Cercospora senecionis-walkeri – a new leaf-spotting hyphomycete from Laos and Thailand

Phengsintham P[1,2], Chukeatirote E [1], McKenzie EHC[3], Hyde KD[1] and Braun U[4]

[1]School of Science, Mae Fah Luang University, Chiang Rai 57100. Thailand
[2]Biology Department, Faculty of Sciences, National University of Laos
[3]Landcare Research, Private Bag 92170, Auckland, New Zealand
[4]Martin-Luther-Universität, Institut für Biologie, Bereich Geobotanik und Botanischer Garten, Herbarium, Neuwerk 21 D-06099 Halle/S. Germany

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A new leaf-spotting hyphomycete, *Cercospora senecionis-walkeri*, is described and illustrated based on material collected in Laos and Thailand. The new species is compared with other *Cercospora* species occurring on *Senecio* spp. in different parts of the world, and a key to *Cercospora* and *Passalora* species on hosts belonging to *Senecio* is provided.

Key words – Asia– *Cercospora* – Cercosporoid fungus– new species

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*Corresponding author: Pheng Phengsintham – e-mail – p.phengsintham@gmail.com

Introduction

Cercospora sensu lato is one of the largest genera of hyphomycetes, cosmopolitan in distribution, and causing leaf spots and other lesions on a wide range of host plants. Species of this genus are important pathogens responsible for severe damage to beneficial plants such as maize, rice, grasses, vegetables, forest trees and ornamentals (Crous & Braun 2003). Comprehensive examinations of cercosporoid hyphomycetes in Laos and Thailand have been carried out, and results have been published in a series of papers (e.g., Phengsintham et al. 2009, 2010a–c, 2012). The present description of a new leaf-spotting *Cercospora* species on the Asian *Senecio walkeri*, encountered in Laos and Thailand, is part of this series. This species is compared with other *Cercospora* species on *Senecio* and a key to cercosporioid fungi on hosts of this genus is provided.

Methods

The fungal material was examined by standard light microscopy using oil immersion (bright field and phase contrast), but without any staining. Thirty measurements (× 1000 magnification) of conidia and other structures were made, and the averages were calculated using the formula:

$$(\bar{x} = \frac{\sum M}{n} \text{ µm}),$$

Where, M = size of each component, n = number of components.

Results

(Taxonomic description)

***Cercospora senecionis-walkeri* sp. nov.**

Figs 1–2.

MycoBank, MB 800489

Description: **Leaf spots** circular to slightly irregular, 2–3 mm diam., at first dark green, later becoming brown to dark brown in the centre, with dark brown margin. **Caespituli** amphigenous, conspicuous, scattered, dark brown. **Mycelium** internal; **hyphae** branched, 3–4 µm wide ($\bar{x}$ = 3.5 µm, n = 5), septate, constricted at the septa, distance between septa 12–14 µm ($\bar{x}$ = 13 µm, n = 5), subhyaline, wall 0.3 µm wide ($\bar{x}$ = 0.3 µm, n = 5), smooth. **Stromata s**ubstomatal, intraepidermal, ellipsoidal, lenticular, 10–25 µm diam. ($\bar{x}$ = 18.8 µm, n = 5), brown, stromatal cells 4–10 µm diam. ($\bar{x}$ = 6 µm, n = 17), wall 0.5–1 µm wide ($\bar{x}$ = 0.78 µm, n = 17), smooth. **Conidiophores** single or loosely to densely fasciculate, arising from stromata (1–8 per fascicle), subcylindrical, straight to curved, 0–5 geniculate, 67–170 × 5–6 µm ($\bar{x}$ = 114 × 5.53 µm, n = 19), 0–8-septate, distance between septa 10–32 µm ($\bar{x}$ = 21 µm, n = 30), pale brown or olivaceous-brown; wall 0.5–1 µm wide ($\bar{x}$ = 0.82 µm, n = 30), smooth. **Conidiogenous cells** integrated, terminal, becoming intercalary, cylindrical, tapering to the apex, 14–30 × 4–5 µm ($\bar{x}$ = 21.8 × 4.5 µm, n = 8); **conidiogenous loci** (scars) conspicuous, thickened and darkened, 2–4 µm wide ($\bar{x}$ = 3.07 µm, n = 30), wall of the loci approximately 0.5–1 µm thick ($\bar{x}$ = 0,54 µm, n = 30). **Conidia** solitary, clavate, cylindrical-clavate or obclavate, straight to curved, 17–82 × 4–7 µm ($\bar{x}$ = 50.66 × 5.66 µm, n = 9), 0–8-septate, slightly constricted at the septa, subhyaline or faintly olivaceous-brown, smooth, wall 0.3–0.5 µm thick ($\bar{x}$ = 0.37 µm, n = 9), apex subobtuse, base truncate, hila 2–3 µm wide ($\bar{x}$ = 2.2 µm, n = 9), thickened and darkened, wall of the hila 0.5 µm wide ($\bar{x}$ = 0.5 µm, n = 9).

Material examined: **Laos**, Bokeo Province, Houay Xay District, Phimonsine Village, on leaf of *Senecio walkeri*, 20 February 2010, P. Phengsintham (NOUL 567, **holotype**). **Thailand**, Chiang Rai Province, Muang District, Sri Pasang Village, on leaves of *Senecio walkeri* Arn. (Asteraceae), 11 August 2009, P. Phengsintham (MFLU 10-0318).

Discussion

Several *Cercospora* species have been described from *Senecio* spp., but all of them are distinct from the new species. *C. senecionis* Ellis & Everh. was reduced to synonym with *C. jacquiniana* Thüm. by Chupp (1954). However, based on a re-examination of type material, Braun (in Braun & Mel'nik 1997) showed that *C. senecionis* represents a distinct true species of *Cercospora* with acicular conidia, similar to those of *C. apii* s. lat., but 80–200 µm long and above all 3–6 µm wide. *C. jacquiniana* is similar to *C. senecionis-walkeri* with regard to its conidial shape and pigmentation, but has much shorter conidiophores and shorter conidia, usually only 1–3-sepate, which are hyaline to faintly pigmented. Therefore, this species was reallocated to *Passalora* by Braun (in Braun & Mel'nik 1997).

The Indian *C. senecionis-grahamii* Thirum. & Govindu (Thirumalachar & Govindu 1962) on *Senecio grahamii* Benth. is close to *C. senecionis*, but differs in having acicular to obclavate conidia, only 3–4 µm wide. Collections on *Senecio walkeri* from Laos and Thailand were originally referred to as *C. senecionicola* Davis (Phengsintham et al. 2012), but further examinations and a detailed comparison with the latter species showed that the Asian collections are not conspecific with this North American species, which is morphologically easily distinguishable from *C. senecionis-walkeri* by its narrower acicular-subcylindrical conidia, only 2–3.5 µm wide (Chupp 1954). The South American *Passalora senecionicola* U. Braun & Delhey (Braun et al. 2006) on *Senecio bonariensis* in Argentina is morphologically very close to *C. senecionis-walkeri* but characterized by having quite distinct lesions, larger stromata, up to 60 µm diam. and short conidia that are cylindrical. *P. senecionicola* was assigned to *Passalora* due to subhyaline to pale olivaceous conidia, but it is possible that this species belongs in *Cercospora* which may be suggested by the phylogenetic position of *C. senecionis-walkeri*. Despite having almost hyaline to somewhat pigmented conidia, the latter species clusters within the *Cercospora* clade in an isolated, basal position adjacent to *C. zeae-maydis* Tehon & E.Y. Daniels and *C. zeina* Crous & U. Braun (unpublished phylogenetic tree prepared by the CBS, Utrecht, the Netherlands, based on a culture derived from material collected in

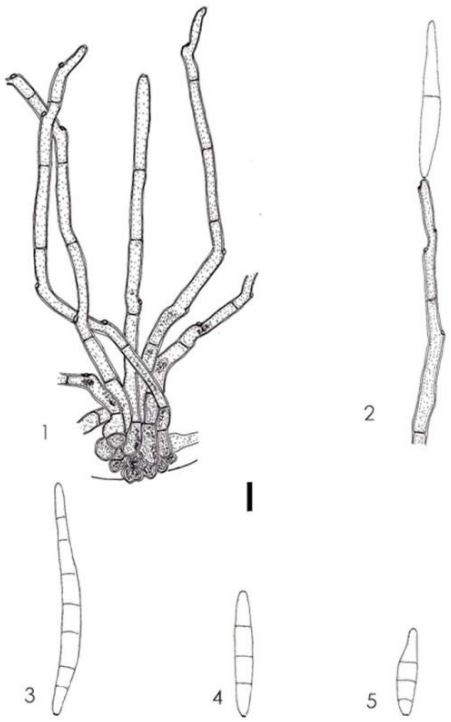

Fig. 1 – *Cercospora senecionis-walkeri* on *Senecio walkeri*, based on type material. **1.** Stroma with attached conidiophores. **2.** Conidiophore with attached conidium. **3–5.** Conidia. Bars: 1–5 = 10 µm.

Laos).

Key to the species of *Cercospora* and *Passalora* on *Senecio* spp.

1. Conidia relatively short, 25–60 × 5–9 µm, only 1–3-septate, hyaline, subhyaline to pale olivaceous; on *Senecio* spp., Europe, North America ..... *Passalora jacquiniana*

1* Conidia longer, at least partly exceeding 60 µm, pluriseptate 2

2. Conidia obclavate, cylindrical-obclavate, clavate, but never acicular, rather broad, 4–7 µm, hyaline, subhyaline to faintly pigmented 3

2* Conidia acicular (base truncate, width gradually attenuated towards the tip) to obclavate-cylindrical), always colourless, 2–6 µm wide 4

3. Leaf spots circular to slightly irregular, 2–3 mm diam., at first dark green, later becoming brown to dark brown in the centre, with dark brown margin; stromata small, 10–25 µm diam.; about 20–80 µm long, subhyaline to faintly pigmented; on *Senecio walkeri*, Asia

..... *Cercospora senecionis-walkeri*

3* Leaf spots indistinct, diffuse to subcircular or irregular, 2–20 mm diam., at first greenish, later brownish to grey, margin indefinite; stromata larger, up to 60 µm diam.; conidia longer, 30–120(–150) µm, subhyaline, pale olivaceous or olivaceous-brown; on *Senecio bonariensis*, South America, Argentina

..... *Passalora senecionicola*

4. Conidia acicular to subcylindrical, narrow, 2–3.5 µm; on *Senecio* spp., Asia, North America ..... *Cercospora senecionicola*

4* Conidia strictly acicular or acicular to obclavate, broader, 3–6 µm 5

5. Conidia strictly acicular, 3–6 µm wide, base always truncate; on *Senecio* spp., North America ..... *Cercospora senecionis*

5* Conidia acicular to obclavate, base truncate to obconically truncate, 3–4 µm wide; on *Senecio grahamii*, Asia, India

..... *Cercospora senecionis-grahamii*

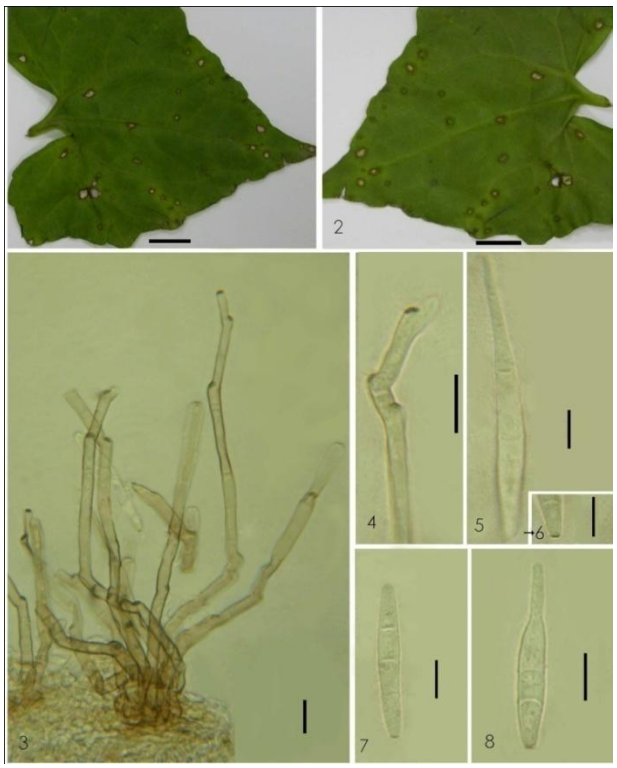

Fig. 2 – *Cercospora senecionis-walkeri* on *Senecio walkeri*, micrographs, based on type material. **1–2.** Lesions on host leaf (1. upper surface, 2. lower surface). **3.** Stroma with attached conidiophores. **4.** Apex of conidiophore. **5–8.** Conidia (**6.** Base of conidium). Bars: 1–2 = 10 mm, 3–8 = 10 µm.

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