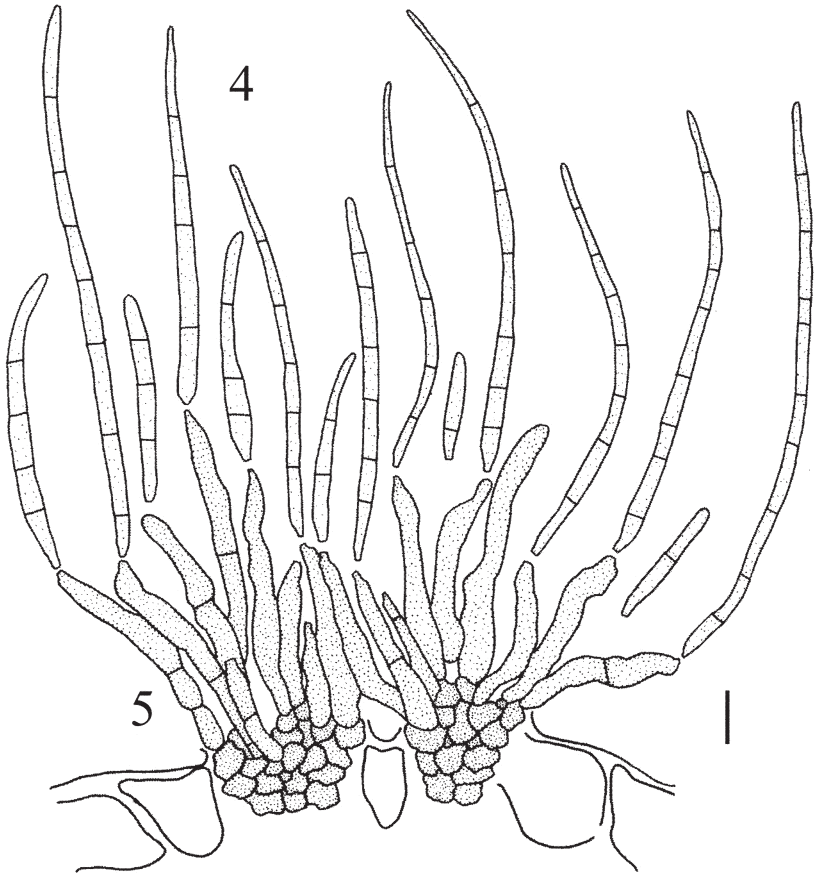

Plate 4-5. *Pseudocercospora epidendri* (VIC 30553, holotype). 4. Pigmented conidiophores with inconspicuous conidiogenous cells. 5. Solitary, pluriseptate conidia, with inconspicuous unthickened and not darkened scars. Bar: 10 µm.

Taxonomy

Pseudocercospora epidendri Meir. Silva & O.L. Pereira, **sp. nov.** Plate 4–5

MycoBank 519630

Differt a Pseudocercospora odontoglossi *conidiphoris non ramosae et brevioribus, 10–57 × 2–6 µm; conidiis brevioribus 11–86 × 1–3 µm.*

Holotype: BRAZIL, Minas Gerais, Araponga, Parque Estadual da Serra do Brigadeiro, on leaves of *Epidendrum secundum* Jacq. (*Orchidaceae*), 08 Jan. 2008, O. L. Pereira (VIC 30553, **holotype**). Ex-type culture OLP 30553 (Universidade Federal de Viçosa).

Etymology: referring to the host genus *Epidendrum*.

Plate 6. Necrotic symptoms on leaves of *Epidendrum secundum* 8 days after inoculation with *Pseudocercospora epidendri*.

Leaf spots distinct, scattered over leaves, amphigenous, irregular, pale brown, delimited by a black margin on abaxial and adaxial leaf surfaces, 3–12 mm diam. Stromata well-developed, immersed, becoming erumpent, brown, 47.5–166 µm wide and 57–213 µm high. Caespituli commonly hypophyllous, brown. Conidiophores fasciculate, brown, becoming paler towards apex, unbranched, smooth, 0-2 septate, subcylindrical, straight to curved, arising from cells of a well-developed stroma, 10–57 × 2–6 µm. Conidiogenous cells terminal, integrated, pale brown, smooth 3–4.5 × 2–3.5 µm. Conidiogenous loci inconspicuous, not darkened, unthickened. Conidia solitary, acicular to obclavate, 11–86 × 1–3 µm, 1–9 septate, straight to curved, pale brown, smooth, guttulate, base rounded to long obconically truncate hila unthickened, not darkened.

Cultures on PDA slow growing, 1.5–2.0 cm after 30 days at 27°C, stromatic and immersed in center, grayish aerial mycelium, black reverse, no sporulation.

Comments — Dark sunken necrotic symptoms were detected 8 days after artificial inoculation on all inoculated leaves, with structures formed 20–30 days after inoculation. Uninoculated control leaves, on which only PDA plugs were placed, remained healthy. The same fungus was then re-isolated, from the symptom in the inoculation assay (Plate 6). Thirteen cercosporoid species are known to occur on orchidaceous hosts: *Cercospora angraeci* Feuilleaub.

Table 1. *Pseudocercospora* spp. known to occur on *Orchidaceae*.

Species	Conidiophores (µm)	Conidia (µm)	Caespituli	Host genera
P. cypripedii	10–40 × 3–5	30–150 × 3–5	mainly epiphyllous	*Cypripedium*
P. dendrobii	10–100 × 2–5	15–80 × 2–4.5	hypophyllous	*Dendrobium*
P. peristeriae	10–60 × 2.5–6	40–100 × 2–5	mainly hypophyllous	*Peristeria*
P. odontoglossi	50–200 × 3–5.5	35–100 × 3–5	hypophyllous	*Cattleya*, *Cymbidium*, *Dendrobium*, *Epidendrum*, *Laelia*, ×*Laeliocattleya*, *Odontoglossum*
P. epidendri	10–57 × 2–6	11–86 × 1–3	mainly hypophyllous	*Epidendrum*

& Roum., *C. cephalantherae* Ondřej & Zavřel, *C. epidendronis* Bolick, *C. epipactidis* C. Massal., *C. eulophiae* M.S. Patil, *C. habenariicola* Meeboon et al., *Ramularia epipactidis* U. Braun & Rogerson, *Pseudocercospora cypripedii* (Ellis & Dearn.) U. Braun & Crous, *P. dendrobii* Goh & W.H. Hsieh [= *P. dendrobii* (H.C. Burnett) U. Braun & Crous, nom. illegit.], *P. odontoglossi* (Prill. & Delacr.) U. Braun, *P. peristeriae* (H.C. Burnett) U. Braun & Crous, *Stenella orchidacearum* U. Braun & Sivap., and *S. cyrtopodii* Dorn.-Silva et al. (Chupp 1954, Hsieh & Goh 1990, Crous & Braun 2003, Braun & Crous 2007, Dornelo-Silva et al. 2007, Meeboon et al. 2007). *Pseudocercospora epidendri* is the fifth *Pseudocercospora* species known to occur on the *Orchidaceae* (Table 1) and the second known to occur on *Epidendrum* (*P. odontoglossi* was the first reported to occur on that genus.) *Pseudocercospora cypripedii* and *P. odontoglossi* can be distinguished from *P. epidendri* by their longer and wider conidia (Chupp 1954), while *P. dendrobii* produces narrower conidia (Crous & Braun 2003) and *P. peristeriae* is diagnosed by superficial hyphae with solitary conidiophores (Meeboon et al. 2007). Almost all *P. epidendri* caespituli were hypophyllous but not formed through stomata, which may indicate an adaptation for the high solar incidence typical of Brazilian "high altitude grasslands".

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