
Monograph of Cercosporoid fungi from Thailand

Phengsintham P^{1,2*}, Braun U³, McKenzie EHC⁴, Chukeatirote E¹, Cai L⁵ and Hyde KD¹

¹School of Science, Mae Fah Luang University, Chiang Rai 57100, Thailand

²Biology Department, Faculty of Sciences, National University of Laos

³Martin-Luther-Universität, Institut für Biologie, Bereich Geobotanik und Botanischer Garten, Herbarium, Neuwerk 21 06099 Halle/S. Germany

⁴Landcare Research, Private Bag 92170, Auckland, New Zealand

⁵State Key Laboratory of Mycology, Institute of Microbiology, Chinese Academy of Sciences, Beijing 100101, P.R. China.

Phengsintham P, Braun U, McKenzie EHC, Chukeatirote E, Cai L, Hyde KD 2013 – Monograph of Cercosporoid fungi from Thailand. *Plant Pathology & Quarantine* 3(2), 67–138, doi 10.5943/ppq/3/2/2

The diversity of cercosporoid fungi in northern Thailand is very high. Eighty-five cercosporoid species were found in northern Thailand including (i) 84 species of true cercosporoid fungi: *Cercospora* (34), *Passalora* (7), *Pseudocercospora* (42), *Zasmidium* (1); (ii) One morphological similar fungus. Three new species were established, namely *Pseudocercospora christellae*, *P. cratevae* and *P. radermachericola*, while 23 cercosporoid species represent new records for Thailand. In this study, 50 species are described in full descriptions and illustrations, and another 35 species are only listed additionally because they have been described in “Monograph of Cercosporoid from Laos” or have previously been recorded from Thailand. The data show that the diversity of cercosporoid fungi in northern Thailand is very high; Meeboon (2009) recorded 166 cercosporoid species from this region.

Key words – Asia – *Cercospora* – *Cercospora*-like hyphomycetes – taxonomic treatment

Article Information

Received 10 February 2013

Accepted 6 April 2013

Published online 10 September 2013

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

Introduction

Background of Thai biodiversity

Thailand is situated in a hot and humid climatic zone which supports a variety of tropical ecosystems. Tropical ecosystems provide more niches for organisms than in temperate ecosystems and hence, support a much larger variety of plant, animal and microbe species. Thailand has approximately 15,000 vascular plants, including 1000 orchid varieties, 600 ferns and over 1,000 endemism species (Tanticharoen, 2004). A database of

Thai fungi compiled by BIOTEC lists 13,696 fungal collections, consisting of 2,200 species in approximately 800 genera (Hywel-Jones & Boonpratuang, 2001).

Background on cercosporoid fungi from Thailand

The first significant list of fungi from Thailand was published by Rostrup (1902) and listed 94 taxa including 2 myxomycetes, 58 basidiomycetes, 12 ascomycetes and anamorphic fungi, 14 of which were new species.

There have been several recent comprehensive accounts of the fungi of Thailand which are among the best documented in the region (Shirouzu et al., 2009; To-anun et al., 2009; Wannathes et al., 2009). Some studies include pathogenic microfungi (Prihastuti et al., 2009; Than et al., 2008). Cercosporoid fungi of Thailand have been well examined since 1980. Sontirat et al. (1980) recorded 21 species of *Cercospora*. Giatgong (1980) listed 60 cercosporoids, including 13 unidentified species of *Cercospora* in the host index of plant diseases in Thailand, and Petcharat & Kajanama-neesathian (1989) recorded 49 cercosporoid species. Nakashima et al. (2007) described three new species and recorded 11 species that were new to Thailand. Forty-three cercosporoid species were included in an annotated list of cercosporoid fungi in northern Thailand (Meeboon et al., 2007), and two taxa associated with necrotic leaflets of areca palms (*Areca catechu*) were published by To-anun et al. (2009). A Ph.D. thesis by Meeboon (2009) encompassed 166 cercosporoids from northern Thailand. To-anun et al. (2010) reported *Cercospora cristellae*, a new cercosporoid species associated with the weed *Cristella parasitica* from northern Thailand. To-anun et al. (2011) included 24 representatives of *Cercospora apii* s. lat. Three species, *Cercospora arecacearum* (To-anun et al., 2009), *C. neobougainvilleae* (Meeboon et al., 2008) and *C. habenariicola* (Meeboon et al., 2007), have been validly published as new species from Thailand.

Materials and Methods

Sample collections

Leaves of plants with leaf spots or other lesions were collected during the course of field trips. Photos of symptoms, including the fungal colonies or fruit bodies were taken. The specimens were collected in three provinces in northern Thailand [Chiang Mai, Chiang Rai and Pha Yao Provinces] (Fig. 1).

Examination of fungal structures

Macroscopic characters were observed using a stereoscope to check (1) lesions/leaf spots (shape, size, colour, margin), and (2)

colonies/caespituli (with details, e.g., amphigenous/epiphyllous, punctiform/pustulate/inconspicuous, effuse, loose, dense, brown/blackish, etc.).

Microscopic examination, measurement, description, and presentation of drawings follow the standard procedures outlined by Braun (1995). In the illustrations, thin-walled structures are depicted by a single line, thick-walled ones by double lines, and stippling is used to accentuate shape and pigmentation.



Fig. 1 – Collection sites

Measurements and microscopic study

Where sufficient material was available, 30 measurements of each morphological character were carried out and the average estimated by using the formula:

$$\bar{x} = \frac{\sum M}{n} \mu\text{m},$$

Notes: m = is a size of each components, n = is a number of components.

The characters described and/or measured are mycelia (internal, external), hyphae (branched or not, width, septation, colour, wall thin/thick, smooth/verruculose), stromata (location, e.g., substomatal, intra-epidermal; shape, size, colour; cells, angular or rounded in outline, size, wall thick/thin), conidiophores (formation, solitary/fasciculate/sporodochial, arising from internal/external hyphae/stromata, erumpent/through stomata; shape; size; septation; colour; wall, thin/thick, smooth/verruculose), conidiogenous cells (integrated, terminal/intercalary; length, shape,

e.g., cylindrical/geniculate/sinuuous), conidigenous loci [scars] (shape, size, thickened, darkened/pigmented or unthickened or inconspicuous, etc.), and conidia (formation, solitary/catenate; shape; size; septation; colour; wall, thin/thick, smooth/verruculose, apex; base; hila, size, thickened/unthickened, pigmented or not).

Identification of Fungi

The concept of Crous & Braun (2003) about the classification of *Cercospora* and morphologically similar cercosporoid genera is followed. The species of cercosporoid hyphomycetes from Thailand were determined on the basis of the currently relevant taxonomic publications, especially the monograph of *Cercospora* by Chupp (1954), and the works of Deighton (1967–1983), Ellis (1971, 1976), Hsieh & Goh (1990), Guo & Hsieh (1995), etc.

Single spore isolation

Symptomatic leaves were collected from different locations and different species in Thailand. Spores of hyphomycetes of some species were picked directly from the substrate using fine forceps or a needle. The spores of some species were placed in sterilized water and agitated in order to provide a spore suspension (Choi et al., 1999).

The suspension was prepared on sterilized glass slides. Sixteen squares were marked on the bottom of a water agar plate and the prepared spore suspension was then transferred with a sterilised pipette onto the surface of the water agar plate, above each of the drawn squares. Alternatively about six drops of the suspension can be pipetted onto the centre of the agar plate and this can be carefully shaken to spread the suspension. If this method is followed it is a good practice to mark the outer edge of the suspension on the base of the Petri dish. Both of these methods may help to locate the germinating spores later. A small drop of the suspension should be used at this stage to make a permanent slide and to check that the correct fungus has been selected. The unsealed plate is incubated at 25°C for 12–24 hours. The spores were checked within 12

hours and then every 24 hours to establish germination. Once the spores had germinated, a sterilised glass needle was used to pick up a small piece of agar containing a spore. In order to establish that the spore is the one desired, and maintain quality control, a slide is prepared and examined under the compound microscope. If the spores do not germinate after 12 hours, seal the plate with Parafilm and examine periodically. Ten germinated spores are transferred and distributed evenly onto two PDA plates and incubated at 25°C until their colony diam. are about 1 to 2 cm. A small piece of mycelium with agar can then be cut and transferred to another PDA plate and the culture is checked after few days, if there is no contamination, a pure culture has been obtained. Cultures can then be stored on the desired media.

Isolates of single spores were deposited in the culture collection at Herbarium, Biology Department, School of Science, Mae Fah Luang University (Thailand), BIOTECH (Thailand), and CBS (The Netherlands).

Herbarium specimens

Dried specimens were prepared and stored in the herbaria of the Mae Fah Luang University, Chiang Rai, Thailand and the Biology Department, Faculty of Science, National University of Laos. Various duplicates are preserved in the herbarium of the Institute of Biology, Geobotany and Botanical Garden, Halle (Saale), Germany (HAL).

Results

Summary of results

By integrating the morphological and molecular characters, 85 cercosporoid species were found in this study including (i) 84 species of true cercosporoid fungi: *Cercospora* (34), *Passalora* (7), *Pseudocercospora* (42), *Zasmidium* (1); (ii) about 1 species of morphological similar fungi. Three new taxa were established, namely *Pseudocercospora christellae*, *P. cratevae* and *P. radermachericola*.

Table 1 – Cercosporoid species found in this study

Ser#	Fungus	Hosts	Host Family	Thailand
1	<i>Cercospora arecacearum</i>	<i>Areca</i> sp.	Arecaceae	
2	<i>Cercospora balsaminiana</i>	<i>Impatiens balsamina</i> , <i>I. walleriana</i>	Balsaminaceae	
3	<i>Cercospora basellae-albae</i>	<i>Basella rubra</i>	Basellaceae	
4	<i>Cercospora broussonetiae</i>	<i>Broussonetia papyrifera</i>	Moraceae	New record
5	<i>Cercospora buteae</i>	<i>Butea monosperma</i>	Fabaceae	New record
6	<i>Cercospora canescens</i>	<i>Lablab purpureus</i> subsp. <i>bengalensis</i>	Fabaceae	
7	<i>Cercospora codiae</i>	<i>Cordiaum variegatum</i>	Euphorbiaceae	
8	<i>Cercospora coffeicola</i>	<i>Coffea arabica</i>	Rubiaceae	
9	<i>Cercospora crotalariae</i>	<i>Crotalaria uncinella</i> subsp. <i>elliptica</i>	Fabaceae	
10	<i>Cercospora diplaziicola</i>	<i>Diplazium esculentum</i>	Woodsiaceae	New record
11	<i>Cercospora gossypina</i>	<i>Gossypium herbaceum</i>	Malvaceae	
12	<i>Cercospora malloti</i>	<i>Mallotus repandus</i>	Euphorbiaceae	New record
13	<i>Cercospora nilghirensis</i>	<i>Conyza bonariensis</i>	Asteraceae	
14	<i>Cercospora passifloricola</i>	<i>Passiflora foetida</i>	Passifloraceae	
15	<i>Cercospora senecionis-walkeri</i>	<i>Senecio walkeri</i>	Asteraceae	New record
16	<i>Cercospora sidicola</i>	<i>Sida mysorensis</i>	Malvaceae	New record
17	<i>Cercospora sonchi</i>	<i>Taraxacum officinale</i>	Asteraceae	
18	<i>Cercospora</i> sp. sp.1	<i>Crateva religiosa</i>	Capparaceae	New record
19	<i>Cercospora</i> sp.sp. 2	<i>Celtis timoriensis</i>	Cannabaceae	New record
20	<i>Cercospora</i> sp. sp. 3	<i>Ziziphus</i> sp	Rhamnaceae	New record
21	<i>Cercospora tageteae</i>	<i>Tagetes patula</i>	Asteraceae	
22	<i>Cercospora verniciferae</i>	<i>Spondias pinnata</i>	Anacardiaceae	New record
23	<i>Passalora barretoana</i>	<i>Echinochloa esculenta</i> and <i>Panicum</i> sp.	Poaceae	New record
24	<i>Passalora broussonetiae</i>	<i>Broussonetia papyrifera</i>	Moraceae	New record
25	<i>Passalora fusimaculans</i>	<i>Agrostis</i> sp.	Poaceae	New record
26	<i>Pseudocercospora atromarginalis</i>	<i>Lycianthes biflora</i>	Solanaceae	New record
27	<i>Pseudocercospora balsaminae</i>	<i>Impatiens balsamina</i>	Balsaminaceae	
28	<i>Pseudocercospora bischofia</i>	<i>Bischofia javanica</i>	Euphorbiaceae	
29	<i>Pseudocercospora carbonacea</i>	<i>Dioscorea bulbifera</i>	Dioscoreaceae	
30	<i>Pseudocercospora christellae</i>	<i>Christella parasitica</i>	Thelypteridaceae	New species
31	<i>Pseudocercospora consociata</i>	<i>Justicia gendarussa</i>	Acanthaceae	
32	<i>Pseudocercospora cratevae</i>	<i>Crateva religiosa</i>	Capparaceae	New species
33	<i>Pseudocercospora cycleae</i>	<i>Cyclea peltata</i>	Menispermaceae	
34	<i>Pseudocercospora jahnii</i>	<i>Tabebuia chrysotricha</i>	Bignoniaceae	
35	<i>Pseudocercospora lygodii</i>	<i>Lygodium flesuoxum</i>	Schizaeaceae	
36	<i>Pseudocercospora mallotica</i>	<i>Mallotus barbatus</i>	Euphorbiaceae	
37	<i>Pseudocercospora mombin</i>	<i>Spondias pinnata</i>	Anacardiaceae	
38	<i>Pseudocercospora mori</i>	<i>Molus alba</i>	Moraceae	

Ser#	Fungus	Hosts	Host Family	Thailand
39	<i>Pseudocercospora olacicola</i>	<i>Olax scandens</i>	Olacaceae	New record
40	<i>Pseudocercospora oroxyli</i>	<i>Oroxylum indicum</i>	Bignoniaceae	
41	<i>Pseudocercospora paederiae</i>	<i>Paederia tomentosa</i>	Rubiaceae	
42	<i>Pseudocercospora panacis</i>	<i>Polyscias balfouriana</i>	Araliaceae	
43	<i>Pseudocercospora puderi</i>	<i>Rosa chinensis</i>	Rosaceae	
44	<i>Pseudocercospora punicae</i>	<i>Punica granatum</i>	Lythraceae	
45	<i>Pseudocercospora radermachericola</i>	<i>Radermachera ignea</i>	Bignoniaceae	New species
46	<i>Pseudocercospora riachueli</i> var. <i>horiana</i>	<i>Vitis venifera</i>	Vitaceae	New record
47	<i>Pseudocercospora scopariicola</i>	<i>Scoparia dulcis</i>	Plantaginaceae	New record
48	<i>Pseudocercospora timorensis</i>	<i>Operculina</i> sp.	Convolvulaceae	New record
49	<i>Pseudocercospora tremicola</i>	<i>Trema orientalis</i>	Cannabaceae	
50	<i>Zasmidium cassiicola</i>	<i>Cassia fistula</i>	Fabaceae	New record
Additional List				
51	<i>Cercospora alocasiae</i>	<i>Alocasia macrorrhiza</i>	Araceae	
52	<i>Cercospora begoniae</i>	<i>Begonia inflata</i>	Begoniaceae	
53	<i>Cercospora bidentis</i>	<i>Bidens pilosa</i>	Asteraceae	
54	<i>Cercospora brassicicola</i>	<i>Brassica integrifolia</i>	Brassicaceae	
55	<i>Cercospora capsicigena</i>	<i>Capsicum annuum</i>	Solanaceae	
56	<i>Cercospora cocciniae</i>	<i>Coccinia grandis</i>	Cucurbitaceae	
57	<i>Cercospora duranticola</i>	<i>Duranta repens</i>	Verbenaceae	New record
58	<i>Cercospora erechthitis</i>	<i>Erechtites valerianifolius</i>	Asteraceae	
59	<i>Cercospora ipomoeae</i>	<i>Ipomoea involucreta</i> , <i>I. aquatica</i>	Convolvulaceae	
60	<i>Cercospora physalidis</i>	<i>Physalis angulata</i>	Solanaceae	
61	<i>Cercospora</i> sp.	<i>Oroxylum indicum</i>	Bignoniaceae	
62	<i>Cercospora zinniae</i>	<i>Zinnia elegans</i>	Asteraceae	
63	<i>Passalora aenea</i>	<i>Senna siamea</i>	Fabaceae	
64	<i>Passalora bougainvilleae</i>	<i>Bougainvillea spectabilis</i>	Nyctaginaceae	
65	<i>Passalora henningsii</i>	<i>Manihot esculenta</i>	Euphorbiaceae	
66	<i>Passalora perfoliati</i>	<i>Chromolaena</i> sp.	Asteraceae	
67	<i>Pseudocercospora catappae</i>	<i>Terminalia alata</i>	Combretaceae	
68	<i>Pseudocercospora centrosematicola</i>	<i>Centrosema</i> sp.	Fabaceae	
69	<i>Pseudocercospora cotizensis</i>	<i>Crotalaria uncinella</i> subsp. <i>elliptica</i>	Fabaceae	
70	<i>Pseudocercospora duabangae</i>	<i>Duabanga grandiflora</i>	Lythraceae	New record
71	<i>Pseudocercospora eupatorii- formosani</i>	<i>Chromolaena odorata</i>	Asteraceae	
72	<i>Pseudocercospora fuligena</i>	<i>Lycopersicon esculentum</i>	Solanaceae	
73	<i>Pseudocercospora getoniae</i>	<i>Getonia floribunda</i>	Combretaceae	New record
74	<i>Pseudocercospora jussiaeae</i>	<i>Ludwigia prostrata</i>	Onagraceae	
75	<i>Pseudocercospora lythracearum</i>	<i>Lagerstroemia macrocarpa</i>	Lythraceae	
76	<i>Pseudocercospora musae</i>	<i>Musa paradisiaca</i>	Musaceae	
77	<i>Pseudocercospora</i>	<i>Eucalyptus</i> sp.	Myrtaceae	

Ser#	Fungus	Hosts	Host Family	Thailand
	<i>paraguayensis</i>			
78	<i>Pseudocercospora puerariicola</i>	<i>Pueraria phaseoloides</i>	Fabaceae	
79	<i>Pseudocercospora sphaerellae-eugeniae</i>	<i>Syzygium cuminii</i>	Myrtaceae	
80	<i>Pseudocercospora stahlia</i>	<i>Passiflora foetida</i>	Passifloraceae	
81	<i>Pseudocercospora stizobii</i>	<i>Mucuna pruriens</i>	Fabaceae	
82	<i>Pseudocercospora trichophila</i> var. <i>punctata</i>	<i>Solanum undatum</i>	Solanaceae	
83	<i>Pseudocercospora wrightiae</i>	<i>Wrightia pubescens</i>	Apocynaceae	
84	<i>Zasmidium suregadae</i>	<i>Suregada multiflora</i>	Euphorbiaceae	New record
	Morphological similar fungi			
85	<i>Cladosporium colocasiae</i>	<i>Colocasia esculenta</i>	Araceae	

23 cercosporoid species represent new records for Thailand.

In this study, 50 species are described with full descriptions and illustrations, and another 35 species are only listed because they have previously been recorded from Thailand (Table 1).

Key

Crous & Braun (2003) prepared two different keys, viz., a key to the recognised true cercosporoid genera, i.e. dematiaceous hyphomycetious anamorphs of *Mycosphaerella* with holoblastic conidiogenesis, and a second key to cercosporoid and morphological similar, non-cercosporoid genera.

Key to recognized true cercosporoid genera

This key only contains the true cercosporoid genera discussed and treated in this work (adapted from Crous & Braun, 2003). The synopsis to identify species is arranged by host families in alphabetical order, based on models applied by Chupp (1954), Ellis (1971, 1976), Deighton (1967–1983), Hsieh & Goh (1990), and Guo & Hsieh (1995).

1. Conidiogenous loci inconspicuous or subdenticulate, but always unthickened and not darkened or subconspicuous, i.e. unthickened, but somewhat refractive or rarely very slightly darkened or only outer rim slightly darkened or refractive (visible as minute rings).....

.....*Pseudocercospora* (III)

1. Conidiogenous loci conspicuous, i.e. thickened and darkened throughout, only with a minute central pore.....2

2. With verruculose superficial mycelium; conidia amero- to scolecosporous, mostly verruculose.....*Zasmidium* (IV)

2. If superficial mycelium present, hyphae smooth or almost so.....3

3. Conidia hyaline or subhyaline, usually scolecosporous, acicular, obclavate-cylindrical, filiform, and pluriseptate, rarely non-scolecosporous.....*Cercospora* (I)

3. Conidia pigmented, non-scolecosporous, ellipsoid-ovoid, short cylindrical, fusoid and only few septa, to obclavate-cylindrical and pluriseptate.....*Passalora* (II)

I Genus *Cercospora*

Anacardiaceae

Single species; on *Spondias*.....

.....*Cercospora verniciferae* (22)

Areaceae

Single species; on *Areca*.....

.....*Cercospora areacearum* (1)

Asteraceae = Compositae

On *Conyza*: Stromata 10–40 µm in diam.; conidiophores 50–128 × 3–5 µm, unbranched, geniculate; conidia 14–128 × 2–3.5 µm, 1–15-septate.....*Cercospora nilghirensis* (13)

On *Senecio*: Stromata 10–25 µm in diam.; conidiophores 67–170 × 5–6 µm, unbranched, geniculate; conidia 17–82 × 4–7 µm, 0–8-septate.....*Cercospora senecionis-walkeri* (15)

On *Tagetes*: Stromata 10–20 µm in diam.; conidiophores 25–68 × 5–6 µm, unbranched, geniculate; conidia 45–54 × 5–6 µm, 1–3-septate.....*Cercospora tageteae* (21)

On *Taraxacum*: Stromata 18–40 µm in diam.; conidiophores 15–190 × 4–5 µm, unbranched, geniculate; conidia 78–91 × 2–4 µm, 7–14-

septate.....*Cercospora sonchi* (17)

Balsaminaceae

Single species; on *Impatiens*.....

.....*Cercospora balsaminiana* (2)

Basellaceae

Single species; on *Basella*.....

.....*Cercospora basellae-albae* (3)

Cannabaceae

Single species; on *Celtis*.....

.....*Cercospora* sp. sp.2 (19)

Capparaceae

Single species; on *Crateva*.....

.....*Cercospora* sp. sp. 1 (18)

Euphorbiaceae

On *Codiaeum*: Stromata 17–27 μm in diam.; conidiophores 16–49 \times 3–5 μm , unbranched, geniculate; conidia 50–150 \times 3–5 μm , 3–8-septate.....

.....*Cercospora codiaei* (7)

On *Mallotus*: Stromata 15–30 μm in diam.; conidiophores 32–140 \times 5–6 μm , unbranched, geniculate; conidia 20–146 \times 2–4 μm , 6–19-septate.....

.....*Cercospora malloti* (12)

Fabaceae

On *Butea*: Stromata 18–25 μm in diam.; conidiophores 56–235 \times 5–6 μm , unbranched, geniculate; conidia 60–110 \times 2–4 μm , 4–5-septate

.....*Cercospora buteae* (5)

On *Clitoria*: Stromata 10–38 μm in diam.; conidiophores 28–78 \times 4–6 μm , unbranched, not geniculate; conidia 42–165 \times 3–4 μm , 3–14-septate

.....*Cercospora canescens* (6)

On *Crotalaria*: Stromata 25–45 μm in diam.; conidiophores 20–148 \times 5–6 μm , unbranched, geniculate; conidia 40–320 \times 3–4 μm , 3–26-septate.....

.....*Cercospora crotalariae* (9)

On *Labla*; see *Cercospora canescens*

On *Vigna*; see *Cercospora canescens*

Malvaceae

On *Gossypium*: Stromata 13–30 μm in diam.; conidiophores 50–95 \times 3.5–6 μm , unbranched, geniculate; conidia 32–75 \times 2–4 μm , 1–7-septate.....

.....*Cercospora gossypina* (11)

On *Sida*: Stromata 7–25 μm in diam.; conidiophores 50–131 \times 4–5 μm , unbranched, geniculate; conidia 44–105 \times 2–6 μm , 4–8-septate.....

.....*Cercospora sidicola* (16)

Moraceae

Single species; on *Broussonetia*.....

.....*Cercospora broussonetiae* (4)

Rhamnaceae

Single species; on *Ziziphus*.....

.....*Cercospora* sp. sp. 3 (20)

Rubiaceae

Single species; on *Coffea*.....

.....*Cercospora coffeicola* (8)

Woodsiaceae (Fern)

Single species; on *Diplazium*.....

.....*Cercospora diplaziicola* (10)

II Genus *Passalora*

Moraceae

Single species; on *Broussonetia*.....

.....*Passalora broussonetiae* (24)

Poaceae

On *Agrostis*: Stromata 20–50 μm in diam.; conidiophores 10–52 \times 3–5 μm , unbranched, not geniculate; conidia 18–38 \times 1.5–2 μm , 3–4-septate.....

.....*Passalora fusimaculans* (25)

On *Echinochloa*: Stromata 12–14 μm in diam.; conidiophores 20–150 \times 3–9 μm , unbranched, geniculate; conidia 20–57 \times 3–5 μm , 1–5-septate.....

.....*Passalora barretoana* (23)

On *Panicum*; see *Passalora fusimaculans*

III Genus *Pseudocercospora*

Acanthaceae

Single species; on *Justicia*.....

.....*Pseudocercospora consociata* (31)

Anacardiaceae

Single species; on *Spondias*.....

.....*Pseudocercospora mombin* (37)

Araliaceae

Single species; on *Polyscias*.....

.....*Pseudocercospora panacis* (42)

Balsaminaceae

Single species; on *Impatiens*.....

.....*Pseudocercospora balsaminae* (27)

Bignoniaceae

On *Oroxylum*: Stromata 14–21 μm in diam.; conidiophores 11–16 \times 3–5 μm , unbranched, geniculate; conidia 31–75 \times 2–4 μm , 1–5-septate.....

.....*Pseudocercospora oroxyli* (40)

On *Radermachera*: Stromata 8–44 μm in diam.; conidiophores 9–26 \times 3–5 μm , unbranched, geniculate; conidia 29–38 \times 2–3 μm , 0–3-septate.....

.....*Pseudocercospora radermachericola* (45)

On *Tabebuia*: Stromata 20–34 μm in diam.; conidiophores 6–10 \times 2–4 μm , unbranched, not geniculate; conidia 42–64 \times 2–3 μm , 4–8-septate.....

.....*Pseudocercospora jahnii* (34)

Cannabaceae

Single species; on *Trema*.....

.....*Pseudocercospora tremicola* (49)

Capparaceae

Single species; on *Crateva*.....
*Pseudocercospora cratevae* (32)

Convolvulaceae

Single species; on *Operculina*.....
*Pseudocercospora timorensis* (48)

Dioscoreaceae

Single species; on *Dioscorea*.....
*Pseudocercospora carbonacea* (29)

Euphorbiaceae

On *Bischofia*: Stromata 5–17 µm in diam.;
 conidiophores 9–24 × 2–6 µm, unbranched,
 geniculate; conidia 41–56 × 2–3 µm, 4–6-
 septate.....*Pseudocercospora bischofiae* (28)

On *Mallotus*: Stromata 10–40 µm in diam.;
 conidiophores 10–40 × 3–5 µm, unbranched,
 geniculate; conidia 33–75 × 3–4 µm, 3–7-
 septate.....*Pseudocercospora mallotica* (36)

Lythraceae

Single species; on *Punica*.....
*Pseudocercospora punicae* (44)

Menispermaceae

Single species; on *Cyclea*.....
*Pseudocercospora cycleae* (33)

Moraceae

Single species; on *Morus*.....
*Pseudocercospora mori* (38)

Olacaceae

Single species; on *Olax*.....
*Pseudocercospora olacicola* (39)

Plantaginaceae

Single species; on *Scoparia*.....
*Pseudocercospora scopariicola* (47)

Rosaceae

Single species; on *Rosa*.....
*Pseudocercospora puderi* (43)

Rubiaceae

Single species; on *Paederia*.....
*Pseudocercospora paederiae* (41)

Schizaeaceae (fern)

Single species; on *Lygodium*.....
*Pseudocercospora lygodii* (35)

Solanaceae

Single species; on *Lycianthes*.....
*Pseudocercospora atromarginalis* (26)

Thelypteridaceae (Fern)

Single species; on *Christella*.....
*Pseudocercospora christellae* (30)

Vitaceae

Single species; on *Vitis*.....
 ..*Pseudocercospora riachueli* var. *horiana* (46)

IV Genus *Zasmidium***Fabaceae**

Single species; on *Cassia*.....
*Zasmidium cassiicola* (50)

Treatment of cercosporoid fungi**Treatment of true cercosporoid fungi**

Cercospora arecacearum Hidayat & Meeboon,
 Mycol. Progr. 8: 116, 2009. Figs 2–3.

Leaf spots circular, 1–7 mm diam., pale brown to dark brown in the centre, with medium brown to dark brown margin. Colonies amphigenous, scattered, dark brown. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal, substomatal, 10–75 µm diam. (\bar{x} = 42.5 µm, n = 9), brown, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 6–13 µm wide (\bar{x} = 9 µm, n = 15), brown to dark brown, wall 0.5–0.8 µm wide (\bar{x} = 0.67 µm, n = 15), smooth. Conidiophores fasciculate, arising from stromata (2–22 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 45–117 × 4–6 µm (\bar{x} = 73.6 × 5 µm, n = 16), 3–5-septate, distance between septa 8–35 µm (\bar{x} = 23.4 µm, n = 25), medium brown, paler at the apex, wall 0.5–0.8 µm wide (\bar{x} = 0.58 µm, n = 25), smooth, geniculate. Conidiogenous cells integrated, terminal, cylindrical, 12–35 × 4–5 µm (\bar{x} = 24 × 4.5 µm, n = 7), pale brown; conidiogenous loci conspicuous, subcircular, 2–3 µm wide (\bar{x} = 2.6 µm, n = 30), dark brown, wall 0.5–0.8 µm thick (\bar{x} = 0.6 µm, n = 30). Conidia solitary, acicular, straight to curved, 41–130 × 4–5 µm (\bar{x} = 69 × 4 µm, n = 5), 3–14-septate, hyaline, thin-walled, smooth, tip acute, base truncate to slightly obconically truncate, hila thickened and darkened, 1.5–3 µm wide (\bar{x} = 2.12 µm, n = 5), wall of the hila 0.25–0.3 µm (\bar{x} = 0.28 µm, n = 5) thick.

Colonies on PDA after 3 weeks at 25°C grey, 4.5–5 mm diam., surface ridged. Hyphae smooth, brown, 1–12 µm wide (\bar{x} = 4.3 µm, n = 30), septate, constricted at the septa, distance between septa 8–26 µm (\bar{x} = 13.08 µm, n = 30), wall 0.3–1 µm wide (\bar{x} = 0.66 µm, n = 30), smooth. Conidia not formed in culture.

Known hosts – *Areca catechu* L., *Areca* sp. (Arecaceae).

Known distribution – **Asia:** Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Areca* sp. (Arecaceae), 15 January 2010, P. Phengsintham (P521), GenBank accession no (ITS, KC677879).

Notes – Morphologically, the present collection is similar to those described by To-anun et al. (2009).

Literature – To-anun et al. (2009: 115–121).

Cercospora balsaminiana J.M. Yen & Lim, Cah. Pacifique 14: 91, 1970. Figs 4–5.

Leaf spots suborbicular to irregular, 1–13 mm in diam., grey-brown in the centre, with dark brown margin. Colonies amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–3 μm wide (\bar{x} = 2.66 μm , n = 5), septate, constricted at the septa, distance between septa 6–15 μm (\bar{x} = 9 μm , n = 5), brownish or green-hyaline, wall 0.3–0.5 μm wide (\bar{x} = 0.43 μm , n = 5), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 8–36 μm in diam. (\bar{x} = 18.41 μm , n = 7), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–10 μm wide (\bar{x} = 7.28 μm , n = 20), brown to dark brown, wall 0.5–1 μm wide (\bar{x} = 0.76 μm , n = 20), smooth. Conidiophores fasciculate, arising from stromata (3–9 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 18–62 \times 4–6 μm (\bar{x} = 49.36 \times 4.99 μm , n = 15), 1–3-septate, distance between septa 5–31 μm (\bar{x} = 16.33 μm , n = 20), medium brown, paler at the apex, wall 0.5–0.8 μm wide (\bar{x} = 0.6 μm , n = 20), smooth, 0–2-times geniculate. Conidiogenous cells terminal, cylindrical, 7–31 \times 4–5 μm (\bar{x} = 21.75 \times 4.9 μm , n = 8), pale brown; conidiogenous loci conspicuous, subcircular, 2–4 μm wide (\bar{x} = 3.41 μm , n = 8), wall 0.5–0.8 μm thick (\bar{x} = 0.57 μm , n = 8), thickened and darkened.

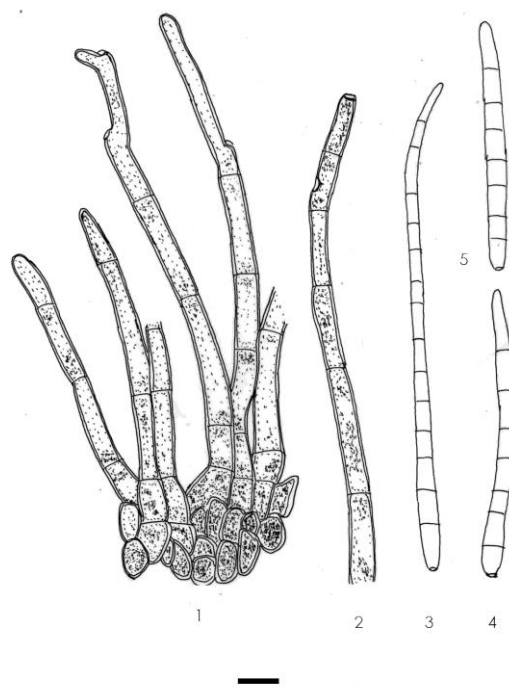


Fig. 2 – *Cercospora arecaeum* from *Areca* sp.: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–5. Conidia. Bars: 1–5 = 10 μm .



Fig. 3 – *Cercospora arecaeum* from *Areca* sp.: 1–2. Stroma with attached conidiophores. 3–5. Conidiophore. 6–8. Conidia. Bars: 1. Not to scale. 2–8 = 10 μm .

Conidia solitary, acicular to obclavate, straight to curved, $45\text{--}155 \times 2\text{--}4 \mu\text{m}$ ($\bar{x} = 90.63 \times 3.29 \mu\text{m}$, $n = 13$), 5–16-septate, hyaline to subhyaline, thin-walled, $0.3 \mu\text{m}$ ($\bar{x} = 0.3 \mu\text{m}$, $n = 13$), smooth, tip acute, base obconically truncate; hila thickened and darkened $1\text{--}3 \mu\text{m}$ wide ($\bar{x} = 1.88 \mu\text{m}$, $n = 13$), wall of the hila $0.3\text{--}0.5 \mu\text{m}$ ($\bar{x} = 0.46 \mu\text{m}$, $n = 13$) thick.

Colonies on PDA after 3 weeks at 25°C dark grey mycelium, 20–25 mm diam., hyphae $2\text{--}10 \mu\text{m}$ wide ($\bar{x} = 6.8 \mu\text{m}$, $n = 20$), septate, constricted at the septa, distance between septa $11\text{--}20 \mu\text{m}$ ($\bar{x} = 14.4 \mu\text{m}$, $n = 20$), brownish or subhyaline, wall $0.3\text{--}1 \mu\text{m}$ wide ($\bar{x} = 0.72 \mu\text{m}$, $n = 20$), smooth. Conidia not formed in culture.

Known hosts – *Impatiens balsamina* L., *I. walleriana* Hook. f. (Balsaminaceae)

Known distribution – **Asia:** China, Thailand.

Material examined – Chiang Rai Province, Maechan District, Doitung National Part, on leaves of *Impatiens balsaminiana* (Balsaminaceae), 20 July 2010, P. Phengsintham (P603). GenBank accession no (ITS, KC677881); Muang District, Hah Ngaek Pho Khoune Village, on leaves of *Impatiens walleriana*, 28 July 2010, P. Phengsintham (P608), GenBank accession no (ITS, KC677880; LSU, KC677915).

Notes – The collections differ from the description of *C. balsaminiana* published by To-anun et al. (2011) in having shorter conidia and unbranched conidiophores. To-anun et al. (2011) regarded the *Cercospora* on *Impatiens balsamina* as *C. balsaminiana* and that on *Impatiens walleriana* as *C. fukushiana*, based on presence of branched conidiophores.

Literature – Yen & Lim (1980: 155); Crous & Braun (2003: 75); To-anun et al. (2011: 48).

Cercospora basellae-albae R.K. Srivast., S. Norayana & A.K. Srivast. Indian Phythopatol. 47: 229, 1994. Figs 6–7.

Leaf spots circular or suborbicular, 1–5 mm diam., grayish brown to dark brown in the centre, and with brown to dark brown margin.

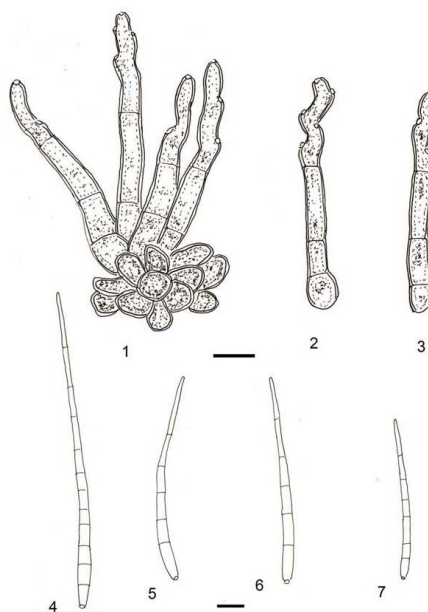


Fig. 4 – *Cercospora balsaminiana* on *Impatiens balsamina* from leaf spots: 1. Stroma with attached conidiophores. 2. Conidiophore. 4–7. Conidia. Bars: 1–7 = $10 \mu\text{m}$.

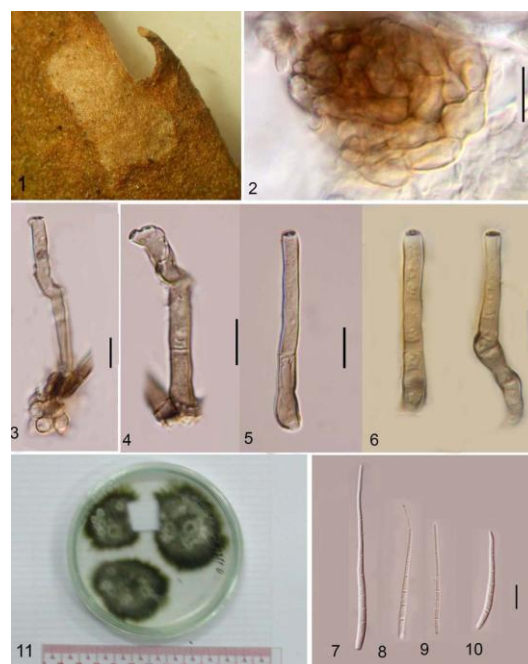


Fig. 5 – *Cercospora balsaminiana* on *Impatiens balsamina* from leaf spots: 1. Leaf spot on host leaf (lower surface). 2. Stroma. 3. Stroma with attached conidiophores. 4–6. Conidiophores. 7–10. Conidia. 11. Culture. Bars: 1. Not to scale. 2–10 = $10 \mu\text{m}$. 11 = 10mm .

Colonies amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–3 μm wide (\bar{x} = 2.6 μm , n = 5), septate, constricted at the septa, distance between septa 7–10 μm (\bar{x} = 8.4 μm , n = 5), brownish or green-hyaline, wall 0.3–0.5 μm wide (\bar{x} = 0.34 μm , n = 5), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata well-developed, oval to ellipsoidal, substomatal, 25–45 μm diam. (\bar{x} = 32.5 μm , n = 4), brown, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 4–10 μm wide (\bar{x} = 6.7 μm , n = 30), brown to dark brown, wall 0.8–1 μm wide (\bar{x} = 0.81 μm , n = 30), smooth, 0–2 times geniculate, width uniform. Conidiophores fasciculate, arising from stromata (10–24 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 11–50 \times 3–5 μm (\bar{x} = 33.16 \times 4.35 μm , n = 24), 0–2-septate, distance between septa 5–25 μm (\bar{x} = 12.07 μm , n = 13), medium brown, paler at the apex, wall 0.5–0.8 μm wide (\bar{x} = 0.73 μm , n = 13), smooth, 0–2 times geniculate, width uniform. Conidiogenous cells integrated, terminal, cylindrical, 11–35 \times 3–5 μm (\bar{x} = 19.55 \times 4.11 μm , n = 9), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 μm wide (\bar{x} = 2.36 μm , n = 30), dark brown, wall 0.5–0.8 μm thick (\bar{x} = 0.58 μm , n = 30). Conidia solitary, acicular, straight to curved, 47–75 \times 2–4 μm (\bar{x} = 60 \times 3 μm , n = 9), 3–7-septate, hyaline, thin-walled, smooth, tip acute, base truncate or slightly narrowed at the very base, hila thickened and darkened, 1.5–2 μm wide (\bar{x} = 1.78 μm , n = 7), wall of the hila 0.3–0.5 μm (\bar{x} = 0.44 μm , n = 7) thick.

Known hosts – *Basella alba* L., *Basella rubra* L. (Basellaceae).

Known distribution – **Asia:** India, Laos, Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Basella rubra* (Basellaceae), 10 August 2009, P. Phengsintham (P433).

Notes – A true *Cercospora* s. str. close to or identical with *C. apii* s. lat. (Crous & Braun, 2003). The present collection agrees well with the description of *C. basellae-albae* given by To-anun et al. (2011) in having a similar size of conidiophores and conidia [conidiophores 25–70 \times 3–6 μm and conidia 17–93 \times 3–5 μm].

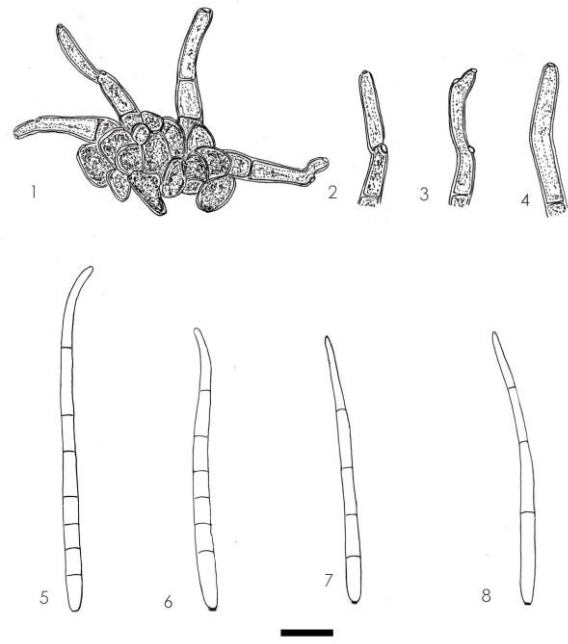


Fig. 6 – *Cercospora basellae-albae* on *Basella rubra*: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–8. Conidia. Bars: 1–8 = 10 μm .

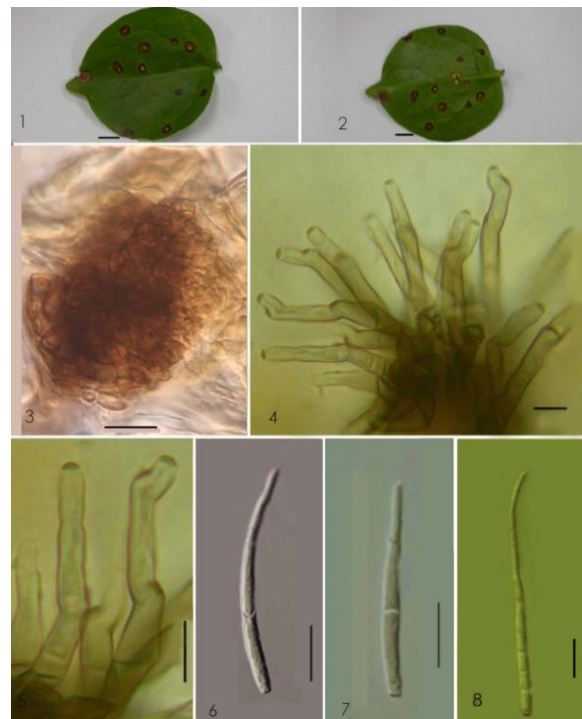


Fig. 7 – *Cercospora basellae-albae* on *Basella rubra* from leaf spots: 1. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3–4. Stromata with attached conidiophores. 5. Conidiophore. 6–8. Conidia. Bars: 1–2 = 10 mm, 3–8 = 10 μm .

Literature – Crous & Braun (2003); To-anun et al. (2011: 50).

Cercospora broussonetiae Y.L. Guo & L. Xu, *Mycosystema* 21: 181. 2002. Figs 8–9.

Leaf spots small to fairly large, suborbicular to irregular, 1–7 mm in diam., grey-brown in the centre, and with dark brown violet margin. Colonies amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–8 μm wide (\bar{x} = 5.66 μm , n = 13), septate, constricted at the septa, distance between septa 5–10 μm (\bar{x} = 6.66 μm , n = 13), brownish or green-hyaline, wall 0.3–0.5 μm wide (\bar{x} = 0.43 μm , n = 13), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 12–24 μm in diam. (\bar{x} = 19.6 μm , n = 5), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–8 μm wide (\bar{x} = 6.2 μm , n = 30), brown to dark brown, wall 0.5–0.8 μm wide (\bar{x} = 0.62 μm , n = 30), smooth. Conidiophores solitary or fasciculate, arising from stromata (2–7 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 30–140 \times 5–6 μm (\bar{x} = 63.7 \times 5.67 μm , n = 13), 1–6-septate, distance between septa 10–46 μm (\bar{x} = 23.3 μm , n = 30), medium brown, paler at the apex, wall 0.5–0.8 μm wide (\bar{x} = 0.58 μm , n = 30), smooth, 0–1-times geniculate. Conidiogenous cells terminal, cylindrical, 20–46 \times 5–6 μm (\bar{x} = 30.7 \times 5.33 μm , n = 7), pale brown; conidiogenous loci conspicuous, subcircular, 3–4 μm wide (\bar{x} = 3.33 μm , n = 7), wall 0.5–0.8 μm thick (\bar{x} = 0.6 μm , n = 7), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 78–252 \times 2.5–4 μm (\bar{x} = 140.5 \times 2.12 μm , n = 7), 2–16-septate, hyaline to subhyaline, thin-walled 0.3–0.5 μm (\bar{x} = 0.35 μm , n = 7), smooth, tip acute, base truncate; hila thickened and darkened 2–3 μm wide (\bar{x} = 2.62 μm , n = 7), wall of the hila 0.3–0.5 μm (\bar{x} = 0.35 μm , n = 7) thick.

Known hosts – *Broussonetia kaempferi* Siebold, *B. papyrifera* (L.) L'Hér. ex Vent. (Moraceae).

Known distribution – **Asia**: China, Thailand.

Material examined – Chiang Rai Province, Maechan District, Doitung National Park, on leaves of *Broussonetia papyrifera* (Moraceae), 4 December 2009, P. Phengsintham (P472); Chiang Rai Province, Muang District, Bandu Village, on leaves of *Broussonetia papyrifera* (Moraceae), 30 July 2010, P. Phengsintham (P610, GenBank accession no (ITS, KC677882; LSU, KC677916)).

Notes – A true *Cercospora* s. str. close to or identical with *Cercospora apii* s. lat. (Crous & Braun, 2003).

Literature – Crous & Braun (2003: 89).

Cercospora buteae Munjal, Lall & Chona, *Indian Phytopathol.* 12: 133, (1959) 1960. Figs 10–11.

Leaf spots small to fairly large, suborbicular to irregular, 5–15 mm in diam., grey-brown in the centre, and dark brown margin. Colonies hypophyllous, scattered, dark brown. Mycelium internal, inconspicuous. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 18–25 μm in diam. (\bar{x} = 21.5 μm , n = 4), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 4–10 μm wide (\bar{x} = 7.8 μm , n = 13), brown to dark brown, wall 0.5–0.8 μm wide (\bar{x} = 0.65 μm , n = 13), smooth. Conidiophores fasciculate, arising from stromata (1–7 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 56–235 \times 5–6 μm (\bar{x} = 134 \times 5.67 μm , n = 7), 4–10-septate, distance between septa 12–40 μm (\bar{x} = 25.5 μm , n = 30), medium brown, paler at the apex, wall 0.5–1 μm wide (\bar{x} = 0.59 μm , n = 30), smooth, 0–2-times geniculate. Conidiogenous cells terminal, cylindrical, 12–24 \times 4–5 μm (\bar{x} = 18.5 \times 4.5 μm , n = 7), pale brown; conidiogenous loci conspicuous, subcircular, 2–3 μm wide (\bar{x} = 2.75 μm , n = 7), wall 0.5–0.8 μm thick (\bar{x} = 0.57 μm , n = 7), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 60–110 \times 2–4 μm (\bar{x} = 77.33 \times 3 μm , n = 5), 4–5-septate, hyaline to subhyaline, thin-walled 0.25–0.3 μm (\bar{x} = 0.283 μm , n = 5), smooth, tip acute,

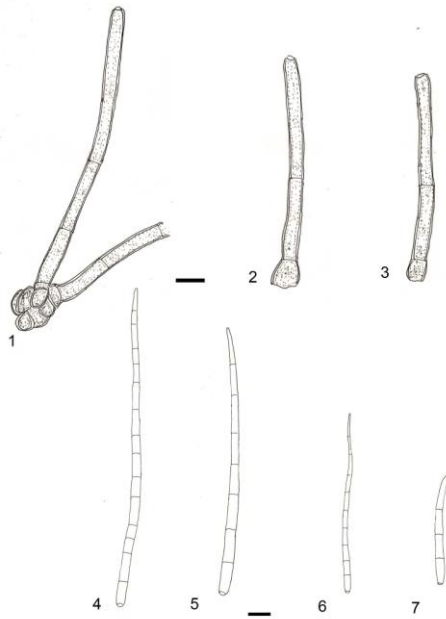


Fig. 8 – *Cercospora broussonetiae* on *Broussonetia papyrifera* from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–7. Conidia. Bars: 1–7 = 10 μ m.

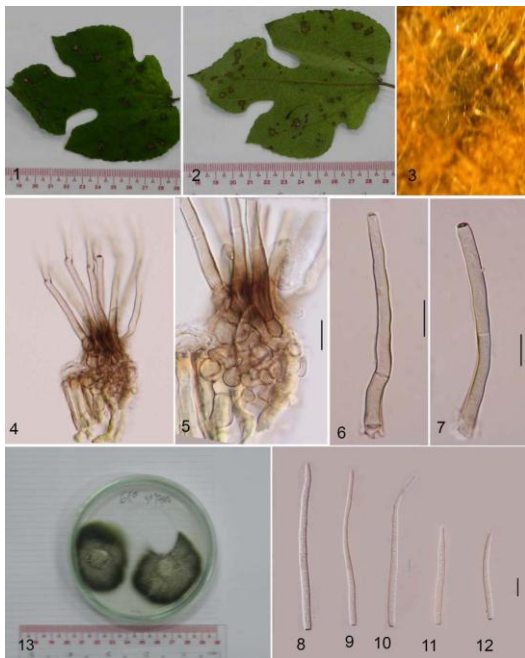


Fig. 9 – *Cercospora broussonetiae* on *Broussonetia papyrifera* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4–5. Stromata with attached conidiophores. 6–7. Conidiophores. 8–12. Conidia. 13. Culture. Bars: 1–2 = 10 mm. 3. Not to scale. 3–12 = 10 μ m. 13. = 10 mm.

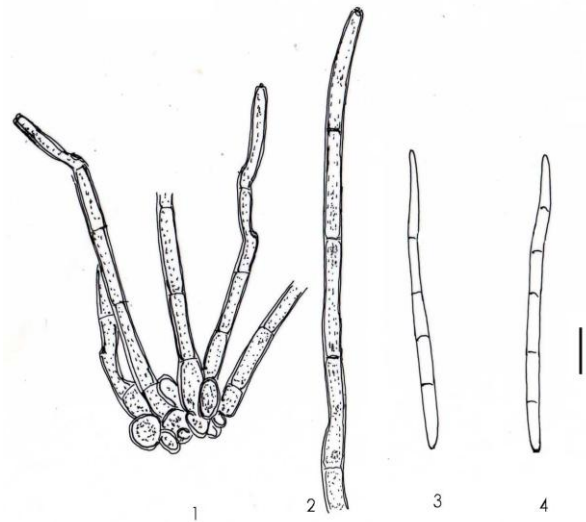


Fig. 10 – *Cercospora buteae* on *Butea monosperma* from leaf spots: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–4. Conidia. Bars: 1–4 = 10 μ m.



Fig. 11 – *Cercospora buteae* on *Butea monosperma* from leaf spots: 1–2. Leaf spots on host leaf (1. upper surface, 2. lower surface). 3. Colonies. 4–5. Stromata with attached conidiophores. 6–7. Conidia. Bars: 1–2 = 10 mm. 3. Not to scale. 4–7 = 10 μ m.

base truncate to obconically truncate; hila thickened and darkened 1–2 μm wide (\bar{x} = 1.5 μm , n = 5), wall of the hila 0.3–0.5 μm (\bar{x} = 0.4 μm , n = 5) thick.

Known hosts – *Butea frondosa* K.D. Koenig ex Roxb., *B. monosperma* Kuntze (Fabaceae).

Known distribution – **Asia:** India, Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Butea monosperma* (Fabaceae), 22 December 2009, P. Phengsintham (P493).

Notes – The collection from Thailand agrees with the original description of *Cercospora buteae* by Munjal, Lall & Chona (1960).

Literature – Crous & Braun (2003: 91).

Cercospora canescens Ellis & G. Martin, Amer. Naturalist 16: 1003, 1882. Figs 12–13.

≡ *Cercosporiopsis canescens* (Ellis & G. Martin) Miura, Flora of Manchuria and East Mongolia 3: 529, 1928.

= *Cercospora vignicaulis* Tehon, Mycologia 29: 436, 1937.

Leaf spots small to fairly large, sub-orbicular to irregular, 3–14 mm in diam., grey-brown in the centre, and with dark brown margin. Colonies amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–4 μm wide (\bar{x} = 3 μm , n = 8), septate, constricted at the septa, distance between septa 6–10 μm (\bar{x} = 8 μm , n = 8), brownish or green-hyaline, wall 0.3–0.5 μm wide (\bar{x} = 0.4 μm , n = 8), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 10–38 μm in diam. (\bar{x} = 20 μm , n = 7), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–11 μm wide (\bar{x} = 7.6 μm , n = 30), brown to dark brown, wall 0.5–0.8 μm wide (\bar{x} = 0.65 μm , n = 30), smooth. Conidiophores fasciculate or solitary, arising from stromata (1–7 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 28–

78 \times 4–6 μm (\bar{x} = 51.17 \times 5.1 μm , n = 13), 0–2-septate, distance between septa 8–35 μm (\bar{x} = 22.35 μm , n = 30), medium brown, paler at the apex, wall 0.5–0.8 μm wide (\bar{x} = 0.69 μm , n = 30), smooth, not geniculate. Conidiogenous cells terminal, cylindrical, 6–35 \times 4–6 μm (\bar{x} = 23.8 \times 5.1 μm , n = 8), pale brown; conidiogenous loci conspicuous, subcircular, 2–5 μm wide (\bar{x} = 3.14 μm , n = 8), wall 0.5–0.8 μm thick (\bar{x} = 0.57 μm , n = 8), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 42–165 \times 3–4 μm (\bar{x} = 68.94 \times 3.09 μm , n = 9), 3–14-septate, hyaline to subhyaline, thin-walled 0.3 μm (\bar{x} = 0.3 μm , n = 5), smooth, tip acute, base truncate to somewhat obconically truncate; hila thickened and darkened 2–3 μm wide (\bar{x} = 2.5 μm , n = 5), wall of the hila 0.3–0.5 μm (\bar{x} = 0.46 μm , n = 5) thick.

Known hosts – *Bauhinia*, *Boerhavia*, *Cajanus*, *Calopogonium*, *Canavalia*, *Cassia*, *Clitoria*, *Codariocalyx*, *Crotalaria*, *Cyamopsis*, *Desmodium*, *Erythrina*, *Flemingia*, *Gliricidia*, *Glycine*, *Heylandia*, *Indigofera*, *Kotschya*, *Lablab*, *Vigna*, *Lespedeza*, *Lathyrus*, *Lotononis*, *Lupinus*, *Macroptilium*, *Macrotyloma*, *Medicago*, *Mimosa*, *Mucuna*, *Neonotonia*, *Phaseolus*, *Pisum*, *Psophocarpus*, *Psoralea*, *Pterocarpus*, *Pueraria*, *Rhynchosia*, *Senna*, *Shuteria*, *Stylosanthes*, *Teramnus*, *Vicia*, *Vigna*, *Voandzeia* (Fabaceae).

Known distribution – **Africa:** Ghana, Kenya, Malawi, Mauritius, Nigeria, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe; **Asia:** Bangladesh, Brunei, Cambodia, China, Hong Kong, India, Indonesia, Iran, Japan, Korea, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Tajikistan, Taiwan, Thailand, Uzbekistan; **Europe:** Georgia, Russia; **North America and West Indies:** Barbados, Costa Rica, Cuba, Dominican Rep., Haiti, Panama, St. Vincent and the Grenadines, Trinidad and Tobago, USA (AL, FL, HI, LA, IL, KS, MD, MO, MS, NC, SC, TX, VA, WV); **Australia; Oceania:** Fiji, New Caledonia, New Zealand, Papua New Guinea, Puerto Rico, Solomon Islands, Virgin Islands, Vanuatu; **South America:** Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Venezuela.

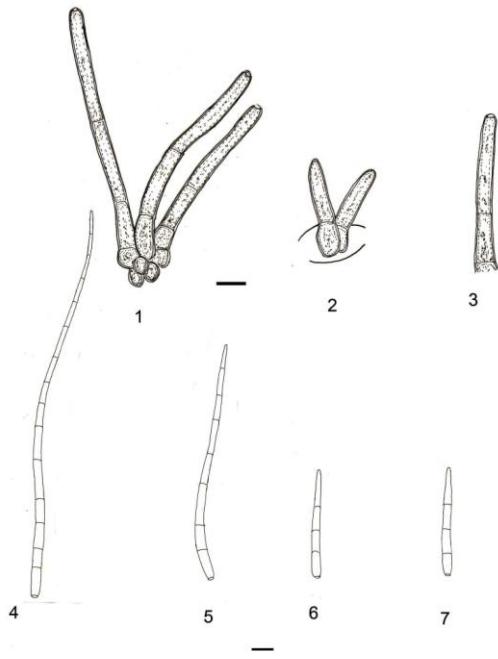


Fig. 12 – *Cercospora canescens* on *Clitoria mariana* from leaf spots: 1–2. Stromata with attached conidiophores. 3. Conidiophore. 4–7. Conidia. Bars: 1–7 = 10 μ m.

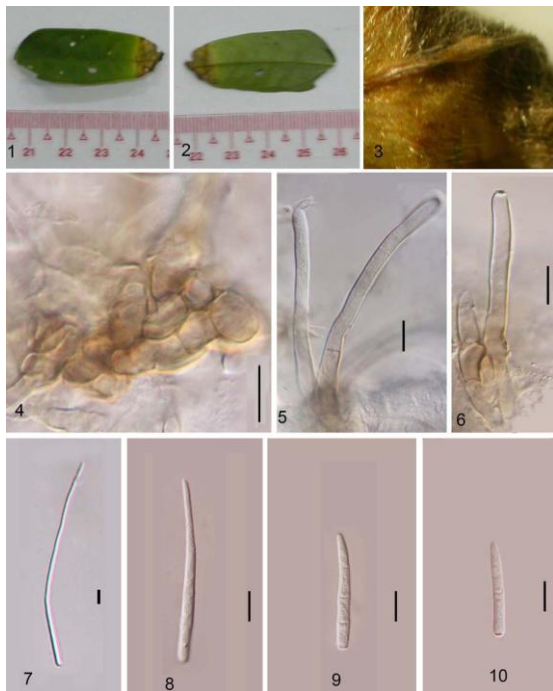


Fig. 13 – *Cercospora canescens* on *Clitoria mariana* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface. 2. lower surface). 3. Colonies. 4. Stroma. 5–6. Stromata with attached conidiophores. 7–10. Conidia. Bars: 1–2 = 10 mm. 3. Not to scale. 4–10 = 10 μ m.

Material examined – Chiang Rai Province, Doi Tung National Park, on leaves of *Vigna uncuiculata* (Fabaceae), 22 August 2009, P. Phengsintham (P441); Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Clitoria mariana*, 4 August 2010, P. Phengsintham (P612). GenBank accession no (ITS, KC677883; LSU, KC677917).

Notes – The size of conidiophores and conidia is similar to those of *C. canescens* as described by Chupp (1954) and Hsieh & Goh (1990) [conidiophores 20–200 \times 3–6.5 μ m and conidia 25–300 \times 2.5–5.5 μ m].

Literature – Chupp (1954: 288); Vasudeva (1963: 62); Ellis (1976: 264); Hsieh & Goh (1990: 164); Crous & Braun (2003: 99).

Cercospora codiae Gonz. Frag. & Cif., Rep. Dominic. Est. Agron. Haina, D, Bot. 5: 9, 1926. Figs 14–15.

Leaf spots suborbicular to irregular, 1–5 mm in diam., grey-brown in the centre, and with reddish margin. Colonies amphigenous, scattered, dark brown. Mycelium internal, inconspicuous. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 17–27 μ m in diam. (\bar{x} = 21.3 μ m, n = 5), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–9 μ m wide (\bar{x} = 6.7 μ m, n = 15), brown to dark brown, wall 0.5–0.8 μ m wide (\bar{x} = 0.6 μ m, n = 15), smooth. Conidiophores fasciculate or solitary, arising from stromata (2–10 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 16–49 \times 3–5 μ m (\bar{x} = 33.8 \times 3.75 μ m, n = 15), 1–3-septate, distance between septa 5–18 μ m (\bar{x} = 11.5 μ m, n = 30), medium brown, paler at the apex, wall 0.5–0.8 μ m wide (\bar{x} = 0.66 μ m, n = 30), smooth, not geniculate. Conidiogenous cells terminal, cylindrical, 13–18 \times 3–5 μ m (\bar{x} = 16 \times 3.67 μ m, n = 5), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–2 μ m wide (\bar{x} = 1.83 μ m, n = 5), wall 0.5–0.8 μ m thick (\bar{x} = 0.6 μ m, n = 5), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 50–150 \times 2.5–4 μ m (\bar{x} = 84 \times 3.16 μ m, n = 9), 3–8-septate, hyaline to subhyaline, thin-walled 0.25–0.3 μ m (\bar{x} = 0.28 μ m, n = 9), smooth, tip acute, base

truncate to somewhat obconically truncate; hila thickened and darkened 1–2 μm wide (\bar{x} = 1.33 μm , n = 9), wall of the hila 0.25–0.3 μm (\bar{x} = 0.28 μm , n = 9) thick.

Known hosts – *Cordiaum variegatum* (L.) A. Juss. (Euphorbiaceae).

Known distribution – **Africa:** Nigeria; **Asia:** Thailand; **North America and West Indies:** Cuba, Dominican Rep.

Material examined – Chiang Mai Province, Maeteng District, Phadeng Village, on leaves of *Cordiaum variegatum* (Euphorbiaceae), 7 June 2011, P. Phengsintham (P639).

Notes – The collection agrees well with *C. cordiaei* as circumscribed by To-anun et al. (2011) [conidiophores 56–213 \times 4–5.5 μm , slightly geniculate; conidia 29–160 \times 3–4.5 μm , acicular, rarely obclavate, 3–10-septate, truncate at the base; on *Cordiaum*].

Literature – Chupp (1954: 215); Crous & Braun (2003: 130); To-anun et al. (2011: 59).

Cercospora coffeicola Berk. & Cooke, Grevillea 9: 99, 1881. Figs 16–17.

= *Cercospora coffeae* Zimm., Ber. Land-Forstw. Deutsch-Ostaf. 2: 35, 1904.

= *Cercospora herrerana* Farneti, Atti Ist. Bot. Univ. Pavia, Ser. 2, 9: 37, 1911.

Teleomorph: *Mycosphaerella coffeicola* (Cooke) J.A. Stev. & Wellman, J. Wash. Acad. Sci. 34: 262, 1944.

\equiv *Sphaerella coffeicola* Cooke, Grevillea 9: 11, 1880.

\equiv *Mycosphaerella coffeicola* (Cooke) Cif., Ist. Bot. Reale Univ. Reale Lab. Crittog. Pavia Atti, Ser. 5, 19: 118, 1962 (comb. superfl.).

Leaf spots small to fairly large, sub-orbicular to irregular, 1–10 mm in diam., at first yellowish, later becoming grey-brown in the centre, and with dark brown margin. Colonies amphigenous scattered, dark brown. Mycelium internal, inconspicuous. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 40–45 μm in diam. (\bar{x} = 42.5 μm , n = 5), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 4–7 μm wide (\bar{x} = 5.9 μm , n = 30), brown to dark brown, wall 0.5–0.8 μm wide (\bar{x} = 0.73 μm , n = 30), smooth.

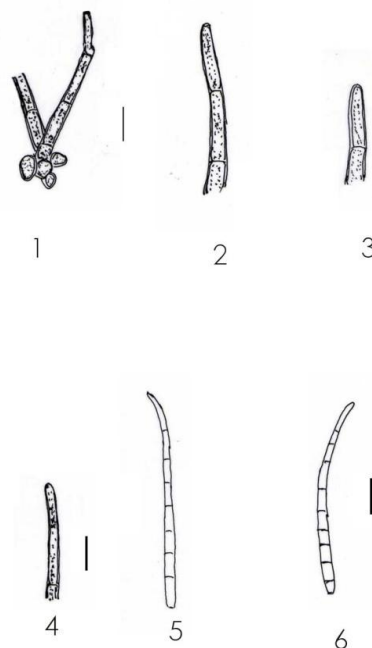


Fig. 14 – *Cercospora cordiaei* on *Cordiaum variegata* from leaf spots: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–6. Conidia. Bars: 1–6 = 10 μm .

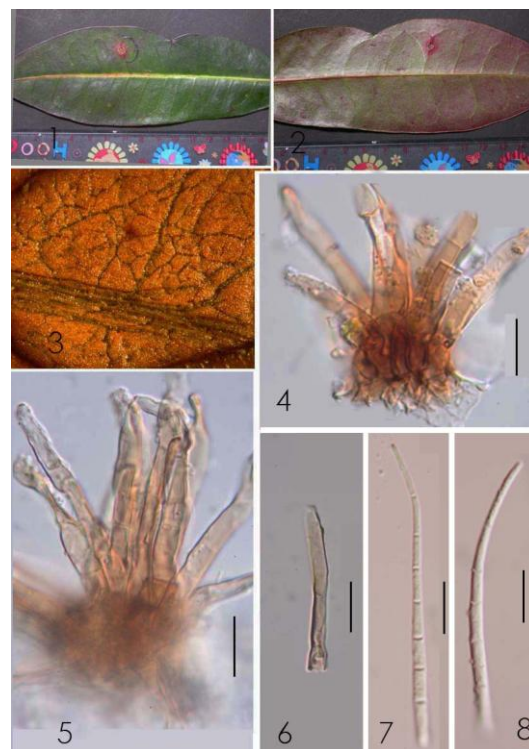


Fig. 15 – *Cercospora cordiaei* on *Cordiaum variegata* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4–5. Stromata with attached conidiophores. 6. Conidiophore. 7–8. Conidia. Bars: 1–2 = 10 mm. 3. Not to scale. 4–8 = 10 μm .

Conidiophores fasciculate, arising from stromata (2–21 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, $9\text{--}55 \times 4\text{--}5 \mu\text{m}$ ($\bar{x} = 52.8 \times 4.46 \mu\text{m}$, $n = 30$), 0–5-septate, distance between septa $9\text{--}34 \mu\text{m}$ ($\bar{x} = 18 \mu\text{m}$, $n = 30$), medium brown, paler at the apex, wall $0.5\text{--}0.8 \mu\text{m}$ wide ($\bar{x} = 0.62 \mu\text{m}$, $n = 30$), smooth, 0–2-times geniculate. Conidiogenous cells integrated, terminal, cylindrical, $9\text{--}34 \times 4\text{--}5 \mu\text{m}$ ($\bar{x} = 18.8 \times 4.6 \mu\text{m}$, $n = 11$), pale brown; conidiogenous loci conspicuous, subcircular, $2\text{--}4 \mu\text{m}$ wide ($\bar{x} = 3 \mu\text{m}$, $n = 11$), wall $0.5\text{--}0.8 \mu\text{m}$ thick ($\bar{x} = 0.62 \mu\text{m}$, $n = 11$), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, $54\text{--}87 \times 2\text{--}3.5 \mu\text{m}$ ($\bar{x} = 70.7 \times 2.87 \mu\text{m}$, $n = 7$), 6–9-septate, hyaline to subhyaline, thin-walled $0.3\text{--}0.5 \mu\text{m}$ ($\bar{x} = 0.4 \mu\text{m}$, $n = 7$), smooth; tip acute; base truncate to obconically truncate, hila thickened and darkened $1\text{--}2 \mu\text{m}$ wide ($\bar{x} = 1.37 \mu\text{m}$, $n = 7$), wall of the hila $0.3\text{--}0.5 \mu\text{m}$ ($\bar{x} = 0.45 \mu\text{m}$, $n = 7$) thick.

Known hosts – *Coffea arabica* L., *C. canephora* Pierre ex A. Froehn, *C. excelsa* A. Chev., *C. laurina* Poir., *C. liberica* W. Bull ex Hiern, *C. robusta* L. Linden, *C. stenophylla* G. Don, *Coffea* spp. (Rubiaceae).

Known distribution – **Africa:** Angola, Congo, Ethiopia, Gabon, Ghana, Ivory Coast, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Nigeria, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zimbabwe; **Asia:** Brunei, Cambodia, China, India, Indonesia, Japan, Laos, Myanmar, Nepal, Papua New Guinea, Philippines, Thailand, Yemen; **North America and West Indies:** Costa Rica, Cuba, Dominican Republ., El Salvador, Guadeloupe, Guatemala, Haiti, Jamaica, Martinique, Panama, Puerto Rico, Trinidad and Tobago, USA (FL, HI); **Australia; Oceania:** American Samoa, Fiji, French Polynesia, Micronesia, New Caledonia, Samoa, Vanuatu; **South America:** Brazil, Colombia, French Guiana, Guyana, Peru, Suriname, Venezuela.

Material examined – Chiang Mai Province, Maeteng District, Phadeng Village, Garden, on leaves of *Coffea arabica* (Rubiaceae), 10 September 2007, P. Phengsintham (P301); Chiang Rai Province, Maechan District, Doi Tung National Park, Garden, on leaves of *Coffea arabica*

(Rubiaceae), 4 December 2009, P. Phengsintham (P481).

Notes – The collections from Thailand agree well with the description of *Cercospora coffeicola* in Hsieh & Goh (1990) [conidiophores $20\text{--}200 \times 4\text{--}6 \mu\text{m}$ and conidia $40\text{--}150 \times 2\text{--}4 \mu\text{m}$]. The variation in the size of conidiophores and conidia ranging from rather short to long are connected with different climate conditions.

Literature – Chupp (1954: 493); Vasudeva (1963: 86); Ellis (1976: 283); Hsieh & Goh (1990: 285).

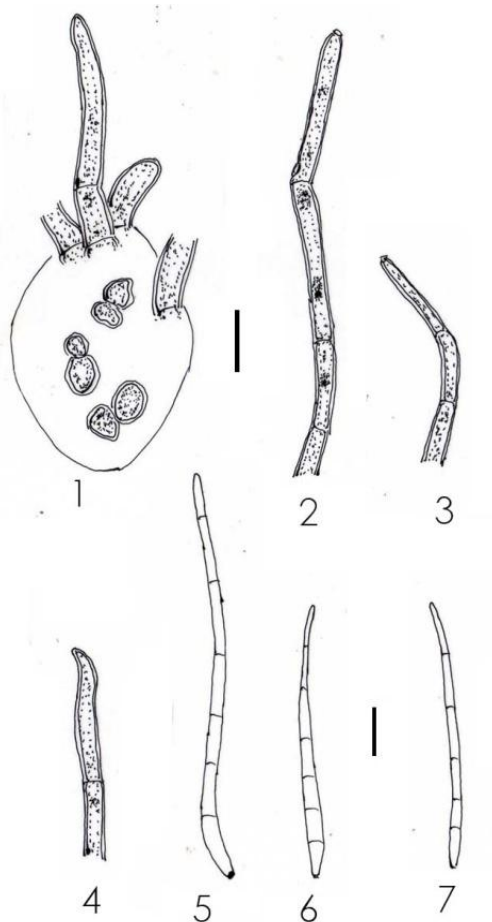


Fig. 16 – *Cercospora coffeicola* on *Coffea arabica* from leaf spots: 1. Stroma with attached conidiophores. 2–4. Conidiophore. 5–7. Conidia. Bars: 1–7 = $10 \mu\text{m}$.

Cercospora crotalariae Sacc. Syll. Fung. 22: 129, 1913. Figs 18–19.

= *Cercospora crotalariae-juncea* Sawada, J. Taihoku Soc. Agric. 7: 27, 1942.

Teleomorph: *Mycosphaerella crotalariae* (Petch) Hans f., Proc. Linn. Soc. London 153: 121, 1942.

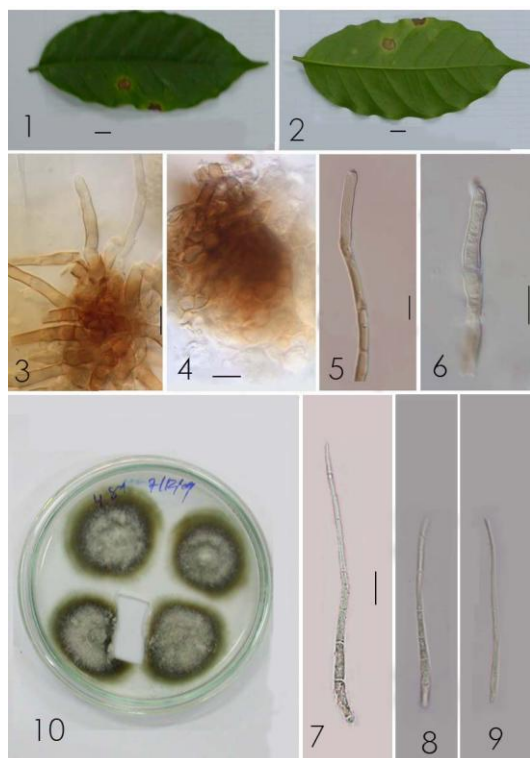


Fig. 17 – *Cercospora coffeicola* on *Coffea arabica* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3–4 Stromata with attached conidiophores. 5–6. Conidiophore. 7–9. Conidia. 10. Culture. Bars: 1–2 = 10 mm. 3–9 = 10 μ m. 10 = 10 mm.

\equiv *Sphaerella crotalariae* Petch, Ann. Roy. Bot. Gard. 3: 2, 1906.

Leaf spots subcircular to irregular, 1–5 mm diam., grey-brown to dark brown in the centre, dark brown margin. Colonies amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–5 μ m wide (\bar{x} = 4.33 μ m, n = 6), septate, constricted at the septa, distance between septa 7–20 μ m (\bar{x} = 13.83 μ m, n = 6), brownish or green-hyaline, wall 0.5–1 μ m wide (\bar{x} = 0.85 μ m, n = 6), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, oval to ellipsoidal, 25–45 μ m diam. (\bar{x} = 22.5 μ m, n = 9), brown, substomatal, intraepidermal, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 5–12 μ m wide (\bar{x} = 8.6 μ m, n = 30), brown to dark brown, wall 0.5–1 μ m wide (\bar{x} = 0.89 μ m, n = 30). Conidiophores formed singly or fasciculate, arising from stromata (1–11 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 20–148 \times 5–6 μ m (\bar{x} = 78.3 \times 5.33 μ m, n = 15),

1–12-septate, distance between septa 7–20 μ m long (\bar{x} = 14.5 μ m, n = 30), medium brown, paler at the apex, wall 0.5–1 μ m wide (\bar{x} = 0.76 μ m, n = 30), smooth, 0–2-times geniculate, width uniform. Conidiogenous cells integrated, terminal or intercalary, cylindrical, 12–17 \times 4–5 μ m, (\bar{x} = 14 \times 4.67 μ m, n = 9), pale brown; conidiogenous loci conspicuous, subcircular, 2–4 μ m wide (\bar{x} = 3 μ m, n = 9), dark brown, wall 0.5–1 μ m thick (\bar{x} = 0.6 μ m, n = 9). Conidia solitary, acicular, straight to curved, 40–320 \times 3–4 μ m (\bar{x} = 180 \times 3.5 μ m, n = 7), 3–26-septate, hyaline, thin-walled, 0.3–0.5 μ m wide (\bar{x} = 0.4 μ m, n = 7), smooth, tip acute, base truncate, hila thickened and darkened, 2–3 μ m wide (\bar{x} = 2.5 μ m, n = 7), wall of the hila 0.3–0.5 μ m thick (\bar{x} = 0.35 μ m, n = 7).

Known hosts – *Crotalaria incana* L., *C. juncea* L., *C. mucronata* Desv., *C. retusa* L., *C. sericea* Burm. f., *C. spectabilis* Roth., *Crotalaria* sp., *C. striata* DC., *C. stricta* Roxb., *Crotalaria uncinella* subsp. *elliptica* (Roxb.) Polhill (new hosts), *C. usaramoensis* Baker f. (Fabaceae).

Known distribution – **Asia:** Bangladesh, China, India, Indonesia, Laos, Pakistan, Papua New Guinea, Sri Lanka, Taiwan, Thailand; **South America and West Indies:** Puerto Rico, Venezuela.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on the leaves of *Crotalaria uncinella* subsp. *elliptica* (Fabaceae), 31 August 2009, P. Phengsintham (P449).

Notes – The collection from Thailand agrees well with the description of *C. crotalariae* published by Hsieh & Goh (1990) in having a similar size of conidiophores and conidia (conidiophores 45–110 \times 4–6 μ m, conidia 40–110 \times 2.5–4 μ m).

Literature – Saccardo (1913: 129); Chupp (1954: 297); Hsieh & Goh (1995: 167); Crous & Braun (2003: 143).

Cercospora diplazicola A.K. Das., Indian J. Mycol. Res. 27: 37, 1989. Figs 20–21.

Leaf spots subcircular to irregular, 1–5 mm diam., grey-brown to dark brown in the centre, dark brown margin. Colonies amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–3 μ m wide

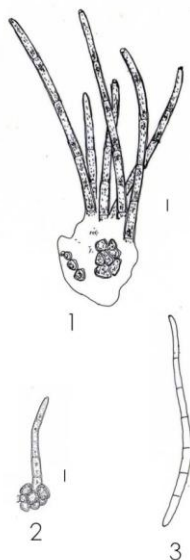


Fig. 18 – *Cercospora crotalariae* on *Crotalaria uncinella* subsp. *elliptica* from leaf spots: 1–2. Stromata with attached conidiophores. 3. Conidium. Bars: 1–3 = 10 μ m.



Fig. 19 – *Cercospora crotalariae* on *Crotalaria uncinella* subsp. *elliptica* from leaf spots: 1. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Internal hyphae. 4–5. Stromata with attached conidiophores. 6. Conidium. 7. Base of conidium. Bars: 1–2 = 10 mm. 3–7 = 10 μ m.

(\bar{x} = 2.5 μ m, n = 13), septate, constricted at the septa, distance between septa 5–10 μ m (\bar{x} = 7.5 μ m, n = 13), brownish or green-hyaline, wall 0.3–0.5 μ m wide (\bar{x} = 0.35 μ m, n = 13), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata well-developed, oval to ellipsoidal, 15–25 μ m diam. (\bar{x} = 20 μ m, n = 7), brown, substomatal, intraepidermal, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 6–17 μ m wide (\bar{x} = 12 μ m, n = 30), brown to dark brown, wall 0.5–0.8 μ m wide (\bar{x} = 0.7 μ m, n = 30). Conidiophores formed singly or fasciculate, arising from stromata (1–7 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 40–76 \times 4–6 μ m (\bar{x} = 65.1 \times 5 μ m, n = 13), 2–4-septate, distance between septa 8–28 μ m long (\bar{x} = 17.8 μ m, n = 30), medium brown, paler at the apex, wall 0.5–0.8 μ m wide (\bar{x} = 0.66 μ m, n = 30), smooth, 0–1-times geniculate, width uniform. Conidiogenous cells integrated, terminal or intercalary, cylindrical, 12–28 \times 3–5 μ m, (\bar{x} = 20.5 \times 3.83 μ m, n = 9), pale brown; conidiogenous loci conspicuous, subcircular, 2–3 μ m wide (\bar{x} = 0.8 μ m, n = 9), dark brown, wall 0.5–0.8 μ m thick (\bar{x} = 0.57 μ m, n = 9). Conidia solitary, acicular, straight to curved, 52–156 \times 3–4 μ m (\bar{x} = 106.33 \times 3.5 μ m, n = 8), 3–18-septate, hyaline, thin-walled 0.3–0.5 μ m wide (\bar{x} = 0.33 μ m, n = 8), smooth, tip acute, base truncate, hila thickened and darkened, 2–3 μ m wide (\bar{x} = 2.4 μ m, n = 8), wall of the hila 0.3–0.5 μ m thick (\bar{x} = 0.34 μ m, n = 9).

Known hosts – *Diplazium esculentum* (Retz.) Sw. (Woodsiaceae).

Known distribution – **Asia**: India, Laos, Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on the leaves of *Diplazium esculentum* (Woodsiaceae), 3 August 2009, P. Phengsintham (P450).

Notes – This species is distinct from *C. apii* s. lat. in having acicular to obclavate, 3–6 μ m wide conidia, with an obconically truncate base (Crous & Braun 2003).

Literature – Crous & Braun (2003).

Cercospora gossypina Cooke, Grevillea 12: 31, 1883. Figs 22–23.

Teleomorph: *Mycosphaerella gossypina*

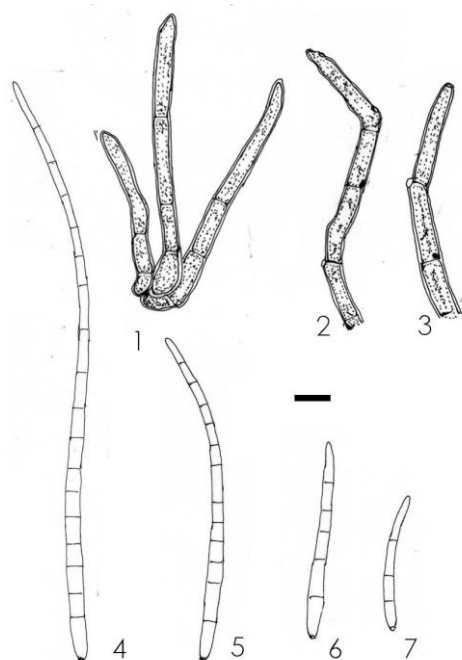


Fig. 20 – *Cercospora diplaziicola* on *Diplazium esculentum* from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–5. Conidia. Bars: 1–7 = 10 μm .



Fig. 21 – *Cercospora diplaziicola* on *Diplazium esculentum* from leaf spots: 1–3. Leaf spots on host leaves (1. upper surface, 2. lower surface, 3. leaf spots). 4. Stroma. 5. Conidiophore. 6. Apex of conidiophores. 7. Conidium. Bars: 1–2 = 10 mm. 3. Not to scale. 4–7 = 10 μm .

(G.F. Atk.) Earle, Bull. Alab. Exp. Sta. 107: 309, 1900.

≡ *Sphaerella gossypina* G.F. Atk, Bull. Torrey Bot. Club 18: 300, 1891.

Leaf spots small to fairly large, sub-orbicular to irregular, 1–5 mm in diam., grey-brown in the centre, and with dark brown margin. Colonies hypophyllous, scattered, dark brown. Mycelium internal, inconspicuous. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 13–50 μm in diam. (\bar{x} = 27 μm , n = 9), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–12 μm wide (\bar{x} = 8.3 μm , n = 16), brown to dark brown, wall 0.5–1 μm wide (\bar{x} = 0.72 μm , n = 16), smooth. Conidiophores fasciculate, arising from stromata (3–20 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 50–95 \times 3.5–6 μm (\bar{x} = 74.6 \times 4.81 μm , n = 8), 1–6-septate, distance between septa 10–35 μm (\bar{x} = 19.1 μm , n = 20), medium brown, paler at the apex, wall 0.5–0.8 μm wide (\bar{x} = 0.73 μm , n = 20), smooth, 0–2-times geniculate. Conidiogenous cells integrated, terminal, cylindrical, 10–35 \times 4–6 μm (\bar{x} = 20.5 \times 4.83 μm , n = 6), pale brown; conidiogenous loci conspicuous, sub-circular, 2–2.5 μm wide (\bar{x} = 2.1 μm , n = 5), wall 0.5–0.8 μm thick (\bar{x} = 0.68 μm , n = 5), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 32–75 \times 2–4 μm (\bar{x} = 56.5 \times 3.5 μm , n = 6), 1–7-septate, hyaline to subhyaline, thin-walled 0.3–0.5 μm (\bar{x} = 0.33 μm , n = 6), smooth; tip acute; base truncate to somewhat obconically truncate, hila thickened and darkened 1–3 μm wide (\bar{x} = 2.21 μm , n = 6), wall of the hila 0.3–0.5 μm (\bar{x} = 0.35 μm , n = 6) thick.

Colonies on PDA after 3 weeks at 25°C with pinkish grey mycelium, reaching 8–14 mm diam., hyphae 2–6 μm wide (\bar{x} = 4.14 μm , n = 14), septate, constricted at the septa, distance between septa 13–40 μm (\bar{x} = 22.71 μm , n = 14), reddish or brownish, wall 0.5–1 μm wide (\bar{x} = 0.64 μm , n = 14), smooth. Conidia not formed in culture.

Known hosts – *Gossypium arboreum* L. (= *G. indicum* Medik.), *G. barbadense* L., *G. herbaceum* L., *G. hirsutum* L., *G. sturtianum* Willis (Malvaceae).

Known distribution – **Africa:** Congo, Egypt, Malawi, Mozambique, Nigeria, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe; **Asia:** Bangladesh, Cambodia, China, India, Japan, Korea, Laos, Myanmar, Pakistan, Papua New Guinea, Sri Lanka, Taiwan, Thailand; **Europe:** Azerbaijan; **North America and West Indies:** Cuba, Dominican Rep., Haiti, Jamaica, Mexico, Puerto Rico, Trinidad and Tobago, USA (FL, MS, OK), Virgin Islands; **Australia; South America:** Argentina, Brazil, Colombia, Peru, Venezuela.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Gossypium herbaceum* (Malvaceae), 15 January 2010, P. Phengsintham (P519). GenBank accession no (LSU, KC677919).

Notes – The collection from Thailand agrees well with *C. gossypina* as circumscribed by Chupp (1954), Ellis (1976) and other authors. *C. gossypina* is part of the *C. apii* complex from which it is morphologically barely distinguishable (Crous & Braun 2003).

Literature – Chupp (1954: 371); Ellis (1976: 274); Crous & Braun (2003: 202).

Cercospora malloti Ellis & Everh., J. Mycol. 4: 114, 1888. Figs 24–25.

Leaf spots suborbicular to irregular, 1–5 mm in diam., brown in the centre, and with dark brown margin. Colonies hypophyllous, scattered, dark brown. Mycelium internal, inconspicuous. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 15–30 μm in diam. (\bar{x} = 25 μm , n = 5), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–11 μm wide (\bar{x} = 7.8 μm , n = 8), brown to dark brown in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–11 μm wide (\bar{x} = 7.8 μm , n = 8), brown to dark brown, wall 0.5–0.8 μm wide (\bar{x} = 0.61 μm , n = 8), smooth. Conidiophores fasciculate, arising from stromata (1–10 per fascicle), emerging through stomata, not branched, straight to curved, cylindrical, about 32–140 \times 5–6 μm (\bar{x} = 83.6 \times 5.6 μm , n = 8),

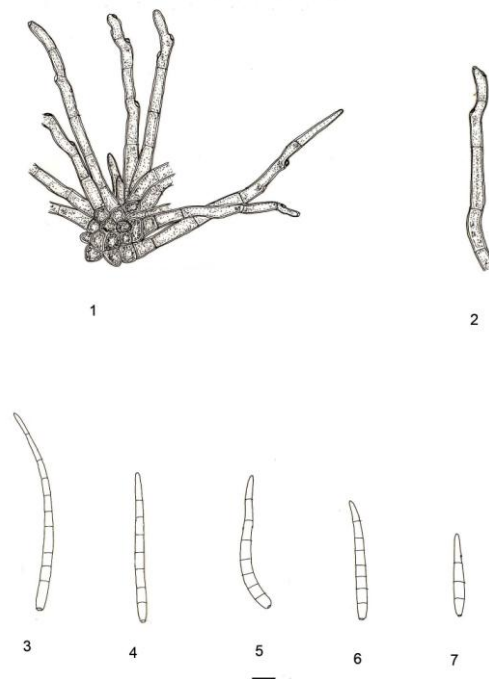


Fig. 22 – *Cercospora gossypina* on *Gossypium herbaceum* from leaf spots: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–7. Conidia. Bars: 1–7 = 10 μm .

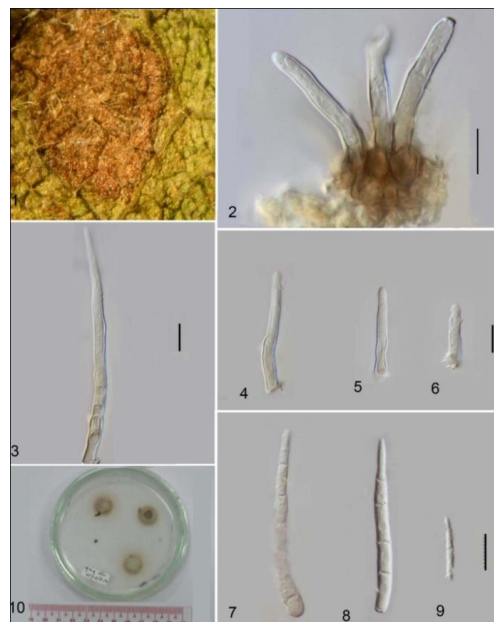


Fig. 23 – *Cercospora gossypina* on *Gossypium herbaceum* from leaf spots: 1. Colonies. 2. Stroma with attached conidiophores. 3–6. Conidiophores. 7–9. Conidia. 10. Culture. Bars: 1. Not to scale. 2–9 = 10 μm . 10 = 10 mm.

1–5-septate, distance between septa 12–31 μm (\bar{x} = 21.3 μm , n = 20), medium brown, paler at the apex, wall 0.5–0.8 μm wide (\bar{x} = 0.65 μm , n = 20), smooth, 0–1-times geniculate. Conidiogenous cells integrated, terminal, cylindrical, 20–31 \times 4–5 μm (\bar{x} = 27 \times 4.67 μm , n = 6), pale brown; conidiogenous loci conspicuous, subcircular, 2–3 μm wide (\bar{x} = 2.5 μm , n = 5), wall 0.5–0.8 μm thick (\bar{x} = 0.65 μm , n = 5), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 20–146 \times 2–4 μm (\bar{x} = 75.8 \times 3.6 μm , n = 7), 6–19-septate, hyaline to subhyaline, thin-walled 0.3–0.5 μm (\bar{x} = 0.34 μm , n = 6), smooth; tip acute; base truncate to somewhat obconically truncate, hila thickened and darkened 1.5–3 μm wide (\bar{x} = 2.5 μm , n = 6), wall of the hila 0.3–0.5 μm (\bar{x} = 0.34 μm , n = 6) thick.

Known hosts – *Mallotus apelta* (Lour.) Müll. Arg., *M. japonicus* (L. f.) Müll. Arg., *M. repandus* (Rottler) Müll. Arg. (Euphorbiaceae).

Known distribution – **Asia:** China, Japan, Thailand; **North America:** USA (MS).

Material examined – Chiang Rai Province, Muang District, Tadsak water fall, on leaves of *Mallotus repandus* (Euphorbiaceae), 23 December 2009, P. Phengsintham (P494).

Notes – The collection from Thailand agrees well with *C. malloti* as circumscribed by Chupp (1954). *C. malloti* is part of the *C. apii* complex (Crous & Braun 2003) from which it is morphologically barely distinguishable.

Literature – Chupp (1954: 224); Hsieh & Goh (1990: 124); Crous & Braun (2003: 264).

Cercospora nilghirensis Govindu & Thirum., Sydowia 9: 224, 1955. Figs 26–27.

Leaf spots small to medium, suborbicular to irregular, 2–8 mm in diam., reddish brown in the centre, and with brown margin. Colonies amphigenous, scattered, dark brown. Mycelium internal, inconspicuous. Stromata developed, small to medium-sized, globular to sub-globular, substomatal and intraepidermal, 10–40 μm in diam. (\bar{x} = 20.7 μm , n = 7), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 4–8 μm wide (\bar{x} = 6.6 μm , n = 15), brown to dark brown, wall 0.5–1 μm wide (\bar{x} = 0.68 μm , n = 15), smooth.

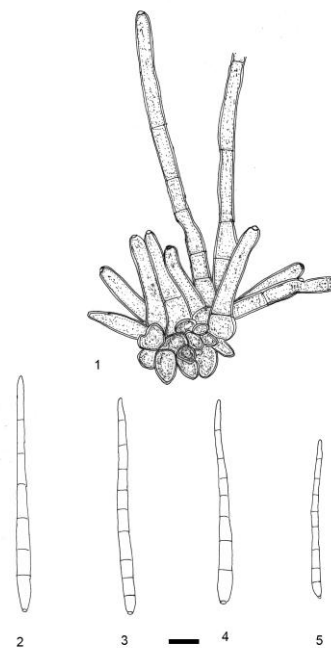


Fig. 24 – *Cercospora malloti* on *Mallotus repandus* from leaf spots: 1. Stroma with attached conidiophores. 2–5. Conidia. Bars: 1–5 = 10 μm .

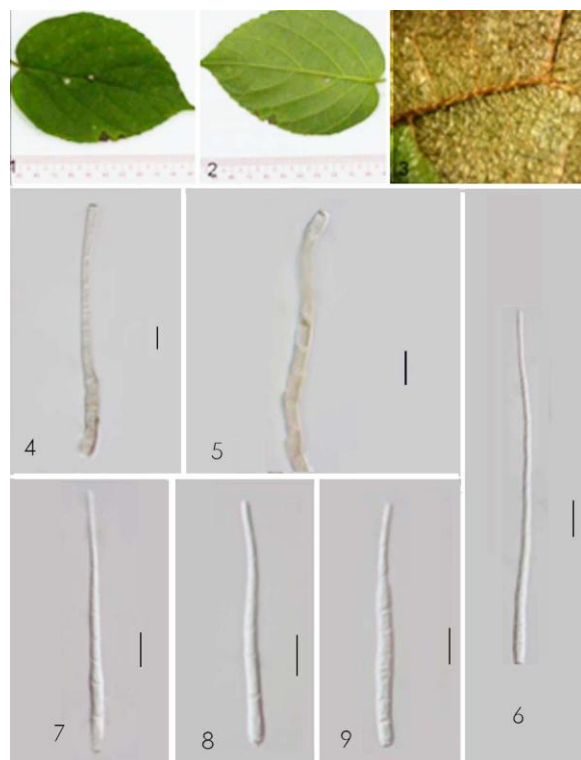


Fig. 25 – *Cercospora malloti* on *Mallotus repandus* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4–5. Conidiophores. 6–9. Conidia. Bars: 1–2 = 10 mm. 3. Not to scale. 4–9 = 10 μm .

Conidiophores fasciculate, arising from stomata (1–9 per fascicle), emerging through stomata, not branched, straight to curved, cylindrical, $50\text{--}128 \times 3\text{--}5 \mu\text{m}$ ($\bar{x} = 98.3 \times 3.63 \mu\text{m}$, $n = 9$), 2–4-septate, distance between septa $8\text{--}45 \mu\text{m}$ ($\bar{x} = 23.9 \mu\text{m}$, $n = 30$), medium brown, paler at the apex, wall $0.5\text{--}1 \mu\text{m}$ wide ($\bar{x} = 0.67 \mu\text{m}$, $n = 30$), smooth, 0–2-times geniculate. Conidiogenous cells integrated, terminal, cylindrical, $15\text{--}45 \times 3\text{--}4 \mu\text{m}$ ($\bar{x} = 22.3 \times 2.3 \mu\text{m}$, $n = 9$), pale brown; conidiogenous loci conspicuous, subcircular, $1.5\text{--}3.5 \mu\text{m}$ wide ($\bar{x} = 2.84 \mu\text{m}$, $n = 9$), wall $0.5\text{--}1 \mu\text{m}$ thick ($\bar{x} = 0.77 \mu\text{m}$, $n = 9$), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, $14\text{--}128 \times 2\text{--}3.5 \mu\text{m}$ ($\bar{x} = 73.3 \times 2.5 \mu\text{m}$, $n = 11$), 1–15-septate, hyaline to subhyaline, thin-walled $0.3\text{--}0.5 \mu\text{m}$ ($\bar{x} = 0.33 \mu\text{m}$, $n = 11$), smooth; tip acute; base truncate to somewhat obconically truncate, hila thickened and darkened $1.5\text{--}3 \mu\text{m}$ wide ($\bar{x} = 2.96 \mu\text{m}$, $n = 11$), wall of the hila $0.3\text{--}0.5 \mu\text{m}$ ($\bar{x} = 0.4 \mu\text{m}$, $n = 11$) thick.

Known hosts – *Conyza ambigua* DC., *C. bonariensis* (L.) Cronquist, *C. stricta* Willd (Asteraceae).

Known distribution – **Asia:** India, Laos, Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Conyza bonariensis* (Asteraceae), 15 September 2009, P. Phengsintham (P456).

Notes – The collection from Thailand agrees well with the descriptions of *C. nilghirensis* in Vasudeva (1963) and To-anun et al. (2011).

Literature – Vasudeva (1963: 151); Crous & Braun (2003: 291); To-anun et al. (2011).

Cercospora passifloricola Chupp, A Monograph of the fungus genus *Cercospora*: 434, 1954. Figs 28–29.

Leaf spots small to medium, suborbicular to irregular, 1–3 mm in diam., dark brown in the centre, and with darker brown margin. Colonies amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–4 μm wide ($\bar{x} = 3 \mu\text{m}$, $n = 13$), septate, constricted at the septa, distance between septa 5–10 μm ($\bar{x} = 9 \mu\text{m}$, $n = 13$),

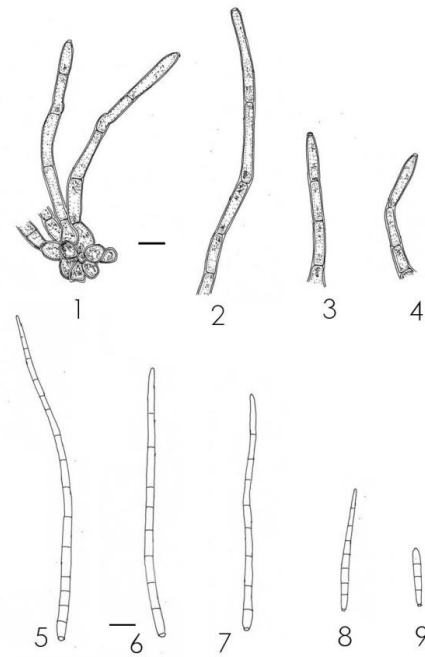


Fig. 26 – *Cercospora nilghirensis* on *Conyza bonariensis* from leaf spots: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–9. Conidia. Bars: 1–9 = 10 μm .

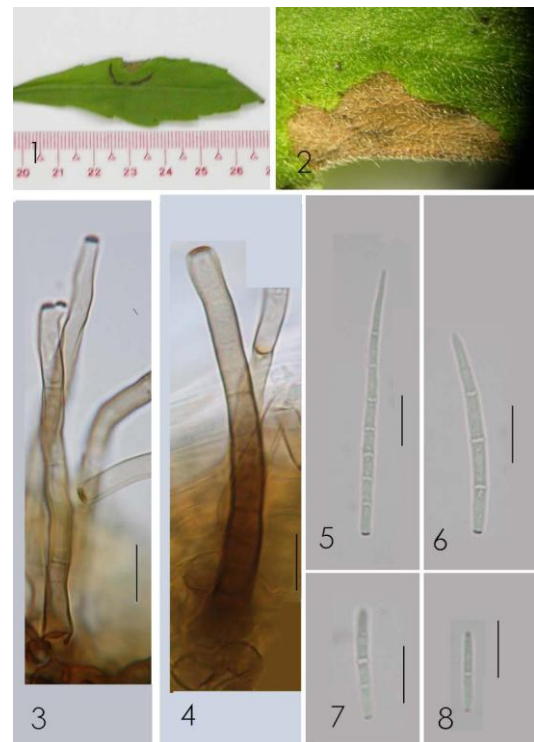


Fig. 27 – *Cercospora nilghirensis* on *Conyza bonariensis* from leaf spots: 1. Leaf spots on host leaf (upper surface). 2. Caespituli. 3–4. Stromata with attached conidiophores. 5–8. Conidia. Bars: 1 = 10 mm. 2 Not to scale. 3–8 = 10 μm .

brownish or green-hyaline, wall 0.3–0.5 μm wide (\bar{x} = 0.46 μm , n = 13), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 10–20 μm in diam. (\bar{x} = 16.3 μm , n = 8), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–10 μm wide (\bar{x} = 6.6 μm , n = 8), brown to dark brown, wall 0.5–0.8 μm wide (\bar{x} = 0.62 μm , n = 8), smooth. Conidiophores fasciculate, arising from stromata (1–4 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 32–95 \times 4–6 μm (\bar{x} = 77.6 \times 5.14 μm , n = 7), 1–7-septate, distance between septa 12–25 μm (\bar{x} = 16.6 μm , n = 30), medium brown, paler at the apex, wall 0.5–0.8 μm wide (\bar{x} = 0.7 μm , n = 30), smooth, 0–1-times geniculate. Conidiogenous cells integrated, terminal, cylindrical, 14–25 \times 4–5 μm (\bar{x} = 19 \times 4.4 μm , n = 7), pale brown; conidiogenous loci conspicuous, sub-circular, 1.5–3 μm wide (\bar{x} = 2.05 μm , n = 7), wall 0.5–0.8 μm thick (\bar{x} = 0.56 μm , n = 7), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 29–102 \times 2–3 μm (\bar{x} = 72 \times 2.4 μm , n = 11), 3–9-septate, hyaline to subhyaline, thin-walled 0.3–0.5 μm (\bar{x} = 0.34 μm , n = 11), smooth; tip acute; base truncate to somewhat obconically truncate, hila thickened and darkened 1.5–3 μm wide (\bar{x} = 2.2 μm , n = 11), wall of the hila 0.3–0.5 μm (\bar{x} = 0.34 μm , n = 11) thick.

Known hosts – *Passiflora coerulea* L., *P. edulis* Sims, *P. foetida* L., *Passiflora* sp. (Passifloraceae).

Known distribution – **Africa:** Zimbabwe; **Asia:** China, Thailand; **North America and West Indies:** Barbados; **South America:** Venezuela.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Passiflora foetida* (Passifloraceae), 11 June 2011, P. Phengsintham (P643).

Notes – The collection from Thailand agrees well with *C. passifloricola* as circumscribed by Chupp (1954) (conidiophores 10–55 \times 2–5 μm and conidia 30–120 \times 2–4 μm).

Literature – Chupp (1954: 434); Crous & Braun (2003: 309).

Cercospora senecionis-walkeri Phengsintham; Chukeatirote; McKenzie; Hyde & U. Braun, Pl. Pathol. & Quarantine 2(1): 70, 2012.

Figs 30–31.

Leaf spots circular to slightly irregular, 2–3 mm diam., at first dark green, later becoming brown to dark brown in the centre, dark brown margin. Colonies amphigenous, conspicuous, scattered, dark brown. Mycelium internal, 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 substomatal, intra-epidermal, ellipsoidal, lenticular 10–25 μm diam. (\bar{x} = 18.8 μm , n = 5), brown, stomatal 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 fasciculate, arising from stromata (1–8 per fascicle), 0–5 geniculate, cylindrical, straight to curved, 67–170 \times 5–6 μm (\bar{x} = 114 \times 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 intergrated, terminal, cylindrical, tapering to the apex, 14–30 \times 4–5 μm (\bar{x} = 21.8 \times 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 0.5–1 μm (\bar{x} = 0.54 μm , n = 30); thick. Conidia solitary, clavate, cylindrical-clavate, obclavate, straight to curved, 17–82 \times 4–7 μm (\bar{x} = 50.66 \times 5.66 μm , n = 9), 0–8-septate, slightly constricted at the septa, subhyaline or olivaceous-brown, smooth, wall 0.3–0.5 μm thick (\bar{x} = 0.37 μm , n = 9), apex subobtuse, based truncate, hila 2–3 μm wide (\bar{x} = 2.2 μm , n = 9), wall of the hila 0.5 μm wide (\bar{x} = 0.5 μm , n = 9), darkened.

Known hosts – *Senecio walkeri* Arn. (Asteraceae).

Known distribution – **Asia:** Laos, Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Senecio walkeri* (Asteraceae), 11 August 2009, P. Phengsintham (P434, MFLU 10-00318).

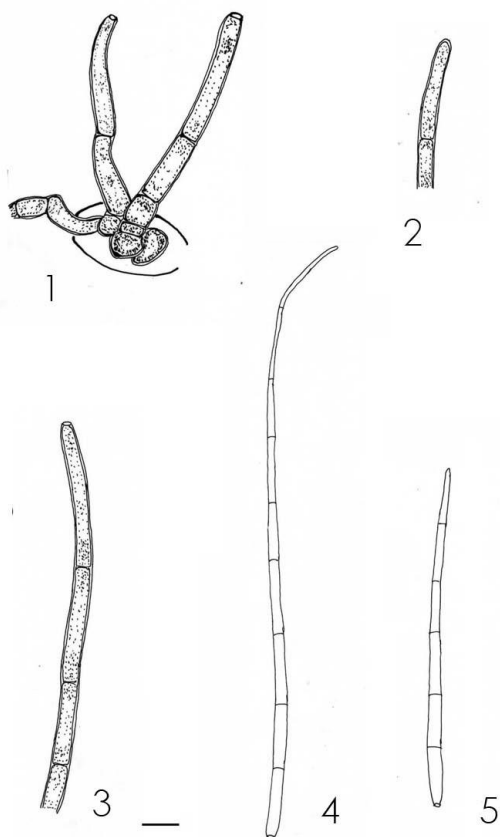


Fig. 28 – *Cercospora passifloricola* on *Passiflora foetida* from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidiophore. 4–5. Conidia. Bars = 10 µm.

Notes – The collection from Thailand is similar to *C. senecionis-walkeri* from Laos (Phengsintham et al., 2012).

Cercospora sidicola Ellis & Everh., J. Mycol. 5: 72, 1889. Figs 32–33.

= *Cercospora densissima* Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires, Ser. 2(3): 341, 1899.

Leaf spots small to medium, suborbicular to irregular, 1–5 mm in diam., dark brown in the centre, and with brown to yellowish margin. Colonies amphigenous, scattered, grey brown. Mycelium internal; hyphae branched, 2–4 µm wide (\bar{x} = 3 µm, n = 13), septate, constricted at the septa, distance between septa 5–15 µm (\bar{x} = 11 µm, n = 13), brownish or green-hyaline, wall 0.5–0.8 µm wide (\bar{x} = 0.57 µm, n = 13), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular,

substomatal and intra-epidermal, 7–25 µm in diam. (\bar{x} = 16.5 µm, n = 7), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 4–13 µm wide (\bar{x} = 7.8 µm, n = 15), brown to dark brown, wall 0.5–1 µm wide (\bar{x} = 0.88 µm, n = 15), smooth. Conidiophores fasciculate, arising from stromata (1–8 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 50–131 × 4–5 µm (\bar{x} = 89 × 4.67 µm, n = 11), 2–7-septate, distance between septa 8–32 µm (\bar{x} = 17.8 µm, n = 30), medium brown, paler at the apex, wall 0.5–0.8 µm wide (\bar{x} = 0.64 µm, n = 30), smooth, 0–2-times geniculate. Conidiogenous cells integrated, terminal, cylindrical, 18–27 × 3–5 µm (\bar{x} = 23 × 4 µm, n = 8), pale brown; conidiogenous loci conspicuous, sub-circular, 2–3 µm wide (\bar{x} = 2.75 µm, n = 8), wall 0.5–0.8 µm thick (\bar{x} = 0.75 µm, n = 8), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 44–105 × 2–6 µm (\bar{x} = 64 × 3.5 µm, n = 10), 4–8-septate, hyaline to subhyaline, thin-walled 0.3–0.5 µm (\bar{x} = 0.33 µm, n = 10), smooth; tip acute; base truncate to somewhat obconically truncate, hila thickened and darkened 1.5–3 µm wide (\bar{x} = 1.45 µm, n = 15), wall of the hila 0.3–0.5 µm (\bar{x} = 0.35 µm, n = 15) thick.

Known hosts – *Sida acuta* Burm. f., *S. cordifolia* (DC.) Fryxell, *S. mysorensis* Wight & Arn., *S. rhombifolia* L., *S. spinosa* L., *Sida* sp. (Malvaceae).

Known distribution – **Asia:** China, India, Thailand; **North America and West Indies:** Cuba, Dominican Republic, Panama, Puerto Rico, USA (FL, LA, TX), Virgin Islands; **South America:** Argentina, Brazil.

Material examined – Chiang Rai Province, Wiang Chiang Rung District, Tadsak waterfall, on leaves of *Sida mysorensis* (Malvaceae), 23 December 2009, P. Phengsintham (MFLU10-0312). GenBank accession no (ITS, KC677888; LSU, KC677922).

Notes – The collection from Tadsak waterfall, Chiang Rai Province agrees with *Cercospora sidicola* as circumscribed by Chupp (1954), but differs in forming distinct leaf spots.

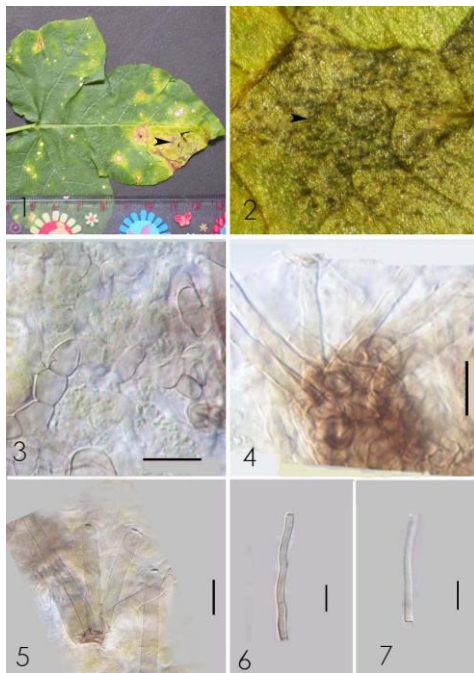


Fig. 29 – *Cercospora passifloricola* on *Passiflora foetida* from leaf spots: 1. Leaf spots on host leaf (upper surface). 2. Colonies. 3. Internal hyphae. 4–5. Stromata with attached conidiophores. 6. Conidiophore. 7. Conidia. Bars: 1 = 10 mm. 2. Not to scale. 3–7 = 10 μ m.



Fig. 31 – *Cercospora senecionis-walkeri* on *Senecio walkeri* from leaf spots/lesions: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Stroma with attached conidiophores. 4. Apex of conidiophore. 5–8. Conidia (6. Base of conidia). Bars: 1–2 = 10 mm, 3–8 = 10 μ m.

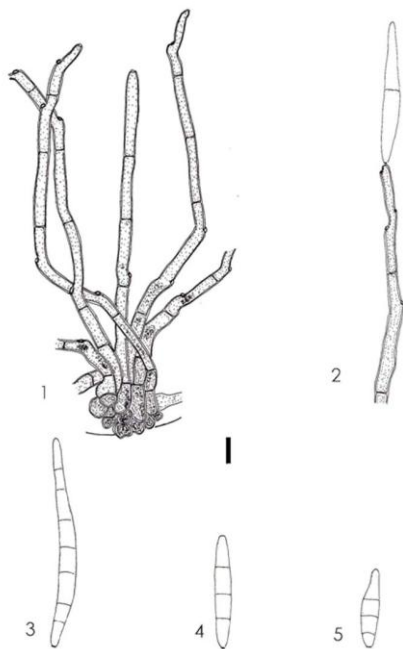


Fig. 30 – *Cercospora senecionis-walkeri* on *Senecio walkeri* from leaf spots: 1. Stroma with attached conidiophores. 2. Conidiophore with attached conidium. 3–5. Conidia. Bars: 1–5 = 10 μ m.

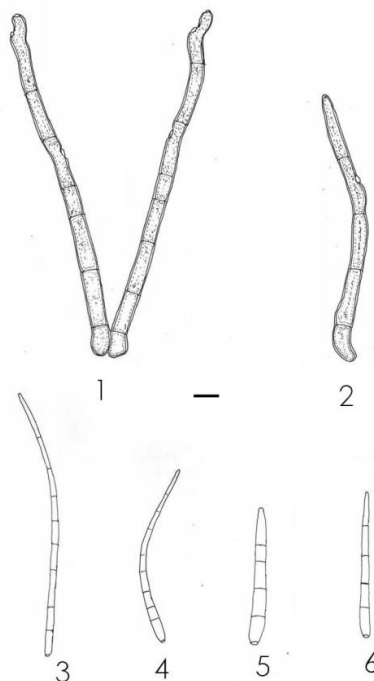


Fig. 32 – *Cercospora sidicola* on *Sida mysorensis* from leaf spots: 1. Stromata with attached conidiophores. 2. Conidiophore. 3–6. Conidia. Bars: 1–6 = 10 μ m.



Fig. 33 – *Cercospora sidicola* on *Sida mysorensis* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4–5. Stomata with attached conidiophores. 6. Conidiophore. 7–8. Conidia. 9. Base of Conidium. Bars: 1–2 = 10 mm. 3 = Not to scale. 4–10 = 10 μ m.

Literature – Saccardo (1902: 1066); Chupp (1954: 377); Crous & Braun (2003: 377).

Cercospora sonchi Chupp, A monograph of the fungus genus *Cercospora*: 154, 1954.

Figs 34–35.

= *Cercospora sonchi* var. *taraxaci* Govindu & Thirum., Sydowia 18: 21, (1964)1965.

Leaf spots small to fairly large, suborbicular to irregular, 1–15 mm in diam., reddish brown in the centre, and with dark red-brown margin. Colonies amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–4 μ m wide (\bar{x} = 2.6 μ m, n = 7), septate, constricted at the septa, distance between septa 5–10 μ m (\bar{x} = 7 μ m, n = 7), brownish or green-hyaline, wall approximately 0.3–0.5 μ m wide (\bar{x} = 0.42 μ m, n = 7), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stomata developed, small to medium-

sized, globular to subglobular, substomatal and intraepidermal, 18–40 μ m in diam. (\bar{x} = 26 μ m, n = 5), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–9 μ m wide (\bar{x} = 7.6 μ m, n = 15), brown to dark brown, wall 0.5–0.8 μ m wide (\bar{x} = 0.7 μ m, n = 15), smooth. Conidiophores fasciculate, arising from stomata (1–7 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 15–190 \times 4–5 μ m (\bar{x} = 76.24 \times 4.49 μ m, n = 15), 1–9-septate, distance between septa 6–28 μ m (\bar{x} = 18.27 μ m, n = 15), medium brown, paler at the apex, wall 0.5–0.8 μ m wide (\bar{x} = 0.6 μ m, n = 15), smooth, 0–2-times geniculate. Conidiogenous cells terminal, cylindrical, 13–27 \times 3–4 μ m (\bar{x} = 22.16 \times 4.21 μ m, n = 8), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 μ m wide (\bar{x} = 2.35 μ m, n = 7), wall 0.5–0.8 μ m thick (\bar{x} = 0.6 μ m, n = 7), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 78–91 \times 2–4 μ m (\bar{x} = 84.58 \times 3.38 μ m, n = 5), 7–14-septate, hyaline to subhyaline, thin-walled 0.3 μ m (\bar{x} = 0.3 μ m, n = 5), smooth, tip acute, base truncate to somewhat obconically truncate; hila thickened and darkened 2–3 μ m wide (\bar{x} = 2.06 μ m, n = 5), wall of the hila 0.3–0.5 μ m (\bar{x} = 0.36 μ m, n = 5) thick.

Known hosts – *Sonchus arvensis* L., *S. cornutus* Hochst. ex Oliv. & Hiern, *S. oleraceus* L., *Sonchus* sp., *Taraxacum officinale* F.H. Wigg., *Taraxacum* sp. (Asteraceae).

Known distribution – **Africa**: Sudan; **Asia**: China, India, Laos, Thailand; **North America and West Indies**: Barbados, Cuba, USA (VA); **Oceania**: Vanuatu.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Taraxacum officinale* (Asteraceae), 7 July 2010, P. Phengsintham (P600).

Notes – The collection from Thailand agrees well with *C. sonchi* as circumscribed by Chupp (1954) [conidiophores 30–120 \times 4–5.5 μ m, conidia 50–200 \times 2–3.5 μ m].

Literature – Chupp (1954: 159); Crous & Braun (2003: 381).

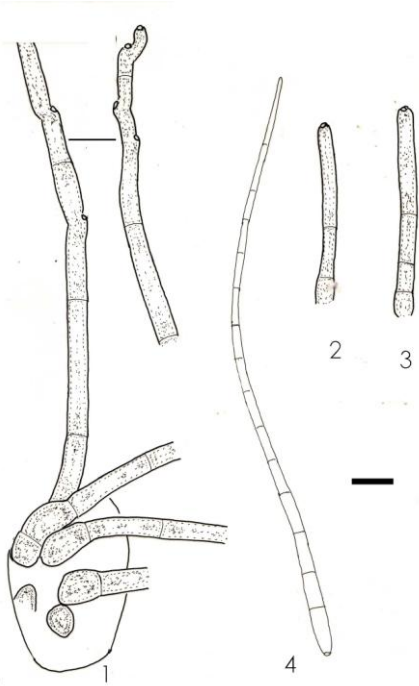


Fig. 34 – *Cercospora sonchi* on *Taraxacum officinale* from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4. Conidia. Bars: 1–4 = 10 µm.



Fig. 35 – *Cercospora sonchi* on *Taraxacum officinale* from leaf spots: 1–2. Leaf spots on host leaves and Colonies (lower surface). 3. Stromata with attached conidiophores. 4–5. Conidiophores. 6. Conidium. 7. Based of Conidium. Bars: 1–2 = Not to scale. 3–7 = 10 µm.

***Cercospora* sp. sp. 1.** Figs 36–37.

Leaf spots small to fairly large, sub-orbicular to irregular, 3–15 mm in diam., reddish brown in the centre, and reddish brown with yellowish margin. Colonies amphigenous, scattered, dark brown. Mycelium internal, inconspicuous. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 10–25 µm in diam. (\bar{x} = 17.5 µm, n = 5), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 4–8 µm wide (\bar{x} = 6 µm, n = 17), brown to dark brown, wall 0.5–0.8 µm wide (\bar{x} = 0.6 µm, n = 17), smooth. Conidiophores fasciculate, arising from stromata (1–3 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 67–132 × 4–6 µm (\bar{x} = 106 × 4.75 µm, n = 9), 2–5-septate, 0–1-geniculate, distance between septa 10–30 µm (\bar{x} = 18.1 µm, n = 30), medium brown, paler at the apex, wall 0.5–0.8 µm wide (\bar{x} = 0.55 µm, n = 30), smooth, 0–2-times geniculate. Conidiogenous cells terminal, cylindrical, 22–28 × 4–5 µm (\bar{x} = 25.5 × 4.25 µm, n = 8), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 µm wide (\bar{x} = 2.12 µm, n = 15), wall 0.5–0.8 µm thick (\bar{x} = 0.57 µm, n = 15), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 100–202 × 2–4 µm (\bar{x} = 138.67 × 3.33 µm, n = 5), 6–16-septate, hyaline to subhyaline, thin-walled 0.25–0.3 µm (\bar{x} = 0.28 µm, n = 5), smooth, tip acute, base truncate; hila thickened and darkened 1.5–3 µm wide (\bar{x} = 2.16 µm, n = 5), wall of the hila 0.3–0.5 µm (\bar{x} = 0.36 µm, n = 5) thick.

Known hosts – *Crateva religiosa* G. Forst. (Capparaceae).

Known distribution – **Asia:** Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Crateva religiosa* (Capparaceae), 22 August 2010, P. Phengsintham (P618).

Notes – The collection from Thailand is similar to the description of *Cercospora apii* s. lat. (emend.) published by Crous & Braun (2003), i.e. the collections on *Crateva religiosa* can tentatively be assigned to the latter species (complex). Further notes see *Cercospora* sp. sp. 2.

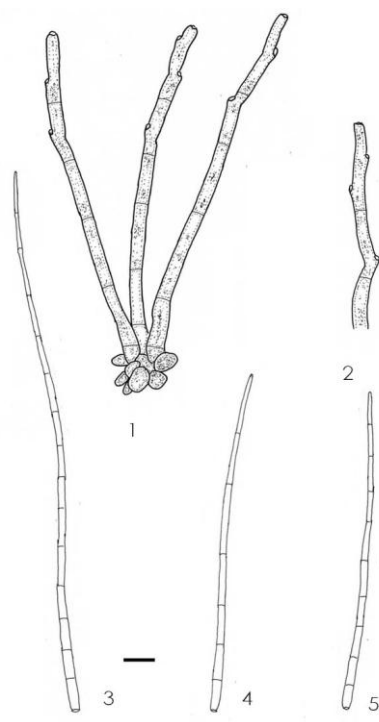


Fig. 36 – *Cercospora* sp. sp. 1 on *Crateva religiosa* from leaf spots: 1. Stroma with attached Conidiophores. 2. Conidiophores. 3–5. Conidia. Bars: 1–5 = 10 μ m.

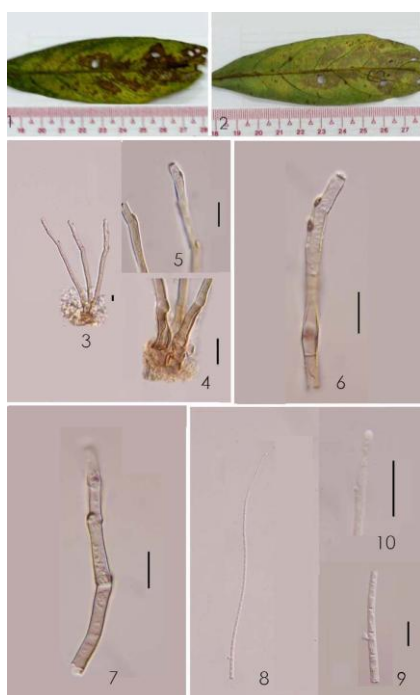


Fig. 37 – *Cercospora* sp. sp. 1 on *Crateva religiosa* from leaf spots: 1–2. Leaf spots on host leaves and Colonies (lower surface). 3–4. Stromata with attached Conidiophores. 5. Apex of conidiophores. 6–7. Conidiophores. 8. Conidium. 9. Base of Conidium. 10. Apex of conidium. Bars: 1–2 = 10 mm. 3–10 = 10 μ m.

***Cercospora* sp. sp. 2.** Figs 38–39.

Leaf spots small to medium, sub-orbicular to irregular, 2–5 mm in diam., dark brown in the centre, and with brown to yellowish margin. Colonies amphigenous, scattered, grey-brown. Mycelium internal; hyphae branched, 3–5 μ m wide (\bar{x} = 3.2 μ m, n = 11), septate, constricted at the septa, distance between septa 5–12 μ m (\bar{x} = 9.2 μ m, n = 11), brownish or green-hyaline, wall 0.5–0.8 μ m wide (\bar{x} = 0.74 μ m, n = 11), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 15–26 μ m in diam. (\bar{x} = 21.5 μ m, n = 5), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 6–10 μ m wide (\bar{x} = 8.3 μ m, n = 30), brown to dark brown, wall 0.5–0.8 μ m wide (\bar{x} = 0.65 μ m, n = 30), smooth. Conidiophores fasciculate, arising from stromata (2–13 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 15–77 \times 2–4 μ m (\bar{x} = 62.9 \times 3.61 μ m, n = 9), 0–4-septate, distance between septa 8–31 μ m (\bar{x} = 17.6 μ m, n = 30), medium brown, paler at the apex, wall 0.5–0.8 μ m wide (\bar{x} = 0.58 μ m, n = 30), smooth, 0–2-times geniculate. Conidiogenous cells integrated, terminal, cylindrical, 8–31 \times 3–4 μ m (\bar{x} = 24.4 \times 3.4 μ m, n = 5), pale brown; conidiogenous loci conspicuous, subcircular, 0.7–3 μ m wide (\bar{x} = 1.37 μ m, n = 7), wall 0.5–0.8 μ m thick (\bar{x} = 0.62 μ m, n = 7), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 54–72 \times 2–3 μ m (\bar{x} = 62 \times 2.33 μ m, n = 5), 5–9-septate, hyaline to subhyaline, thin-walled 0.25–0.3 μ m (\bar{x} = 0.28 μ m, n = 5), smooth; tip acute; base truncate, hila thickened and darkened, 0.7–2 μ m wide (\bar{x} = 1.17 μ m, n = 5), wall of the hila 0.3–0.35 μ m (\bar{x} = 0.31 μ m, n = 5) thick.

Colonies on PDA after 3 weeks at 25°C are grey-violet to dark brown-violet in the centre, pale brown margin, reaching 10–12 mm diam.

Known hosts – *Celtis timorensis* Span. (Cannabaceae).

Known distribution – **Asia**: Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang

Village, on leaves of *Celtis timorensis* (Cannabaceae), 24 August 2010, P. Phengsintham (P624). GenBank accession no (ITS, KC677889; LSU, KC677923).

Notes – This is the first *Cercospora* record on a species of *Celtis*. This collection is morphologically indistinguishable from and belongs to the *Cercospora apii* complex (Crous & Braun 2003). Collections on new hosts within this complex should only be referred to as *C. apii* s. lat. (or *Cercospora* sp. or as belonging to the *C. apii* complex). Without molecular sequence analyses further treatments of collections in this complex are not possible as various plurivorous species, morphologically indistinguishable from *C. apii*, are involved (Groenewald et al., 2012).

Literature – Crous & Braun (2003); Groenewald et al. (2012).

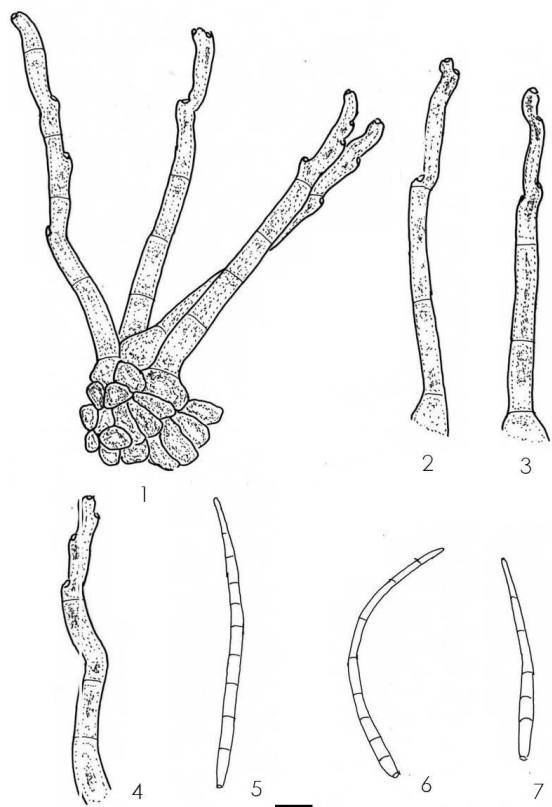


Fig. 38 – *Cercospora* sp. sp. 2 on *Celtis timorensis* from leaf spots: 1. Stroma with attached conidiophores. 2–5. Conidiophores. 6–7. Conidia. Bars: 1–7 = 10 µm.

Cercospora sp. sp. 3. Figs 40–41.

Leaf spots suborbicular to irregular, 1–6 mm in diam., dark brown in the centre, and with yellowish brown margin. Colonies



Fig. 39 – *Cercospora* sp. sp. 2 on *Celtis timorensis* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4–7. Stromata with attached conidiophores. 8–9. Conidia. Bars: 1–2 = 10 mm. 3 = Not to scale. 4–9 = 10 µm.

amphigenous, scattered, dark brown. Mycelium internal, inconspicuous. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intra-epidermal, 3–10 µm in diam. (\bar{x} = 5.8 µm, n = 5), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–9 µm wide (\bar{x} = 7.6 µm, n = 17), brown to dark brown, wall 0.5–0.8 µm wide (\bar{x} = 0.62 µm, n = 17), smooth. Conidiophores fasciculate, arising from stromata (1–4 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 40–320 × 4–7 µm (\bar{x} = 147 × 6 µm, n = 9), 5–7-septate, distance between septa 10–28 µm (\bar{x} = 18.3 µm, n = 30), medium brown, paler at the apex, wall 0.5–0.8 µm wide (\bar{x} = 0.59 µm, n = 30), smooth, 0–1-times geniculate. Conidiogenous cells terminal, cylindrical, 15–28 × 3–4 µm (\bar{x} = 21.8 × 3.25 µm, n = 9), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–2.5 µm wide (\bar{x} = 2 µm, n = 9), wall 0.5–0.8 µm thick (\bar{x} = 0.65 µm, n = 9), thickened and darkened. Conidia solitary, acicular,

straight to curved, $163\text{--}195 \times 2.5\text{--}3 \mu\text{m}$ ($\bar{x} = 179 \times 2.75 \mu\text{m}$, $n = 5$), 7–21-septate, hyaline to subhyaline, thin-walled $0.3\text{--}0.5 \mu\text{m}$ ($\bar{x} = 0.38 \mu\text{m}$, $n = 5$), smooth, tip acute, base truncate; hila thickened and darkened $1.5\text{--}2.5 \mu\text{m}$ wide ($\bar{x} = 2 \mu\text{m}$, $n = 5$), wall of the hila $0.3\text{--}0.5 \mu\text{m}$ ($\bar{x} = 0.36 \mu\text{m}$, $n = 5$) thick.

Known host – *Ziziphus* sp. (Rhamnaceae).

Known distribution – **Asia:** Thailand.

Material examined – Pha Yao Province, Mae Jai District, Mae Puem National Park, on leaves of *Ziziphus* sp. (Rhamnaceae), 22 August 2010, P. Phengsintham (MFLU11-0019).

Notes – The collection MFLU11-0019 from Mae Puem National Park, Pha Yao Province differs to the *Cercospora ziziphigena* described by Xu & Guo (2003) (conidiophores $13.8\text{--}92.5 \times 3.5\text{--}6.3 \mu\text{m}$ and conidia $17.5\text{--}76.8 \times 3.1\text{--}5.3 \mu\text{m}$) in having much longer, narrower conidia. A true *Cercospora* s. str. quite close to *Cercospora apii* s. lat. (Crous & Braun, 2003).

Literature – Crous & Braun (2003: 435); Xu & Guo (2003: 6–8).

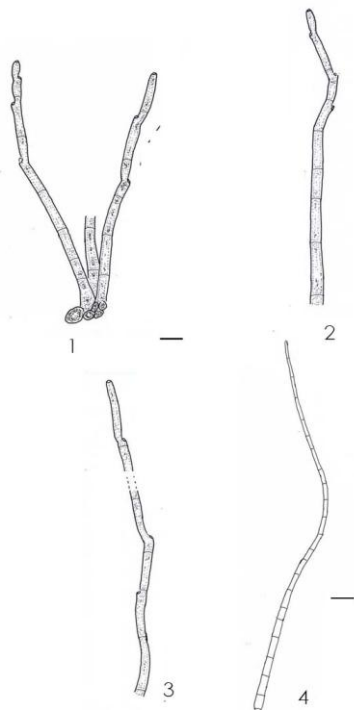


Fig. 40 – *Cercospora* sp. sp. 3 on *Ziziphus* sp. from leaf spots: 1. Stroma with attached conidiophores. 2-3. Conidiophores. 4. Conidium. Bars: 1–4 = $10 \mu\text{m}$.

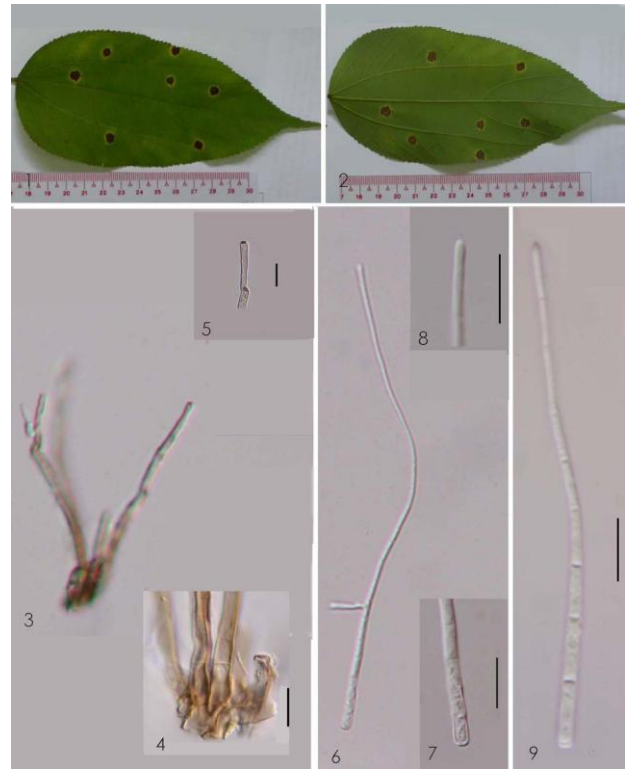


Fig. 41 – *Cercospora* sp. sp. 3 on *Ziziphus* sp. from leaf spots: 1–2. Leaf spots on host leaves (1, upper surface, 2, lower surface). 3. Stromata with attached conidiophores. 5. Stroma. 5. Apex of conidiophore. 6. Conidium. 7. Base of Conidium. 8. Apex of conidia. 9. Conidium. Bars: 1–2 = 10mm . 3–9 = $10 \mu\text{m}$.

Cercospora tageteae Cif., Sydowia 8: 252, 1954. Figs 42–43.

Leaf spots small to fairly large, sub-orbicular to irregular, 2–5 mm in diam., grey-brown to dark brown in the centre, and with dark brown margin. Colonies amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, $2.5\text{--}4 \mu\text{m}$ wide ($\bar{x} = 3.16 \mu\text{m}$, $n = 7$), septate, constricted at the septa, distances between septa $8\text{--}15 \mu\text{m}$ ($\bar{x} = 11.67 \mu\text{m}$, $n = 7$), brownish or green-hyaline, wall approximately $0.3\text{--}0.5 \mu\text{m}$ wide ($\bar{x} = 0.43 \mu\text{m}$, $n = 7$), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, $10\text{--}20 \mu\text{m}$ in diam. ($\bar{x} = 16.5 \mu\text{m}$, $n = 7$), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, $5\text{--}8 \mu\text{m}$ wide ($\bar{x} = 6.7 \mu\text{m}$, $n = 9$), brown to dark brown, wall

0.5–1 μm wide (\bar{x} = 0.67 μm , n = 9), smooth. Conidiophores fasciculate, arising from stomata (1–4 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 25–68 \times 5–6 μm (\bar{x} = 46 \times 5.33 μm , n = 13), 0–1-septate, distance between septa 8–38 μm (\bar{x} = 16.4 μm , n = 30), medium brown, paler at the apex, wall 0.5–0.8 μm wide (\bar{x} = 0.56 μm , n = 30), smooth, 0–2-times geniculate. Conidiogenous cells terminal, cylindrical, 12–38 \times 4–5 μm (\bar{x} = 25 \times 4.5 μm , n = 8), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 μm wide (\bar{x} = 2.16 μm , n = 8), wall 0.5–0.8 μm thick (\bar{x} = 0.65 μm , n = 8), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 45–54 \times 5–6 μm (\bar{x} = 48.8 \times 5.6 μm , n = 5), 1–3-septate, hyaline to subhyaline, thin-walled 0.25–0.3 μm (\bar{x} = 0.29 μm , n = 5), smooth, tip acute, base obconically truncate; hila thickened and darkened 1.5–3 μm wide (\bar{x} = 2.6 μm , n = 5), wall of the hila 0.25–0.3 μm (\bar{x} = 0.29 μm , n = 5) thick.

Known hosts – *Tagetes patula* L. (Asteraceae).

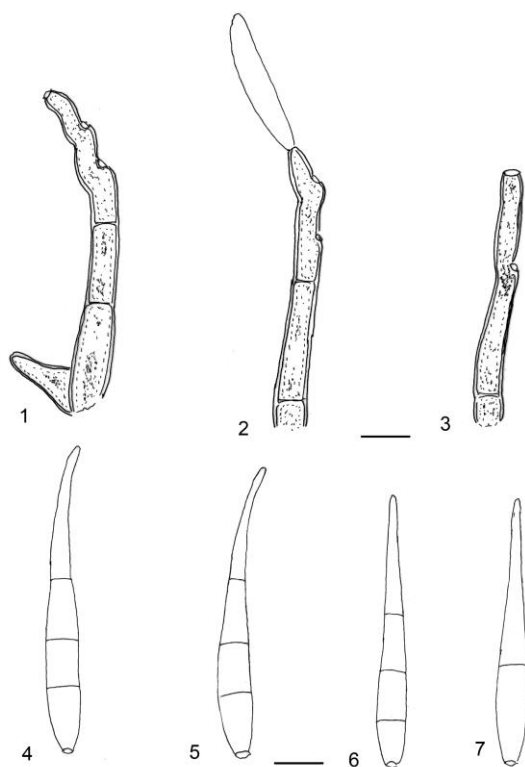


Fig. 42 – *Cercospora tageteae* on *Tagetes patula* from leaf spots: 1–3. Conidiophores. 4–7. Conidia. Bars: 1–7 = 10 μm

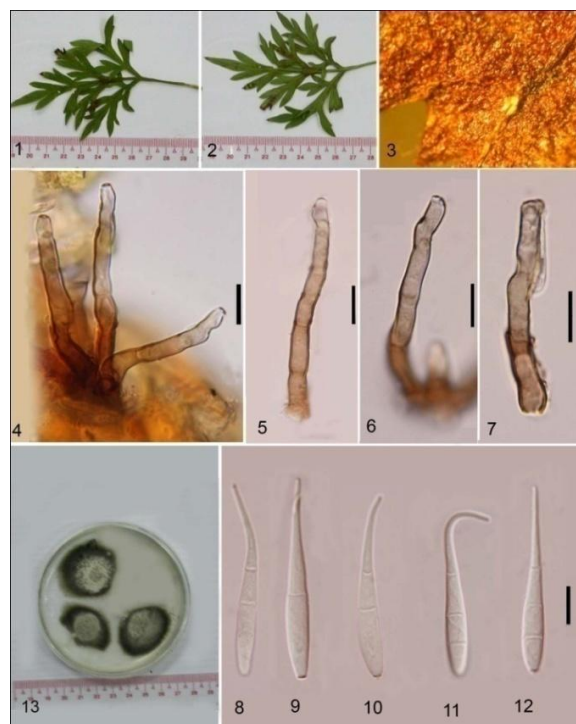


Fig. 43 – *Cercospora tageteae* on *Tagetes patula* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Stroma with attached conidiophores. 5–7. Conidiophores. 9–12. Conidia. 13. Culture. Bars: 1–2 = 10 mm. 3. Not to scale. 4–12 = 10 μm . 13 = 10 mm.

Known distribution – **Asia:** Thailand; **North America and West Indies:** Dominican Republ.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Tagetes patula* (Asteraceae), 30 July 2010. P. Phengsintham (P609). GenBank accession no (ITS, KC677890).

Notes – A true *Cercospora* s. str. distinct from *C. apii* s. lat. by lacking leaf spots, having frequently branched conidiophores, small conidiogenous loci, 1–2.5 μm wide, and obclavate-cylindrical to acicular conidia (Crous & Braun, 2003).

Literature – Crous & Braun (2003: 396).

Cercospora verniciferae Chupp & Viérgas, Bol. Soc. Bras. Agron. 8: 58, 1945. Figs 44–45.

Leaf spots small to medium, sub-orbicular to irregular, 1–4 mm in diam., brown in the centre, and with brown-yellow margin. Colonies hypophyllous, scattered, dark brown. Mycelium internal; hyphae branched, 3–5 μm

wide ($\bar{x} = 3.57 \mu\text{m}$, $n = 7$), septate, constricted at the septa, distance between septa 7–12 μm ($\bar{x} = 8.42 \mu\text{m}$, $n = 7$), brownish or green-hyaline, wall 0.5–0.8 μm wide ($\bar{x} = 0.54 \mu\text{m}$, $n = 7$), smooth, forming plate-like plectenychmatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 16–33 μm in diam. ($\bar{x} = 23.6 \mu\text{m}$, $n = 8$), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–10 μm wide ($\bar{x} = 7.9 \mu\text{m}$, $n = 13$), brown to dark brown, wall 0.5–0.8 μm wide ($\bar{x} = 0.68 \mu\text{m}$, $n = 13$), smooth. Conidiophores fasciculate, arising from stromata (1–4 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 45–89 \times 5–7 μm ($\bar{x} = 71.2 \times 5.4 \mu\text{m}$, $n = 5$), 2–5-septate, distance between septa 5–30 μm ($\bar{x} = 16.2 \mu\text{m}$, $n = 16$), medium brown, paler at the apex, wall 0.5–0.8 μm wide ($\bar{x} = 0.63 \mu\text{m}$, $n = 16$), smooth, 0–2-times geniculate. Conidiogenous cells integrated, terminal, cylindrical, 16–30 \times 4–5 μm ($\bar{x} = 24.5 \times 4.5 \mu\text{m}$, $n = 4$), pale brown; conidiogenous loci conspicuous, subcircular, 2–2.5 μm wide ($\bar{x} = 2.12 \mu\text{m}$, $n = 4$), wall 0.5–0.8 μm thick ($\bar{x} = 0.57 \mu\text{m}$, $n = 4$), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 23–105 \times 2–4 μm ($\bar{x} = 64 \times 2.8 \mu\text{m}$, $n = 5$), 5–12-septate, hyaline to subhyaline, thin-walled 0.3–0.5 μm ($\bar{x} = 0.31 \mu\text{m}$, $n = 5$), smooth; tip acute; base truncate to obconically truncate, hila thickened and darkened 1–1.5 μm wide ($\bar{x} = 1.1 \mu\text{m}$, $n = 5$), wall of the hila 0.3–0.35 μm ($\bar{x} = 0.31 \mu\text{m}$, $n = 5$) thick.

Known hosts – *Rhus vernicifera* DC., *Spondias dulcis* Parkinson, *S. pinnata* (L.f.) Kurz (Anacardiaceae).

Known distribution – **Asia:** Thailand; **Oceania:** American Samoa; **South America:** Brazil.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Spondias pinnata* (Anacardiaceae), 22 December 2009, P. Phengsintham (MFLU10-0313).

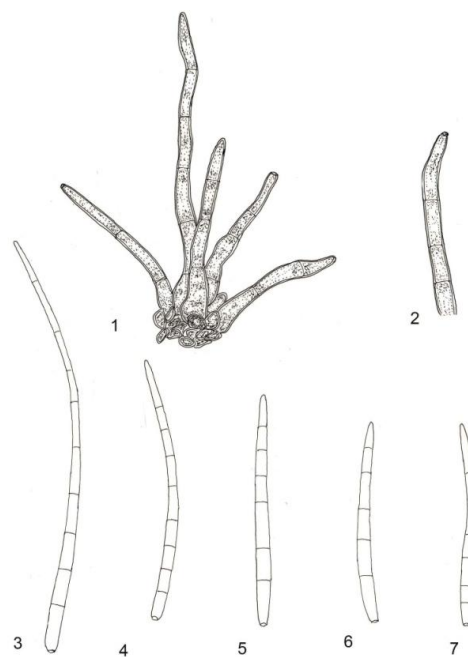


Fig. 44 – *Cercospora verniciferae* on *Spondias pinnata* from leaf spots: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–7. Conidia. Bars = 10 μm .

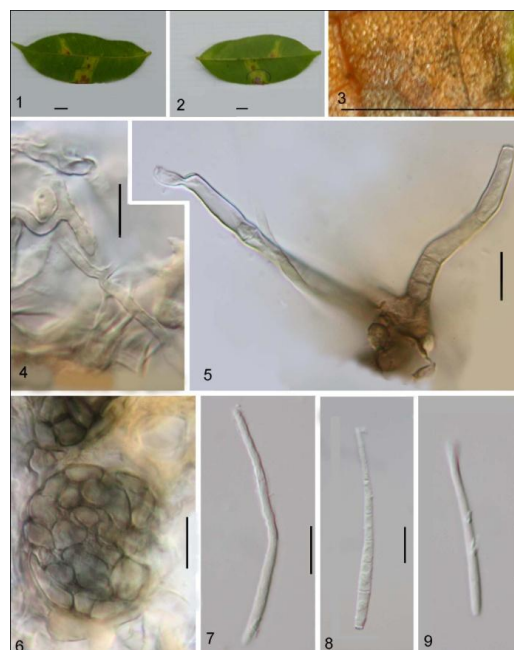


Fig. 45 – *Cercospora verniciferae* on *Spondias pinnata* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Internal mycelium. 5. Stroma with attached conidiophores. 6. Stroma. 7–9. Conidia. Bars: 1–2 = 10 mm. 3 = 3 mm. 4–9 = 10 μm .

Notes – The collection from Thailand agrees well with *C. verniciferae* as circumscribed by Chupp (1954) with conidiophores $25\text{--}150 \times 4.5\text{--}5 \mu\text{m}$ and conidia $35\text{--}175 \times 2.5\text{--}5 \mu\text{m}$. *C. verniciferae* is part of the *C. apii* complex from which it is morphologically barely distinguishable (Crous & Braun, 2003).

Literature – Chupp (1954: 44); Crous & Braun (2003, 420).

Passalora barretoana (U. Braun & Crous) D.J. Soares, U. Braun & R.W. Barreto, Australas. Pl. Pathol. 35(3): 348, 2006. Figs (46–47).

≡ *Passalora fusimaculans* var. *barretoana* U. Braun & Crous, in Crous and Braun, *Mycosphaerella* and its anamorphs: 1. Names published in *Cercospora* and *Passalora*. CBS Biodiversity Series 1: 453, 2003.

Leaf spots irregular, 3–8 mm diam., at first reddish brown, later becoming dark brown in the centre, brown yellowish margin. Colonies amphigenous, conspicuous. Mycelium internal; hyphae, branched, 3–4 μm wide ($\bar{x} = 3.33 \mu\text{m}$, $n = 7$), septate, constricted at the septa, distance between septa 6–13 μm ($\bar{x} = 9.5 \mu\text{m}$, $n = 7$), brownish to dark brown, wall 0.3–0.5 μm wide ($\bar{x} = 0.46 \mu\text{m}$, $n = 7$), smooth. Stromata developed, substomatal, subglobular, 14–42 μm diam. ($\bar{x} = 25.3 \mu\text{m}$, $n = 5$), brown to dark brown, stroma cells oval, ellipsoidal to angular in outline, 5–10 μm wide ($\bar{x} = 7.3 \mu\text{m}$, $n = 15$), dark brown, wall approximately 0.5–0.8 μm wide ($\bar{x} = 0.6 \mu\text{m}$, $n = 15$), smooth. Conidiophores fasciculate, arising from stromata stromata (2–19 per fascicle), unbranched, geniculate, cylindrical, straight to curved, 20–150 \times 3–9 μm ($\bar{x} = 101 \times 5.88 \mu\text{m}$, $n = 15$), 4–8-septate, distance between septa 10–30 μm ($\bar{x} = 18.4 \mu\text{m}$, $n = 30$), pale brown or olivaceous-brown; wall 0.5–0.8 μm wide ($\bar{x} = 0.51 \mu\text{m}$, $n = 30$), smooth. Conidiogenous cells integrated, terminal, cylindrical, tapering to the apex, 10–30 \times 3–6 μm ($\bar{x} = 18.4 \times 4.38 \mu\text{m}$, $n = 9$); conidiogenous loci (scars) small, thickened and slightly darkened, 1.5–3 μm diam. ($\bar{x} = 2 \mu\text{m}$, $n = 13$), wall of the loci approximately 0.5–0.8 μm thick ($\bar{x} = 0.53 \mu\text{m}$, $n = 13$), Conidia solitary or catenate, chains, frequently branched, acropleurogenous, simple, cylindrical with rounded ends or ellipsoidal, straight

to curved, 20–57 \times 3–5 μm ($\bar{x} = 40.62 \times 3.62 \mu\text{m}$, $n = 13$), 1–5-septate, slightly constricted at the septa, very pale to mid pale brown or cream-brown, smooth, wall 0.3–0.5 μm thick ($\bar{x} = 0.35 \mu\text{m}$, $n = 13$), apex rounded, base long obconically truncate, hila 1.5–2 μm wide ($\bar{x} = 1.81 \mu\text{m}$, $n = 13$), wall of the hila 0.3–0.5 μm wide ($\bar{x} = 0.35 \mu\text{m}$, $n = 13$), darkened.

Known hosts – *Echinochloa esculenta* (A. Braun) H.Scholz, *E. polystachya* (Kunth) Hitchc., *Hymenachne amplexicaulis* (Rudge) Nees, *Panicum* sp. (Poaceae).

Known distribution – **Asia:** Thailand; **South America:** Brazil.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Echinochloa esculenta* (Poaceae), 15 September 2009, P. Phengsintham (MFLU10-0315) and Huay Kang Pah National Park, on leaves of *Panicum* sp. (Poaceae), 4 December 2009, P. Phengsintham (MFLU10-0316).

Notes – The collections from Sri Pangsang Village and from Huay Kang Pah National Park, Chiang Rai Province agree well with the original description of *Passalora barretoana* (≡ *P. fusimaculans* var. *barretoana*) in Crous & Braun (2003).

Literature – Crous & Braun (2003: 192).

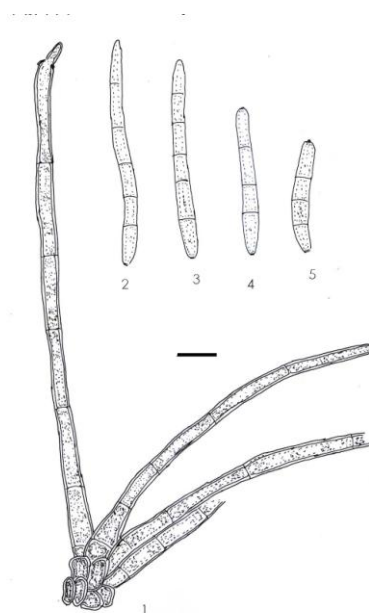


Fig. 46 – *Passalora barretoana* on *Panicum* sp. from leaf spots: 1. Stroma with attached conidiophores. 2–6. Conidia. Bars: 1–6 = 10 μm .



Fig. 47 – *Passalora barretoana* on *Panicum* sp. from leaf spots: 1. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Stroma with attached conidiophores. 5. Stroma. 6. Apices of Conidiophores. 8–9. Conidia. 10. Culture. Bars: 1–2 = 10 mm. 3. Not to scale. 4–9 = 10 µm. 10 = 10 mm.

Passalora broussonetiae (Goh & W.H. Hsieh) U. Braun & Crous, in Crous and Braun, *Mycosphaerella* and its anamorphs: 1. Names published in *Cercospora* and *Passalora*. CBS Biodiversity Series 1: 515, 2003. Figs 48–49.

Leaf spots irregular, 1–9 mm diam., at first reddish brown, later becoming dark brown in the centre, grey to reddish brown margin. Colonies amphigenous, conspicuous. Mycelium external; external hyphae, branched, 2–4 µm wide (\bar{x} = 2.77 µm, n = 13), septate, constricted at the septa, distance between septa 17–38 µm (\bar{x} = 28.46 µm, n = 13), brownish to dark brown, wall 0.3–0.5 µm wide (\bar{x} = 0.44 µm, n = 13), smooth. Stromata not developed. Conidiophores single, born on external mycelium, unbranched or branched, geniculate, cylindrical, straight to curved, 170–390 × 2–5 µm (\bar{x} = 303 × 3 µm, n = 5), 5–17-septate, distance between septa 13–40 µm (\bar{x} = 27 µm, n = 30), pale brown or olivaceous-brown; wall 0.3–0.5 µm wide (\bar{x} = 0.47 µm, n = 30), smooth. Conidiogenous cells integrated, terminal, cylindrical, tapering to the apex, 10–21 × 4–5 µm (\bar{x} = 16.3 × 4.18 µm, n = 11);

conidiogenous loci (scars) small, thickened and slightly darkened, 1–2 µm diam. (\bar{x} = 1.40 µm, n = 11), wall of the loci approximately 0.3–0.5 µm thick (\bar{x} = 0.40 µm, n = 11). Conidia solitary or catenate, chains, frequently branched, acropleurogenous, simple, cylindrical with rounded ends or ellipsoidal, straight to curved, 6–28 × 4–6 µm (\bar{x} = 20.5 × 5.3 µm, n = 30), 0–3-septate, slightly constricted at the septa, very pale to mid pale brown or cream-brown, smooth, wall 0.3–0.5 µm thick (\bar{x} = 0.47 µm, n = 30), apex rounded ends, based long obconically truncate, hila 1–2 µm wide (\bar{x} = 1.45 µm, n = 30), wall of the hila 0.3–0.5 µm wide (\bar{x} = 0.47 µm, n = 30), darkened.

Colonies on PDA after 3 weeks at 25°C cream to dark cream-brown in the centre, margin cream brown, reaching 4–6 mm diam., hyphae 2–6 µm wide (\bar{x} = 3.1 µm, n = 30), septate, slightly constricted at the septa, distance between septa 9–40 µm (\bar{x} = 24.47 µm, n = 30), primary mycelium cream to dark brown, but the second and following ones cream to brownish, wall smooth. Conidia solitary or catenate, chains, frequently branched, acropleurogenous, simple, cylindrical with rounded ends or ellipsoidal, straight to curved, 17–41 × 4–5 µm (\bar{x} = 26.1 × 4.38 µm, n = 21), 1–2-septate, slightly constricted at the septa, very pale to mid pale brown or cream-brown, smooth, wall 0.3–0.5 µm thick (\bar{x} = 0.46 µm, n = 21), apex rounded ends, based long obconically truncate, hila 1–2 µm wide (\bar{x} = 1.5 µm, n = 8), wall of the hila 0.3–0.5 µm wide (\bar{x} = 0.46 µm, n = 8), darkened. In the culture, crystal Seminole-red occurring.

Known host – *Broussonetia papyrifera* (L.) L'Hér. ex Vent. (Moraceae).

Known distribution – **Asia**: Taiwan, Thailand.

Material examined – Chiang Rai Province, Wiang Chiang Rung District, Tadsak waterfall, on leaves of *Broussonetia papyrifera* (Moraceae), 23 December 2009, P. Phengsintham (MFLU10-0314). GenBank accession no (ITS, KC677892).

Notes – The collection MFLU10-0314 from Tadsak waterfall, Chiang Rai province agrees well with *Passalora broussonetiae* (Crous & Braun, 2003), but the hyphae are smooth to distinctly verruculose.

Literature – Crous & Braun (2003).

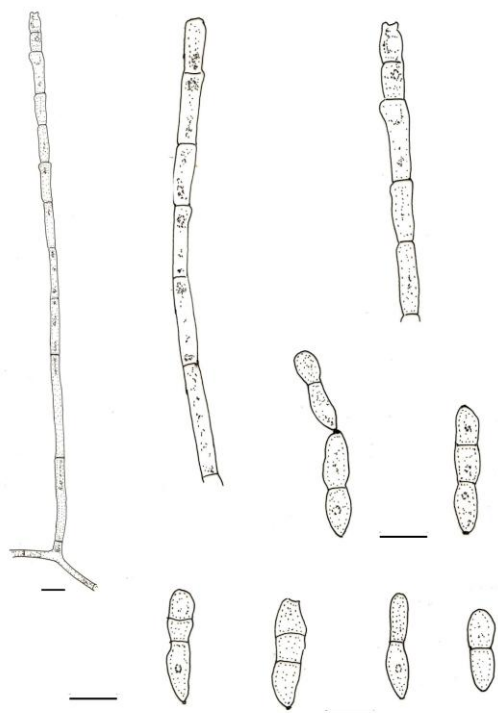


Fig. 48 – *Passalora broussonetiae* on *Broussonetia papyrifera*: 1. External hypha with attached conidiophore. 2–3. Apices of conidiophores. 4–9. Conidia. Bars: 1–9 = 10 µm.

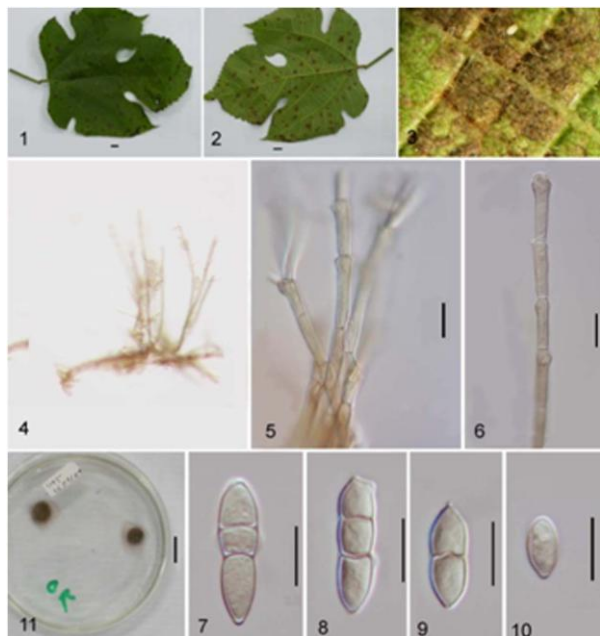


Fig. 49 – *Passalora broussonetiae* on *Broussonetia papyrifera* on host leaves: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. External mycelium with attached conidiophores. 5–6. Conidiophores. 7–10. Conidia. 11. Culture. Bars: 1 = 10 mm, 4–10 = 10 µm, 11 = 10 mm.

Passalora fusimaculans (G.F. Atk.) U. Braun & Crous, in Crous and Braun, *Mycosphaerella* and its anamorphs: 1. Names published in *Cercospora* and *Passalora*. CBS Biodiversity Series 1: 515, 2003. Figs 50–51.

≡ *Cercospora fusimaculans* G.F. Atk., Elisha Mitchell Sci. Soc. 8:50, 1892.

≡ *Phaeoramularia fusimaculans* (G.F. Atk.) X.J. Liu & Y.L. Guo, Acta Phytopathol. Sin. 12: 9, 1982.

= *Cercospora agrostis* G.F. Atk., J. Elisha Mitchell Sci. Soc. 8: 44, 1892.

= *Cercospora panici* Davis, Trans. Wisconsin Acad. Soc. 19: 714, 1919.

≡ *Cercosporina panici* (Davis) Sacc., Syll. Fung. 25: 904, 1931.

= *Cercospora panici-milliacei* Sawada, Rep. Gov. Agric. Res. Inst. Formosa 51: 131, 1931.

Leaf spots circular to irregular, 1–5 mm diam., reddish brown to medium brown in the centre, and with a brown to dark brown margin. Colonies amphigenous, scattered. Mycelium internal, inconspicuous. Stromata developed, substomatal, subglobular, 20–50 µm diam. (\bar{x} = 34.4 µm, n = 8), brown to dark brown, stroma cells oval, ellipsoidal to angular in outline, 4–5 µm wide (\bar{x} = 4.6 µm, n = 12), dark brown, wall 0.3–0.5 µm wide (\bar{x} = 0.33 µm, n = 12), smooth. Conidiophores fasciculate, arising from stromata (6–24 per fascicle), erect, straight or curved, unbranched, 10–52 × 3–5 µm (\bar{x} = 24.2 × 4 µm, n = 12), 0–1-septate, distance between septa 8–30 µm (\bar{x} = 16.9 µm, n = 16), pale to moderately olivaceous-brown, wall 0.3–0.5 µm wide (\bar{x} = 0.48 µm, n = 16), smooth. Conidiogenous cells integrated, 10–30 × 3–5 µm (\bar{x} = 17.1 × 4 µm, n = 10), apex 1.5–2 µm wide (\bar{x} = 1.8 µm, n = 6), wall approximately 0.3–0.5 µm thick (\bar{x} = 0.42 µm, n = 6), subtruncate, cicatrized, pale olivaceous or brown; conidiogenous loci conspicuous, 1.5–2 µm wide (\bar{x} = 1.8 µm, n = 6), wall 0.3–0.5 µm wide (\bar{x} = 0.43 µm, n = 6), smooth. Conidia solitary or catenate, cylindrical, straight to moderately curved, 18–38 × 1.5–2 µm (\bar{x} = 30.25 × 1.9 µm, n = 8), 3–4-septate, slightly constricted at the septa, pale olivaceous, wall 0.2–0.3 µm wide (\bar{x} = 0.25 µm, n = 8), smooth or finely verruculose, both ends subtruncate when catenulate, bluntly rounded at the apex in solitary and primary

conidia, apical hila 0.5–0.8 μm wide (\bar{x} = 0.75 μm , n = 5), wall 0.3–0.5 μm (\bar{x} = 0.35 μm , n = 5) thick, with subtruncate base, basal hila 0.5–1.5 μm wide (\bar{x} = 0.76 μm , n = 5), wall 0.3–0.5 μm (\bar{x} = 0.34 μm , n = 5) thick.

Known hosts – of species of *Agrostis*, *Brachiaria*, *Beckeropsis*, *Chasmopodium*, *Digitaria*, *Echinochloa*, *Eleusine*, *Entolasia*, *Ichnanthus*, *Leptoloma*, *Oplismenus*, *Panicum*, *Paspalidium*, *Pennisetum*, *Rottboellia*, *Setaria*, *Sorghum*, *Stenotaphrum*, *Urochloa*, *Zea* (Poaceae).

Known distribution – **Africa:** Botswana, Ethiopia, Ghana, Guinea, Ivory Coast, Kenya, Malawi, Nigeria, Rwanda, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe; **Asia:** Brunei, China, India, Japan, Malaysia, Philippines, Taiwan, Thailand; **Europe:** Azerbaijan, France, Georgia; **North America and West Indies:** Costa Rica, Cuba, Dominican Rep., El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Trinidad and Tobago, USA (AL, PL, IA, ID, KS, NC, ND, OK, OR, TX, VA, WI); **Australia; Oceania:** Fiji, New Zealand, Palau, Papua New Guinea, Samoa, Solomon Islands, Vanuatu; **South America:** Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Venezuela.

Material examined – Chiang Rai Province, Doi Tung National Park, on leaves of *Agrostis* sp. (Poaceae), 18 August 2009, P. Phengsintham (MFLU10-0317).

Notes – The collection from Doi Tung National Park, Chiang Rai Province agrees well with *Passalora fusimaculans* as circumscribed by Chupp (1954), Vasudeva (1963), Ellis (1976) and Hsieh & Goh (1990).

Literature – Chupp (1954: 246); Vasudeva (1963: 112); Ellis (1976: 260); Hsieh & Goh (1990: 141); Crous & Braun (2003: 203).

Pseudocercospora atromarginalis (G.F. Atk.) Deighton, Mycol. Pap. 140: 139, 1976.

Figs 52–53.

\equiv *Cercospora atromarginalis* G.F. Atk., J. Elisha Mitchel Sci. Soc. 8: 59, 1892.

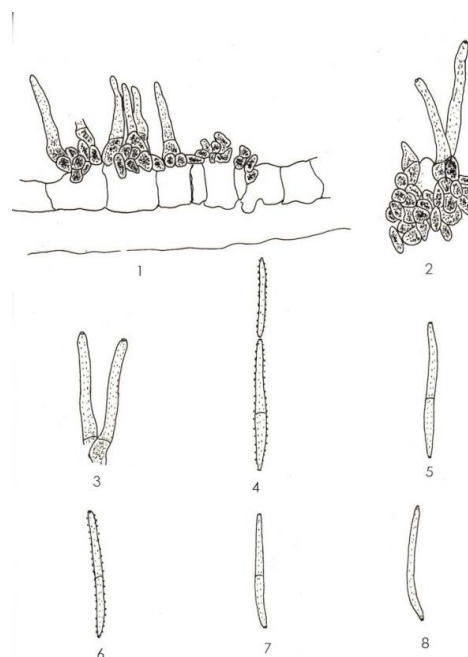


Fig. 50 – *Passalora fusimaculans* on *Agrostis* sp.: 1–2. Stromata with attached conidiophores. 3. Conidiophores. 4–8. Conidia. Bars: 1–8 = 10 μm .

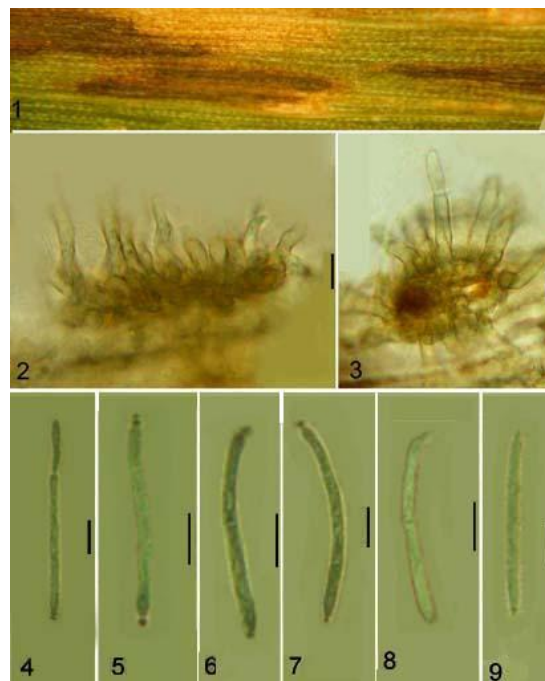


Fig. 51 – *Passalora fusimaculans* on *Agrostis* sp. from leaf spots: 1. Leaf spots on host leaf (upper surface). 2–3. Stromata with attached conidiophores. 4–9. Conidia. Bars: 1 = 10 mm. 2–9 = 10 μm .

= *Cercospora solani-biflora* Sawada, Formosan Agric. Rev. 39: 701, 1942, *nom. inval.*

Leaf spots suborbicular or angular, 1–12 mm diam., at first yellowish and later becoming pale brown or grey to brown in the centre, and with yellowish margin. Colonies amphigenous, but chiefly hypophyllous. Mycelium internal, inconspicuous. Stromata developed, oval to ellipsoidal, 12–15 µm diam., stromatal cells oval, ellipsoidal to angular in outline, 5–6 µm wide, dark brown, wall approximately 0.5 µm wide, smooth. Conidiophores fasciculate, arising from stromata (1–5 per fascicle), erect, straight or curved, simple or branched, apex obtuse, 35–115 × 3.5–5 µm (\bar{x} = 59.2 × 4.03 µm, n = 11), 1–11-septate, distance between septa 7–35 µm (\bar{x} = 16 µm, n = 30), pale to medium brown; wall 0.3–0.5 µm wide (\bar{x} = 0.49 µm, n = 30), smooth. Conidiogenous cells integrated, apex obtuse, 10–35 × 3–5 µm (\bar{x} = 18.6 × 4.15 µm, n = 12), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, subcylindrical, slightly obclavate-cylindrical, or sometimes slightly clavate-cylindrical, almost straight or slightly to strongly curved, 32–55 × 3.5–6 µm (\bar{x} = 40.5 × 4.10 µm, n = 12), 3–5-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide (\bar{x} = 0.32 µm, n = 12), smooth, broadly rounded at the apex, the basal cell rounded at the base or more abruptly tapering towards the base, hilum 1.5–2 µm wide, wall 0.3–0.5 µm wide, unthickened, not darkened.

Known hosts – numerous *Solanum* ssp. and *Lycianthes biflora* (Lour.) Bitter (Solanaceae).

Known distribution – widespread (see Crous & Braun 2003).

Material examined – Chiang Rai Province, Doi Tung National Park, on leaves of *Lycianthes biflora* [= *Solanum biflorum*] (Solanaceae), 22 August 2009, P. Phengsintham (P439).

Notes – *Cercospora solani-biflora*, described from Taiwan on *Solanum biflorum* (= *Lycianthes biflora*), is an invalid name, which was reduced to synonymy with *C. atromarginalis* [= *P. atromarginalis*] by Chupp (1954) and Goh & Hsieh (1990).

Literature – Chupp (1954: 532); Hsieh & Goh (1990: 322), Crous & Braun (2003).

Pseudocercospora balsaminae (Syd.) Deighton, Mycol. Pap. 140: 139, 1976.

Figs 54–55.

= *Cercoseptoria balsaminae* Syd., Ann. Mycol. 33: 69, 1935.

Leaf spots subcircular to irregular, 2–15 mm diam., at first yellowish, later becoming brown in the center, brown to yellowish at the margin. Colonies hypophyllous, scattered, conspicuous. Mycelium internal; hyphae branched, 2–9 µm wide (\bar{x} = 6 µm, n = 7), septate, constricted at the septa, distance between septa 5–27 µm (\bar{x} = 15.5 µm, n = 7), subhyaline to brownish, wall 0.3–1 µm wide (\bar{x} = 0.65 µm, n = 7), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 15–30 µm diam. (\bar{x} = 22.6 µm, n = 6), brown to dark brown, stroma cells oval, ellipsoidal and angular, 3–7 µm wide (\bar{x} = 5 µm, n = 10), dark brown, wall 0.5–0.8 µm wide (\bar{x} = 0.65 µm, n = 10), smooth. Conidiophores fasciculate, arising from stromata (9–30 per fascicle), geniculate, unbranched, 9–16 × 2–4 µm (\bar{x} = 12.35 × 3.05 µm, n = 15), 0–1-septate, slightly constricted at the septa, distance between septa 4–12 µm (\bar{x} = 7.64 µm, n = 15), uniformly pale to medium brown, much paler and narrower toward the tip, wall 0.3–0.5 µm (\bar{x} = 0.47 µm, n = 15), smooth. Conidiogenous cells terminal, 7–12 × 2–4 µm (\bar{x} = 9.64 × 2.70 µm, n = 14), obtuse; conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 32–44 × 2–4 µm (\bar{x} = 38.52 × 2.64 µm, n = 13), 3–5-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide (\bar{x} = 0.36 µm, n = 13), smooth, tip subacute, base obconically truncate, hila 1–2 µm wide (\bar{x} = 1.39 µm, n = 13).

Colonies on PDA after 3 weeks at 25°C dark grey, reaching 20–25 mm diam., hyphae 2–9 µm wide (\bar{x} = 9 µm, n = 20), septate, constricted at the septa, distance between septa 5–27 µm (\bar{x} = 15.25 µm, n = 20), brownish or subhyaline, wall 0.3–1 µm wide (\bar{x} = 0.65 µm, n = 20), smooth. Conidia not formed in culture.

Known hosts – *Impatiens balsamina* L. (Balsaminaceae).

Known distribution – **Asia:** Brunei, China, India, Korea, Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Impatiens balsamina* (Balsaminaceae), 20 July 2010, P. Phengsintham (MFLU10-0404).

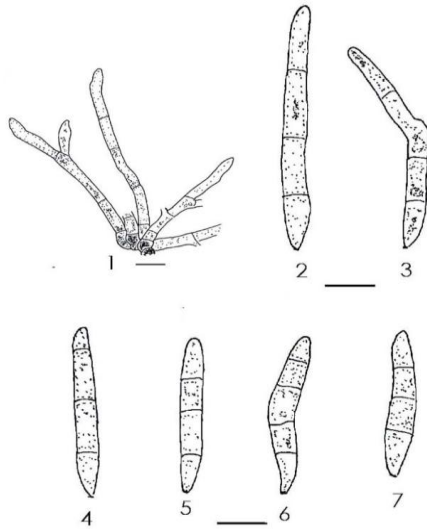


Fig. 52 – *Pseudocercospora atromarginalis* on *Lycianthes biflora*: 1. Stroma with attached conidiophores. 2–7. Conidia. Bar: 1–7 = 10 μ m.

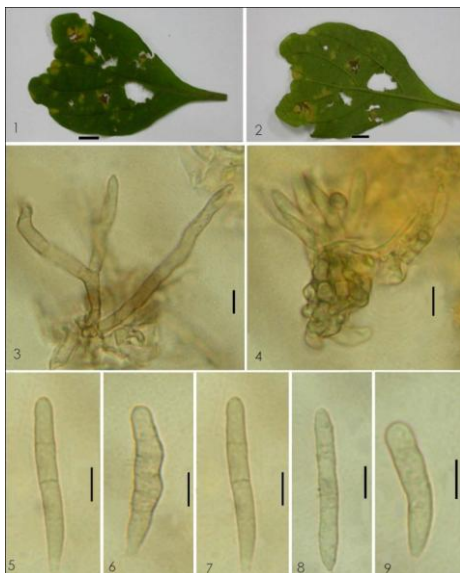


Fig. 53 – *Pseudocercospora atromarginalis* on *Lycianthes biflora* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3–4. Stromata with attached conidiophores. 5–9. Conidia. Bar: 1–2 = 10 mm. 3–9 = 10 μ m.

Notes – *Pseudocercospora balsaminae* is a variable species with a wide range of conidial length. Guo & Hsieh (1995) described conidiophores of $6.5\text{--}40 \times 2.5\text{--}4 \mu\text{m}$ and conidia $25\text{--}90 \times 1.5\text{--}3 \mu\text{m}$. Shin & Kim (2001) even described conidiophores up to $56 \times 4 \mu\text{m}$ and conidia up to $105 \times 3.5 \mu\text{m}$. The conidiophores and conidia in the collection from Thailand are relatively short, but they are within the variation of this species. *P. balsaminicola* (J.M. Yen & Lim) U. Braun & Crous (Yen & Lim 1980, Crous & Braun 2003) is a similar confusable species, but clearly differentiated by its hyaline acicular-filiform, basally truncate, long and narrow conidia $45\text{--}132 \times 2\text{--}2.5 \mu\text{m}$. *P. nojima* (Togashi & Katsuki) Y.L. Guo & X.J. Liu was considered a possible synonym of *P. balsaminae* by Deighton (1976), but represents a distinct species with much broader conidia (Guo & Hsieh 1995, Crous & Braun 2003).

Literatures – Yen & Lim (1980: 152); Guo & Hsieh (1995: 33); Shin & Kim (2001: 166).

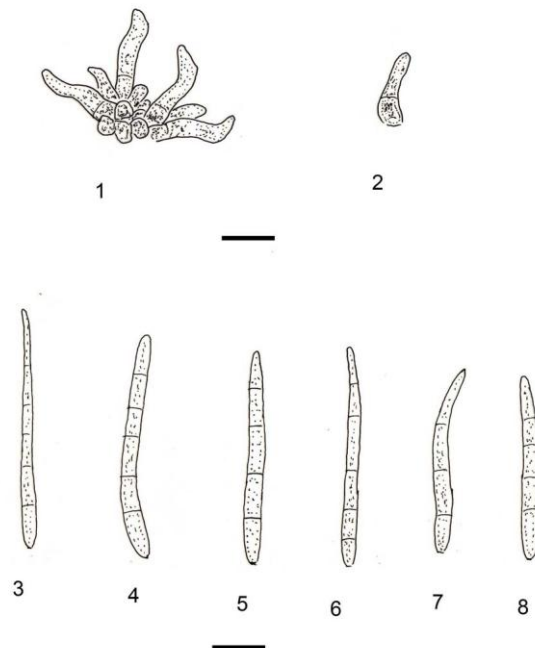


Fig. 54 – *Pseudocercospora balsaminae* on *Impatiens balsamina*: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–8. Conidia. Bars: = 10 μ m.



Fig. 55 – *Pseudocercospora balsaminae* on *Impatiens balsamina* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface and 2. lower surface). 3. Colonies. 4–5. Stromata with attached conidiophores. 6–11. Conidia. 12. Culture. Bars: 1, 2, 12 = 10 mm. 4–11 = 10 μ m. 3. Not to scale.

Pseudocercospora bischofia (W. Yamam.) Deighton, Trans. Brit. Mycol. Soc. 88: 388, 1987.

Figs 56–57.

\equiv *Cercospora bischofia* W. Yamam., Trans. Sapporo Nat. Hist. Soc. 13: 139, 1934.

\equiv *Pseudocercospora bischofia* (W. Yamam.) Goh & W.H. Hsieh, Trans. Mycol. Soc. Republ. China 2: 114, 1987.

Leaf spots subcircular to irregular, 1–5 mm diam., at first yellowish, later becoming brown in the center, dark brown at the margin. Colonies hypophyllous, scattered, conspicuous. Mycelium internal and external; internal hyphae inconspicuous; external hyphae branched, 2–3 μ m wide (\bar{x} = 2.5 μ m, n = 5), septate, constricted at the septa, distance between septa 9–14 μ m (\bar{x} = 11.5 μ m, n = 5), brownish, subhyaline, wall 0.5–0.8 μ m wide (\bar{x} = 0.65 μ m, n = 5), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 5–17 μ m diam. (\bar{x} = 11 μ m, n = 3), brown to dark

brown, stromatal cells oval, ellipsoidal and angular, 2–6 μ m wide (\bar{x} = 3.8 μ m, n = 15), dark brown, wall 0.5–0.8 μ m wide (\bar{x} = 0.56 μ m, n = 15), smooth. Conidiophores singly or fasciculate, arising from stromata (1–2 per fascicle) and borne on external hyphae, geniculate, unbranched, 9–24 \times 2–4 μ m (\bar{x} = 15 \times 3.25 μ m, n = 9), 0–2-septate, slightly constricted at the septa, distance between septa 4–11 μ m long (\bar{x} = 7.25 μ m, n = 20), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.5–0.8 μ m (\bar{x} = 0.61 μ m, n = 20), smooth. Conidiogenous cells terminal, 6–11 \times 2–4 μ m (\bar{x} = 8.25 \times 3 μ m, n = 7), obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 41–56 \times 2–3 μ m (\bar{x} = 50.04 \times 2.6 μ m, n = 11), 4–6-septate, pale olivaceous-brown, wall 0.3–0.5 μ m wide (\bar{x} = 0.34 μ m, n = 11), smooth, tip subacute, base truncate, hila 0.72–2 μ m wide (\bar{x} = 1.44 μ m, n = 11).

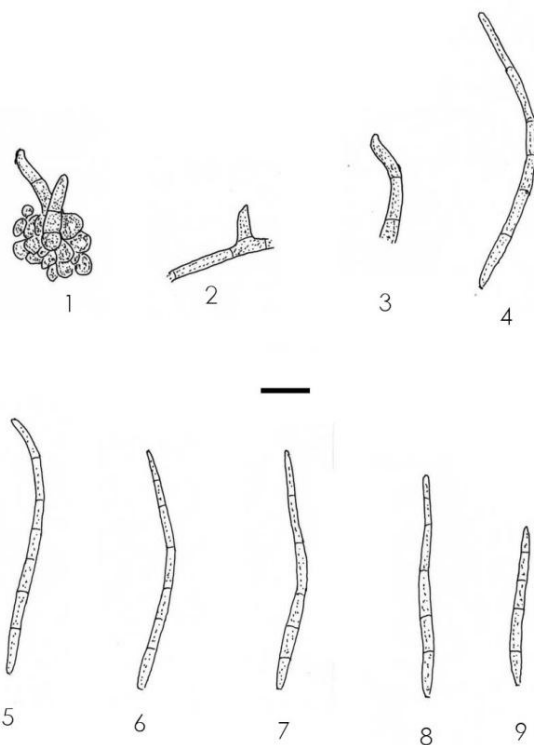


Fig. 56 – *Pseudocercospora bischofia* on *Bischofia javanica* from leaf spots: 1. Stroma with attached conidiophores. 2. External hyphae. 3. Conidiophore. 4–9. Conidia. Bars: 1–9 = 10 μ m.



Fig. 57 – *Pseudocercospora bischofiae* on *Bischofia javanica* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4–5. Stromata with attached conidiophores. 6. Conidiophore. 7–11. Conidia. Bars: 1–2 = 10 mm. 3. Not to scale. 4–11 = 10 μ m.

Known hosts – *Bischofia javanica* Blume, *B. trifoliata* (Roxb.) Hook (Phyllanthaceae = Euphorbiaceae).

Known distribution – **Asia:** China, Hong Kong, Taiwan, Thailand; **North America:** USA (FL).

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Bischofia javanica* (Phyllanthaceae), 22 August 2010, P. Phengsintham (P619). GenBank accession no (ITS, KC677896; LSU, KC677928).

Notes – The collection from Thailand agrees with the collection from Taiwan described by Hsieh & Goh (1990) [conidiophores 10–70 \times 3–5 μ m and conidia 20–80 \times 2–4 μ m] in having similar size of conidiophores and conidia.

Literature – Chupp (1954: 213); Hsieh & Goh (1990: 120); Guo & Hsieh (1995: 102); Guo et al. (1998: 118); Crous & Braun (2003: 81).

Pseudocercospora carbonacea (L.E. Miles) N. Pons & B. Sutton, Mycol. Pap. 160: 26, 1988.

Figs 58–59.

\equiv *Cercospora carbonacea* L.E. Miles, Trans. Illinois Acad. Sci. 10: 255, 1917.

Leaf spots subcircular to irregular, 2–27 mm diam., at first yellowish brown, dark brown in the centre, brown to yellowish at the margin. Colonies amphigenous, conspicuous, scattered, grey. Mycelium internal; Hyphae branched, 1.5–4 μ m wide (\bar{x} = 2.15 μ m, n = 5), septate, constricted at the septa, distance between septa 5–9 μ m (\bar{x} = 7 μ m, n = 5), brownish, subhyaline, wall 0.3–0.5 μ m wide (\bar{x} = 0.43 μ m, n = 5), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 15–36 μ m diam. (\bar{x} = 23.67 μ m, n = 6), brown to dark brown, stromatal cells oval, ellipsoidal to angular, 4–9 μ m wide (\bar{x} = 6.47 μ m, n = 10), dark brown, wall 0.5–0.8 μ m wide (\bar{x} = 0.65 μ m, n = 10), smooth. Conidiophores fasciculate, arising from stromata (2–4 per fascicle), not geniculate, unbranched, 12–26 \times 4–5 μ m (\bar{x} = 15.99 \times 4.41 μ m, n = 9), 0–2-septate, slightly constricted at the septa, distance between septa 5–15 μ m long (\bar{x} = 8.95 μ m, n = 10), uniformly pale to medium brown, much paler and narrower towards the tip, wall 0.3–0.5 μ m (\bar{x} = 0.48 μ m, n = 15), smooth. Conidiogenous cells terminal, 6–12 \times 3–4 μ m (\bar{x} = 8.67 \times 3.52 μ m, n = 10), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 17–99 \times 2–4 μ m (\bar{x} = 70.58 \times 3.05 μ m, n = 10), 2–6-septate, pale olivaceous-brown, wall 0.3–0.5 μ m wide (\bar{x} = 0.36 μ m, n = 10), smooth, tip subacute, base obconically truncate, hila 1–2 μ m wide (\bar{x} = 1.51 μ m, n = 10).

Known hosts – *Dioscorea alata* L., *D. bulbifera* L., *D. caucasica* Lipsky, *D. cayenensis* Lam., *D. deltoidea* Wall. ex Griseb., *D. dumetorum* (Kunth) Pax, *D. gillettii* Milne-Redh., *D. glabra* Roxb., *D. nipponica* Makino, *D. oppositifolia* L., *D. spinosa* Burm., *D. trifida* L. f., *Dioscorea* sp. (Dioscoreaceae).

Known distribution – **Africa:** Ethiopia, Ghana, Guinea, Nigeria, Sierra Leone, Tanzania, Togo; **Asia:** India, Indonesia, Myanmar, Thailand; **North America and**

West Indies: Barbados, Canada, Cuba, Dominican Republ., French Antilles, Grenada, Haiti, Jamaica, Panama, Puerto Rico, Saint Lucia, Saint Vincent and the Grenadines, Virgin Islands, Trinidad and Tobago; **South America:** Brazil, Venezuela.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Dioscorea bulbifera* (Dioscoreaceae), 16 August 2010, P. Phengsintham (P615). GenBank accession no (ITS, KC677897).

Notes – The collection from Thailand differs from *Pseudocercospora carbonacea* described by Hsieh & Goh (1990) and Ellis (1976) in having distinctly geniculate conidiophores.

Litarature – Saccardo (1931: 874); Chupp (1954: 1960); Vasudeva (1963: 68); Ellis (1976: 257); Pons & Sutton (1988: 26); Crous & Braun (2003: 104).

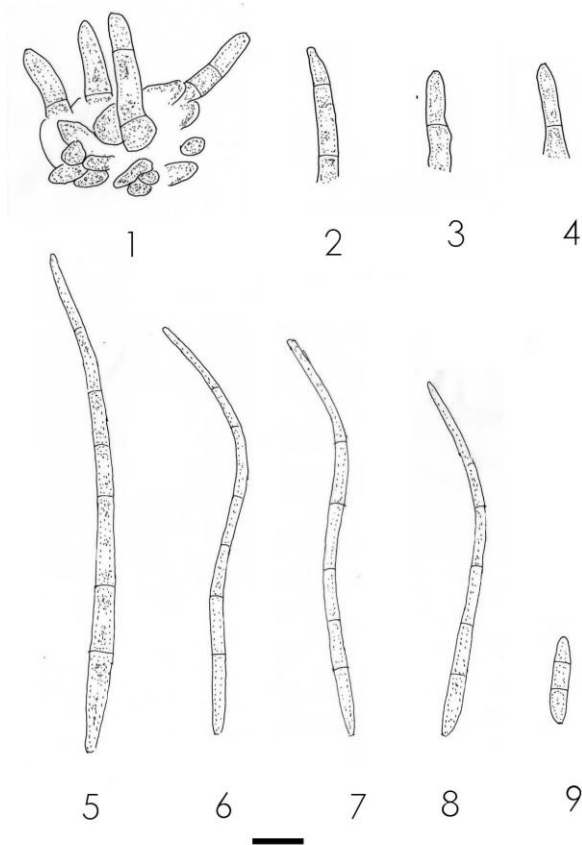


Fig. 58 – *Pseudocercospora carbonacea* on *Dioscorea bulbifera*: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–9. Conidia. Bars: 1–9 = 10 µm.

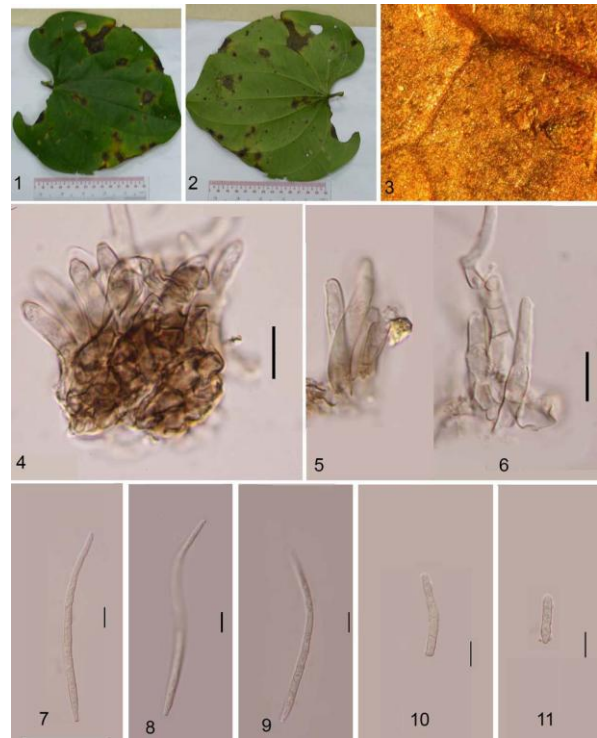


Fig. 59 – *Pseudocercospora carbonacea* on *Dioscorea bulbifera* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4–6. Stromata with attached conidiophores. 7–11. Conidia. Bars: 1–2 = 10 mm. 3. Not to scale. 4–11 = 10 µm.

Pseudocercospora christellae Phengsintham, McKenzie, K.D. Hyde & U. Braun, Mycosphere 1(3): 207, 2011. Figs 60–61.

Leaf spots subcircular to irregular, 3–9 mm diam., at first brownish, later becoming brown, brown to dark yellowish brown at the margin. Colonies epiphyllous, conspicuous. Mycelium internal; hyphae branched, 2–3 µm wide (\bar{x} = 2.5 µm, n = 5), septate, constricted at the septa, distance between septa 6–8 µm (\bar{x} = 4 µm, n = 5), subhyaline to brownish, wall 0.3–0.5 µm wide (\bar{x} = 0.4 µm, n = 5), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 22–40 µm diam. (\bar{x} = 28.5 µm, n = 7), brown to dark brown, stroma cells oval, ellipsoidal and angular, 3–10 µm wide (\bar{x} = 7.66 µm, n = 30), dark brown, wall 0.5–0.8 µm wide (\bar{x} = 0.63 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (3–16 per fascicle), geniculate, unbranched, 9–14 × 2–4 µm (\bar{x} = 10.58 × 3.05 µm, n = 13), 0–1-septate, slightly constricted at

the septa, distance between septa 3–12 μm (\bar{x} = 8.8 μm , n = 15), uniformly pale to medium brown, paler and narrower towards the tip, wall 0.3–0.5 μm wide (\bar{x} = 0.47 μm , n = 15), smooth. Conidiogenous cells terminal, 8–12 \times 2–4 μm (\bar{x} = 9.99 \times 2.77 μm , n = 8), obtuse; conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 53–105 \times 2–4 μm (\bar{x} = 81.36 \times 2.90 μm , n = 17), 3–9-septate, pale olivaceous-brown, wall 0.3–0.5 μm wide (\bar{x} = 0.36 μm , n = 17), smooth, tip subacute, base obconically truncate, hila 1–2 μm wide (\bar{x} = 1.81 μm , n = 17).

Colonies on PDA after 3 weeks at 25°C dark grey, reaching 10–15 mm diam., hyphae 2–7 μm wide (\bar{x} = 4.25 μm , n = 20), septate, constricted at the septa, distance between septa 9–19 μm (\bar{x} = 14 μm , n = 20), brownish or subhyaline, wall 0.3–0.8 μm wide (\bar{x} = 0.52 μm , n = 20), smooth. Conidia not formed in culture.

Known host – *Christella parasitica* (L.) H. Lév. (Thelypteridaceae).

Known distribution – **Asia**: Thailand.

Material examined – Chiang Rai Province, Muang District, Mae Chan Village, on leaves of *Christella parasitica* (Thelypteridaceae), 18 July 2010. *P.* Phengsintham (MFLU10-0405, holotype). GenBank accession no (ITS, KC677898).

Notes – This is the first record of a *Pseudocercospora* on a host of the genus *Christella*. There are numerous *Pseudocercospora* spp. on ferns, but *P. christellae* differs from all species with fasciculate conidiophores in having very short conidiophores, viz. *P. arachnioidis* Y.L. Guo, *P. athyri* W.H. Hsieh & Goh, *P. cyatheae* C. Nakash. & Ivana, *P. lonchitidis* (Chupp) U. Braun & Crous, *P. nephrolepidis* R. Kirschner, *P. plagiogyiae* Goh & W.H. Hsieh, *P. pteridophytophila* Goh & W.H. Hsieh, and *P. thelypteridis* Goh & W.H. Hsieh (Chupp 1954, Hsieh and Goh 1990, Guo & Hsieh 1995, Crous & Braun 2003, Nakashima et al. 2007 (a), Kirschner & Yen 2007). Other species are

distinguished by forming superficial mycelium with solitary conidiophores, viz. *P. abacopteridicola* (J.M. Yen & Lim) J.M. Yen, *P. adianthi* (Syd.) Deighton, *P. lygodii* Goh & W.H. Hsieh, *P. rumohrae* W.H. Hsieh & Goh (Chupp 1954, Hsieh & Goh 1990, Yen & Lim 1980). Four *Pseudocercospora* spp. on hosts of the *Thelypteridaceae* have been described: *P. abacopteridicola* on *Abacopteris urophylla* (with superficial mycelium and solitary conidiophores), *P. phyllitidis* (H.H. Home) U. Braun & Crous, e.g. on *Thelypteris tetragona* (conidiophores up to 100 μm long, conidia 3–5 μm wide), *P. pteridophytophila* on *Cyclosorus acuminatus* (conidiophores up to 50 μm long, conidia shorter and narrower, 30–70 \times 1–1.5 μm), and *P. thelypteridis* (conidiophores up to 60 μm long, conidia acicular-filiform) [Chupp 1954, Hsieh & Goh 1990, Yen & Lim 1980].

Literature – Chupp (1954); Hsieh & Goh (1990); Guo & Hsieh (1995); Yen & Lim (1980: 151–163); Crous & Braun (2003); Nakashima et al. (2007: 48–52); Kirschner & Yen (2007: 219–237).

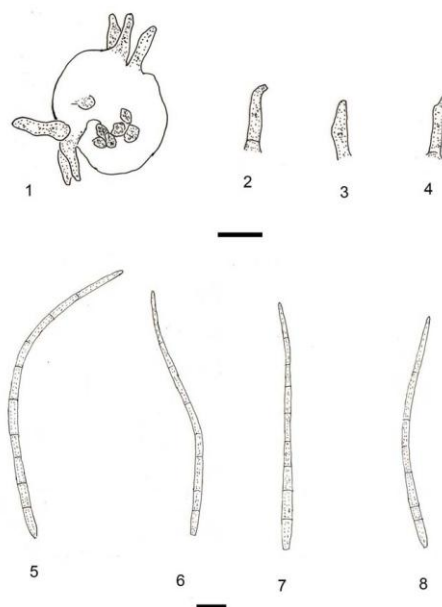


Fig. 60 – *Pseudocercospora christellae* on *Christella parasitica*: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–8. Conidia. Bars: = 10 μm .

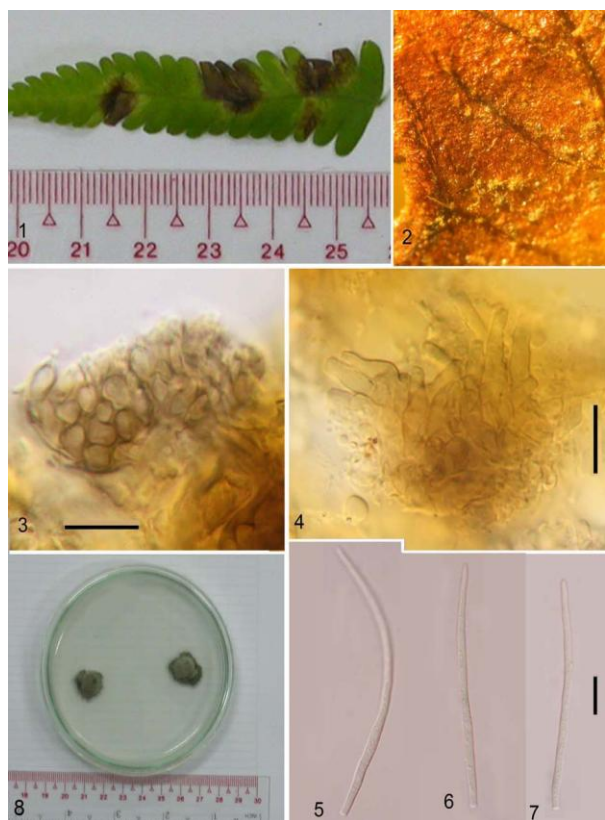


Fig. 61 – *Pseudocercospora christellae* on *Christella parasitica* from leaf spots: 1. Leaf spots on host leaf (upper surface). 2. Colonies. 3. Stroma. 4. Stroma with attached conidiophores. 5–7. Conidia. 8. Culture. Bars: 1, 8 = 10 mm. 3–7 = 10 µm.

Pseudocercospora consociata (G. Winter) Y.L. Guo & X.J. Liu, *Mycosystema* 24: 232, 1989. Figs 62–63.

≡ *Cercospora consociata* G. Winter, *Hedwigia* 22: 70, 1883.

Leaf spots subcircular to irregular, 1–7 mm diam., at first yellowish brown, and then dark brown in the centre, dark brown at the margin. Colonies amphigemous, conspicuous. Mycelium internal; hyphae branched, 3–5 µm wide (\bar{x} = 4.5 µm, n = 5), septate, constricted at the septa, distance between septa 4–7 µm (\bar{x} = 5.6 µm, n = 5), brownish, subhyaline, wall 0.3–0.5 µm wide (\bar{x} = 0.56 µm, n = 5), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 20–55 µm diam. (\bar{x} = 36.7 µm, n = 7), brown to dark brown, stromatal cells oval, ellipsoidal to angular, 4–11 µm wide (\bar{x} = 6 µm, n = 30), dark brown, wall 0.5–0.8 µm wide (\bar{x} = 0.59 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (6–74 per

fascicle), geniculate, unbranched, 9–27 × 2–4 µm (\bar{x} = 18.5 × 3.13 µm, n = 30), 0–1-septate, slightly constricted at the septa, distance between septa 9–17 µm long (\bar{x} = 14.8 µm, n = 30), uniformly pale to medium brown, much paler and narrower towards the tip, wall 0.5–0.8 µm (\bar{x} = 0.65 µm, n = 30), smooth. Conidiogenous cells terminal, 9–17 × 2–3 µm (\bar{x} = 14.8 × 2.67 µm, n = 11), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 24–94 × 2–3 µm (\bar{x} = 56.8 × 2.4 µm, n = 13), 1–7-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide (\bar{x} = 0.38 µm, n = 13), smooth, tip subacute, base obconically truncate, hila 0.72–1.5 µm wide (\bar{x} = 1.03 µm, n = 13).

Known hosts – *Dicliptera chinensis* (L.) Juss., *Dyschoriste oblongifolia* (Michx.) Kuntze, *Justicia gendarussa* Burm. f., *J. procumbens* L., *Ruellia* sp. (Acanthaceae).

Known distribution – **Asia**: China, India, Japan, Thailand; **North America and West Indies**: USA (AL, FL, IA, IL, MS, OK); **South America**: Brazil, Venezuela.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Justicia gendarussa* (Acanthaceae), 16 January 2010, P. Phengsintham (P528).

Notes – The collection from Thailand agrees well with the description of *Pseudocercospora consociata* in Chupp (1954) and Guo & Hsieh (1995) except for relatively narrow conidia, which are, however, within the common range of conidia in this species. Guo & Hsieh (1995) assigned a Chinese collection on *Justicia procumbens* to *P. consociata*, and Braun & Urtiaga (2008) described *P. consociata* var. *dimorpha* U. Braun & Urtiaga on *Justicia galapagana* from Venezuela, differing from typical *P. consociata* by the formation of well-developed superficial mycelium with solitary conidiophores. *P. justiciae* (F.L. Tai) Y.L. Guo & X.J. Liu is quite distinct from *P. consociata* by its much longer and wider conidiophores (50–130 × 4–6.5 µm) and much wider conidia 40–110 × 3.5–6.5 µm.

Literature – Chupp (1954: 24); Guo & Hsieh (1995: 2); Guo et al. (1998: 11); Crous & Braun (2003: 234).

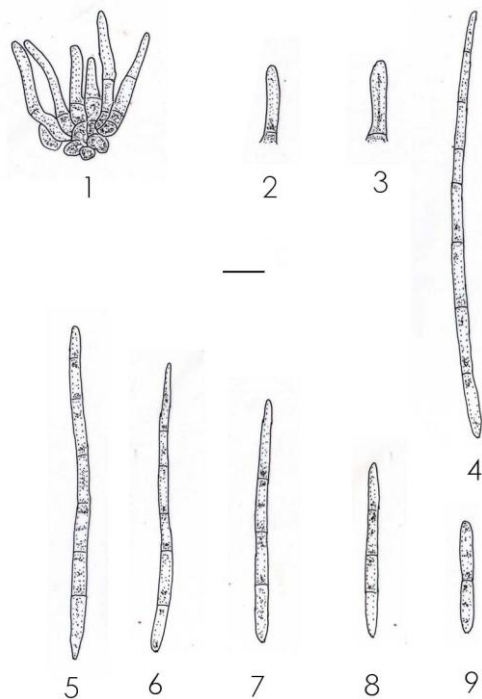


Fig. 62 – *Pseudocercospora consociata* on *Justicia gendarussa* from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidiophore. 5–9. Conidia. Bars: 1–9 = 10 μ m.

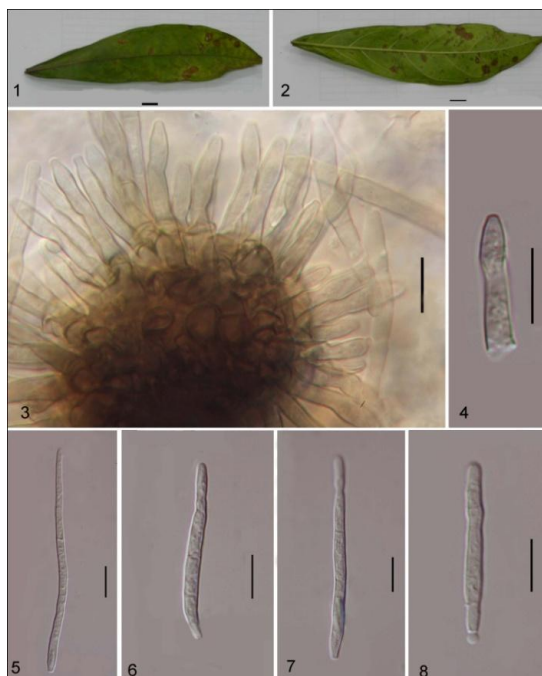


Fig. 63 – *Pseudocercospora consociata* on *Justicia gendarussa* from leaf spots: 1–2 Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Stroma with attached conidiophores. 4. Conidiophore. 5–8. Conidia. Bars: 1–2 = 10 mm, 3–8 = 10 μ m.

Pseudocercospora cratevae sp. nov.

Figs 64–65.

Mycobank, MB 801348

Morphologically similar to *Pseudocercospora conspicua*, but distinct leaf spots formed, conidiophores very short and conidia pale olivaceous-brown.

Leaf spots subcircular to irregular, 1–13 mm diam., grey-brown in the center, brown to dark brown at the margin. Colonies amphigenous, inconspicuous. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal, 9–12 μ m diam. (\bar{x} = 10.5 μ m, n = 5), brown to dark brown, stromatal cells oval, ellipsoidal and angular, 3–9 μ m wide (\bar{x} = 5 μ m, n = 15), dark brown, wall 0.5–0.8 μ m wide (\bar{x} = 0.58 μ m, n = 15), smooth. Conidiophores solitary or fasciculate, arising from stromata (2–6 per fascicle), geniculate, unbranched, 9–16 \times 2–4 μ m (\bar{x} = 12.35 \times 3.05 μ m, n = 15), 0–1-septate, slightly constricted at the septa, distance between septa 4–12 μ m long (\bar{x} = 7.64 μ m, n = 15), uniformly pale to medium brown or much paler and more narrow toward the tip, wall 0.3–0.5 μ m (\bar{x} = 0.47 μ m, n = 15), smooth. Conidiogenous cells terminal, 7–12 \times 2–4 μ m (\bar{x} = 9.64 \times 2.70 μ m, n = 14), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 32–44 \times 2–4 μ m (\bar{x} = 38.52 \times 2.64 μ m, n = 13), 3–5-septate, pale olivaceous-brown, wall 0.3–0.5 μ m wide (\bar{x} = 0.36 μ m, n = 13), smooth, tip subacute, base obconically truncate, hila 1–2 μ m wide (\bar{x} = 1.39 μ m, n = 13).

Known hosts – *Crateva religiosa* Forst. f. (Capparaceae).

Known distribution – **Asia:** Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Crateva religiosa* (Capparaceae), 22 August 2010, P. Phengsintham, P617 (MFLU12-2200, **holotype**).

Notes – This is the first record of a *Pseudocercospora* on this host. *P. conspicua* (Earle) Deighton, known from Australia, North America and the West Indies on *Cleome* spp. (Chupp 1954, Crous & Braun 2003), is a morphologically similar species, which differs from *P. cratevae* in lacking leaf spots and in having longer conidiophores, up to 40 μ m, and

very pale, almost colourless conidia (Chupp 1954).

Pseudocercospora cycleae (Chidd.) Deighton, Mycol. Pap. 140: 143, 1976. Figs 66–67.

Leaf spots subcircular to irregular, 1–10 mm diam., grey-brown in the center, brown to dark brown at the margin. Colonies amphigenous, conspicuous. Mycelium internal; hyphae branched, 2–5 μm wide (\bar{x} = 4 μm , n = 7), septate, constricted at the septa, distance between septa 10–18 μm (\bar{x} = 15.71 μm , n = 7), subhyaline to brownish, wall 0.5–0.8 μm wide (\bar{x} = 0.58 μm , n = 7), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 20–40 μm diam. (\bar{x} = 29.1 μm , n = 10), brown to dark brown, stroma cells oval, ellipsoidal and angular, 5–10 μm wide (\bar{x} = 6.9 μm , n = 30), dark brown, wall 0.5–1 μm wide (\bar{x} = 0.61 μm , n = 30), smooth. Conidiophores fasciculate, arising from stromata (2–33 per fascicle), geniculate, unbranched, 37–143 \times 2–5 μm (\bar{x} = 112 \times 3.8 μm , n = 11), 2–7-septate, slightly constricted at the septa, distance between septa 6–29 μm (\bar{x} = 17.6 μm , n = 30), uniformly pale to medium brown, paler and narrower towards the tip, wall 0.5–0.8 μm wide (\bar{x} = 0.62 μm , n = 30), smooth. Conidiogenous cells terminal, 6–28 \times 2–4 μm (\bar{x} = 17.1 \times 3 μm , n = 7), apex obtuse; conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 27–85 \times 4–6 μm (\bar{x} = 52.5 \times 4.6 μm , n = 15), 2–10-septate, pale olivaceous-brown, wall 0.3–0.5 μm wide (\bar{x} = 0.39 μm , n = 15), smooth, tip subacute, base obconically truncate, hila 0.72–2 μm wide (\bar{x} = 1.52 μm , n = 15).

Known hosts – *Cyclea fissicalyx* Dunn, *C. peltata* Hook. f. & Thomson, *Cyclea* sp. (Menispermaceae).

Known distribution – **Asia:** China, India, Thailand.

Material examined – Chiang Rai Province, Khun Korn waterfall, on leaves of *Cyclea peltata* (Menispermaceae), 18 December 2009, P. Phengsintham (MFLU10-0319).

Notes – The collection from Khun Korn waterfall, Chiang Rai Province agrees with the

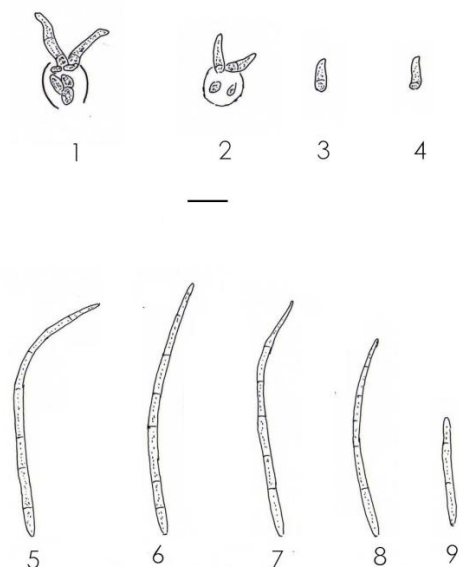


Fig. 64 – *Pseudocercospora cratevae* on *Crateva religiosa* from leaf spots: 1–2. Stroma with attached conidiophores. 3–4. Conidiophores. 5–9. Conidia. Bar1: 1–9 = 10 μm .

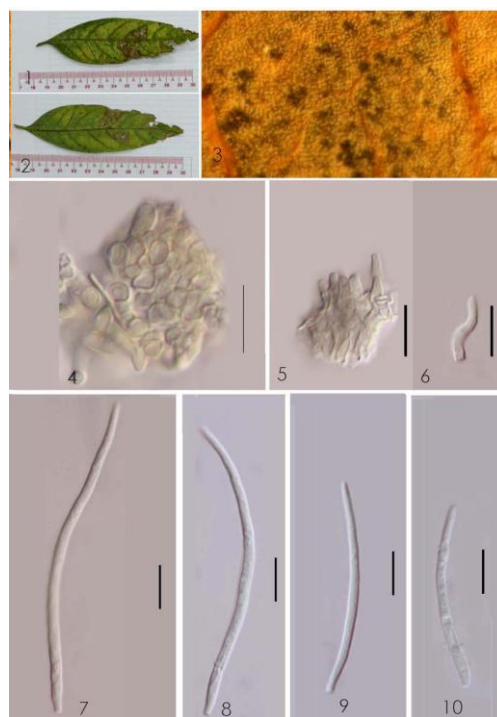


Fig. 65 – *Pseudocercospora cratevae* on *Crateva religiosa* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Stroma. 5. Stroma with attached conidiophores. 6. Conidiophore. 7–10. Conidia. Bars: 1–2 = 10 mm. 3. Not to scale. 4–10 = 10 μm .

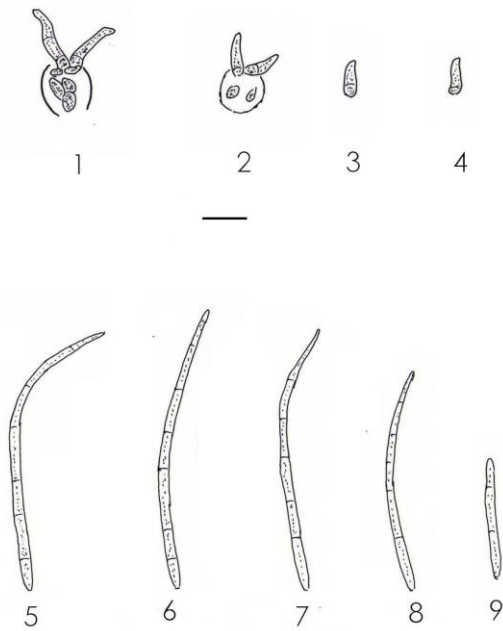


Fig. 66 – *Pseudocercospora cycleae* on *Cyclea peltata* from leaf spots: 1. Stroma with attached conidiophores. 2–6. Conidia. Bars: 1–6 = 10 μ m.



Fig. 67 – *Pseudocercospora cycleae* on *Cyclea peltata* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Internal hyphae. 5. Stroma with attached conidiophores. 6. Stroma. 7. Apices of conidiophores. 8. Conidiophores. 9–12. Conidia. 13. Culture. Bars: 1–2 = 10 mm. 3. Not to scale. 4–12 = 10 μ m. 13 = 10 mm.

description of this species in Guo & Hsieh (1995), but differs in having longer conidiophores.

Literature – Guo & Hsieh (1995: 203); Guo et al. (1998: 215); Crous & Braun (2003: 149).

Pseudocercospora jahnii (Syd.) U. Braun & Crous, in Crous and Braun, *Mycosphaerella* and its anamorphs: 1. Names published in *Cercospora* and *Passalora*. CBS Biodiversity Series 1: 230, 2003. Figs 68–69.

\equiv *Cercospora jahnii* Syd., Ann. Mycol. 28: 214, 1930.

Leaf spots subcircular to irregular, 1–5 mm diam., at first yellowish brown, and then dark brown in the centre, yellow at the margin. Colonies amphigenous, scattered. Mycelium internal; hyphae branched, 2–3 μ m wide (\bar{x} = 2.5 μ m, n = 6), septate, constricted at the septa, distance between septa 6–12 μ m (\bar{x} = 9 μ m, n = 6), brownish, subhyaline, wall 0.3–0.5 μ m wide (\bar{x} = 0.4 μ m, n = 6), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 20–34 μ m diam. (\bar{x} = 27.60 μ m, n = 4), brown to dark brown, stromatal cells oval, ellipsoidal to angular, 2–5 μ m wide (\bar{x} = 3.38 μ m, n = 10), dark brown, wall 0.3–0.5 μ m wide (\bar{x} = 0.45 μ m, n = 10), smooth. Conidiophores fasciculate, arising from stromata (8–17 per fascicle), not geniculate, unbranched, 6–10 \times 2–4 μ m (\bar{x} = 8.38 \times 3.25 μ m, n = 9), 0–1-septate, slightly constricted at the septa, distance between septa 4–6 μ m long (\bar{x} = 4.60 μ m, n = 9), uniformly pale to medium brown or much paler and narrower towards the tip, wall 0.3–0.5 μ m (\bar{x} = 0.48 μ m, n = 9), smooth. Conidiogenous cells terminal, 5–9 \times 2–4 μ m (\bar{x} = 6.11 \times 2.70 μ m, n = 9), apex obtuse, conidiogenous loci inconspicuous, neither thickened nor darkened. Conidia solitary, obclavate, straight to slightly curved, 42–64 \times 2–3 μ m (\bar{x} = 52.41 \times 2.73 μ m, n = 13), 4–8-septate, pale olivaceous-brown, wall 0.3–0.5 μ m wide (\bar{x} = 0.36 μ m, n = 13), smooth, tip subacute, base obconically truncate, hila 1–2 μ m wide (\bar{x} = 1.24 μ m, n = 13).

Known hosts – *Tabebuia argentea* (Bureau & K. Schum.) Britton, *T. chrysotricha* (Mart. ex A. DC.) Standl., *T. heterophylla* (DC.) Britton, *T. pentaphylla* (L.) Hemsl., *T.*

rosea (Bertol.) A. DC., *T. serratifolia* (Vahl) G. Nicholson, *T. shaferi* Britton (Bignoniaceae).

Known distribution – **Africa**: Senegal; **Asia**: India, Thailand; **North America and West Indies**: Cuba, Panama, Trinidad and Tobago, USA (FL); **Oceania**: Puerto Rico, Virgins Islands; **South America**: Brazil, Venezuela.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Tabebuia chrysotricha* (Bignoniaceae), 4 August 2010, P. Phengsintham (P613). GenBank accession no (ITS, KC677903; LSU, KC677933).

Notes – The collection from Thailand differs from the description of *P. jahnii* by Chupp (1954) [conidiophores $10\text{--}40 \times 3\text{--}5 \mu\text{m}$ and conidia $30\text{--}80 \times 4\text{--}5.5 \mu\text{m}$] in having shorter conidiophores.

Literature – Chupp (1954: 86); Crous & Braun (2003: 230).

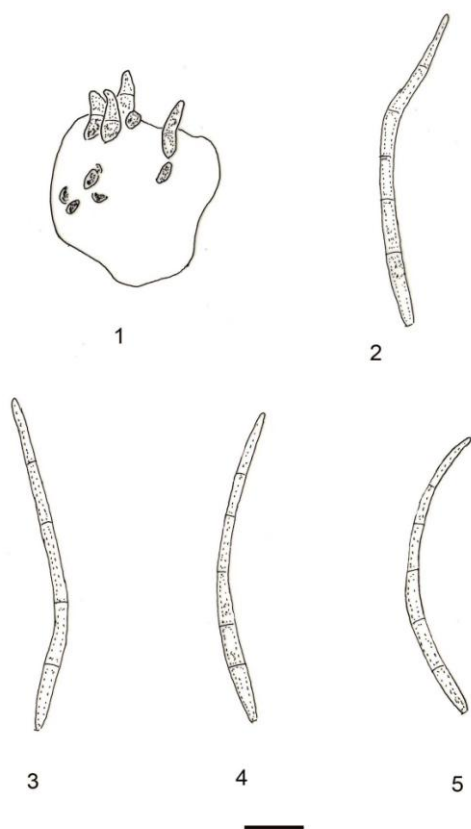


Fig. 68 – *Pseudocercospora jahnii* on *Tabebuia chrysotricha*: 1. Stroma with attached conidiophores. 2–5. Conidia. Bars: 1–5 = 10 μm .



Fig. 69 – *Pseudocercospora jahnii* on *Tabebuia chrysotricha* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Stroma with attached conidiophores. 5–7. Conidia. Bars: 1–2 = 10 mm. 3. Not to scale. 4–7 = 10 μm .

Pseudocercospora lygodii Goh & W. H. Hsieh, Trans. Mycol. Soc. Republ. China 2: 131, 1987. Figs 70–71.

= *Cercospora lygodii* Sawada, Rep. Gov. Agric. Res. Inst. Taiwan 87: 83, 1944.

Leaf spots subcircular to irregular, 3–7 mm diam., dark brown in the centre, brown and dark brown at the margin. Colonies amphigenous, conspicuous. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal, 10–60 μm diam. (\bar{x} = 39.6 μm , n = 5), brown to dark brown, stromatal cells oval, ellipsoidal to angular, 4–11 μm wide (\bar{x} = 6.7 μm , n = 15), dark brown, wall 0.5–0.8 μm wide (\bar{x} = 0.53 μm , n = 15), smooth. Conidiophores fasciculate, arising from stromata (4–30 per fascicle), geniculate, unbranched, 13–46 \times 2.5–4 μm (\bar{x} = 29.4 \times 3.50 μm , n = 13), 0–4-septate, slightly constricted at the septa, distance between septa 4–30 μm long (\bar{x} = 12.3 μm , n = 20), uniformly pale to medium brown, much paler and narrower towards the tip, wall approximately 0.5–0.8 μm (\bar{x} = 0.61 μm , n = 20), smooth. Conidiogenous cells terminal, 12–30 \times 2–4 μm (\bar{x} = 16 \times 2.72 μm , n = 9), apex obtuse, conidiogenous loci

inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, $36\text{--}120 \times 2\text{--}4 \mu\text{m}$ ($\bar{x} = 80.4 \times 3 \mu\text{m}$, $n = 15$), 4–11-septate, pale olivaceous-brown, wall $0.3\text{--}0.5 \mu\text{m}$ wide ($\bar{x} = 0.46 \mu\text{m}$, $n = 15$), smooth, tip subacute, base obconically truncate, hila $1.15\text{--}2 \mu\text{m}$ wide ($\bar{x} = 1.83 \mu\text{m}$, $n = 15$).

Known hosts – *Lygodium flexuosum* (L.) Sw., *Lygodium japonicum* (Thunb.) Sw., *L. macrostachyum* Tagawa (Schizaeaceae).

Known distribution – Asia: Taiwan, Thailand.

Material examined – Chiang Mai Province, Maeteng District, Phadeng Village, on leaves of *Lygodium flexuosum* (Schizaeaceae), 7 June 2011, P. Phengsintham (P625).

Notes – The collection from Thailand agrees with the description of *Pseudocercospora lygodii* published by Chupp (1954) and Hsieh & Goh (1990) [conidiophores $20\text{--}90 \times 3\text{--}4 \mu\text{m}$ and conidia $10\text{--}35 \times 1.5\text{--}3 \mu\text{m}$].

Literature – Chupp (1954: 456); Hsieh & Goh (1990: 305); Guo & Hsieh (1995: 187); Guo et al. (1998: 199); Crous & Braun (2003: 258).

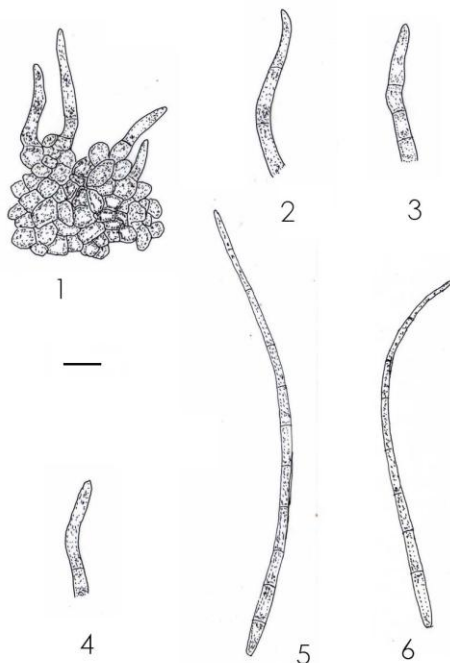


Fig. 70 – *Pseudocercospora lygodii* on *Lygodium flexuosum* from leaf spots: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–6. Conidia. Bars: 1–6 = $10 \mu\text{m}$.

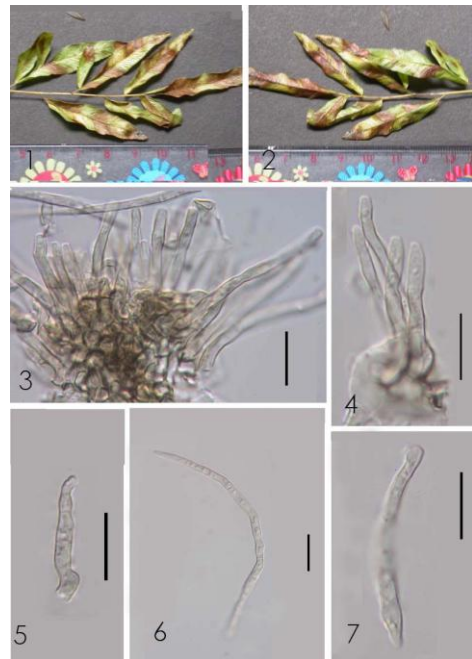


Fig. 71 – *Pseudocercospora lygodii* on *Lygodium flexuosum* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3–4. Stromata with attached conidiophores. 5. Conidiophore. 6–7. Conidia. Bars: 1–2 = 10mm , 3–7 = $10 \mu\text{m}$.

Pseudocercospora mallotica Goh & W.H. Hsieh, *Cercospora* and similar fungi from Taiwan: 124, 1990

Figs 72–73.

= *Cercospora malloti* Ellis & Everh. sensu Sawada, Taiwan Agric. Res. Inst. Rept 85: 113 (1943a); also 86: 173 (1943b); non *Cercospora malloti* Ellis & Everh. (J. Mycol. 4: 114, 1888).

Leaf spots circular to irregular, 1–6 mm diam., at first yellowish, later becoming brown or dark brown, and with yellowish margin. Colonies amphigenous, inconspicuous. Stromata well-developed, substomatal, oval, ellipsoidal, $10\text{--}40 \mu\text{m}$ wide ($\bar{x} = 29.9 \mu\text{m}$, $n = 11$), brown to dark brown, stomatal cells oval, angular to obclavate in outline, $3\text{--}7 \mu\text{m}$ wide ($\bar{x} = 5.2 \mu\text{m}$, $n = 28$), wall $0.5\text{--}0.8 \mu\text{m}$ wide ($\bar{x} = 0.52 \mu\text{m}$, $n = 28$), smooth. Conidiophores fasciculate, arising from stromata (2–11 per fascicle), emerging through stomata, nearly straight or cylindrical, simple, unbranched, $10\text{--}40 \times 3\text{--}5 \mu\text{m}$ ($\bar{x} = 20.3 \times 4.1 \mu\text{m}$, $n = 10$), 0–2-septate, distance between septa $10\text{--}20 \mu\text{m}$ ($\bar{x} = 13.7 \mu\text{m}$, $n = 17$), medium brown, paler at the apex, uniformly pale to medium brown, or much paler and more narrower toward the tip,

thin-walled 0.5–0.6 μm (\bar{x} = 5.2 μm , n = 17), smooth. Conidiogenous cells terminal, 10–20 \times 3–5 μm (\bar{x} = 15 \times 3.9 μm , n = 10), nearly straight or cylindrical; walled 0.5–0.6 μm (\bar{x} = 5.1 μm , n = 11); conidiogenous loci inconspicuous or subdenticulate, unthickened, not darkened. Conidia formed singly, obclavate-cylindrical, straight to slightly curved, 33–75 \times 3–4 μm (\bar{x} = 58.5 \times 3.6 μm , n = 13), 3–7-septate, pale olivaceous-brown, wall 0.3–0.5 μm (\bar{x} = 0.33 μm , n = 13), smooth, apex subacute, base obconically truncate, hila 1.5–2 μm wide (\bar{x} = 1.8 μm , n = 10), wall 0.3–0.5 μm wide (\bar{x} = 0.44 μm , n = 10), unthickened and not darkened.

Known hosts – *Mallotus barbatus* (Wall.) Müll. Arg., *M. japonicus* (L. f.) Müll. Arg., *M. thorelii* Gagnep. (Euphorbiaceae).

Known distribution – **Asia**: Laos, Taiwan, Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Mallotus barbatus* (Euphorbiaceae), 30 August 2009, P. Phengsintham (MFLU10-0320). GenBank accession no (ITS, KC677906).

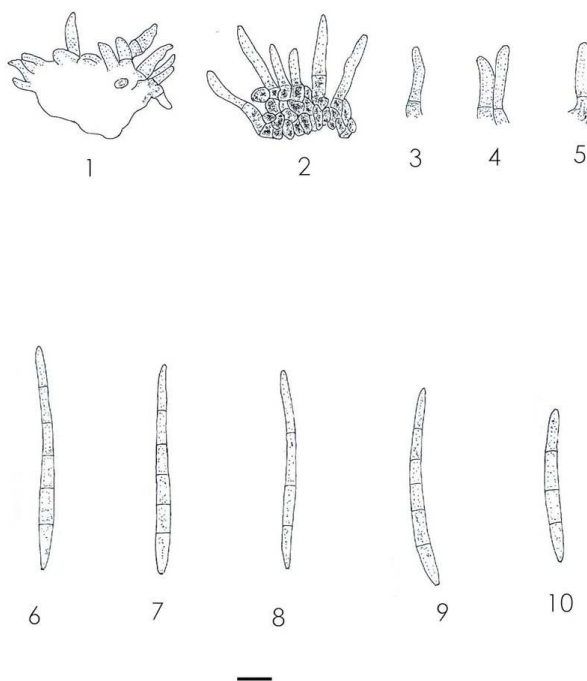


Fig. 72 – *Pseudocercospora mallotica* on *Mallotus barbatus*: 1–2. Stromata with attached conidiophores. 3–5. Conidiophores. 6–10. Conidia. Bars: 1–10 = 10 μm .

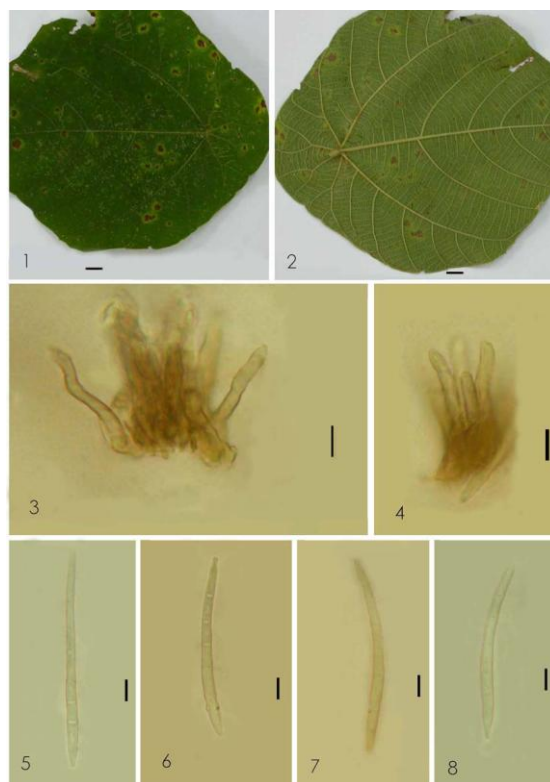


Fig. 73 – *Pseudocercospora mallotica* on *Mallotus barbatus* on leaf spots: 1–2. Leaf spots (1. upper surface, 2. lower surface). 3–4. Stromata with attached conidiophores. 5–8. Conidia. Bars: 1–2 = 10 mm, 3–8 = 10 μm .

Notes – The collection MFLU10-0320 from Sri Pangsang Village, Chiang Rai Province is similar to *P. mallotica* from Taiwan described by Hsieh & Goh (1990).

Literature – Hsieh & Goh (1990: 124).

Pseudocercospora mombin (Petr. & Cif.) Deighton, Mycol. Pap. 140: 148, 1976.

Figs 74–75.

= *Cercospora mombin* Petr. & Cif., Ann. Mycol. 30: 322, 1932.

Leaf spots irregular, 5–40 mm diam., grey-brown or brown in the center, and with dark brown margin. Colonies amphigenous, conspicuous, scattered. Mycelium internal, sparsely developed; hyphae small, branched, intercellular, 2–4 μm wide (\bar{x} = 2.75 μm , n = 15), septate, constricted at the septa, distance between septa 4–8 μm (\bar{x} = 6.25 μm , n = 15), hyaline to subhyaline, thin-walled 0.5–0.8 μm wide (\bar{x} = 0.57 μm , n = 15), smooth, forming plate-like plectenchymatous structures; external hyphae lacking. Stromata well-developed, substomatal, oval, ellipsoidal, 18–53 μm wide

(\bar{x} = 32 μm , n = 5), brown to dark brown, stomatal cells oval, angular to obclavate in outline, 3–7 μm wide (\bar{x} = 4.7 μm , n = 30), wall 0.5–1 μm wide (\bar{x} = 0.66 μm , n = 30), smooth. Conidiophores fasciculate, arising from stomata (2–18 per fascicle), emerging through stomata, nearly straight or cylindrical, simple, unbranched, not geniculate, 4–24 \times 1.5–4 μm (\bar{x} = 12.3 \times 2.9 μm , n = 15), 0–1-septate, distance between septa 4–24 μm (\bar{x} = 9.9 μm , n = 15), medium brown, paler at the apex, uniformly pale to medium brown, or much paler and more narrower toward the tip, thin-walled 0.3–0.5 μm (\bar{x} = 0.36 μm , n = 15), smooth. Conidiogenous cells terminal, 4–24 \times 1.5–4 μm (\bar{x} = 10.6 \times 2.88 μm , n = 10), nearly straight or cylindrical; walled 0.5–0.8 μm (\bar{x} = 0.38 μm , n = 10); conidiogenous loci inconspicuous or subdenticulate, unthickened, not darkened. Conidia formed singly, cylindrical, straight to slightly curved, 21–57 \times 1–2 μm (\bar{x} = 37.7 \times 1.55 μm , n = 15), 2–7-septate, pale olivaceous-brown, wall 0.3–0.5 μm (\bar{x} = 0.32 μm , n = 15) wide, smooth, apex subacute, base obconically truncate, hila 0.5–1.5 μm wide (\bar{x} = 0.7 μm , n = 15), wall 0.3–0.5 μm wide (\bar{x} = 0.32 μm , n = 15), thickened and darkened.

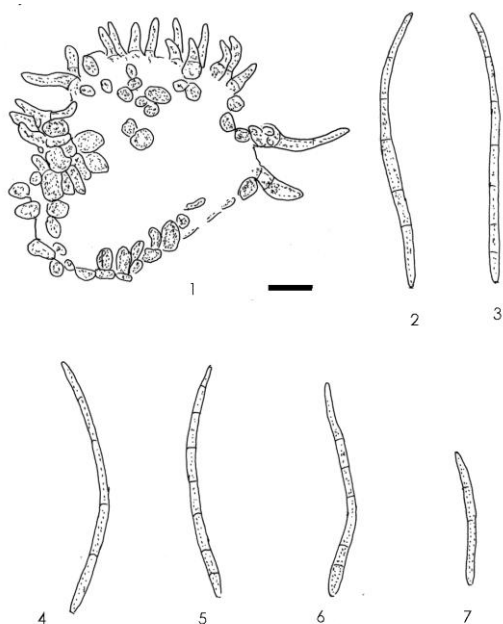


Fig. 74 – *Pseudocercospora mombin* on *Spondias pinnata* on leaf spots: 1. Stroma with attached conidiophores. 2–7. Conidia. Bars: 1–7 = 10 μm .

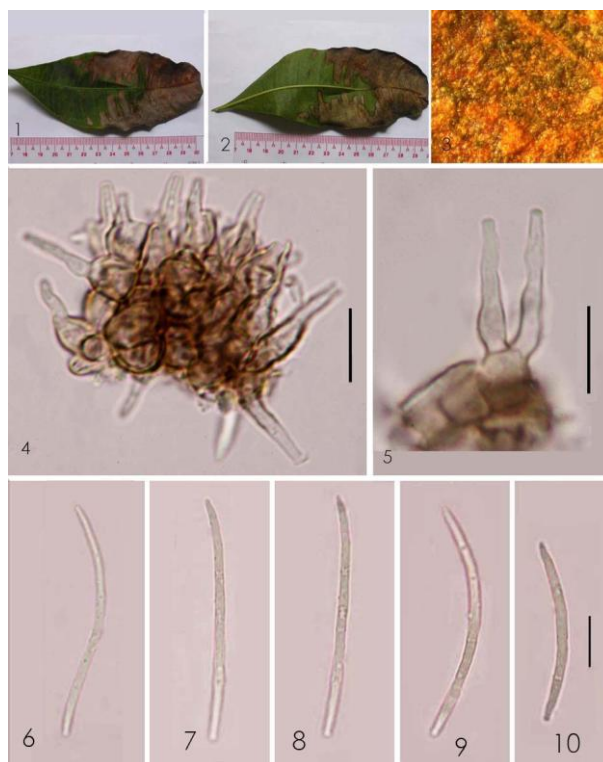


Fig. 75 – *Pseudocercospora mombin* on *Spondias pinnata* on leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4–5. Stromata with attached conidiophores. 6–10. Conidia. Bars: 1–2 = 10 mm, 3. Not to scale. 4–10 = 10 μm .

Known hosts – *Spondias mombin* L., *S. pinnata* (L.F.) Kurz, *S. purpurea* L. (Anacardiaceae).

Known distribution – **Asia**: Philippines, Thailand; **North America and West Indies**: Cuba, Dominican Rep., Panama; **South America**: Brazil, Venezuela.

Material examined – Chiang Rai Province, Muang District, Ban Dou Village, on leaves of *Spondias pinnata* (Anacardiaceae), 24 August 2010, P. Phengsintham (P625). GenBank accession no (ITS, KC677907; LSU, KC677935).

Notes – The collection from Ban Dou Village, Chiang Rai Province (Thailand) is similar to *P. mombin* (= *Cercospora mombin*) from the Dominican Republic described by Chupp (1954) [conidiophores 5–30 \times 3–4 μm and conidia 20–85 \times 2–3.5 μm].

Literature – Chupp (1954: 41); Crous & Braun (2003: 279).

Pseudocercospora mori (Hara) Deighton, Mycol. Pap. 140: 148, 1976. Figs 76–77.

≡ *Cercospora mori* Hara, J. Sericult. Assoc. Japan 27: 227, 1918.

= *Cercospora mori* Marshall & Steyaert, Bull. Soc. Roy. Bot. Belgique 61: 166, 1929.

Leaf spots irregular, 1–5 mm diam., brown or brown in the center, and with yellowish margin. Colonies amphigenous, conspicuous, scattered. Mycelium internal, inconspicuous. Stromata developed, substomatal, oval, ellipsoidal, 13–50 µm wide (\bar{x} = 31.5 µm, n = 5), brown to dark brown, stomatal cells oval, angular to obclavate in outline, 4–7 µm wide (\bar{x} = 6 µm, n = 30), wall 0.5–0.8 µm wide (\bar{x} = 0.62 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (2–18 per fascicle), emerging through stomata, nearly straight or cylindrical, simple, unbranched, 8–17 × 3–5 µm (\bar{x} = 12.5 × 4 µm, n = 9), 0–1-septate, distance between septa 6–8 µm (\bar{x} = 7 µm, n = 10), medium brown, paler at the apex, uniformly pale to medium brown, or much paler and more narrow toward the tip, thin-walled 0.5–0.8 µm (\bar{x} = 0.6 µm, n = 9), smooth. Conidiogenous cells terminal, 7–8 × 3–4 µm (\bar{x} = 7.5 × 3.5 µm, n = 5), nearly straight or cylindrical; wall 0.5–0.8 µm (\bar{x} = 0.65 µm, n = 5); conidiogenous loci inconspicuous or subdenticulate, unthickened, not darkened. Conidia formed singly, cylindrical, straight to slightly curved, 27–46 × 2.5–4 µm (\bar{x} = 33.2 × 3.12 µm, n = 15), 2–7-septate, pale olivaceous-brown, wall 0.3–0.5 µm (\bar{x} = 0.35 µm, n = 15), smooth, apex subacute, base obconically truncate, hila 1–2 µm wide (\bar{x} = 1.37 µm, n = 15), wall 0.3–0.5 µm wide (\bar{x} = 0.45 µm, n = 15), unthickened and not darkened.

Known hosts – *Morus acidosa* Griff., *M. alba* L., *M. australis* Poir., *M. indica* L., *M. nigra* L., *M. rubra* L. (Moraceae).

Known distribution – **Africa:** Congo; **Asia:** Bangladesh, China, India, Japan, Lebanon, Myanmar, Pakistan, Singapore, Taiwan, Thailand; **Europe:** Belgium, Georgia; **North America and West Indies:** Cuba, Dominican Rep. Panama; USA (AL).

Material examined – Chiang Rai

Province, Maechan District, Doitung National Park, on leaves of *Morus alba* (Moraceae), 12 April 2009, P. Phengsintham (P484). GenBank accession no (ITS, KC731557).

Notes – The collection from Doitung National Park, Chiang Rai Province (Thailand) is similar to *P. mori* described by Hsieh & Goh (1990) [conidiophores 20–90 × 3–5 µm and conidia 20–80 × 3–5 µm].

Literature – Chupp (1954: 399); Saccardo (1972: 1378, 1384); Yen & Lim (1980: 180); Hsieh & Goh (1990: 240); Guo & Hsieh (1995: 217); Crous & Braun (2003: 282).

Pseudocercospora olacicola (Muthappa) Kamal, M.K. Khan & R.K. Verma, Mycol. Res. 94: 241, 1990. Figs 78–79.

≡ *Cercospora olacicola* Muthappa, Sydowia 21: 156, (1967)1968.

Leaf spots subcircular to irregular, 1–5 mm diam., at first yellowish, later becoming brown in the center, brown to yellowish brown at the margin. Colonies amphigenous, scattered, conspicuous. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal, 15–32 µm diam. (\bar{x} = 22.3 µm, n = 7), brown to dark brown, stomatal cells oval, ellipsoidal 15–32 µm diam. (\bar{x} = 22.3 µm, n = 7), brown to dark brown, stomatal cells oval, ellipsoidal and angular, 3–7 µm wide (\bar{x} = 5.3 µm, n = 15), dark brown, wall 0.5–0.8 µm wide (\bar{x} = 0.58 µm, n = 15), smooth. Conidiophores fasciculate, arising from stromata (3–12 per fascicle), geniculate, unbranched, 13–34 × 3–4 µm (\bar{x} = 23.3 × 3.56 µm, n = 19), 0–3-septate, simple or branched, slightly constricted at the septa, distance between septa 4–20 µm long (\bar{x} = 10.4 µm, n = 30), uniformly pale to medium brown or much paler and more narrow toward the tip, wall 0.5–0.8 µm (\bar{x} = 0.56 µm, n = 30), smooth. Conidiogenous cells terminal, 9–20 × 2–4 µm (\bar{x} = 13.1 × 3 µm, n = 9), apex obtuse; conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 47–83 × 3–4 µm (\bar{x} = 62.2 × 3.2 µm, n = 15), 4–6-septate, pale olivaceous-brown, wall 0.5–0.8 µm wide (\bar{x} = 0.56 µm, n = 15), smooth, tip subacute, base obconically truncate, hila 0.7–2 µm wide (\bar{x} = 1.23 µm, n = 15).

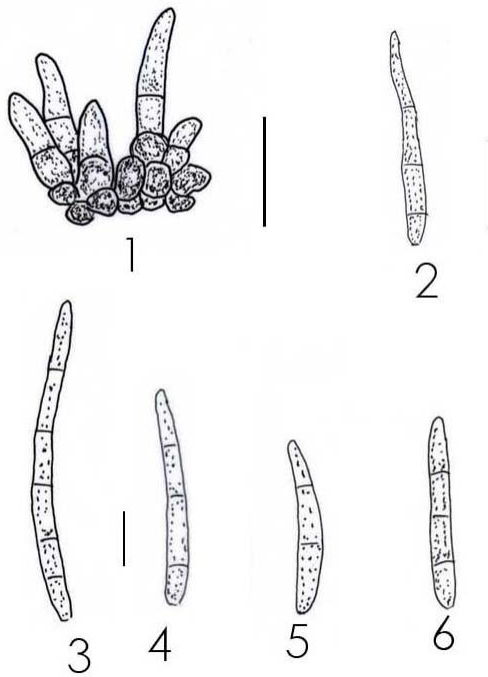


Fig. 76 – *Pseudocercospora mori* on *Molus alba* from leaf spots: 1. Stroma with attached conidiophores. 2–6. Conidia. Bars: 1–6 = 10 µm.

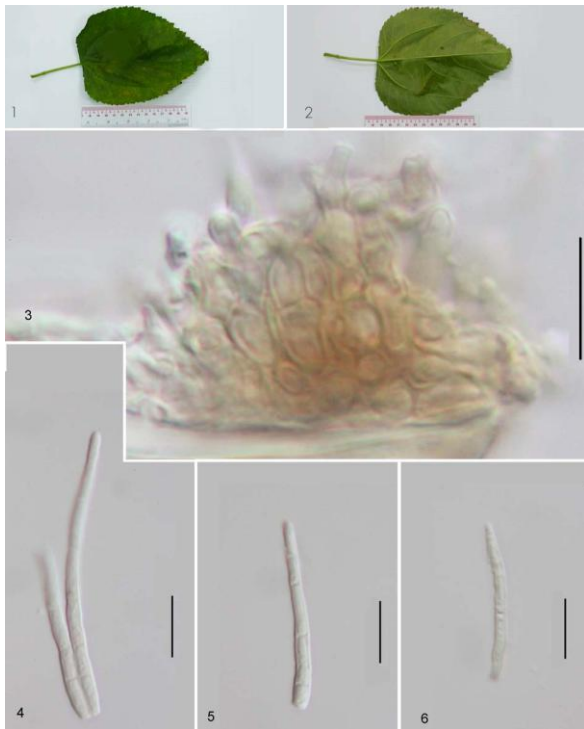


Fig. 77 – *Pseudocercospora mori* on *Molus alba* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Stroma with attached conidiophores. 4–6. Conidia. Bars: 1–2 = 10 mm. 3–6 = 10 µm.

Known hosts – *Olex scandens* Roxb., *O. wightiana* Wall. ex Wight & Arn., *O. zeylanica* L., *Olex* sp., *Ximenea* sp. (Olacaceae).

Known distribution – **Asia:** India, Thailand.

Material examined – Pha Yao Province, Mae Jai District, Mae Puem National Park, on leaves of *Olex scandens* (Olacaceae), 24 August 2010, P. Phengsintham (MFLU11-0020).

Notes – The collection from Mae Puem National Park, Pha Yao Province agrees with *Pseudocercospora olacicola* described by Kamal et al. (1990) [conidiophores 10.5–40.5 × 2.5–5 µm and conidia 16–30.5 × 2.5–4 µm].

Literature – Crous & Braun (2003: 297).

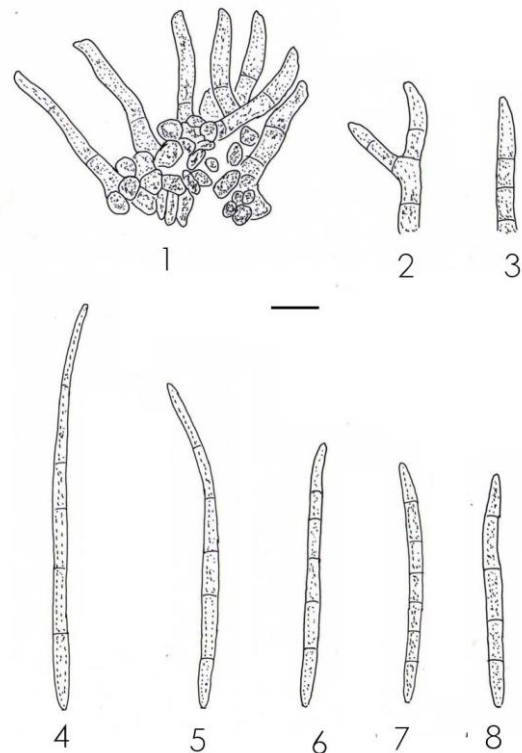


Fig. 78 – *Pseudocercospora olacicola* on *Olex scandens* from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidio-phores. 4–8. Conidia. Bars: 1–8 = 10 µm.

Pseudocercospora oroxyli (A.K. Kar & M. Mandal) Deighton, Trans. Brit. Mycol. Soc. 88: 388, 1987.

Figs 80–81.

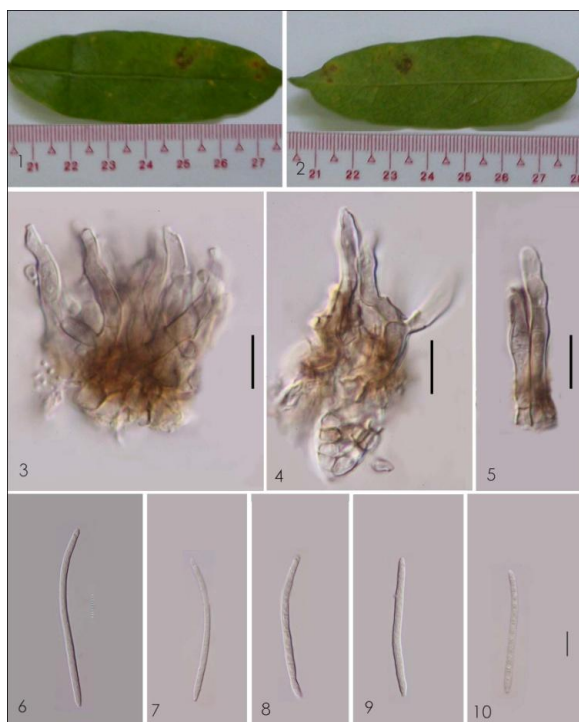


Fig. 79 *Pseudocercospora olacicola* on *Olax scandens* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3–4. Stromata with attached conidiophores. 5. Conidiophores. 6–10. Conidia. Bars: 1–2 = 10 mm, 3. Not to scale. 3–10 = 10 μ m.

\equiv *Cercospora oroxyli* A.K. Kar & M. Mandal, Trans. Brit. Mycol. Soc. 53: 344, 1969.

Leaf spots circular or irregular, 1–4 mm in diam., brown in the centre, brown to dark brown margin. Colonies hypophyllous, conspicuous, scattered, grey. Mycelium internal; hyphae branched, 2–4 μ m wide (\bar{x} = 3 μ m, n = 8), septate, constricted at the septa, distance between septa 5–21 μ m (\bar{x} = 11.66 μ m, n = 8), subhyaline or hyaline, wall 0.3–0.5 μ m wide (\bar{x} = 0.43 μ m, n = 8), smooth. Stromata well-developed, substomatal, subglobular, 14–21 μ m wide (\bar{x} = 17.96 μ m, n = 7), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 4–6 μ m wide (\bar{x} = 4.82 μ m, n = 20), dark brown, wall 0.3–0.5 μ m wide (\bar{x} = 0.36 μ m, n = 20), smooth. Conidiophores fasciculate, arising from stromata (2–7 per fascicle), erect, straight or curved, unbranched, 11–16 \times 3–5 μ m (\bar{x} = 14.12 \times 3.65 μ m, n = 9), 0–1-septate, distance between septa 4–13 μ m (\bar{x} = 9.41 μ m, n = 10), pale to moderately olivaceous-brown, paler and narrower towards the apex, wall 0.5–0.8 μ m wide (\bar{x} = 0.65 μ m,

n = 10), smooth. Conidiogenous cells integrated, 12–13 \times 2–4 μ m (\bar{x} = 12.4 \times 3.23 μ m, n = 10), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, 31–75 \times 2–4 μ m (\bar{x} = 48.47 \times 2.82 μ m, n = 20), 1–5-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 μ m wide (\bar{x} = 0.35 μ m, n = 20), smooth, obtuse at the apex, with long obconically truncate base.

Known hosts – *Oroxylum indicum* (L.) Kurz (Bignoniaceae).

Known distribution – **Asia:** India, Myanmar, Thailand.

Material examined – Chiang Rai Province, Maechan District, Maechan Village, on leaves of *Oroxylum indicum* (Bignoniaceae), 18 July 2010, P. Phengsintham (P602).

Notes – In the Thailand collection the conidiophores are 27–70 \times 5–7 μ m and the conidia are 14–40 \times 4–6 μ m, which is similar to those described in Yen (1979).

Literature – Crous & Braun (2003: 299).

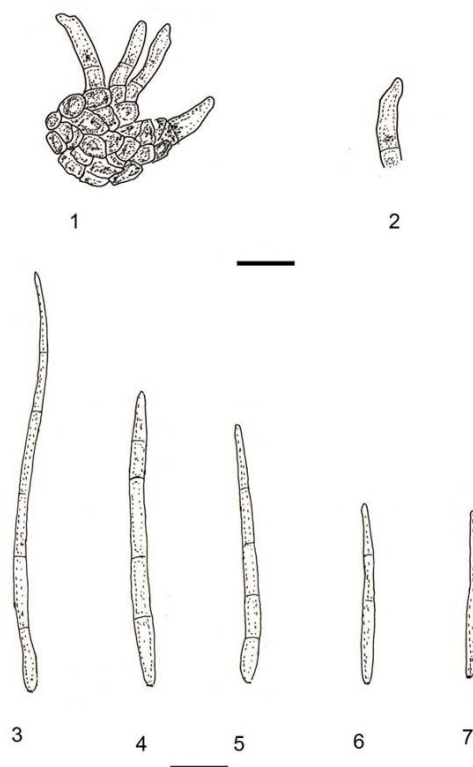


Fig. 80 – *Pseudocercospora oroxyli* on *Oroxylum indicum*: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–7. Conidia. Bars: 1–7 = 10 μ m.

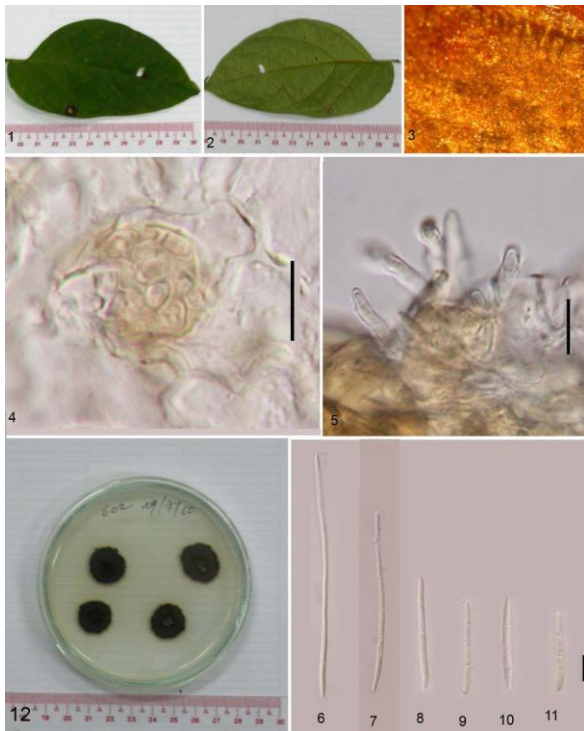


Fig. 81 – *Pseudocercospora oroxyli* on *Oroxylum indicum* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Stroma. 5. Stroma with attached conidiophores. 6–11. Conidia. 12. Culture. Bars: 1–2 = 10 mm. 3. Not to scale. 4–11 = 10 μ m. 12 = 10 mm.

Pseudocercospora paederiae Goh & W.H. Hsieh, in Hsieh and Goh, *Cercospora* and Similar fungi from Taiwan; 291, 1990.

Figs 82–83.

\equiv *Cercospora paederiae* Sawada, Rep. Gov. Res. Inst. Formosa 87: 84, 1944, nom. inval.

= *Cercospora paederiae* F.L. Tai, Bull. Chinese Bot. Soc. 2: 56, 1936.

Leaf spots circular or irregular, 1–4 mm in diam., brown in the centre, dark brown margin. Colonies amphigenous, but chiefly hypophyllous. Mycelium internal; hyphae branched, 3–5 μ m wide (\bar{x} = 4.33 μ m, n = 5), septate, constricted at the septa, distance between septa 8–10 μ m (\bar{x} = 9 μ m, n = 5), subhyaline or hyaline, wall 0.5–0.8 μ m wide (\bar{x} = 0.6 μ m, n = 5), smooth. Stromata well-developed, substomatal, subglobular, 22–45 μ m wide (\bar{x} = 32.3 μ m, n = 5), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 3–5 μ m wide (\bar{x} = 4.1 μ m, n = 8), dark brown, wall 0.5–0.8 μ m wide (\bar{x} =

0.69 μ m, n = 8), smooth. Conidiophores solitary or fasciculate, arising from stromata (1–2 per fascicle), erect, straight or curved, unbranched, geniculate, 5–20 \times 3–5 μ m (\bar{x} = 11 \times 3.67 μ m, n = 5), 0–2-septate, distance between septa 5–13 μ m (\bar{x} = 8.25 μ m, n = 5), pale to moderately olivaceous-brown, paler and narrower towards the apex, wall 0.3–0.5 μ m wide (\bar{x} = 0.35 μ m, n = 5), smooth. Conidiogenous cells integrated, 5–13 \times 3–4 μ m (\bar{x} = 8.25 \times 0.35 μ m, n = 5), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, 42–75 \times 2–3 μ m (\bar{x} = 56 \times 2.2 μ m, n = 5), 3–6-septate, slightly constricted at the septa, pale olivaceous, wall 0.25–0.3 μ m wide (\bar{x} = 0.29 μ m, n = 5), smooth, obtuse at the apex, with long obconically truncate base.

Known hosts – *Paederia chinensis* Hance, *P. foetida* L., *P. scandens* (Lour.) Merr., *P. tomentosa* Blume (Rubiaceae).

Known distribution – **Asia**: China, Japan, Korea, Taiwan and Thailand.

Material examined – Chiang Rai Province, Muangng District, Tadsak water fall, on leaves of *Paederia tomentosa* (Rubiaceae), 23 December 2009, P. Phengsintham (P499).

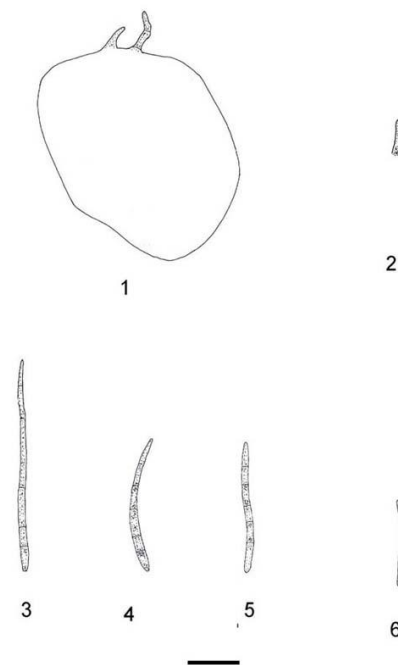


Fig. 82 – *Pseudocercospora paederiae* on *Paederia tomentosa*: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–6. Conidia. Bars: 1–6 = 10 μ m.



Fig. 83 – *Pseudocercospora paederiae* on *Paederia tomentosa* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Stroma. 5. Internal mycelium. 6. Conidium. Bars: 1–2 = 10 mm. 3. Not to scale. 4–6 = 10 µm.

Notes – The collection from Thailand is similar to the original description of this species, based on material from Taiwan, but there are slight differences in the size of the conidiophores and conidia. The collection from Taiwan has densely fasciculate conidiophores, 20–120 × 3–4 µm, subhyaline to pale brown and conidia obclavate, straight to moderately curved, 30–80 × 3.5–5 µm, medium olivaceous (Chupp 1954, Hsieh & Goh 1990, Guo & Hsieh 1995).

Literature – Chupp (1954: 500); Hsieh & Goh (1990: 291); Guo & Hsieh (1995: 291).

Pseudocercospora panacis (Thirum. & Chupp) Y.L. Guo & X.J. Liu, Acta Mycol. Sin. 11: 297, 1992. Figs 84–85.

≡ *Cercospora panacis* Thirum. & Chupp, Mycologia 40: 358, 1948.

≡ *Passalora panacis* (Thirum. & Chupp) Crous & U. Braun, Mycotaxon 78: 336, 2001.

= *Pseudocercospora polysciatis-pinnatae* U. Braun & Mouch., New Zealand J. Bot. 37: 319, 1999.

Leaf spots circular or irregular, 1–10 mm in diam., grey-brown in the centre, yellowish brown margin. Colonies hypophyllous. Mycelium internal; hyphae branched, 2–4 µm wide (\bar{x} = 3.33 µm, n = 5), septate, constricted at the septa, distance between septa 3–10 µm (\bar{x} = 5 µm, n = 5), subhyaline or hyaline, wall 0.3–0.5 µm wide (\bar{x} = 0.4 µm, n = 5), smooth. Stromata well-developed, substomatal, subglobular, 10–22 µm wide (\bar{x} = 16.7 µm, n = 5), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 5–11 µm wide (\bar{x} = 7.8 µm, n = 18), dark brown, wall 0.5–0.8 µm wide (\bar{x} = 0.6 µm, n = 18), smooth. Conidiophores solitary or fasciculate, arising from stromata (2–12 per fascicle), erect, straight or curved, simple or occasionally branched, geniculate, 7–35 × 3–5 µm (\bar{x} = 39.4 × 4.21 µm, n = 9), 0–6-septate, distance between septa 6–13 µm (\bar{x} = 10.3 µm, n = 30), pale to moderately olivaceous-brown, paler and narrower towards the apex, wall 0.3–0.5 µm wide (\bar{x} = 0.45 µm, n = 30), smooth. Conidiogenous cells integrated, 6–13 × 2.5–5 µm (\bar{x} = 9.63 × 3.44 µm, n = 5), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, 13–69 × 3–4 µm (\bar{x} = 64.5 × 3.27 µm, n = 18), 1–5-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide (\bar{x} = 0.34 µm, n = 18), smooth, obtuse at the apex, with long obconically truncate base.

Known hosts – *Kalopanax septemlobus* (Thunb. ex A. Murr.) Koidz., *Polyscias balfouriana* (André) L.H. Bailey, *P. fruticosa* (L.) Harms, *P. fulva* (Hiern) Harms, *P. guilfoylei* (W. Bull) L.H. Bailey, *P. pinnata* J.R. Forst. & G. Forst., *Polyscias* sp. (Araliaceae).

Known distribution – **Africa:** Mauritius, Sierra Leone; **Asia:** Brunei, Cambodia, India, Indonesia, Papua New Guinea, Thailand; **South America:** Venezuela; **Oceania:** New Caledonia.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Polyscias balfouriana*

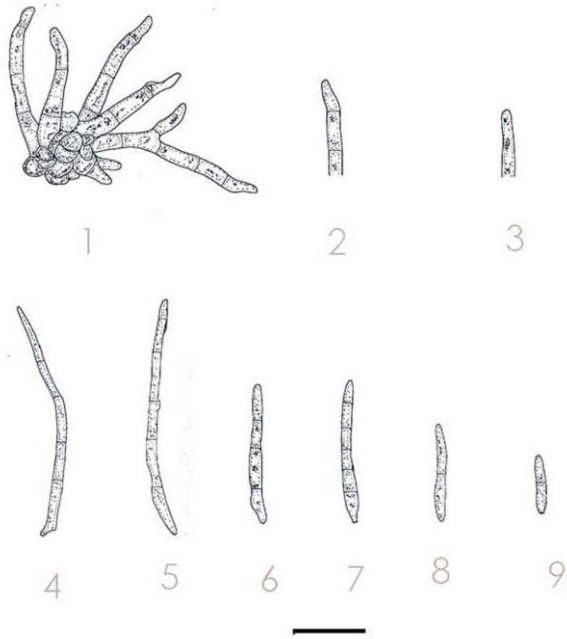


Fig. 84 – *Pseudocercospora panacis* on *Polyscias balfouriana* on host leaf: 1. Stroma with attached conidiophores. 2–3. Conidiophore. 4–9. Conidia. Bars: 1–9 = 10 μ m.



Fig. 85 – *Pseudocercospora panacis* on *Polyscias balfouriana* on host leaf: 1. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Stroma with attached conidiophores. 5. Conidiophore. 6–11. Conidia. Bars: 1–2 = 10 mm, 3. Not to scale. 4–11 = 10 μ m.

(Araliaceae), 16 January 2010, P. Phengsintham (MFLU10-0322).

Notes – The collection from Sri Pangsang Village, Chiang Rai province agrees well with the description of *P. panacis* in Braun (2003) who described, illustrated and discussed *P. panacis* and *P. polysciatis* (S.H. Sun) J.M. Yen in detail. The latter species is easily distinguishable from *P. panacis* by its very long (up to about 100 μ m), frequently branched appendages, sometimes decumbent, developing into superficial hyphae.

Literature – Chupp (1954: 64); Hsieh & Goh (1990: 357); Guo & Hsieh (1995: 24); Guo et al. (1998: 38); Braun (2003: 90–92); Crous & Braun (2003: 305).

Pseudocercospora puderi Deighton, Mycol. Pap. 140: 90, 1976. Figs 86–87.

= *Cercospora puderi* B.H. Davis, Mycologia 30: 291, 1938.

Leaf spots subcircular to irregular, 2–10 mm diam., at first yellowish, later becoming brown in the center, brown to yellowish brown at the margin. Colonies hypophyllous, scattered. Mycelium internal and external hyphae; internal hyphae branched, 2–3 μ m wide (\bar{x} = 2.25 μ m, n = 7), septate, constricted at the septa, distance between septa 7–10 μ m (\bar{x} = 8.5 μ m, n = 5), brownish, subhyaline, wall 0.3–0.5 μ m wide (\bar{x} = 0.4 μ m, n = 7), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations; external hyphae branched, 1.5–2 μ m wide (\bar{x} = 1.76 μ m, n = 4), septate, constricted at the septa, distance between septa 5–10 μ m (\bar{x} = 7 μ m, n = 4), brownish, subhyaline, wall 0.3–0.5 μ m wide (\bar{x} = 0.43 μ m, n = 4), smooth. Stromata oval to ellipsoidal, 20–36 μ m diam. (\bar{x} = 28.7 μ m, n = 3), brown to dark brown, stromatal cells oval, ellipsoidal and angular, 3–6 μ m wide (\bar{x} = 4.2 μ m, n = 13), dark brown, wall 0.5–0.8 μ m wide (\bar{x} = 0.54 μ m, n = 13), smooth. Conidiophores fasciculate, arising from stromata (4–15 per fascicle), unbranched, not geniculate, 4–7 \times 2–3 μ m (\bar{x} = 5.5 \times 2.75 μ m, n = 15), 0–1-septate, slightly constricted at the septa, distance between septa 4–7 μ m long (\bar{x} = 4.75 μ m, n = 16), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.5–

0.8 μm (\bar{x} = 0.55 μm , n = 15), smooth. Conidiogenous cells terminal, 4–7 \times 2–3 μm (\bar{x} = 4.75 \times 2.5 μm , n = 9), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 12–50 \times 1–2 μm (\bar{x} = 32.66 \times 1.55 μm , n = 9), 1–5-septate, pale olivaceous-brown, wall 0.3–0.5 μm wide (\bar{x} = 0.34 μm , n = 9), smooth, tip subacute, base obconically truncate, hila 0.7–1.5 μm wide (\bar{x} = 1.22 μm , n = 9).

Known hosts – *Rosa centifolia* L., *R. davurica* Pall., *R. involucrata* Roxb. ex Lindl., *R. multiflora* Thunb., *R. odorata* (Andrews) Sweet, *Rosa* sp. (Rosaceae).

Known distribution – **Africa:** Mauritius, Sierra Leone, **Asia:** Cambodia, China, Hong Kong, India, Korea, Malaysia, Papua New Guinea, Philippines, Sabah, Thailand; **Europe:** Cyprus, Netherlands; **North America and West Indies:** Cuba, Dominican Republ., Haiti, Jamaica, Mexico, USA (FL, GA, TX); **South America:** Venezuela.

Material examined – Chiang Rai Province, Muang District, Bandu Village, on leaves of *Rosa* sp. (Rosaceae), 24 August 2010, P. Phengsintham (P622).

Notes – The collection from Thailand differs from the description of *P. puderi* (= *Cercospora puderi*) in Chupp (1954) [conidiophores 10–30 \times 2.5–4 μm , and conidia 20–75 \times 2–3.5 μm] and Ellis (1976) [conidiophores 15–16 \times 2–4 μm and conidia 30–80 \times 2–3.5 μm] in having shorter conidiophores.

Literature – Chupp (1954: 484); Ellis (1976: 283); Guo & Hsieh (1995: 282); Crous & Braun (2003: 341).

Pseudocercospora punicae (Henn.) Deighton, Mycol. Pap. 140: 151, 1976. Figs 88–89.

≡ *Cercospora punicae* Henn., Bot. Jahrb. Syst. 37: 165, 1906.

Leaf spots subcircular to irregular, 1–4 mm diam., at first brown, dingy grey to pale tan, brown to dark brown at the margin. Colonies amphigenous, conspicuous. Mycelium internal and external; internal hyphae branched, 2–3 μm wide (\bar{x} = 2.2 μm), septate, constricted at the septa, distance between septa 6–10 μm (\bar{x} = 8.8 μm), brownish or subhyaline, wall 0.3–0.5 μm wide (\bar{x} = 0.34 μm), smooth, forming

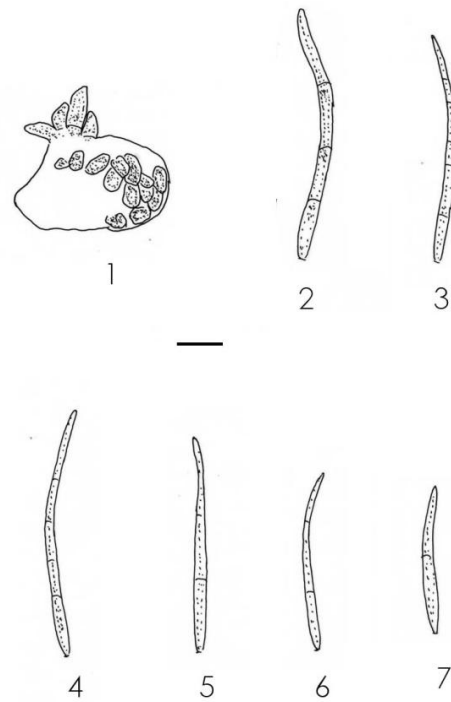


Fig. 86 – *Pseudocercospora puderi* on *Rosa* sp. from leaf spots: 1. Stroma with attached conidiophores. 2–7. Conidia. Bars: 1–7 = 10 μm .

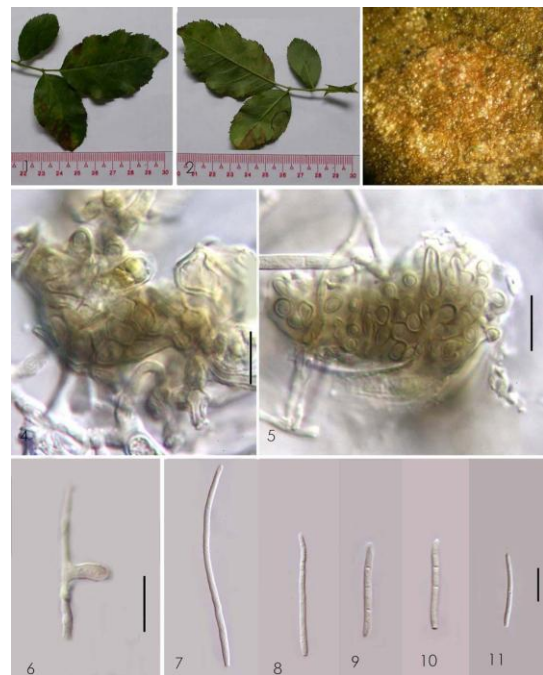


Fig. 87 – *Pseudocercospora puderi* on *Rosa* sp. from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4–5. Stromata with attached conidiophores. 6. External mycelium with attached conidiophore. 7–11. Conidia. Bars: 1–2 = 10 mm, 3. Not to scale. 4–11 = 10 μm .

plate-like plectenchymatous stromatic hyphal aggregations; external hyphae branched, 2–4 μm wide (\bar{x} = 3 μm), septate, constricted at the septa, distance between septa 4–8 μm (\bar{x} = 4.7 μm), brownish or subhyaline, wall 0.3–0.5 μm wide (\bar{x} = 0.43 μm), smooth. Stromata oval to ellipsoidal, 10–35 μm diam. (\bar{x} = 22.5 μm), brown to dark brown, stroma cells oval, ellipsoidal to angular, 3–9 μm wide (\bar{x} = 6.3 μm), dark brown, wall 0.3–0.5 μm wide (\bar{x} = 0.45 μm), smooth. Conidiophores fasciculate or solitary, arising from stromata (4–40 per fascicle) and external mycelium, geniculate, branched, 7–22 \times 3–4 μm (\bar{x} = 13.8 \times 3.28 μm), 0–1-septate, slightly constricted at the septa, distance between septa 5–17 μm long (\bar{x} = 8.33 μm), uniformly pale to medium brown, paler and narrower towards the tip, wall 0.3–0.5 μm (\bar{x} = 0.48 μm), smooth. Conidiogenous cells integrated, terminal, 7–17 \times 3–4 μm (\bar{x} = 10 \times 3.11 μm), apex obtuse; conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 42–72 \times 2–4 μm (\bar{x} = 54.23 \times 2.46 μm), 2–6-septate, pale olivaceous-brown, wall 0.3–0.5 μm wide (\bar{x} = 0.36 μm), smooth, tip subacute, base obconically truncate, hila 1.5–2 μm wide (\bar{x} = 1.55 μm).

Colonies on PDA after 3 weeks at 25°C grey to dark grey, reaching 16–18 mm diam., hyphae 2–9 μm wide (\bar{x} = 5 μm), septate, constricted at the septa, distance between septa 5–26 μm (\bar{x} = 11.37 μm), brownish or subhyaline, wall 0.3–1 μm wide (\bar{x} = 0.61 μm), smooth. Conidia not formed in culture.

Known hosts – *Punica granatum* L. (Lythraceae).

Known distribution – **Africa:** Egypt, Ethiopia, Kenya, Maldives, Mauritius, Mozambique, Sudan, Tanzania, Uganda, Zambia; **Asia:** Afghanistan, Cambodia, China, Hong Kong, India, Indonesia, Iran, Japan, Laos, Malaysia, Nepal, Pakistan, Philippines, Saudi Arabia, Singapore, Taiwan, Thailand; **Europe (Caucasus):** Azerbaijan, Georgia; **North America and West Indies:** Cuba, Dominican Rep., Guatemala, Jamaica, Panama, Puerto Rico, USA (FL, HI, TX), Virgin Islands; **South America:** Brazil, Colombia, Venezuela.

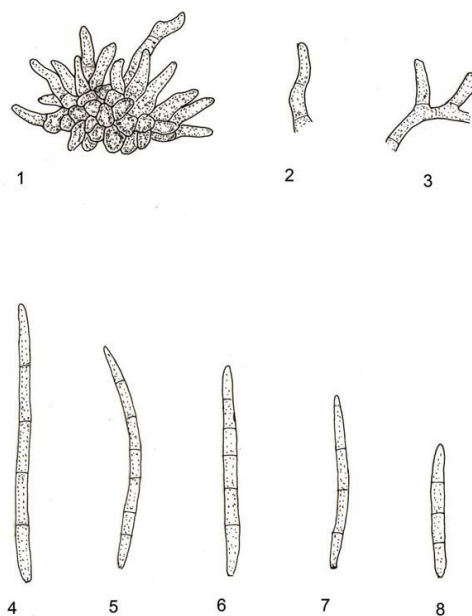


Fig. 88 – *Pseudocercospora punicae* on *Punica granatum*: 1. Stroma with attached conidiophores. 2. Conidiophore. 3. External hypha with attached conidiophores. 4–8. Conidia. Bars: = 10 μm .

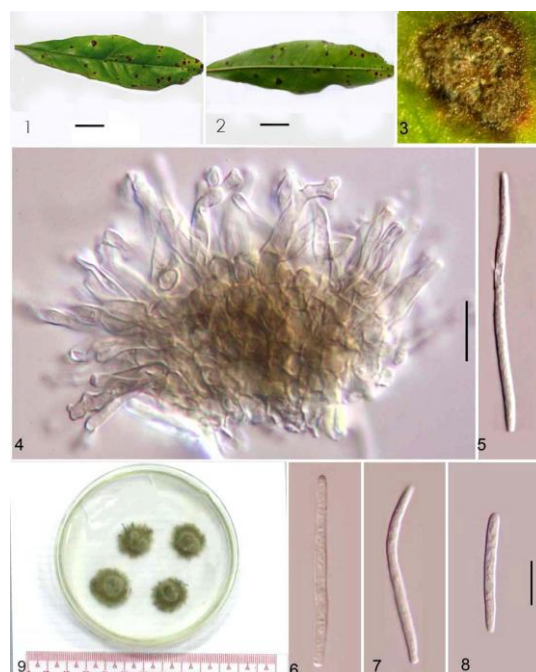


Fig. 89 – *Pseudocercospora punicae* on *Punica granatum* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Stromata with attached conidiophores. 5–8. Conidia. 9. Culture. Bars: 1, 2, 9 = 10 mm. 4–8 = 10 μm .

Material examined – Chiang Rai Province, Muang District, Ban Du Village, on leaves of *Punica granatum* (Lythraceae), 1 July 2010, P. Phengsintham (MFLU10-0323). Culture = MFLUCC 11-0284, GenBank accession no JN107998.

Notes – The collection from Thailand differs from *Pseudocercospora punicae* as described by Hsieh & Goh (1990) in having geniculate conidiophores.

Literature – Saccardo (1913: 1418); Chupp (1954: 573); Hsieh & Goh (1990: 271); Guo & Hsieh (1995: 258); Crous & Braun (2003: 344).

Pseudocercospora radermachericola Phengsintham, McKenzie, K.D. Hyde & U. Braun, *Mycosphere* 1(3): 209, 2010. Figs 90–91.

Leaf spots subcircular to irregular, 1–6 mm diam., at first brown-violet, reddish brown in the centre, brown to dark brown at the margin. Colonies amphigenous, conspicuous. Mycelium internal; hyphae branched, 2–3 μm wide (\bar{x} = 2.66 μm , n = 7), septate, constricted at the septa, distance between septa 5–9 μm (\bar{x} = 6.66 μm , n = 7), brownish, subhyaline, wall 0.3–0.5 μm wide (\bar{x} = 0.36 μm , n = 7), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 8–44 μm diam. (\bar{x} = 22.35 μm , n = 6), brown to dark brown, stroma cells oval, ellipsoidal to angular, 3–6 μm wide (\bar{x} = 4.8 μm , n = 10), dark brown, wall 0.5–0.8 μm wide (\bar{x} = 0.65 μm , n = 10), smooth. Conidiophores fasciculate, arising from stromata (2–46 per fascicle), geniculate, unbranched, 9–26 \times 3–5 μm (\bar{x} = 16.94 \times 3.67 μm , n = 9), 0–2-septate, slightly constricted at the septa, distance between septa 3–25 μm (\bar{x} = 10.16 μm , n = 15), uniformly pale to medium brown or paler and narrower towards the tip, wall 0.3–0.5 μm (\bar{x} = 0.48 μm , n = 15), smooth. Conidiogenous cells terminal, 6–25 \times 2–3 μm (\bar{x} = 13.52 \times 2.49 μm , n = 12), apex obtuse; conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 29–38 \times 2–3 μm (\bar{x} = 32.79 \times 2.22 μm , n = 15), 0–3-septate, pale olivaceous-brown, wall 0.3–0.5 μm wide (\bar{x} = 0.36 μm , n = 15), smooth, tip subacute, base obconically truncate, hila 1–2 μm wide (\bar{x} = 1.18 μm , n = 15).

Colonies on PDA after 3 weeks at 25°C dark-grey, reaching 4–7 mm diam., hyphae 2–6 μm wide (\bar{x} = 4.75 μm , n = 10), septate, constricted at the septa, distance between septa 9–16 μm (\bar{x} = 12.75 μm , n = 10), brownish or subhyaline, wall 0.3–0.8 μm wide (\bar{x} = 0.52 μm , n = 10), smooth. Conidia not formed in culture.

Known host – *Radermachera ignea* (Kurz) Steenis (Bignoniaceae).

Known distribution – **Asia:** Thailand.

Material examined: Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Radermachera ignea* (Bignoniaceae), 12 August 2010, P. Phengsintham (MFLU10-0406, holotype).

Notes – *Cercospora radermacheae* Boedijn (Boedijn, 1961) was described from Indonesia on *Radermachera glandulosa* (as “*glandulata*”). Braun (2001) re-examined type material of this species assigned it to *Pseudocercospora* and published a description and illustration. *P. radermacheae* is quite distinct from the new species on *Radermachera ignea* by its long (25–80 \times 2–4 μm), pluriseptate, densely fasciculate, often almost synnematos conidiophores and longer conidia, 30–70 \times 2–4 μm . *Radermachera ignea* is not closely allied to *R. glandulosa*. In the “Flora of China” (Wu & Robens, 1988), the accepted name of this species is *Mayodendron igneum*.

Literatures – Boedijn (1961: 411–436); Wu & Robens (1988); Braun (2001: 419–436).

Pseudocercospora riachueli var. ***horiana*** (Togashi & Katsuki) U. Braun & Crous, in Crous & Braun, *CBS Biodiversity Series* 1: 354, 2003. Figs 92–93.

≡ *Cercospora horiana* Togashi & Katsuki, *Sci. Rep. Yokohama Natl. Univ., Sect. 2, Biol. Sci.*, 1: 4, 1952.

= *Pseudocercospora cissi* Bagyan., U. Braun & Jagad., *Mycotaxon* 45: 106, 1992.

= *Pseudocercospora ampelocissi* P.N. Singh, *in herb.*

Leaf spots circular to irregular, 1–5 mm in diam., brown to grey-brown in the center, and dark brown margin. Colonies amphigenous, scattered. Mycelium internal and external; internal hyphae branched, 2–4 μm wide (\bar{x} = 2.8 μm , n = 5), septate, constricted

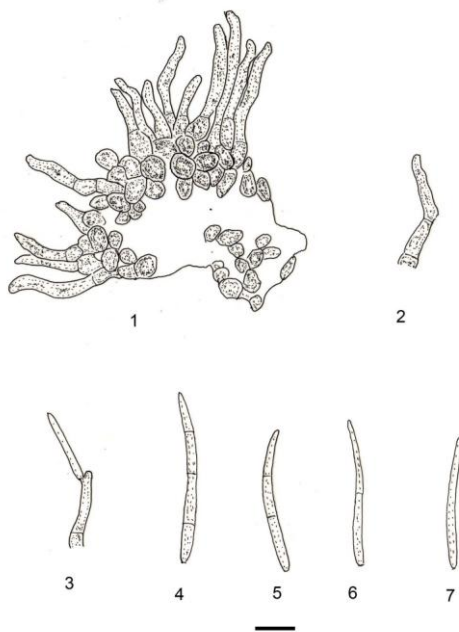


Fig. 90 – *Pseudocercospora radermachericola* on *Radermachera ignea*: 1. Stroma with attached conidiophores. 2. Conidiophore. 3. Conidiophore with attached young conidium. 4–7. Conidia. Bars: = 10 μ m.



Fig. 91 – *Pseudocercospora radermachericola* on *Radermachera ignea* from leaf spots: 1, 2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Stroma with attached conidiophores. 5–6. Conidiophores. 7–10. Conidia. 11. Culture. Bars: 1–2, 11 = 10 mm. 4–10 = 10 μ m.

at the septa, distance between septa 6–15 μ m (\bar{x} = 9.2 μ m, n = 5), subhyaline or hyaline, wall 0.3–0.5 μ m wide (\bar{x} = 0.46 μ m, n = 5), smooth; external hyphae branched, 2–3 μ m wide (\bar{x} = 2.5 μ m, n = 7), septate, constricted at the septa, distance between septa 8–10 μ m (\bar{x} = 9 μ m, n = 7), subhyaline or hyaline, wall 0.3–0.5 μ m wide (\bar{x} = 0.4 μ m, n = 7), smooth. Stromata well-developed, substomatal, subglobular, 20–50 μ m wide (\bar{x} = 30 μ m, n = 4), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 2–3 μ m wide (\bar{x} = 2.7 μ m, n = 15), dark brown, wall 0.5–0.8 μ m wide (\bar{x} = 0.55 μ m, n = 15), smooth. Conidiophores fasciculate, arising from stromata (8–45 per fascicle), erect, straight or curved, unbranched, 10–17 \times 2–4 μ m (\bar{x} = 14.7 \times 2.86 μ m, n = 13), 0–1-septate, distance between septa 6–17 μ m (\bar{x} = 11.6 μ m, n = 15), pale to moderately olivaceous-brown, paler and narrower towards the apex, wall 0.5–0.8 μ m wide (\bar{x} = 0.58 μ m, n = 15), smooth. Conidiogenous cells integrated, 10–17 \times 2–4 μ m (\bar{x} = 14 \times 2.8 μ m, n = 5), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, 21–67 \times 1.5–3 μ m (\bar{x} = 50.71 \times 1.85 μ m, n = 13), 3–9-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 μ m wide (\bar{x} = 0.36 μ m, n = 13), smooth, obtuse at the apex, with long obconically truncate base.

Known Hosts – *Ampelocissus latifolia* (Roxb.) Planch., *Cissus* sp., *Parthenocissus tricuspidata* (Siebold & Zucc.) Planch., *Vitis vinifera* L. (Vitaceae).

Distribution – **Asia**: India, Japan and Thailand.

Material examined – Chiang Rai Province, Muang District, Ban Du Village, on leaves of *Vitis vinifera*, 24 August 2010, P. Phengsintham (P632).

Notes – *P. riachueli* var. *horiana* differs from var. *riachueli* in forming superficial hyphae. The collection from Thailand agrees well with *P. riachueli* except for narrower conidia. *Vitis vinifera* is a new host for *P. riachueli* var. *horiana*.

Literature – Crous & Braun (2003: 354).

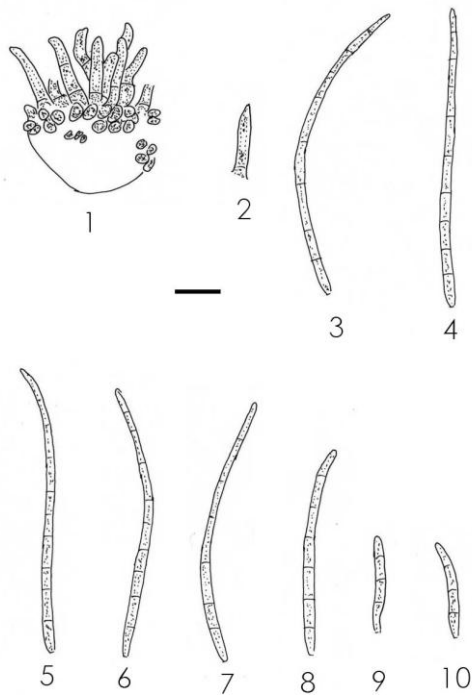


Fig. 92 – *Pseudocercospora riachueli* var. *horiana* on *Vitis vinifera* from leaf spots: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–10. Conidia. Bar = 10 μ m.

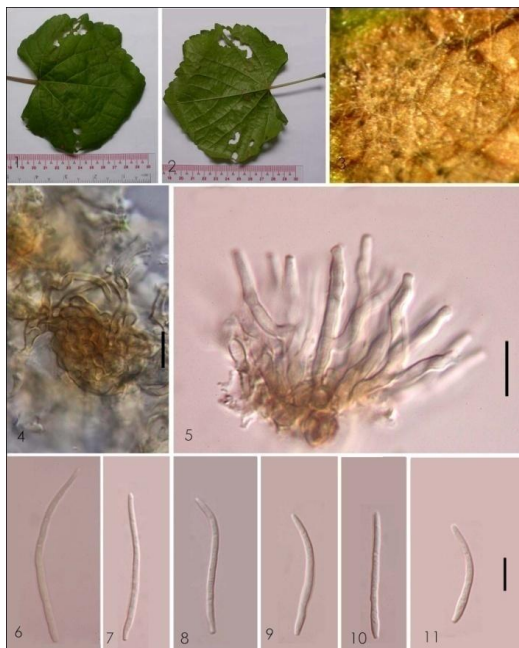


Fig. 93 – *Pseudocercospora riachueli* var. *horiana* on *Vitis vinifera* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Stroma. 5. Stroma with attached conidiophores. 6–11. Conidia. Bars 1–2 = 10 mm, 4–11 = 10 μ m.

Pseudocercospora scopariicola (J.M. Yen)
Deighton, Mycol. Pap. 140: 152, 1976.

Figs 94–95.

\equiv *Cercospora scopariicola* J.M. Yen,
Bull. Trimestriel Soc. Mycol. France 84: 11,
1968.

Leaf spots circular, 2–6 mm in diam., yellow to grey-yellow in the center, and yellowish green margin. Colonies amphigenous, but chiefly hypophyllous. Mycelium internal, inconspicuous. Stromata well-developed, substomatal, subglobular, 10–22 μ m wide (\bar{x} = 16.7 μ m, n = 6), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 3–6 μ m wide (\bar{x} = 4.4 μ m, n = 30), dark brown, wall 0.5–0.8 μ m wide (\bar{x} = 0.52 μ m, n = 30), smooth. Conidiophores fasciculate, arising from stromata (2–14 per fascicle), erect, straight or curved, unbranched, geniculate, 13–34 \times 3–4 μ m (\bar{x} = 20 \times 3.33 μ m, n = 12), 0–3-septate, distance between septa 5–20 μ m (\bar{x} = 11.8 μ m, n = 30), pale to moderately olivaceous-brown, paler and narrower towards the apex, wall 0.5–0.8 μ m wide (\bar{x} = 0.58 μ m, n = 30), smooth. Conidiogenous cells integrated, 10–19 \times 2–4 μ m (\bar{x} = 14.3 \times 3.11 μ m, n = 9), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, 13–85 \times 1.5–3 μ m (\bar{x} = 55.42 \times 2.35 μ m, n = 7), 0–7-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 μ m wide (\bar{x} = 0.39 μ m, n = 7), smooth, obtuse at the apex, with long obconically truncate base, 1–2 μ m wide (\bar{x} = 1.71 μ m, n = 7).

Known hosts – *Scoparia dulcis* L.,
Vernonia sp. (Plantagiaceae).

Known distribution – **Asia**: China,
India, Laos, Taiwan, Thailand.

Material examined – Chiang Rai
Province, Muang District, Sri Pangsang
Village, on leaves of *Scoparia dulcis* (Plantagi-
naceae), 11 June 2011, P. Phengsintham
(P642).

Notes – The collection from Thailand
differs from the description of *P. scopariicola*
published by Guo & Hsieh (1995) [conidio-
phores 10–50 \times 3–5.5 μ m and conidia 45–170
 \times 3–4 μ m] in having a shorter of conidiophores
and conidia.

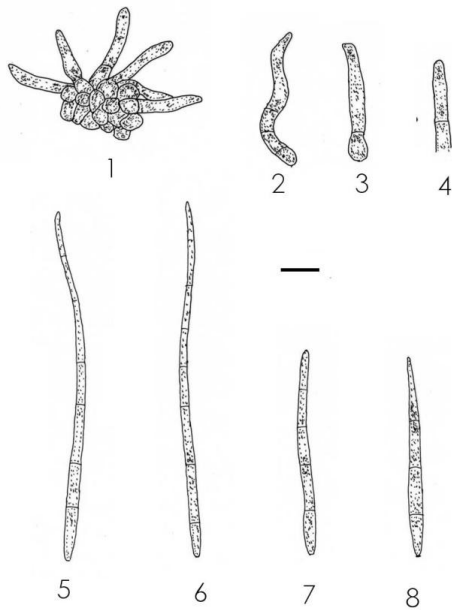


Fig. 94 – *Pseudocercospora scopariicola* on *Scoparia dulcis* from leaf spots: 1. Stroma with attached conidiophores. 3–4. Conidiophores. 6–9. Conidia. Bars: 1–8 = 10 µm.

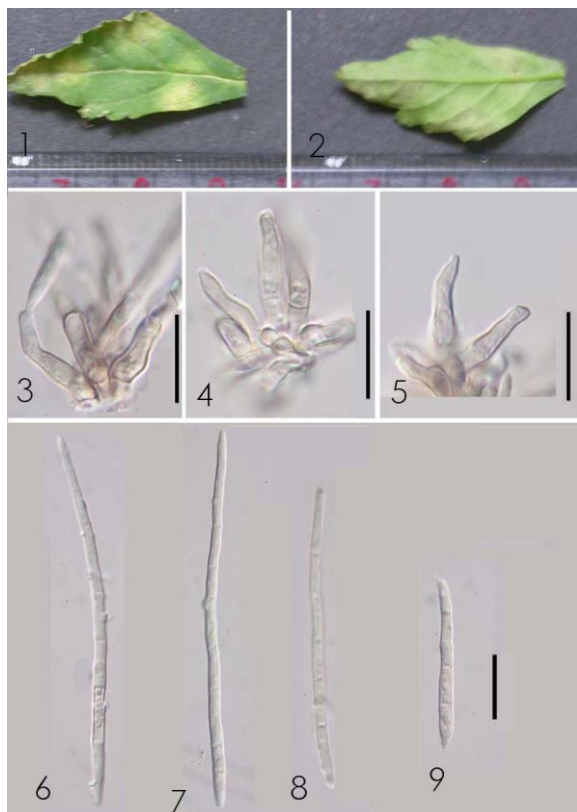


Fig. 95 – *Pseudocercospora scopariicola* on *Scoparia dulcis* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3–5. Stromata with attached conidiophores. 6–9. Conidia. Bars: 1–2 = 10 mm. 3–9 = 10 µm.

Literature – Yen & Lim (1980: 185); Hsieh & Goh (1990: 309); Guo & Hsieh (1995: 311); Crous & Braun (2003: 370).

Pseudocercospora timorensis (Cooke) Deighton, Mycol. Pap. 140: 154, 1976.

Figs 96–97.

≡ *Cercospora timorensis* Cooke, Grevillea 12: 38, 1883.

= *Ramularia batatas* Racib., Paras. Algen Pilze Javas, Batavia I: 35, 1900.

= *Cercospora batatae* Zimm., Ber. Land. Forstw. Deutsch Ostafrikas 2: 28, 1904.

= *Cercospora batatae* Henn., Bot. Syst. 38: 118, 1907.

= *Cercospora ipomoeae-purpureae* J.M. Yen, Rev. Mycol. 30: 173, 1965.

≡ *Pseudocercospora ipomoeae-purpureae* (J.M. Yen) J.M. Yen, in Yen and Lim, Gard. Bull. Singapore 33: 177, 1980.

Leaf spots circular, 2–8 mm in diam., brown to dark brown in the center, and dark brown margin. Colonies amphigenous, but chiefly hypophyllous. Mycelium internal; hyphae branched, 2–4 µm wide (\bar{x} = 2.8 µm, n = 5), septate, constricted at the septa, distance between septa 8–11 µm (\bar{x} = 9 µm, n = 5), subhyaline or hyaline, wall 0.5–0.8 µm wide (\bar{x} = 0.56 µm, n = 5), smooth. Stromata well-developed, substomatal, subglobose, 8–26 µm wide (\bar{x} = 16 µm, n = 5), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 5–8 µm wide (\bar{x} = 6.2 µm, n = 30), dark brown, wall 0.5–1 µm wide (\bar{x} = 0.72 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (2–7 per fascicle), erect, straight or curved, unbranched, geniculate, 11–45 × 2–6 µm (\bar{x} = 22.6 × 4 µm, n = 8), 0–3-septate, distance between septa 7–14 µm (\bar{x} = 10.8 µm, n = 15), pale to moderately olivaceous-brown, paler and narrower towards the apex, wall 0.5–0.8 µm wide (\bar{x} = 0.65 µm, n = 15), smooth. Conidiogenous cells integrated, 7–14 × 3–4 µm (\bar{x} = 11.9 × 3.75 µm, n = 8), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, 30–77 × 3–4 µm (\bar{x} = 57 × 3.5 µm, n = 12), 3–8-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide (\bar{x} = 0.48 µm, n = 12),

smooth, obtuse at the apex, with long obconically truncate base.

Colonies on PDA after 3 weeks at 25°C grey in the center and dark brown margin, surface ridged and smooth, 6–10 mm diam.

Known hosts – *Calystegia* sp., *Ipomoea acuminata* (Vahl) Roem. & Schultes, *I. asarifolia* (Desr.) Roem., *I. batatas* (L.) Poir, *I. biloba* Forssk, *I. campanulata* L., *I. purpurea* (L.) Roth., *I. reptans* Forsk., *I. setifera* Poir, *Ipomoea* sp., *Operculina* sp. (Convolvulaceae).

Known distribution – **Africa:** Gabon, Ghana, Mauritius, Sierra Leone, South Africa, Sudan, Tanzania, Uganda; **Asia:** Bangladesh, Brunei, China, Hong Kong, India, Indonesia, Japan, Laos, Malaysia, Nepal, Papua New Guinea, Philippines, Singapore, Taiwan, Thailand; **North America and West Indies:** Panama, Trinidad and Tobago; **Oceania:** Fiji, Kiribati, Micronesia, Palau, Samoa, Solomon Islands, St. Lucia, Tonga, Vanuatu; **South America:** Brazil, Ecuador, Venezuela.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Operculina* sp. (Convolvulaceae), 15 September 2009, P. Phengsintham (P455). GenBank accession no (LSU, KC677937).

Notes – The collection from Thailand agrees well with the descriptions of *Pseudocercospora timorensis* in Chupp (1954), Ellis (1976), Hsieh & Goh (1990) and Guo & Hsieh (1995).

Literature – Chupp (1954: 173); Ellis (1976: 253); Hsieh & Goh (1990: 91); Guo & Hsieh (1995: 75); Crous & Braun (2003: 404).

Pseudocercospora tremicola (J.M. Yen) Deighton [as ‘*trematicola*’], Mycol. Pap. 140: 154, 1976. Figs 98–99.

≡ *Cercospora tremicola* J.M. Yen, Bull. Trimestiel Soc. Mycol. France 86: 752, (1970) 1971.

= *Cercospora tremae-guineensis* J.M. Yen & Gilles (as ‘*trematis-guineensis*’), Bull. Trimestiel Soc. Mycol. France 90: 322, (1974) 1975.

≡ *Pseudocercospora tremae-guineensis* (J.M. Yen & Gilles) J.M. Yen, Bull. Trimestiel Soc. Mycol. France 94: 283, (1978) 1979.

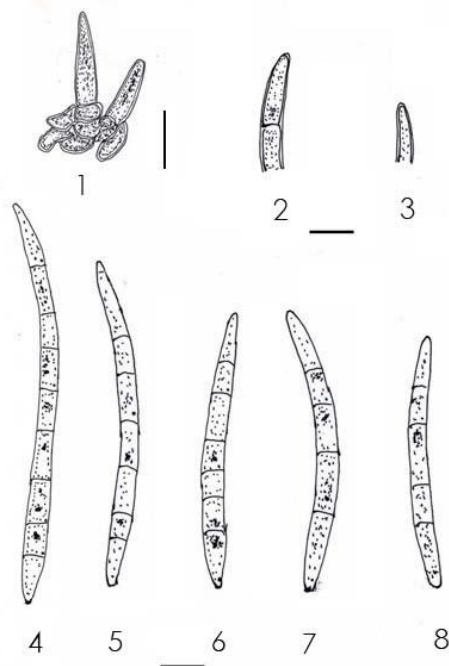


Fig. 96 – *Pseudocercospora timorensis* on *Operculina* sp. from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–8. Conidia. Bars: 1–8 = 10 µm.



Fig. 97 – *Pseudocercospora timorensis* on *Operculina* sp. from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Internal hyphae. 5. Stroma with attached conidiophores. 6. Conidiophore. 7–9. Conidia. Bars: 1–2 = 10 mm. 3. Not to scale. 4–9 = 10 µm.

Leaf spots circular to irregular, 2–5 mm in diam., brown in the center, and dark brown margin. Colonies amphigenous, but chiefly hypophyllous. Mycelium internal, inconspicuous and external; external hyphae branched, 3–4 μm wide (\bar{x} = 3.6 μm , n = 7), septate, constricted at the septa, distance between septa 10–17 μm (\bar{x} = 14 μm , n = 7), subhyaline or hyaline, wall 0.5–0.8 μm wide (\bar{x} = 0.7 μm , n = 7), smooth. Stromata lacking or very small, composed of 2–3 stromatic cells. Conidiophores solitary or fasciculate, arising from stromata (2–3 per fascicle) and arising from external hyphae, erect, straight or curved, unbranched, 30–110 \times 3–4 μm (\bar{x} = 81.3 \times 3.75 μm , n = 13), 3–6-septate, distance between septa 12–18 μm (\bar{x} = 15.3 μm , n = 30), pale to moderately olivaceous-brown, paler and narrower towards the apex, wall 0.5–0.8 μm wide (\bar{x} = 0.55 μm , n = 30), smooth. Conidiogenous cells integrated, 12–17 \times 3–5 μm (\bar{x} = 14.7 \times 0.67 μm , n = 10), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, 44–80 \times 3–5 μm (\bar{x} = 64 \times 4.1 μm , n = 30), 3–8-septate, slightly constricted at the septa, pale olivaceous, wall 0.5–0.8 μm wide (\bar{x} = 0.53 μm , n = 30), smooth, obtuse at the apex, with long obconically truncate base, hilum unthickened, not darkened.

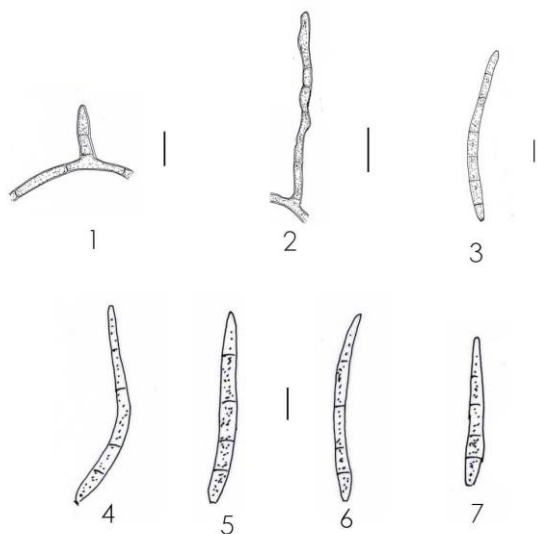


Fig. 98 – *Pseudocercospora tremicola* on *Trema orientalis*: 1–2. External hyphae with attached conidiophores. 3–7. Conidia. Bar: 1–7 = 10 μm .



Fig. 99 – *Pseudocercospora tremicola* on *Trema orientalis* from leaf spots: 1–2. Leaf spots on host leaves (1. upper surface, 2. lower surface). 3. Colonies. 4. Internal hyphae with attached conidiophore. 5–8. Conidia. Bars: 1–2 = 10 mm. 3. Not to scale. 4–8 = 10 μm .

Known hosts – *Trema cannabina* Lour., *T. guineensis* (Schum. & Thonn.) Ficalho, *T. orientalis* (L.) Blume, *T. politoria* (Planch.) Blume (Cannabaceae).

Known distribution – **Africa:** Gabon, Ghana, Ivory Coast, Sierra Leone; **Asia:** India, Laos, Singapore, Taiwan, Thailand.

Material examined – Chiang Rai Province, Tasud Muang District, Sri Pangsang Village, on leaves of *Trema orientalis* (Cannabaceae), 25 January 2010, P. Phengsintham (MFLU10 0288).

Notes – In the Thailand collection the conidiophores are 30–110 \times 3–4 μm and the conidia are 44–80 \times 4–5 μm , which is similar to those reported in Ellis (1971) and Hsieh & Goh (1990) [conidiophores 25–55 \times 3.5–5.5 μm , conidia 20–90 \times 4–5 μm]. *Pseudocercospora tremae-orientalis* (S.H. Sun) Deighton is distinguished from *P. tremicola* by forming stromata, 30–35 μm diam., and fasciculate conidiophores. Superficial mycelium with solitary conidiophores is lacking (Hsieh & Goh 1990).

Literature – Deighton (1979: 9); Hsieh & Goh (1990: 333); Guo & Hsieh (1995: 334); Guo et al. (1998: 400); Crous & Braun (2003: 408).

Zasmidium cassiicola (S. Mishra, A.K. Srivast. & Kamal) Kamal, Cercosporoid Fungi of India: 239, 2010. Figs 100–101.

≡ *Stenella cassiicola* S. Mishra, A.K. Srivast. & Kamal, Mycol. Res. 103: 268, 1999.

Leaf spots variable, more or less irregularly orbicular, 1–8 mm diam., typically deep brown. Colonies hypophyllous, conspicuous. Mycelium external; hyphae branched, 2–4 μm wide (\bar{x} = 3.2 μm , n = 9), septate, constricted at the septa, distance between septa 8–30 μm (\bar{x} = 18.56 μm , n = 9), pale olivaceous-brown, thin-walled 0.3–0.5 μm wide (\bar{x} = 0.41 μm , n = 9), verruculose. Stromata absent. Conidiophores borne on external mycelial hyphae, unbranched, cylindrical, 30–117 \times 3–4 μm (\bar{x} = 65.9 \times 3.17 μm , n = 18), 3–8-septate, distance between septa 7–25 μm (\bar{x} = 15.8 μm , n = 30), mid pale golden brown, wall 0.5–0.8 μm (\bar{x} = 0.48 μm , n = 30), smooth. Conidiogenous cells integrated, terminal or intercalary, 7–20 \times 2–4 μm (\bar{x} = 13 \times 2.63 μm , n = 8), cylindrical, swollen and curved at the apex; conidiogenous loci formed as minute, dark or refractive scars on lateral and terminal denticles, 1–2 μm diam. (\bar{x} = 1.4 μm , n = 7), giving rise to branched conidial chains, wall 0.3–0.5 μm wide (\bar{x} = 0.4 μm , n = 7), thickened, darkened. Conidia solitary or catenate, sometimes ellipsoidal-ovoid or subcylindrical, but mostly slightly obclavate, straight or slightly curved or sinuous, 11–70 \times 2–4 μm (\bar{x} = 34.16 \times 2.9 μm , n = 24), 1–5-septate, pale olivaceous, wall 0.3–0.5 μm wide (\bar{x} = 0.33 μm , n = 24), smooth or finely verruculose; apex rounded or subtruncate, 1–1.5 μm wide, wall 0.3–0.5 μm wide; base short tapered at the base to the hilum, 1–2 μm wide (\bar{x} = 1.3 μm , n = 9), wall 0.3–0.5 μm wide (\bar{x} = 0.41 μm , n = 9), thickened and darkened.

Colonies on PDA after 3 weeks at 25°C with spreading mycelium, surface ridged, black and wavy in the centre and grey margin, reaching 5–15 mm diam.; hyphae often constricted at the septa, distance between septa

6–16 \times 3–5 μm (\bar{x} = 10.5 \times 3.6 μm , n = 30), thin-walled, 0.3–0.5 μm wide (\bar{x} = 0.45 μm , n = 30), hyaline, smooth or verruculose; conidia not formed in culture.

Known host – *Cassia fistula* L. (Fabaceae).

Known distribution – Asia: India, Thailand.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Cassia fistula* (Fabaceae), 16 January 2010, P. Phengsintham (MFLU10-0324).

Notes – The collection from Thailand agrees well with the Indian *Zasmidium cassiicola* (Braun et al., 2006; Mishra et al., 1999). This is the first record outside India.

Zasmidium cassiae-fistulae (Mishra et al., (1999) is a similar species but differs in forming its conidia consistently singly (Braun et al., 2006).

Literature – Mishra et al. (1999); Braun et al. (2006).

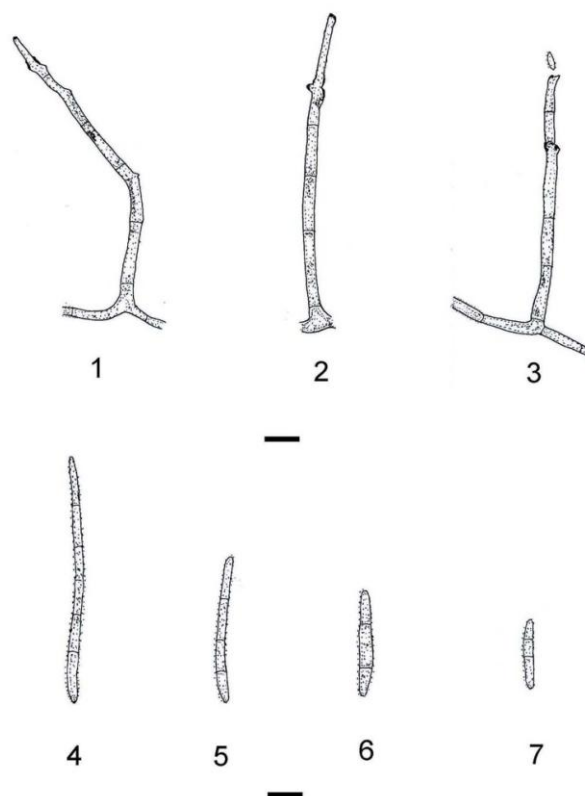


Fig. 100 – *Zasmidium cassiicola* on *Cassia fistula*: 1–3. External mycelia with attached conidiophore. 4–7. Conidia. Bars = 10 μm .



Fig. 101 – *Zasmidium cassicola* on *Cassia fistula* from leaf spot: 1–2 Leaf spots on host leaves (1. upper surface, 2. lower surface). 3–6. Conidiophores. 7. Apex with attached conidium. 8. External mycelium. 9–11. Conidia. 12. Living culture. Bars: 1–2 = 10 mm, 3–11 = 10 μ m.

Additional list of cercosporoid fungi

Cercospora alocasiae Goh & W.H. Hsieh, Trans. Mycol. Soc. Republ. China 2: 86–87, 1987.

Material examined – Chiang Rai Province, Maechan District, Doitung National Park, Fallow forest, on leaves of *Alocasia macrorrhiza* (L.) G. Don (Araceae), 8 August 2009, P. Phengsintham (P427).

Cercospora begoniae Nori, Lecture on plant diseases (Shokubutsu Bybai Kowa), 2: 181, 1916.

Material examined – Chiang Rai Province, Houay Kangpa National Park, on leaves of *Begonia inflata* C.B. Clarke (Begoniaceae), 20 November 2009, P. Phengsintham (P468).

Cercospora bidentis Tharp. Mycologia 9: 108, 1917.

Material examined – Chiang Rai

Province, Meuang District, Sri Pangxang Village, Fallow forest, on leaves of *Bidens pilosa* L. (Asteraceae), 18 August 2009, P. Phengsintham (P436).

Cercospora brassicicola Henn., Bot. Jahrb. Syst. 37: 166, 1905.

Material examined – Chiang Rai Province, Doi Tung National Park, on leaves of *Brassica integrifolia* (H. West) Rupr. (Brassicaceae), 4 December 2009, P. Phengsintham (P482).

Cercospora capsicigena Bhartiya, Dubey & S.K. Singh, Indian Phytopathol. 5(3): 149, 2000.

Material examined – Chiang Mai Province, Maeteng District, Phadeng Village, on leaves of *Capsicum annum* L. (Solanaceae), 17 July 2007, P. Phengsintham (P289).

Cercospora cocciniae Munjal, Lall & Chona, Indian Phytopathol. 12: 86, 1959.

Material examined – Chiang Rai Province, Sri Pangsang Village, on leaves of *Coccinia indica* Wight & Arn. (Cucurbitaceae), 4 August 2009, P. Phengsintham (P408).

Cercospora duranticola Phengsintham, Chukeatirote, McKenzie, K.D. Hyde & U. Braun, Current Research in Environmental & Applied Mycology 3(1): 59, 2013.

Material examined – Chiang Rai Province, Meuang District, Sri Pangsang Village, Urban area, on leaves of *Duranta repens* L. (Verbenaceae), 17 August 2009, P. Phengsintham (P435).

Cercospora erechitidis G.F. Atk., J. Elisha Mitch. Sci. Soc. 8: 66, 1892.

Material examined – Chiang Rai Province, Wiangpapao, on leaves of *Erechtites valerianifolius* (Link ex Spreng.) DC. (Asteraceae), 28 May 2008, P. Phengsintham (P312).

Cercospora ipomoeae G. Winter, Hedwingia 26: 34, 1887.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, Rice paddy, on leaves of *Ipomoea*

aquatica Forssk. (Convolvulaceae), 29 August 2010, P. Phengsintham (P627).

***Cercospora* sp.**

Material examined – Chiang Rai Province, Doi Tung National Park, Fallow forest, on leaves of *Oroxylum indicum* (L.) Kurz (Bignoniaceae), 22 August 2009, P. Phengsintham (P438).

Cercospora physalidis Ellis, Amer. Naturalist 16: 810, 1882.

Material examined – Chiang Rai Province, Tadsack Waterfall, on leaves of *Physalis angulata* L. (Solanaceae), 3 May 2006, P. Phengsintham (P443).

Cercospora zinniae Ellis & G. Martin, J. Mycol. 1: 20, 1885.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Zinnia elegans* Jacq. (Asteraceae), 15 September 2009, P. Phengsintham (P453).

Passalora aenea (Cif.) U. Braun & Crous, in Crous and Braun, *Mycosphaerella* and its anamorphs: 1. Names published in *Cercospora* and *Passalora*. CBS Biodiversity Series 1: 46, 2003.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang village, on leaves of *Senna siamea* (Lam.) H.S. Irwin & Barneby (Fabaceae), 9 January 2010, P. Phengsintham (P518).

Passalora bougainvilleae (Munt.-Cvetk.) R.F. Castañeda & U. Braun, Cryptog. Bot. 2: 291, 1991.

Material examined – Chiang Rai Province, Doi Tung National Park, Village area, on leaves of *Bougainvillea spectabilis* Willd. (Nyctaginaceae), 8 August 2009, P. Phengsintham (P342).

Passalora henningsii (Allesch.) R.F. Castañeda & U. Braun, Cryptog. Bot. 1(1): 46, 1989.

Material examined – Chiang Rai Province, Doi Tung National Park, Village area, on leaves of *Manihot utilissima* Pohl (Euphorbiaceae), September 2009, P.

Phengsintham (P445).

Passalora perfoliati (Ellis & Everh) U. Braun & Crous, in Crous and Braun, *Mycosphaerella* and its anamorphs: 1. Names published in *Cercospora* and *Passalora*. CBS Biodiversity Series 1: 46, 2003.

Material examined – Chiang Mai, Maeteng District, Phadeng Village, Fallow forest, on leaves of *Chromolaena* sp. (Asteraceae), 17 July 2007, P. Phengsintham (P114); Chiang Rai, Muang District, Sri Pangsang Village, Fallow forest, on leaves of *Chromolaena* sp. (Asteraceae), 28 May 2008, P. Phengsintham (P214).

Pseudocercospora catappae (Henn.) X.J. Liu & Y.L. Guo, Mycosystema 2: 230, 1989.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Terminalia tomentosa* Wight & Arn. (Combretaceae), 20 November 2010, P. Phengsintham (P653).

Pseudocercospora centrosematicola (J.M. Yen & G. Lim) J.M. Yen, Gard. Bull., Singapore 33: 171, 1980.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Centrosema pubescens* Benth. (Fabaceae), 20 November 2010, P. Phengsintham (P654).

Pseudocercospora cotizensis (A.S. Mull. & Chupp) Deighton, Mycol. Pap. 140: 142, 1976.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, Village area, on leaves of *C. uncinella* subsp. *elliptica* (Roxb.) Polhill. (Fabaceae), 31 August 2010, P. Phengsintham (P629).

Pseudocercospora duabangae M.D. Mehrotra & R.K. Verma. Mycol. Res. 95 (10): 1163–1168, 1991.

Material examined – Chiang Rai Province, Khounkon water fall, on leaves of *Duabanga grandiflora* (Roxb. ex DC.) Walp. (Lythraceae), 18 December 2009, P. Phengsintham (MFLU10 0287).

Pseudocercospora eupatorii-formosani U. Braun & Bagyan., Sydowia 51: 8, 1999.

Material examined – Chiang Rai Province, Sri Pangsang Village, Village area, on leaves of *Chromolaena odorata* (L.) R.M. King & H. Rob. (Asteraceae), 16 January 2010, P. Phengsintham (P527).

Pseudocercospora fuligena (Roldan) Deighton, Mycol. Pap. 140: 144, 1976.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, Garden, on leaves of *Lycopersicon esculentum* Mill. (Solanaceae), 3 June 2010, P. Phengsintham (P578).

Pseudocercospora getoniae Phengsintham, Chukeatirote, McKenzie, K.D. Hyde & U. Braun, Current Research in Environmental & Applied Mycology 3(1): 105, 2013.

Material examined – Chiang Rai Province, Tadsack Water Fall, on leaves of *Getonia floribunda* Roxb. (= *Calycopteris floribunda* (Roxb.) Lam. ex Poir.) (Combretaceae), 27 August 2009, P. Phengsintham (444).

Pseudocercospora jussiaeae (G.F. Atk.) Deighton, Mycol. Pap. 140: 146, 1976.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Ludwigia prostrata* Roxb. (Onagraceae), 20 November 2011, P. Phengsintham (P656).

Pseudocercospora lythracearum (Heald & F.A. Wolf) X.J. Liu & Y.L. Guo, Acta Mycol. Sin. 11: 294, 1992.

Material examined – Chiang Rai Province, Muang District, Ban Sri Pangsang Village, on leaves of *Lagerstroemia macrocarpa* Wall. (Lythraceae), 4 August 2010, P. Phengsintham (P611).

Pseudocercospora musae (Zimm.) Deighton, Mycol. Pap. 140: 148, 1976.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, *Musa paradisiaca* L. (Musaceae), 15 January 2010, P. Phengsintham (P520).

Pseudocercospora paraguayensis (Tak. Kobay.) Crous, Mycotaxon 57: 270, 1996.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Eucalyptus* sp. (Myrtaceae), 16 January 2010, P. Phengsintham (P530).

Pseudocercospora puerariicola (W. Yamam.) Deighton, Mycol. Pap. 140: 151, 1976.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Pueraria phaseoloides* (Roxb.) Benth. (Fabaceae), 20 November 2011, P. Phengsintham (P567).

Pseudocercospora sphaerellae-eugeniae (Sacc.) Crous, Alfenas & R.W. Barreto, Mycotaxon 64: 425, 1997.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Syzygium cuminii* (L.) Skeels (Myrtaceae), 20 November 2011, P. Phengsintham (P658).

Pseudocercospora stahlii (F. Stevens) Deighton, Mycol. Pap. 140: 82, 1976.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Passiflora foetida* L. (Passifloraceae), 11 September 2009, P. Phengsintham (P452).

Pseudocercospora stizolobii (Syd. & P. Syd.) Deighton, Mycol. Pap. 140: 153, 1976.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Mucuna pruriens* (L.) DC. (Fabaceae), 20 November 2011, P. Phengsintham (P655).

Pseudocercospora trichophila (F. Stevens) Deighton var. *punctata* U. Braun & Urtega, Mycosphere 3(3): 322, 2012.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Solanum* sp. (Solanaceae), 22 August 2009, P. Phengsintham (440).

Pseudocercospora wrightiae (Thurum. & Chupp) Deighton, Mycol. Pap. 140: 156, 1976.

Material examined – Chiang Rai Province, Muang District, Sri Pangsang Village, on leaves of *Wrightia pubescens*

Blume (Apocynaceae), 23 December 2009, P. Phengsintham (P496).

Zasmidium suregadae Phengsintham, K.D. Hyde & U. Braun, Cryptog. Mycol. 30(3): 258, 2009.

Material examined – Chiang Mai Province, Maeteng District, Phadeng Village, Fallow forest, on leaves of *Suregada multiflora* (A. Juss.) Baill. (Euphorbiaceae), 12 August 2011, P. Phengsintham (P640).

Cladosporium colocasiae Sawada, Trans. Nat. Hist. Soc. Taiwan 25: 125, 1916.

Material examined – Chiang Mai Province, Maeteng District, on leaves of *Colocasia esculenta* (L.) Schott (Araceae), 17 July 2007, P. Phengsintham (P285); Chiang Rai Province, Meachan District, Doi Tung National Park, on leaves of *Colocasia esculenta* (L.) Schott (Araceae), 4 December 2009, P. Phengsintham (P483).

Acknowledgements

The authors would like to thank the Mushroom Research Foundation (MRF) for financial support. Special thanks go to the MRF organizers and members of Prof. K.D. Hyde's laboratory, Mae Fah Luang University (MFU) for their assistance. The authors would like also thank to Prof. Dr. Cai Lei, State Key Laboratory of Mycology, Institute of Microbiology, Chinese Academy of Sciences, Beijing 100101, P.R. China for support for molecular phylogeny studies.

References

Boedijn KB. 1961 – The genus *Cercospora* in Indonesia. *Nova Hedwigia* 3, 411–436.
 Braun U. 2001 – Revision of *Cercospora* species described by K.B. Boedijn. *Nova Hedwigia* 73(3–4), 419–436.
 Braun U. 2003 – Miscellaneous notes on some cercosporoid hyphomycetes. *Bibliotheca Lichenologica* 86, 79–98.
 Braun U, Crous PW, Kamal 2006 – New species of *Pseudocercospora*, *Pseudocercospora*, *Ramularia* and *Stenella* (cercosporoid hyphomycetes). *Mycological Progress* 2, 197–208.

Choi YW, Hyde KD, Ho WH. 1999 – Single spore isolation of fungi. *Fungal Diversity* 3, 29–38.

Chupp C. 1954 – A Monograph of the Fungus Genus *Cercospora*. Ithaca, New York. Published by the author.

Crous PW, Braun U. 2003 – *Mycosphaerella* and its anamorphs: Names published in *Cercospora* and *Passalora*. CBS Biodiversity Series 1. CBS Utrecht, The Netherlands.

Deighton FC. 1967 – Studies on *Cercospora* and allied genera. II. *Passalora*, *Cercosporidium*, and some species of *Fusicladium* on *Euphorbia*. *Mycological Papers* 112, 1–80.

Deighton FC. 1971 – Studies on *Cercospora* and allied genera. III. *Centrospora*. *Mycological Papers* 124, 1–13.

Deighton FC. 1973 – Studies on *Cercospora* and allied genera. IV. *Cercosporiella* Sacc., *Pseudocercospora* gen. nov. and *Pseudocercosporidium* gen. nov. *Mycological Papers* 133, 1–62.

Deighton FC. 1976 – Studies on *Cercospora* and allied genera. VI. *Pseudocercospora* Speg., *Pantospora* Cif., and *Cercoseptoria* Petr. *Mycological Papers* 140, 1–168.

Deighton FC. 1979 – Studies on *Cercospora* and allied genera. VII. New species and redispositions. *Mycological Papers* 144, 1–56.

Deighton FC. 1987 – New species of *Pseudocercospora* and *Mycovellosiella*, and new combination into *Pseudocercospora* and *Phaeoramularia*. *Transactions of the British Mycological Society* 88, 365–391.

Ellis MB. 1971 – Dematiaceous hyphomycetes. Commonwealth Mycological Institute Kew, Surrey, England.

Ellis MB. 1976 – More dematiaceous hyphomycetes. Commonwealth Mycological Institute Kew, Surrey, England.

Giattong P. 1980 – Host index of plant disease of Thailand. Mycology Section. Plant Pathology and Microbiology Division. Department of Agriculture, Bangkok, Thailand.

Groenewald JZ, Nakashima C, Nishikawa J, Shin HD, Park JH, Jama AN,

- Groenewald M, Braun U, Crous PW. 2012 – Species concepts in *Cercospora*: spotting the weeds among the roses. *Studies in Mycology* 75, 115–170.
- Guo YL, Liu XJ, Hsieh WH. 1998 – *Pseudocercospora*. *Flora Fungorum Sinicorum*. Vol. 9. Beijing, P.R. China.
- Guo YL, Hsieh WH. 1995 – The genus *Pseudocercospora* in China. *Mycosystema Monographicum Series* 2, 1–388.
- Hsieh WH, Goh TK. 1990 – *Cercospora* and Similar Fungi from Taiwan. Maw Chang Book Company, Taipei, Taiwan.
- Hywel-Jones NL. 2001 – A review of invertebrate pathogenic Cladicipitaceae of Thailand. BRT 2001 Research Report, Bangkok, 34–41.
- Hywel-Jones NL, Boonpratuang T. 2001 – An updated preliminary checklist of fungi recorded from Thailand. BIOTEC database.
- Jones EBG, Hyde KD. 2004 – Introduction to Thai fungal diversity. In *Thai Fungal Diversity*. BIOTEC, Thailand, 7–35.
- Kirschner R, Chen CJ. 2007 – Foliicolous hyphomycetes from Taiwan. *Fungal Diversity* 26, 219–237.
- Meeboon J. 2009 – Diversity and phylogeny of true cercosporoid fungi from northern Thailand. Ph.D. Thesis, Chiang Mai University, Thailand (Unpublished).
- Meeboon J, Hidayat I, To-anun C. 2007 – Annotated list of cercosporoid fungi in northern Thailand. *Journal of Agricultural Technology* 3, 51–63.
- Meeboon J, Hidayat I, To-anun C, Nakashima C. 2008 – Cercosporoid fungi from Thailand II. New species of *Cercospora* and *Passalora*. *Sydowia* 60(2), 253–260.
- Mishra S, Srivastava KK, Kamal 1999 – Further additions to *Stenella* from India and Nepal. *Mycological Research* 103, 268–270.
- Nakashima C, Motohashi K, Meeboon J, To-anun C. 2007 – Studies on *Cercospora* and allied genera in northern Thailand. *Fungal Diversity* 26, 257–270.
- Petcharat V, Kajanamaneesathian M. 1989 – Species of plant pathogenic *Cercospora* in Southern Thailand. *Thai Phytopathology* 9, 23–27.
- Pons N, Sutton BC. 1988 – *Cercospora* and similar fungi on yams (*Dioscorea* species). *Mycological Papers* 160, 1–78.
- Prihastuti H, Cai L, Chen H, McKenzie EHC, Hyde KD. 2009 – Characterization of *Colletotrichum* species associated with coffee berries in Northern Thailand. *Fungal Diversity* 39, 89–109.
- Raška I, Koberna K, Malínský J, Fidlerová H, Mašata M. 2004 – The nucleolus and transcription of ribosomal genes. *Biology of the Cell* 96, 579–594.
- Rostrup E. 1902 – Fungi. In *flora of Koh Chang*. *Botanik Tidsskrift* 24, 355–367.
- Saccardo PA. 1902 – *Sylloge Fungorum omnium hucusque cognitorum*, Vol. 16. Padova.
- Saccardo PA. 1913 – *Sylloge Fungorum omnium hucusque cognitorum*, Vol. 22. Padova.
- Saccardo PA. 1931 – *Sylloge Fungorum omnium hucusque cognitorum*, Vol. 25. Avellino.
- Saccardo PA. 1972 – *Sylloge Fungorum omnium hucusque cognitorum*, Vol. 26 (Trotter, A. ed., published by Cash, K.), Johnson Reprint Corporation, New York, London.
- Shin HD, Kim JD. 2001 – *Cercospora* and allied genera from Korea. *Plant Pathogens from Korea* 7, 1–302.
- Shirouzu T, Hirose D, Fukasawa Y, Tokumasu S. 2009 – Fungal succession associated with the decay of leaves of an evergreen oak, *Quercus myrsinaefolia*. *Fungal Diversity* 34, 87–109.
- Sontirat P, Pitakpraiwan P, Choonbamroong W, Kueprakone U. 1980 – Plant pathogenic cercosporoid in Thailand. Department of Agriculture, Ministry of Agriculture and Cooperative. Bangkok, Thailand.
- Tanticharoen M. 2004 – Introduction to Thai biodiversity. In *Thai Fungal Diversity*. BIOTEC, Thailand, 1–6.
- Than PP, Jeewon R, Hyde KD, Pongsupasamit S, Mongkolporn O, Taylor PWJ. 2008 – Characterization and pathogenicity of *Colletotrichum* species associated with

- anthracnose on chilli (*Capsicum* spp.) in Thailand, *Plant Pathology* 57, 562–572.
- To-anun C, Hidayat I, Meeboon J. 2011 – Genus *Cercospora* in Thailand: Taxonomy and phylogeny (with a dichotomous key to species). *Plant Pathology & Quarantine* 1(1), 11–87.
- To-anun C, Nguenhom J, Meeboon J, Hidayat I. 2009 – Two fungi associated with necrotic leaflets of areca palm (*Areca catechu*). *Mycological Progress* 8, 115–121.
- Vasudeva RS. 1963 – India *Cercosporae*. Indian Council of Agricultural Research. New Delhi.
- Wannathes N, Desjardin DE, Hyde KD, Perry BA, Lumyong S. 2009 – A monograph of *Marasmius* (Basidiomycota) from northern Thailand based on morphological and molecular (ITS sequences). *Fungal Diversity* 37, 209–306.
- Wu CY, Robens PH. 1988 – *Flora of China*, Vol. 18, Beijing.
- Xu L, Guo LT. 2003 – Studies on *Cercospora* and allied genera in China XIII. *Mycosystema* 22, 6–8.
- Yen JM, Lim G. 1980 – *Cercospora* and allied genera of Singapore and the Malay Peninsula. *Garden Bulletin Singapore* 33, 175–176.