Monograph of Cercosporoid fungi from Laos

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

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

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The Lao People's Democratic Republic (Lao PDR) or Laos is a landlocked country. During a study of cercosporoid fungi in Laos, 113 species were identified including 108 species of true cercosporoid fungi; *Cercospora* (41 species), *Passalora* (10), *Pseudocercospora* (49), and *Zasmidium* (8). Five species of morphological similar fungi we also found; *Cladosporium* (1 species), *Periconiella* (1), *Pseudocercosporella* (1), *Scolecostigmina* (1), and *Spiropes* (1). Sixteen new taxa were established namely, *Cercospora duranticola*, *C. senecionis-walkeri*, *Passalora dipterocarpi*, *P. helicteris-viscidae*, *Pseudocercospora getoniae*, *P. mannanorensis* var. *paucifasciculata*, *P. micromeli*, *P. tectoniae*, *P. wenlandiphila*, *Zasmidium aporosae*, *Z. dalbergiae*, *Z. jasminicola*, *Z. meynae-laxiflorae*, *Z. micromeli*, *Z. suregadae*, *Z. pavettae*. Eighty-seven species are described in full and illustrated, and another 26 species are only listed since they have been previously recorded from Laos.

Key words – Asia – *Cercospora* – Cercosporoid fungus – monograph

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*Corresponding author: Kevin D. Hyde – e-mail – kdhyde3@gmail.com

Introduction

The Lao People's Democratic Republic (Lao PDR) or Laos is a landlocked country with a total area of 236,800 km^2, much of which is forested and mountainous. The country is divided into seventeen provinces. With a population of about 6 million in 2011, the Lao PDR is the second least populated country in Association of South-East Asia Nations (ASEAN) with the lowest population density of about 25 persons per square kilometer (Laos 2011).

Lao PDR is considered to be globally important for biodiversity conservation due to its relatively high forest cover and high diversity of flora and fauna. Approximately 41.5 % of Lao PDR is covered with forest which contains an estimated 8,000–11,000 species of flowering plants. The country's fauna includes 166 reported species of reptiles and amphibians, at least 700 bird species, 90 known species of bats and at least 100 species of large mammals (MAF and STEA 2003), but only 201 fungal species (Phengsintham et al. 2012).

The fungi of Laos are poorly known, although they have been studied since 1959. Vidal (1959), a French botanist, published a checklist of plant species of Laos which included 33 species of Lao fungi. Almost all names of fungi are local names, but include some scientific names. Overseas collaboration was carried with the Mushroom Research Centre, Papae, Chiang Mai, Thailand and School of Science, Mae Fah Luang University (MFU), Chiang Rai, Thailand and other institutions to document macro- and microfungi. Phengsintham & Hyde (2003a) prepared a list of 60 fungi from Laos, and published on 20 ascomycetes on palms (Phengsintham & Hyde 2003b). Fungi from Laos were updated to include 201 species (Phengsintham et al. 2012).

Sample collection

Leaves of plants with leaf spots or other lesions were collected during the course of field trips in Laos. Photos of symptoms, including the fungal colonies or fruit bodies were taken. The specimens were collected from 12 provinces (Fig. 1).

Fig. 1 – Collection sites. 1 Louang Namtha 2 Bokeo 3 Oudomxay 4 Loungprabang 5 Sayabouri 6 Huaphanh 7 Xiangkhouang 8 Vientiane Province 9 Vientiane Capital 10 Bolikhamsay 11 Khammoune 12 Savannakhet

Examination of fungal structures

Macroscopic characters were observed using a stereoscope to check (1) lesions (shape, size, colour, margin), and (2) details of colonies/caespituli (e.g., amphigenous, epiphyllous, punctiform, postulate, inconspicuous, effuse, loose, dense, colour, etc.).

Microscopic examination, measurement, description, and presentation of drawings follow 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.

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:

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

Notes – m = is size of each components, n = is 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, intraepidermal; 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/verrucuose), conidiogenous cells (integrated, terminal/intercalary; length, shape, e.g., cylindrical/geniculate/sinuous), conidiogenous loci [scars] (shape, size, thickened, darkened/pigmented or unthickend 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) for classification of *Cercospora* and morphologically similar cercosporoid genera was followed. The species of cercosporoid hyphomycetes 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

Conidia were picked directly from the substrate using fine forceps or a needle. The conidia 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 were pipetted onto the centre of the agar plate and this was carefully shaken to spread the suspension. The plates were incubated at 25^{o}C for 12–24 hours. Once the conidia had germinated, a sterilised glass needle was used to pick up a small piece of agar containing a spore. If the conidia did not germinate after 12 hours, then the plates were sealed with film and examined periodically. Ten germinated spores are transferred and distributed evenly onto two PDA plate and incubated at 25^{o}C until their colony diameters were about 1 to 2 cm. A small piece of mycelium with agar was then cut out and transferred to a fresh PDA plate.

Isolates of single spores were deposited in the culture collection at Herbarium, Biology Department, School of Science, Mae Fah Luang University, Biotech Center, Bangkok and CBS.

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. Duplicates are preserved in the herbarium of the Institute of Biology, Geobotany and Botanical Garden, Halle (Saale), Germany (HAL).

Results

By integrating the morphological and molecular characters, 113 cercosporoid species were identified including 108 species of true cercosporoid fungi *Cercospora* (41 species), *Passalora* (10), *Pseudocercospora* (49), *Zasmidium* (8) and five species of morphological similar fungi *Cladosporium* (1 species), *Periconiela* (1), *Pseudocercosporella* (1), *Scolecostigmina* (1), *Spirops* (1). Sixteen new taxa are described: *Cercospora duranticola, C. senecionis-walkeri, Passalora dipterocarpi, P. helicteris-viscidae, Pseudocercospora getoniae, P. mannanorensis* var. *paucifasciculata, P. micromeli, P. tectoniae, P. wendlandiphila, Zasmidium aporosae, Z. dalbergiae, Z. jasminicola, Z. meynae-laxiflorae, Z. micromeli, Z. suregadae, Z. pavettae.*

Eighty-seven species are described in full and illustrated, and another 26 species are only listed because they have been previously recorded from Laos (Table 1).

Key to true cercosporoid genera

This key contains only the true cercosporoid genera discussed and treated in this work (Crous & Braun 2003). The key to identify species, alphabetically arranged by host families, are based on models of Chupp (1954), Ellis (1971, 1976), Deighton (1967, 1973, 1976, 1979), 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*

Table 1 Cercosporoid fungi found in Laos

Ser#	Fungus	Hosts	Host family	Laos
I. True cercosporoid fungi				
1	*Cercospora achyranthis*	*Achyranthes aspera*	Amaranthaceae	New record
2	*Cercospora alocasiae*	*Alocasia macrorrhiza*	Araceae	New record
3	*Cercospora apii*	*Byttneria andamensis*	Malvaceae	New record, new host
4	*Cercospora artemisiae*	*Artemisia caudata*	Asteraceae	New record
5	*Cercospora asparagi*	*Asparagus officinalis*	Asparagaceae	New record
6	*Cercospora begoniae*	*Begonia inflata*	Begoniaceae	New record
7	*Cercospora bidentis*	*Bidens pilosa*	Asteraceae	New record
8	*Cercospora brassicicola*	*Brassica integrifolia*	Brassicaceae	New record
9	*Cercospora cannabis*	*Cannabis sativa*	Cannabaceae	New record
10	*Cercospora capsicigena*	*Capsicum annuum*	Solanaceae	New record
11	*Cercospora cocciniae*	*Coccinia grandis*	Cucurbitaceae	New record
12	*Cercospora duranticola*	*Duranta repens*	Verbenaceae	**New species**
13	*Cercospora erechtitis*	*Erechtites valerianifolius*	Asteraceae	New record
14	*Cercospora hyptidicola*	*Hyptis suaveolens*	Lamiaceae	New record
15	*Cercospora ipomoeae*	*Ipomoea involucrata, I. aquatica*	Convolvulaceae	New record
16	*Cercospora meliicola*	*Chukrasia tabularis*	Meliaceae	New record
17	*Cercospora nasturtii*	*Nasturtium officinale*	Brassicaceae	New record
18	*Cercospora nicotianae*	*Nicotiana tabacum*	Solanaceae	New record
19	*Cercospora paederiicola*	*Paederia scandens*	Rubiaceae	New record
20	*Cercospora physalidis*	*Physalis angulata*	Solanaceae	New record
21	*Cercospra ricinella*	*Ricinus communis*	Euphorbiaceae	New record
22	*Cercospora senecionis-walkeri*	*Senecio walkeri*	Asteraceae	**New species**
23	*Cercospora* sp.	*Oroxylum indicum*	Bignoniaceae	New record
24	*Cercospora stahlianthi*	*Stahlianthus thorelii*	Zingiberaceae	New record
25	*Cercospora taccae*	*Tacca integrifolia*	Taccaceae	New record
26	*Cercospora trewiae*	*Trewia nudiflora*	Euphorbiaceae	New record
27	*Cercospora volkameriae*	*Clerodendrum schmidtii*	Lamiaceae	New record
28	*Cercospora zinniae*	*Zinnia elegans*	Asteraceae	New record
29	*Passalora aenea*	*Cassia siamea*	Fabaceae	New record
30	*Passalora bougainvilleae*	*Bougainvillea spectabilis*	Nyctaginaceae	New record
31	*Passalora capsicicola*	*Capsicum annuum*	Solanaceae	New record
32	*Passalora dipterocarpi*	*Dipterocarpus alatus*	Dipterocarpaceae	**New species**
33	*Passalora erytrinae*	*Erythrina stricta*	Fabaceae	New record
34	*Passalora haldinae*	*Haldina cordifolia*	Rubiaceae	New record
35	*Passalora helicteris-viscidae*	*Helicteres viscida*	Malvaceae	**New species**
36	*Passalora henningsii*	*Manihot esculenta*	Euphorbiaceae	New record
37	*Passalora perfoliati*	*Chromolaena* sp.	Asteraceae	New record
38	*Passalora tithoniae*	*Tithonia diversifolia*	Asteraceae	New record
39	*Pseudocercospora alangii*	*Alangium kurzii*	Cornaceae	New record
40	*Pseudocercospora baliospermi*	*Baliospermum montanum*	Euphorbiaceae	New record
41	*Pseudocercospora buddlejae*	*Buddleja asiatica*	Scrophulariaceae	New record
42	*Pseudocercospora catappae*	*Terminalia alata*	Combretaceae	New record
43	*Pseudocercospora cotizensis*	*Crotalaria uncinella* subsp. *elliptica*	Fabaceae	New record
44	*Pseudocercospora duabangae*	*Duabanga grandiflora*	Lythraceae	New record
45	*Pseudocercospora eupatorii–formasani*	*Chromolaena odorata*	Asteraceae	New record
46	*Pseudocercospora formasana*	*Lantana camara*	Verbenaceae	New record

Ser#	Fungus	Hosts	Host family	Laos
47	*Pseudocercospora fuligena*	*Lycopersicon esculentum*	Solanaceae	New record
48	*Pseudocercospora getoniae*	*Getonia floribunda*	Combretaceae	**New species**
49	*Pseudocercospora gmelinae*	*Gmelina arborea*	Lamiaceae	New record
50	*Pseudocercospora holarrhenae*	*Holarrhena curtisii*	Apocynaceae	New record
51	*Pseudocercospora jussiaeae*	*Ludwigia prostrata*	Onagraceae	New record
52	*Pseudocercospora lythracearum*	*Lagerstroemia macrocarpa*	Lythraceae	New record
53	*Pseudocercospora macarangae*	*Macaranga denticulate*	Euphorbiaceae	New record
54	*Pseudocercospora maesae*	*Maesa ramentacea*	Primulaceae	New record
55	*Pseudocercospora mannanorensis* var. *paucifasciculata*	*Microcos paniculata*	Tiliaceae	**New variety**
56	*Pseudocercospora melochiae*	*Melochia corchorifolia*	Malvaceae	New record
57	*Pseudocercospora micromeli*	*Micromelum hirsutum*	Rutaceae	**New species**
58	*Pseudocercospora musae*	*Musa paradisiaca*	Musaceae	
59	*Pseudocercospora nigricans*	*Cassia occidentalis*	Fabaceae	New record
60	*Pseudocercospora ocimicola*	*Ocimum tenuiflorum*	Lamiaceae	New record
61	*Pseudocercospora paraguayensis*	*Eucalyptus* sp.	Myrtaceae	New record
62	*Pseudocercospora piperis*	*Piper lolot*	Piperaceae	New record
63	*Pseudocercospora polygonicola*	*Polygonum pulchrum*	Polygonaceae	New record
64	*Pseudocercospora puerariicola*	*Pueraria phaseoloides*	Fabaceae	New record
65	*Pseudocercospora sphaerellae-eugeniae*	*Syzygium cumini*	Myrtaceae	New record
66	*Pseudocercospora stahlii*	*Passiflora foetida*	Passifloraceae	New record
67	*Pseudocercospora stizolobii*	*Vigna unguiculata* subsp. *unguiculata*	Fabaceae	New record
68	*Pseudocercospora tabernaemontanae*	*Tabernaemontana coronaria*	Apocynaceae	New record
69	*Pseudocercospora tectonae*	*Tectona grandis*	Verbenaceae	**New species**
70	*Pseudocercospora tetramelis*	*Tetrameles nudiflora*	Tetramelaceae	New record
71	*Pseudocercospora tiliacorae*	*Tiliacora triandra*	Menispermaceae	New record
72	*Pseudocercospora trichophila* var. *punctata*	*Solonum undatum*	Solanaceae	New record
73	*Pseudocercospora wendlandiphila*	*Weldlandia thorelii*	Rubiaceae	**New species**
74	*Pseudocercospora wrightiae*	*Wrightia pubescens*	Apocynaceae	New record
75	*Zasmidium aporosae*	*Aporosa villosa*	Euphorbiaceae	**New species**
76	*Zasmidium dalbergiae*	*Dalbergia cultrata*	Leguminosae	**New species**
77	*Zasmidium jasminicola*	*Jasminum undulatum*	Oleaceae	**New species**
78	*Zasmidium meynae-laxiflorae*	*Meyna pubescens*	Rubiaceae	**Comb.nov.**
79	*Zasmidium micromeli*	*Micromelum hirsutum*	Rutaceae	**New species**
80	*Zasmidium pavettae*	*Pavetta indica*	Rubiaceae	**New species**
81	*Zasmidium* sp.	*Spondias pinnata*	Anacardiaceae	**New species**

Ser#	Fungus	Hosts	Host family	Laos
82	*Zasmidium suregadae*	*Suregada multiflora*	Euphorbiaceae	**New species**
II. Morphological similar fungi				
83	*Cladosporium colocasiae*	*Colocasia esculenta*	Araceae	New record
84	*Periconiella lygodii*	*Lygodium polystachyum*	Lygodiaceae	New record
85	*Pseudocercosporella bakeri*	*Impomoea aquatica*	Convolvulaceae	New record
86	*Scolecostigmina mangiferae*	*Mangifera indica*	Anacardiaceae	New record
87	*Spiropes clavatus*	*Mangifera indica*	Anacardiaceae	New record
III Additional List				
88	*Cercospora canescens*	*Lablab purpureus* subsp. *bengalensis*	Fabaceae	New record
89	*Cercospora citrulina*	*Luffa cylindrica*	Cucurbitaceae	New record
90	*Cercospora coffeicola*	*Coffea arabica*	Rubiaceae	New record
91	*Cercospora crotalariae*	*Crotalaria uncinella* subsp. *elliptica*	Fabaceae	New record
92	*Cercospora diplaziicola*	*Diplazium esculentum*	Woodsiaceae	New record
93	*Cercospora erythrinicola*	*Erythrina stricta*	Fabaceae	New record
94	*Cercospora nilghirensis*	*Conyza bonariensis*	Asteraceae	New record
95	*Cercospora papayae*	*Carica papaya*	Caricaceae	New record
96	*Cercospora petersii*	*Smilax chinensis*	Smilacaceae	New record
97	*Cercospora sambuci*	*Sambucus* sp.	Caprifoliaceae	New record
98	*Cercospora scrophulariae*	*Scrophularia* sp.	Scrophulariaceae	New record
99	*Cercospora sonchi*	*Taraxacum officinale*	Asteraceae	New record
100	*Cercospora tridacis-procumbentis*	*Tridax procumbens*	Asteraceae	New record
101	*Pseudocercospora centrosematicola*	*Centrosema pubescens*	Fabaceae	New record
102	*Pseudocercospora cycleae*	*Cyclea peltata*	Menispermaceae	New record
103	*Pseudocercospora ecdysantherae*	*Ecdysanthera rosea*	Apocynaceae	New record
104	*Pseudocercospora giranensis*	*Glochidion eriocarpum*	Euphorbiaceae	New record
105	*Pseudocercospora ixorae*	*Ixora stricta*	Rubiaceae	New record
106	*Pseudocercospora malloticola*	*Mallotus thorelii*	Euphorbiaceae	New record
107	*Pseudocercospora namae*	*Hydrolea zeylanica*	Hydroleaceae	New record
108	*Pseudocercospora olacicola*	*Olax scandens*	Olacaceae	New record
109	*Pseudocercospora puderi*	*Rosa chinensis*	Rosaceae	New record
110	*Pseudocercospora punicae*	*Punica granatum*	Lythraceae	New record
111	*Pseudocercospora sarcocephali*	*Sarcocephalus cordatus*	Rubiaceae	New record
112	*Pseudocercospora scopariicola*	*Scoparia dulcis*	Plantanginaceae	New record
113	*Pseudocercospora tremicola*	*Trema orientalis*	Cannabaceae	New record

1. Condiogenous loci conspicuous i.e. thickened and darkened throughout only with a minute central pore.....2
2. With verruculose superficial secondary mycelium; conidia amero- to scolecosporous, mostly verruculose.....*Zasmidium*
2. If secondary mycelium present, hyphae smooth or almost so.....3
3. Conidia hyaline or subhyaline, scolecosporous, acicular, obclavate-cylindrical, filiform, usually pluriseptate.....*Cercospora*
3. Conidia pigmented or, if subhyaline, conidia none scolecosporous, ellipsoid-ovoid, short cylindrical, fusoid and only few septa.....*Passalora*

Genus *Cercospora*

Amaranthaceae
Single species, on *Achyranthes*.....*Cercospora achyranthis* (1)

Araceae
Single species, on *Alocasia*.....*Cercospora alocasiae* (2)

Asparagaceae
Single species, on *Asparagus*.....*Cercospora asparagi* (5)

Asteraceae = Compositae
On *Artemisia*; stromata 15–30 µm in diam.; conidiophores 34–85 × 4–5 µm, unbranched, geniculate; conidia 25–49 × 2–4 µm, 1–4-septate.....*Cercospora artemisiae* (4)
On *Bidens*; stromata 10–20 µm in diam.; conidiophores 25–117 × 4–7 µm, unbranched, geniculate; conidia 31–62 × 2–3 µm, 2–6-septate.....*Cercospora bidentis* (7)
On *Erechtites*; stromata 15–30 µm in diam.; conidiophores 4–35 × 5–8 µm, unbranched, geniculate; conidia 28–83 × 2–3 µm, 3–7-septate.....*Cercospora erechtitis* (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* (22)
On *Zinnia*; stromata 10–20 µm in diam.; conidiophores 32–95 × 4–6 µm, unbranched, geniculate; conidia 30–102 × 2–3 µm, 3–9-septate.....*Cercospora zinniae* (28)

Begoniaceae
Single species, on *Begonia*.....*Cercospora begoniae* (6)

Bignoniaceae
Single species, on *Oroxylum*.....*Cercospora* sp. (23)

Brassicaceae
On *Brassica*; stromata 10–30 µm in diam.; conidiophores 15–232 × 4–6 µm, unbranched, geniculate; conidia 30–288 × 1.5–5 µm, 2–20-septate.....*Cercospora brassicicola* (8)
On *Nasturtium*; stromata up to 15 µm in diam.; conidiophores 20–134 × 4–6 µm, unbranched, geniculate; conidia 22–75 × 3–4 µm, 1–7-septate.....*Cercospora nasturtii* (17)

Cannabaceae
Single species, on *Cannabis*….....*Cercospora cannabis* (9)

Convolvulaceae
Single species, on *Ipomoea*….....*Cercospora ipomoeae* (15)

Cucurbitaceae
Single species; on *Coccinia*.....*Cercospora cocciniae* (11)

Euphorbiaceae
On *Ricinus*; stromata 15–20 µm in diam.; conidiophores 15–105 × 4–6 µm, unbranched, geniculate; conidia 32–98 × 3–4 µm, 3–11-septate.....*Cercospora ricinella* (21)
On *Trewia*; stromata 10–72 µm in diam.; conidiophores 35–215 × 4–7 µm, unbranched, geniculate; conidia 74–135 × 3–5 µm, 4–11-septate.....*Cercospora trewiae* (26)

Lamiaceae
Single species, on *Hyptis*.....*Cercospora hyptidicola* (14)

Malvaceae
Single species, on *Byttneria*.....*Cercospora apii* (3)

Meliaceae
Single species, on *Chukrasia*.....*Cercospora meliicola* (16)

Rubiaceae
Single species, on *Paederia*.....*Cercospora paederiicola* (19)

Solanaceae
On *Capsicum*; stromata 10–30 µm in diam.; conidiophores 21–63 × 4–6 µm, unbranched, not geniculate; conidia 49–70 × 3–4 µm, 4–5-septate.....*Cercospora capsicigena* (10)
On *Nicotiana*; stromata 10–33 µm in diam.; conidiophores 20–395 × 4–7 µm, unbranched, geniculate; conidia 94–267 × 3–4 µm, 5–8-septae.....*Cercospora nicotianae* (18)
On *Physalis*; stromata 15–32 µm in diam.; conidiophores 10–56 × 3–6 µm, unbranched, geniculate; conidia 52–59 × 3–4 µm, 3–4-septate.....*Cercospora physalidis* (20)

Taccaceae
Single species, on *Tacca*.....*Cercospora taccae* (25)

Verbenaceae
On *Clerodendron*; stromata 19–45 µm in diam.; conidiophores 12–148 × 4–5 µm, unbranched, geniculate; conidia 47–145 × 2–3 µm, 3–16-septate.....*Cercospora volkameriae* (27)
On *Duranta*; stromata 17–52 µm in diam.; conidiophores 17–35 × 4–5 µm, unbranched, not geniculate; conidia 24–144 × 2–5 µm, 10–16-septate.....*Cercospora duranticola* (12)

Zingiberaceae
Single species, on *Stahlianthus*.....*Cercospora stahlianthi* (24)

Genus *Passalora*

Asteraceae
On *Chromolaena*; stromata 10–45 µm in diam.; conidiophores 15–150 × 3–6 µm, unbranched, geniculate; conidia 8–57 × 3–6 µm, 3–6-septate.....*Passalora perfoliati* (37)
On *Tithonia*; stromata 35–50 µm in diam.; conidiophores 14–144 × 3–5 µm, unbranched**,** not geniculate; conidia 17–75 × 3–6 µm, 0–3-septate.....*Passalora tithoniae* (38)

Dipterocarpaceae
Single species, on *Dipterocarpus*.....*Passalora dipterocarpi* (32)

Euphorbiaceae
Single species, on *Manihot*.....*Passalora henningsii* (36)

Fabaceae
On *Cassia*; stromata 10–35 µm in diam.; conidiophores 15–140 × 3–5 µm, unbranched, not geniculate; conidia 19–53 × 4–6 µm, 2–5-septate.....*Passalora aenea* (29)
On *Erythrina*; stromata 17–40 µm in diam.; conidiophores 18–54 × 4–6 µm, unbranched, not geniculate; conidia 43–58 × 4–5 µm, 0–3-septate.....*Passalora erythrinae* (33)

Nystaginaceae
Single species, on *Bougainvillea*.....*Passalora bougainvilleae* (30)

Rubiaceae
Single species; on *Haldina*.....*Passalora haldinae* (34)

Solanaceae
Single species; on *Capsicum*.....*Passalora capsicicola* (31)
Sterculiaceae
Single species; on *Helicteres*.....*Passalora helicteris-viscidae* (35)

Genus *Pseudocercospora*

Alangiaceae
Single species, on *Alangium*.....*Pseudocercospora alangii* (39)

Apocynaceae
On *Holarrhena*; stromata 20–40 µm in diam.; conidiophores 23–37 × 4–6 µm, unbranched, geniculate; conidia 27–86 × 2–4 µm, 2–7-septate.....*Pseudocercospora holarrhenae* (50)
On *Tabernaemontana*; stromata 15–70 µm in diam.; conidiophores 7–17 × 2–5 µm, unbranched, rarely geniculate; conidia 15–77 × 2–4 µm, 0–5-septate...*Pseudocercospora tabernaemontanae* (68)
On *Wrightia*; stromata 20–42 µm in diam.; conidiophores 10–30 × 3–5 µm, unbranched, not geniculate; conidia 28–107 × 3–6 µm, 1–7-septate.....*Pseudocercospora wrightiae* (74)

Asteraceae
Single species, on *Chromolaena*.....*Pseudocercospora eupatorii-formosani* (45)

Combretaceae
On *Getonia*; stromata 10–30 µm in diam.; conidiophores 20–99 × 4–5 µm, unbranched, geniculate; conidia 50–70 × 2–4 µm, 3–8-septate.....*Pseudocercospora getoniae* (48)
On *Terminalia*; stromata 20–55 µm in diam.; conidiophores 12–25 × 3–5 µm, branched, geniculate; conidia 51–80 × 3–4 µm, 4–12-septate.....*Pseudocercospora catappae* (42)

Datiscaceae
Single species, on *Tetrameles*.....*Pseudocercospora tetramelis* (70)

Euphorbiaceae
On *Baliospermum*; stromata 15–35 µm in diam.; conidiophores 16–160 × 2–5 µm, unbranched, geniculate; conidia 15–101 × 3–5 µm, 1–8-septate.....*Pseudocercospora baliospermi* (40)
On *Macaranga*; stromata 35–45 µm in diam.; conidiophores 30–210 × 4–5 µm, unbranched, geniculate; conidia 22–58 × 3–4 µm, 1–5-septate.....*Pseudocercospora macarangae* (53)

Fabaceae
On *Cassia*; stromata 10–40 µm in diam.; conidiophores 15–69 × 3–5 µm, branched, geniculate; conidia 40–53 × 2.5–4 µm, 0–5-septate.....*Pseudocercospora nigricans* (59)
On *Crotalaria*; stromata 8–30 µm in diam.; conidiophores 13–60 × 3–6 µm, branched, geniculate; conidia 28–85 × 3–5 µm, 0–8-septate.....*Pseudocercospora cotizensis* (43)
On *Mucuna*; stromata 20–50 µm in diam.; conidiophores 50–118 × 3–4 µm, unbranched, geniculate; conidia 47–64 × 4–5 µm, 1–7-septate.....*Pseudocercospora stizolobii* (67)
On *Pueraria*; stromata 10–40 µm in diam.; conidiophores 9–30 × 3–5 µm, branched, geniculate; conidia 6–80 × 2–3 µm, 1–6-septate.....*Pseudocercospora puerariicola* (64)

Lamiaceae
Single species, on *Ocimum*.....*Pseudocercospora ocimicola* (60)

Lythraceae
On *Duabanga*; stromata 4–65 µm in diam.; conidiophores 8–34 × 2–5 µm, unbranched, geniculate; conidia 18–61 × 2–3 µm, 1–7-septate.....*Pseudocercospora duabangae* (44)
On *Lagerstroemia*; stromata 8–49 µm in diam.; conidiophores 5–16 × 3–5 µm, unbranched, not geniculate; conidia 36–52 × 2–3 µm, 3–5-septate.....*Pseudocercospora lythracearum*(52)

Malvaceae
Single species, on *Melochia*.....*Pseudocercospora melochiae* (56)

Menispermaceae
Single species, on *Tiliacora*.....*Pseudocercospora tiliacorae* (71)

Musaceae
Single species, on *Musa*.....*Pseudocercospora musae* (58)

Myrsinaceae
Single species, on *Maesa*.....*Pseudocercospora maesae* (54)

Myrtaceae
On *Eucalyptus*; stromata 14–20 µm in diam.; conidiophores 10–53 × 3–4 µm, branched, geniculate; conidia 18–25 × 2–4 µm, 3–4-septate.....*Pseudocercospora paraguayensis* (61)
On *Syzygium*; stromata 8–40 µm in diam.; conidiophores 8–24 × 3–6 µm, unbranched, geniculate; conidia 5–78 × 2–3 µm, 0–6-septate.....*Pseudocercospora sphaerellae-eugeniae* (65)

Onagraceae
Single species, on *Ludwigia*.....*Pseudocercospora jussiaeae* (51)

Passifloraceae
Single species, on *Passiflora*.....*Pseudocercospora stahlii* (66)

Piperaceae
Single species, on *Piper*.....*Pseudocercospora piperis* (62)

Polygonaceae
Single species, on *Polygonum*.....*Pseudocercospora polygonicola* (63)

Rubiaceae
Single species, on *Wendlandia*.....*Pseudocercospora wendlandiphila* (73)

Rutaceae
Single species, on *Micromelum*.....*Pseudocercospora micromeli* (57)

Scrophulariaceae
Single species, on *Buddleja*.....*Pseudocercospora buddlejae* (41)

Solanaceae
On *Solanum*; stromata 9–40 µm in diam.; conidiophores 6–50 × 3–4 µm, unbranched, geniculate; conidia 30–60 × 3–5 µm, 1–6-septate.....*Pseudocercospora trichophila* var. *punctata* (72)

On *Lycopersicon*; stromata 15–25 µm in diam.; conidiophores 8–31 × 4–5 µm, unbranched, geniculate; conidia 21–76 × 2.5–4 µm, 1–6-septate.....*Pseudocercospora fuligena* (50)

Tiliaceae
Single species, on *Microcos*.....*Pseudocercospora mananorensis* var. *paucifasciculata* (57)

Verbenaceae
On *Gmelina*; stromata 4–10 µm in diam.; conidiophores 27–70 × 5–7 µm, unbranched, geniculate; conidia 10–40 × 4–6 µm, 1–10-septate.....*Pseudocercospora gmelinae* (51)
On *Lantana*; stromata 15–45 µm in diam.;conidiophores 23–30 × 3–5 µm, unbranched, geniculate; conidia 32–98 × 3–4 µm, 3–10-septate.....*Pseudocercospora formosana* (49)
On *Tectona*; stromata 25–40 µm in diam.; conidiophores 5–20 × 3–4 µm, unbranched, not geniculate; conidia 35–63 × 3–4 µm, 2–5-septate.....*Pseudocercospora tectonae* (69)

Genus *Zasmidium*

Anacardiaceae
Single species, on *Spondias*.....*Zasmidium* sp. (81)

Euphorbiaceae
On *Aporosa*; stromata absent; conidiophores 6–83 × 3–4 µm; conidia 5–39 × 2–3 µm, 0–3-septate.....*Zasmidium aporosae* (75)
On *Suregada*; stromata 35–70 µm in diam.; conidiophores 34–110 × 3–4 µm; conidia 46–153 × 2–4 µm, 1–10-septate.....*Zasmidium suregadae* (82)

Fabaceae
Single species, on *Dalbergia*.....*Zasmidium dalbergiae* (76)

Oleaceae
Single species, on *Jasminum*.....*Zasmidium jasminicola* (77)

Rubiaceae
On *Meyna*; stromata 10–40 µm in diam.; conidiophores 14–98 × 3–4 µm; conidia 4–87 × 2–4 µm, 0–6-septate.....*Zasmidium meynae-laxiflorae* (78)
On *Pavetta*; stromata up to 23 µm in diam.; conidiophores 12–34 × 3–4 µm; conidia 5–65 × 2–4 µm, 0–5-septate.....*Zasmidium pavettae* (80)

Rutaceae
Single species, on *Micromelum*.....*Zasmidium micromeli* (79)

Key to morphologically similar genera

Leaf-inhabiting, dematiaceous, hyphomycetous genera with thalloblastic to holoblastic conidiogenesis, which are not *Mycosphaerella* anamorphs, can be considered to be "cercosporoid *s. lat*." Such genera have sometimes been confused with true cercosporoids, and determinations of and differentiations between the genera concerned are often difficult for non-specialists (Crous & Braun 2003). The present key is based on the keys to cercosporoid and morphologically similar genera of Crous & Braun (2003) and Ellis (1971, 1976) and has been adapted. The key to identify particular species are alphabically arranged by host families. They are based on models of Chupp (1954), Ellis (1971, 1976), Deighton (1967, 1973, 1976, 1979), Hsieh & Goh (1990), and Guo & Hsieh (1995).

1. Conidiophores long, forming distinct synnemata; conidiogenous loci conspicuous, thickened, darkened or distinctly denticulate; conidia often thick-walled, septate or distoseptate; hyperparasitic on Meliolaceae.....*Spiropes*
1. Conidiophores not forming distinct synnemata; conidiogenous cells (i.e. conidiophores reduced to conidiogenous cells) solitary, arising from superficial hyphae, or conidiophores loosely to densely fasciculate or forming sporodochia; not hyperparasitic on Meliolaceae 2
2. Conidiophores and conidia colourless; conidiogenous loci inconspicuous, neither thickened nor darkened; conidia scolecosporous.....*Pseudocercosporella*
2. Conidiophores and conidia pigmented.....3
3. Conidiogenous cells percurrent, with annellations, conidiogenous loci neither thickened nor darkened.....*Scolecostigmina*
3. Conidiogenous cells sympodial, without annellations; conidiogenous loci conspicuous, thickened and darkened.....4
4. Conidiophores usually unbranched, in any case without branched head (apical part); conidiogenous loci protuberant, coronate, i.e. with a central converx part (dome) surrounded by a raised periclinal rim; conidia in long, often branched acropatal chains.....*Cladosporium*
4. Conidiophores long, composed of erect long stalks and more or less branched heads, usually strongly branched; conidial scars either unthickened and not darkened or thickened and darkened, but not coronate.....5
5. Conidial scars conspicuous, thickened and darkened-refractive; conidia solitary and scolecosporous (in the Laos species).....*Periconiella*

Genus *Cladosporium*

Araceae
On *Colocasia*; stromata absent; conidiophores 28–165 × 3–9 µm; conidia 5–11 × 2–6 µm, 0–3-septate.....*Cladosporium colocasiae* (83)

Genus *Periconiella*

Schizaeaceae
Single species, on *Lygodium*.....…*Periconiella lygodii* (84)

Genus *Pseudocercosporella*

Convolvulaceae
Single species, on *Ipomoea*.....*Pseudocercosporella bakeri* (85)

Genus *Scolecostigmina*

Anacardiaceae
Single species, on *Mangifera*.....*Scolecostigmina mangiferae* (86)

Genus *Spiropes*

Anacardiaceae
Single species, on *Mangifera*.....*Spiropes clavatus* (87)

True cercosporoids

(1) ***Cercospora achyranthis*** Syd. & P. Syd., Ann. Mycol. 7: 171, 1909. Figs 2–3.

Leaf spots round, 1–5 mm diam., pale brown to dark brown in the centre, and with medium brown to purple-brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 3–5 µm wide ($\bar{x}$ = 4.5 µm, n = 5), septate, constricted at the septa, distance between septa 5–10 µm ($\bar{x}$ = 8 µm, n = 5), brownish or green-hyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.38 µm, n = 5), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, oval to ellipsoidal, substomatal, 12–25 µm diam. ($\bar{x}$ = 20.71 µm, n = 7), brown, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–8 µm wide ($\bar{x}$ = 5.67 µm, n = 26), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.86 µm, n = 26), smooth. Conidiophores fasciculate, arising from stromata (3–12 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 26–145 × 4–7 µm ($\bar{x}$ = 74.8 × 5.19 µm, n = 16), 0–4-septate, distance between septa 8–54 µm ($\bar{x}$ = 29.7 µm, n = 27), medium brown, paler at the apex, wall 0.5–1 µm wide ($\bar{x}$ = 0.75 µm, n = 16), smooth, 0–2 times geniculate. Conidiogenous cells integrated, terminal, cylindrical, 23–54 × 3–5 µm ($\bar{x}$ = 37.3 × 3.8 µm, n = 10), pale brown; conidiogenous loci conspicuous, subcircular, 2–3 µm wide ($\bar{x}$ = 2.62 µm, n = 30), dark brown, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.68 µm, n = 30). Conidia solitary, acicular, straight to curved, 44–194 × 3–5 µm ($\bar{x}$ = 95.27 × 3.73 µm, n = 30), 3–16-septate, hyaline, thin-walled, smooth, tip acute, base truncate to obconically truncate, hila thickened and darkened, 1.5–3 µm wide ($\bar{x}$ = 2.5 µm, n = 30), wall of the hila 0.5–0.8 µm ($\bar{x}$ = 0.51 µm, n = 30) thick.

Colonies on PDA after 3 weeks at 25°C grey, 4.5–5 mm diam., spreading surface ridged, smooth, brown; hyphae 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), brown to subhyaline, wall 0.3–1 µm wide ($\bar{x}$ = 0.66 µm, n = 30), smooth. Conidia not formed in culture.

Hosts – *Achyranthes aspera* L., *A. bidentata* Blume and *A. japonica* (Miq.) Nakai (Amaranthaceae).

Distribution – **Asia:** China, India, Japan, Korea, Laos, Taiwan; **North America and West Indies:** Domican Republic, Puerto Rico.

Material examined – Vientiane Capital, Xaysetha District, Non Kho Village, on leaves of *Achyranthes aspera*, 11 May 2006, P. Phengsintham (P43); Xaythany District, Dong Dok Village, on leaves of *A. aspera*, 9 June 2007, P. Phengsintham (P283); Dong Dok Village, on leaves of *A. aspera*, 12 August 2007, P. Phengsintham (P298); Loungprabang Province, Lak 10 Village, on leaves of *A. aspera*, 7 June 2006, P. Phengsintham (P66).

Notes – The collections from Laos are similar to those described by Chupp (1954) [conidiophores fasciculate, 20–80 × 4–6 µm, pale olivaceous-brown; conidia 40–150 × 3–5 µm].

Literature – Saccardo (1913: 1429), Chupp (1954: 30), Vasudeva (1963: 31), Shin & Kim (2001: 24), Crous & Braun (2003: 42).

(2) ***Cercospora alocasiae*** Goh & W.H. Hsieh, Trans. Mycol. Soc. Republ. China 2: 86–87, 1987. Figs 4–5.

≡ *Cercospora alocasiae* Sawada, Taiwan Agric. Rev. 38: 693, 1942 (nom. inval.).

Leaf spots small to fairly large, suborbicular to irregular, 2–25 mm in diam., grey-brown in the centre, and with dark brown margin. Caespituli amphigenous, scattered, white brown. Mycelium internal; hyphae branched, 2–4 µm wide ($\bar{x}$ = 3 µm, n = 7), septate, constricted at the septa, distance between septa 7–15 µm wide ($\bar{x}$ = 10.5 µm, n = 7), brownish or green-hyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.46 µm, n = 7), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 17–32 µm in diam. ($\bar{x}$ = 22.8 µm, n = 7), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–10 µm wide ($\bar{x}$ = 7.9 µm, n = 7), brown to dark brown, wall 0.5–0.8 µm wide ($\bar{x}$

= 0.59 µm, n = 7), smooth. Conidiophores fasciculate, arising from stromata (2–7 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 10–88 × 4–6 µm ($\bar{x}$ = 43.4 × 5.2 µm, n = 13), 0–3-septate, distance between septa 7–37 µm ($\bar{x}$ = 17.4 µm, n = 17), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.63 µm, n = 17), smooth, 0–2-times geniculate. Conidiogenous cells terminal, cylindrical, 20–37 × 4–6 µm ($\bar{x}$ = 27.3 × 5 µm, n = 8), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–2 µm wide ($\bar{x}$ = 1.75 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, 57–108 × 2–3 µm ($\bar{x}$ = 79 × 2.6 µm, n = 10), 6–11-septate, hyaline to subhyaline, thin-walled, 0.3 µm ($\bar{x}$ = 0.3 µm, n = 10), smooth, tip acute, base truncate to obconically truncate; hila thickened and darkened, 0.5–2 µm wide ($\bar{x}$ = 1.33 µm, n = 10), wall of the hila 0.3–0.5 µm ($\bar{x}$ = 0.36 µm, n = 8) thick.

Colonies on PDA after 3 weeks at 25 °C grey, 10–20 mm diam., surface ridged and smooth, mycelium light brown-violet.

Hosts – *Alocasia indica* (Lour.) Spach, *A. macrorrhiza* (L.) G. Don, *A. odora* (Lindl.) K. Koch, *Alocasia* sp., *Pistia stratioites* L. (Araceae).

Distribution – **Asia:** China, India, Japan, Laos, Myanmar, Nepal, Taiwan, Thailand; **North America and West Indies:** Cuba; **South America:** Venezuela.

Material examined – Vientiane Province, Home District, Pha En Village, mixed deciduous forest, on leaves of *Alocasia macrorrhiza*, 18 November 2009, P. Phengsintham (P464); Phongsali Province, Phongsali District, Phon Hin Village, mixed deciduous forest, on leaves of *A. macrorrhiza*, 22 June 2010, P. Phengsintham (P598).

(3) *Cercospora apii* Fresen., Beitr. Mykol. 3:91, 1863. Figs 6–7 s. lat. (sensu Crous & Braun 2003).

≡ *Cercospora penicillata* var. *apii* Fuckel, Hedwigia 2: 132, 1863.

Leaf spots subcircular to irregular, 1–3 mm diam., brown to dark brown in the centre, margin yellowish. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–5 µm wide ($\bar{x}$ = 3 µm, n = 11), septate, constricted at the septa, distance between septa 4–12 µm ($\bar{x}$ = 7.2 µm, n = 11), brownish or green hyaline, wall 0.3–0.8 µm wide ($\bar{x}$ = 0.50 µm, n = 11), smooth, forming plate like plectenchymatous stromatic hyphal aggregations. Stromata well developed, oval to ellipsoidal, 10–30 µm diam. ($\bar{x}$ = 20 µm, n = 13), brown, substomatal, intraepidermal, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 3–7 µm wide ($\bar{x}$ = 6 µm, n = 14), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.9 µm, n = 15). Conidiophores formed singly or fasciculate, arising from stromata (1–7 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 14–81 × 4–6 µm ($\bar{x}$ = 45.3 × 4,7 µm, n = 30), 0–3-septate, distance between septa 10–35 µm long ($\bar{x}$ = 21.1 µm, n = 30), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.79 µm, n = 30), smooth, 0–1-times geniculate, width uniform; conidiogenous cells integrated, terminal or intercalary, cylindrical, 10–35 × 3–5 µm, ($\bar{x}$ = 22.9 × 4.46 µm, n = 28), pale brown; conidiogenous loci conspicuous, subcircular, 2–3 µm wide ($\bar{x}$ = 0.63 µm, n = 30), dark brown, wall 0.6–0.8 µm thick ($\bar{x}$ = 0.70 µm, n = 30). Conidia solitary, acicular, straight to curved, 9–154 × 2–7 µm ($\bar{x}$ = 108.5

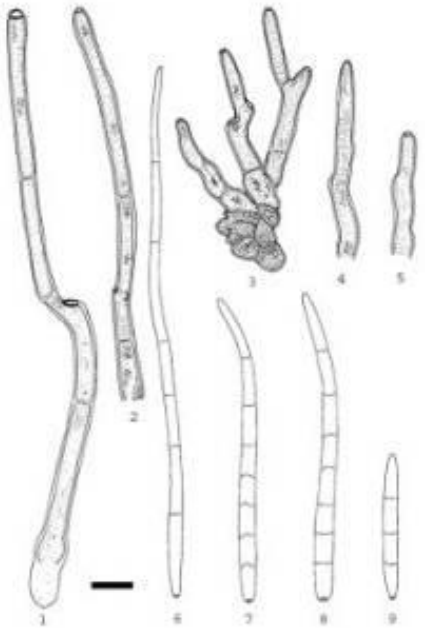

Fig. 2 – *Cercospora achyranthis* from *Achyranthes aspera*: 1–2. Conidiophores. 3. Stroma with attached conidiophores. 4–5. Conidiophores. 6–9. Conidia. Bar = 10 µm.

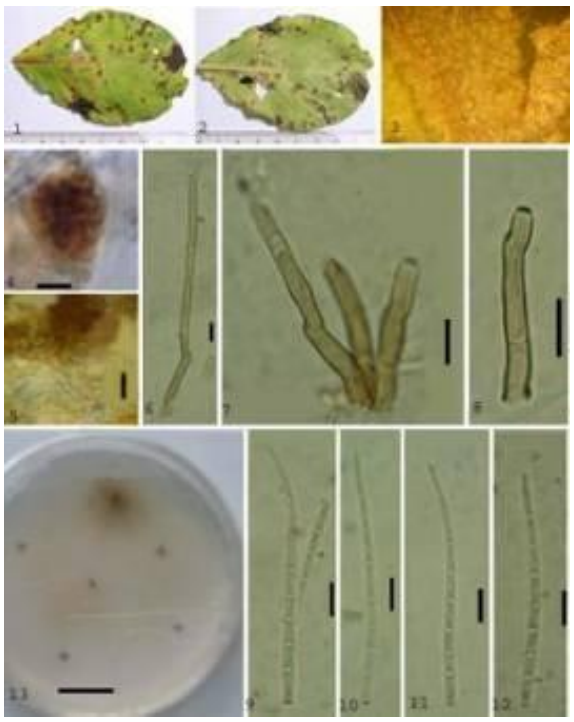

Fig. 3 – *Cercospora achyranthis* on *Achyranthes asspera*: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4. Stroma. 5. Internal hyphae. 6–8. Conidiophores. 9–12. Conidia. 13. Culture. Bars 4–12 = 10 µm, 13 = 10 mm.

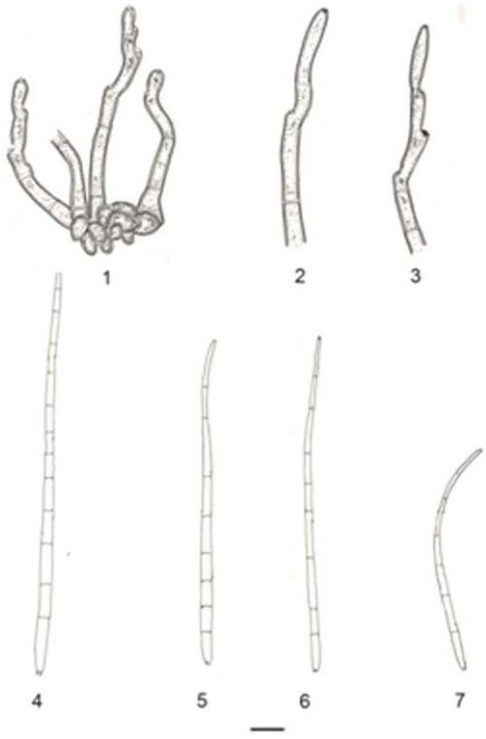

Fig. 4 – *Cercospora alocasiae* on *Alocasia macrorrhiza* from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–7. Conidia. Bar = 10 µm.

Fig. 5 – *Cercospora alocasiae* on *Alocasia macrorrhiza* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stroma. 4–5. Stromata with attached conidiophores. 6–10. Conidia. 11. Culture. Bars 3–10 = 10 µm, 11 = 10 mm.

×4.7 µm, n = 6), 5–19-septate, hyaline, thin walled 0.25–0.3 µm wide, smooth, tip acute, base truncate to obconically truncate, hila thickened and darkened, wall 2–3 µm wide, wall of the hila 0.5 µm thick.

Colonies on PDA after 3 weeks at 25°C grey, 25 mm diam., spreading surface ridged and smooth, mycelium brown, hyphae 2–9 µm wide ($\bar{x}$ = 3.5 µm, n = 30), septate, constricted at the septa, distance between septa 10–37 µm ($\bar{x}$ = 20.2 µm, n = 30), brown to hyaline, wall 0.3–0.8 µm wide ($\bar{x}$ = 0.6 µm, n = 30), smooth. Conidia not formed in culture.

Hosts – On a wide range of hosts of many genera belonging to numerous unrelated families.

Distribution – worldwide.

Material examined: Vientiane Capital, Xaythany District, Nong Viengkham Village, fallow forest, on leaves of *Byttneria andamensis* Kurz, fallow forest, 22 April 2006, P. Phengsintham (P18); ibid., Xaythany District, Houay Den Muang Village, fallow forest, on leaves of *B. andamensis*, 12 September 2006, P. Phengsintham (P167).

Notes – This is the first record of a cercosporoid hyphomycete on a host of the genus *Byttneria*. This taxon is morphologically indistinguishable from *Cercospora apii* s. lat. (*C. apii* complex) as defined and circumscribed by Crous & Braun (2003). Within this complex, the morphology and cultures are not sufficient to indicate if taxa on new hosts are different species or new hosts for the species. Biological data (inoculation experiments) and/or molecular sequence analyses are necessary. The whole taxonomy and biology within this complex is complicated. Therefore, we follow the advice of Crous & Braun (2003) to simply assign such collections to *C. apii* s. lat.

Literature – Chupp (1954: 568), Ellis (1971: 276–278), Crous & Braun (2003: 388).

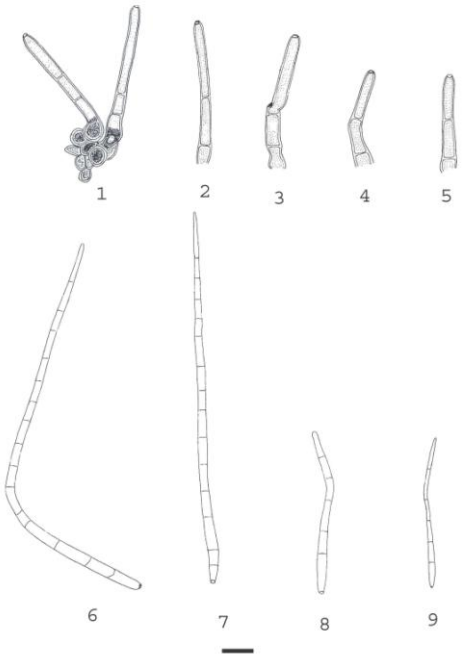

Fig. 6 – *Cercospora apii* on *Byttneria andamensis* from leaf spots: 1. Stroma with attached conidiophores. 2–5. Conidiophores. 6–9. Conidia. Bar = 10 µm.

(4) *Cercospora artemisiae* Y. L. Guo & Y. Jiang, Mycosystema 19: 445, 2000. Figs 8–9.

Leaf spots on cladodes and branches small oval to elliptic in shape, 0.5–2 mm diam., pale grey to dingy grey-violet in the centre, and with a fairly wide reddish brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 3–4 µm wide ($\bar{x}$ = 3.5 µm, n = 7), septate, constricted at the septa, distance betw-

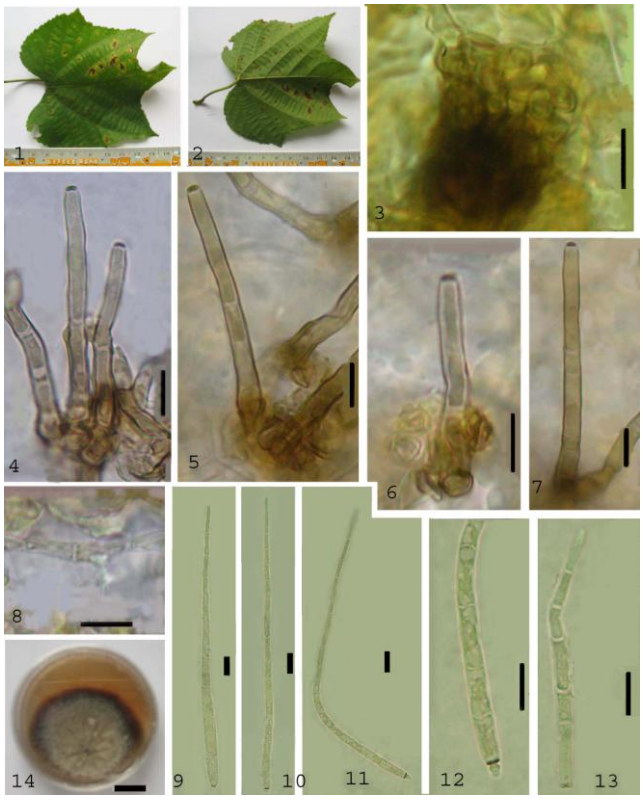

Fig. 7 – *Cercospora apii* on *Byttneria andamensis* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stroma. 4–7. Stromata with attached conidiophores. 8. Internal mycelium. 9–13. Conidia (12. Base of conidium). 14. Culture. Bars 3–13 = 10 µm, 14 = 10 mm.

een septa 5–10 µm ($\bar{x}$ = 8.25 µm, n = 7), brownish or green-hyaline, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.57 µm, n = 7), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, substomatal, 15–30 µm diam. ($\bar{x}$ = 22.5 µm, n = 9), brown, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 4–8 µm wide ($\bar{x}$ = 6.2 µm, n = 9), brown to dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.57 µm, n = 9), smooth. Conidiophores solitary or fasciculate, arising from stromata (3–11 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 34–85 × 4–5 µm ($\bar{x}$ = 63.8 × 4.25 µm, n = 13), 1–4-septate, distance between septa 10–28 µm ($\bar{x}$ = 16.4 µm, n = 30), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.57 µm, n = 30), smooth, 0–1-times geniculate, width uniform; conidiogenous cells integrated, terminal, cylindrical, 15–28 × 3–4 µm ($\bar{x}$ = 20.3

× 3.67 µm, n = 9), pale brown; conidiogenous loci conspicuous, subcircular, 0.7–2 µm wide ($\bar{x}$ = 1.23 µm, n = 25), dark brown, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.6 µm, n = 25). Conidia solitary, acicular, straight to curved, 25–49 × 2–4 µm ($\bar{x}$ = 37.55 × 3 µm, n = 9), 1–4-septate, hyaline, thin–walled, smooth, tip subobtuse to acute, base truncate, hila thickened and darkened, 0.7–2 µm wide ($\bar{x}$ = 1.56 µm, n = 9), wall of the hila 0.25–0.3 µm ($\bar{x}$ = 0.28 µm, n = 9) thick.

Hosts – *Artemisia caudata* Michx., *A. lactiflora* Wall. ex DC. (Asteraceae).

Distribution – **Asia:** China, Laos, Thailand.

Material examined – Phongsali Province, Phongsali District, Phon Hin Village, on leaves of *Artemisia caudata*, 24 June 2010, P. Phengsintham (P597).

Notes – This species belongs to the *Cercospora apii* (s. lat.) complex (Crous & Braun 2003).

Literature – Crous & Braun (2003: 67).

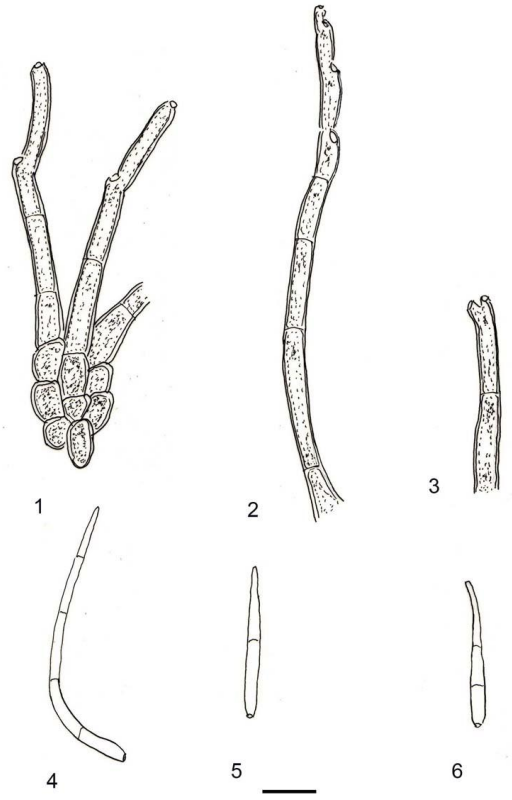

Fig. 8 – *Cercospora artemisiae* from *Artemisia caudata*: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–6. Conidia. Bar = 10 µm.

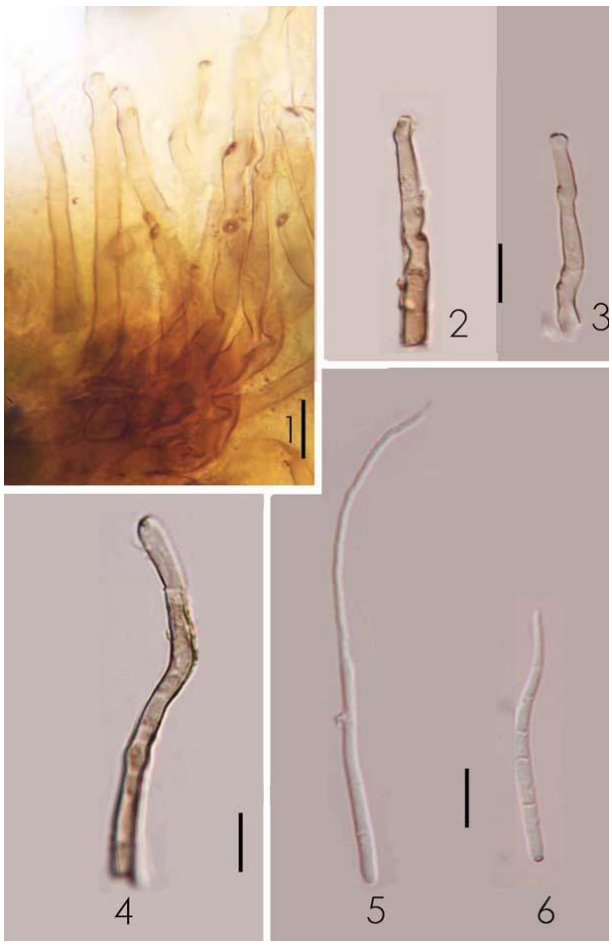

Fig. 9 – *Cercospora artemisiae* from *Artemisia caudata*: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–6. Conidia. Bars = 10 µm.

(5) ***Cercospora asparagi*** Sacc., Michelia 1: 88, 1877. Figs 10–11.

= *Cercospora caulicola* G. Winter. J. Mycol. 1: 125, 1885.

= *Cercosporina asparagicola* Speg., Anal. Mus. Buenos Aires 20: 424, 1910.

≡ *Cercosporina asparagicola* (Speg.) Vassiljevsky, in Vassiljevsky & Karakulin, Fungi imperfecti parasitici. 1. Hyphomycetes: 296, 1937.

Leaf spots on cladodes and branches, small oval to elliptic in shape, 0.5–2 mm diam., pale tan to dingy grey in the centre, and with a fairly wide reddish brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal. Stromata well-developed, oval to ellipsoidal, substomatal, up to 32 µm diam., brown, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 5–13 µm wide ($\bar{x}$ = 8.8 µm, n = 13),

brown to dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.6 µm, n = 13), smooth. Conidiophores solitary or fasciculate, arising from stromata (2–15 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 28–63 × 4–6 µm ($\bar{x}$ = 43.5 × 4.56 µm, n = 10), 1–3-septate, distance between septa 4–36 µm ($\bar{x}$ = 15 µm, n = 17), medium brown, paler at the apex, wall 0.4–0.5 µm wide ($\bar{x}$ = 0.49 µm, n = 10), smooth, 0–1-times geniculate, width uniform; conidiogenous cells integrated, terminal, cylindrical, 10–32 × 4–5 µm ($\bar{x}$ = 21.4 × 4.5 µm, n = 11), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 µm wide ($\bar{x}$ = 2.5 µm, n = 25), dark brown, wall 0.3–0.5 µm thick ($\bar{x}$ = 0.4 µm, n = 25). Conidia solitary, acicular, straight to curved, 54–112 × 4–5 µm ($\bar{x}$ = 80 × 4 µm, n = 5), 1–8-septate, hyaline, thin-walled, smooth, tip subotuse to acute, base truncate to 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 ($\bar{x}$ = 0.4 µm, n = 5) thick.

Hosts – *Asparagus officinalis* L., *A. plumosus* (Baker) Oberm. (Asparagaceae).

Distribution: **Africa:** Ghana, Kenya, Malawi, South Africa, Zimbabwe; **Asia:** Brunei, Cambodia, China, Hong Kong, India, Israel, Japan, Korea, Laos, Malysia, Nepal, Pakistan, Taiwan, Thailand; **Europe:** Italy, Ukraine, Serbia; **North America and West Indies:** Cuba, USA (CA, FL, HI, IL, NC, NE). **Oceania:** Solomon Islands; **South America:** Argentina, Brazil, Colombia.

Material examined – Vientiane Capital, Xaythany District, Xay Village, garden, on leaves of *Asparagus officinalis*, 30 June 2006, P. Phengsintham (P57).

Notes – Crous & Braun (2003) considered *Cercospora asparagi* close to or identical with *C. apii* s. lat. In the Laos collection conidiophores were fasciculate, 28–63 × 4–6 µm and conidia are 54–112 × 4–5 µm, which is similar to those reported by Ellis (1976) [conidiophores 40–150 × 3–8 µm and conidia 80–130 × 4–5 µm], Hsieh & Goh (1990) [conidiophores 30–170 × 4–7 µm and conidia 35–130 × 2.5–5 µm] and Chupp (1954).

Literature – Saccado (1886: 477), Chupp (1954: 343), Ellis (1976: 270), Hieh & Goh (1990: 208), Crous & Braun (2003: 68).

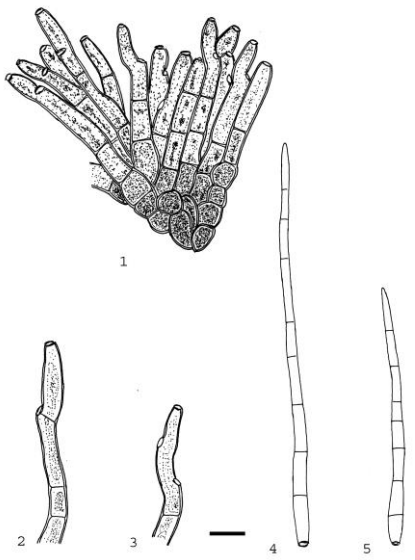

Fig. 10 – *Cercospora asparagi* from *Asparagus officinalis*: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–5. Conidia. Bar = 10 µm.

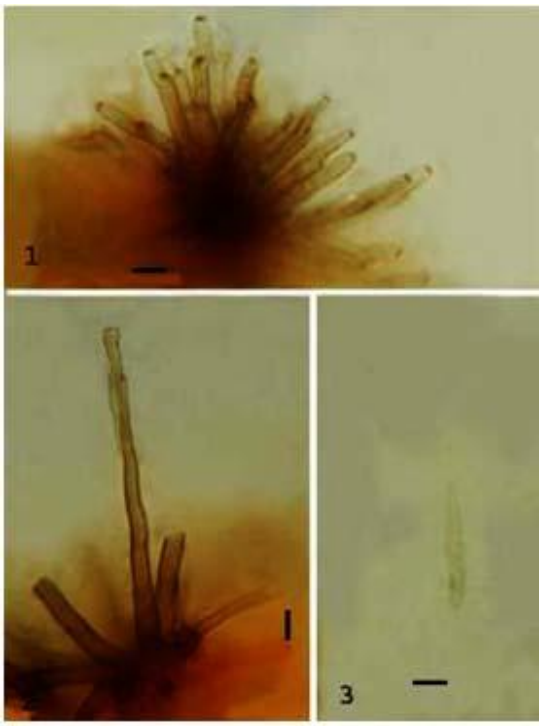

Fig. 11 – *Cercospora asparagi* from *Asparagus officinalis*: 1–2. Stroma with attached conidiophores. 3. Conidium. Bars = 10 µm.

(6) ***Cercospora begoniae*** Hori, Lecture on plant diseases (Shokubutsu Bybai Kowa) 2: 181, 1916. Figs 12–13.

(= ***Cercospora*** *apii* s. lat.)

Leaf spots small to fairly large, suborbicular to irregular, 1–4 mm in diam., grey-brown in the centre, and with dark brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal, inconspicuous. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 10–15 µm in diam. ($\bar{x}$ = 12.5 µm, n = 5), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–8 µm wide ($\bar{x}$ = 6.7 µm, n = 11), brown to dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.7 µm, n = 11), smooth. Conidiophores fasciculate, arising from stromata (2–3 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 55–93 × 4–5 µm ($\bar{x}$ = 65.3 × 4.4 µm, n = 11), 2–4-septate, distance between septa 9–36 µm ($\bar{x}$ = 18 µm, n = 30), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.59 µm, n = 30), smooth, 0–3-times geniculate. Conidiogenous cells terminal, cylindrical, 17–36 × 3.5–4 µm ($\bar{x}$ = 28.3 × 3.83 µm, n = 7), pale brown; conidiogenous loci conspicuous, subcircular, 2–3 µm wide ($\bar{x}$ = 2.6 µm, n = 7), wall 0.5–0.8 µm thick ($\bar{x}$ = 0.62 µm, n = 7), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 57–150 × 2–3 µm ($\bar{x}$ = 103.5 × 2.5 µm, n = 8), 7–12-septate, hyaline to subhyaline, thin-walled 0.3–0.5 µm ($\bar{x}$ = 0.35 µm, n = 8), smooth, tip acute, base truncate to obconically truncate; hila thickened and darkened 1.5–2 µm wide ($\bar{x}$ = 1.75 µm, n = 8), wall of the hila 0.3–0.5 µm ($\bar{x}$ = 0.37 µm, n = 8) thick.

Hosts – *Begonia argenteo-guttata* M. Lemoine, *B. evansiana* C. Andrews, *B. inflata* Clarke, *B. palmata* D. Don, *B. rex* Putz., *B. rex-culturum* hybrid, *B. semperflorens* Link & Otto, *Begonia* sp. (Begoniaceae).

Distribution – **Africa:** Zimbabwe; **Asia:** Brunei, China, India, Japan, Laos, Malaysia, Taiwan, Thailand; **Europe:** Poland; **North America and West Indies:** USA (FL).

Material examined – Xiangkhouang Province, Paek District, Phonsavane Village, on leaves of *Begonia inflata*, 3 January 2010, P. Phengsintham (P517).

Notes – The collection from Laos agrees with the description of *Cercospora begoniae* by Chupp (1954) and Hsieh & Goh (1990) [conidiophores 20–200 × 3–5 µm and conidia 50–300 × 2–3.5 µm].

Literature – Chupp (1954: 79), Katsuki (1965: 14), Hsieh & Goh (1990: 42), Crous & Braun (2003: 78).

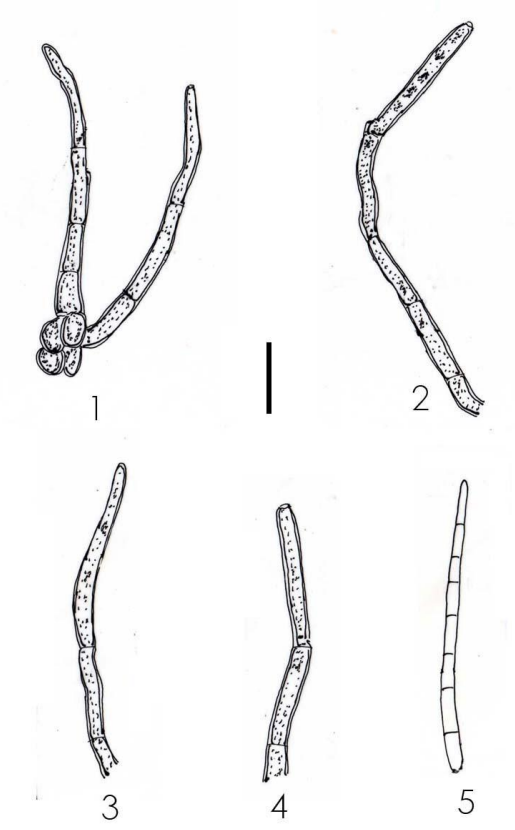

Fig. 12 – *Cercospora begoniae* on *Begonia inflata* from leaf spots: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5. Conidium. Bar = 10 µm.

(7) *Cercospora bidentis* Tharp, Mycologia 9: 108, 1917. Figs 14–15.

= *Cercospora bidentis* Marchal & Stayaert, Bull. Soc. Roy. Bot. Belgiques 61: 167, 1954.

= *Cercospora bidentis-pilosae* Sawada, Rep. Gov. Agric. Res. Inst. Taiwan 85: 98, 1943, nom. inval.

Leaf spots orbicular to irregular, 2–10 mm diam., dark brown to black in the centre, and with brown to dark brown margin.

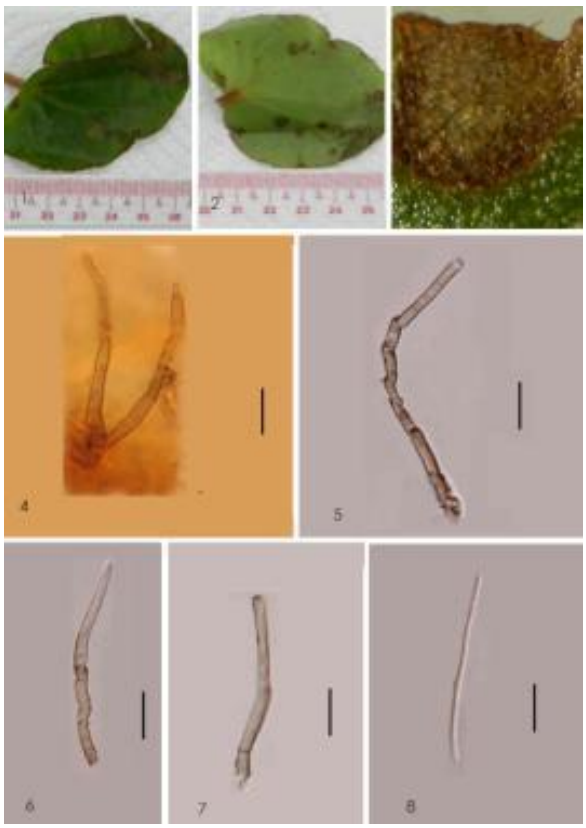

Fig. 13 – *Cercospora begoniae* on *Begonia inflata* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4. Stroma with attached conidiophores. 5–7. Conidiophores. 8. Conidium. Bars = 10 µm.

Caespituli amphigenous, scattered, brown to dark brown. Mycelium internal; hyphae branched, 3–5 µm wide ($\bar{x}$ = 3.69 µm, n = 13), septate, constricted at the septa, distance between septa 6–14 µm ($\bar{x}$ = 10.8 µm, n = 13), 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 oval to ellipsoidal, substomatal, 10–20 µm diam. ($\bar{x}$ = 16.5 µm, n = 15), brown, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 5–11 µm wide ($\bar{x}$ = 7.7 µm, n = 23), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.88 µm, n = 23), smooth. Conidiophores fasciculate, arising from stromata (1–2 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 25–117 × 4–7 µm ($\bar{x}$ = 75 × 4.95 µm, n = 22), 0–5-septate, distance between septa 8–35 µm ($\bar{x}$ = 19.9 µm, n = 30), medium brown, paler at the apex, wall 0.5–1 µm wide ($\bar{x}$ = 0.7 µm, n = 30), smooth, 0–2-times geniculate, width uniform. Conidiogenous cells integrated, terminal, cylindrical, 7–35 × 3–5 µm ($\bar{x}$ = 25.4 × 4.27 µm, n = 11), pale brown; conidiogenous loci conspicuous, subcircular, 2–3 µm wide ($\bar{x}$ = 2.4 µm, n = 14), dark brown, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.53 µm, n = 11). Conidia solitary, acicular, straight to curved, 31–62 × 2–3 µm ($\bar{x}$ = 43.8 × 2.2 µm, n = 7), 2–6-septate, hyaline, thin-walled, smooth, tip acute, base truncate to obconically truncate, hila thickened and darkened, 0.8–2 µm wide ($\bar{x}$ = 1.18 µm, n = 7), wall of the hila 0.3–0.5 µm ($\bar{x}$ = 0.35 µm, n = 7) thick.

Hosts – *Bidens bipinnata* L., *B. biternata* (Lour.) Merr. & Sherff, *B. cernua* L., *B. coronata* (L.) Fisch. ex Steud., *B. laevis* (L.) Britton, Sterns & Poggenb., *B. nashii* Small, *B. pilosa* L., *Bidens* spp., *Centaurea americana* Nutt., *Chrysanthemum hortorum* Bailey, *Coreopsis drummondii* Torr. & A. Grey, *C. lanceolata* L., *Coreopsis* spp., *Conyza* sp., *Cosmos bipinnatus* Cav., *Erigeron floribundus* (Kunth) Sch. Bip., *Helianthus annuus* L., *H. tuberosus* L., *Helichrysum brassii* Brenan, *Pseudelephantopus spicatus* (Juss. ex Aubl.) Rohr, *Rudbeckia laciniata* L., *Senecio cruentus* (Masson ex L'Hér.) DC., *Solidago* spp.. *Tithonia speciosa* (Hook.) Hook. ex Griseb., *Tridax procumbens* L., *Vernonia glabra* (Steetz) Vatke (Asteraceae).

Distribution – Widespread in tropical and subtropical countries. **Africa:** Congo, Ghana, Kenya, Malawi, Mauritius, Nigeria, South Africa, Sudan, Tanzania, Zimbabwe; **Asia:** China, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Taiwan, Thailand; **North America and West Indies:** Cuba, Trinidad and Tobago Panama, USA (FL, TX, WI); **Oceania:** Papua New Guinea, Solomon Islands, Tonga, American Samoa; **South America:** Brazil, Venezuela.

Material examined – Luangprabang Province, Phoukhoun District, Phadeng Village, fallow forest, on leaves of *Bidens bipinnata*, 18 June 2006, P. Phengsintham (P102).

Notes – The collection from Laos is characterized by forming conidiophores singly or only three in a small fascicle, which differs from other samples on *Bidens pilosa* with 3–20 conidiophores per fascicle (e.g. Hsieh & Goh 1990).

Literature – Saccado (1931: 871; 1972: 1369), Chupp (1954: 123–124), Katsuki (1965: 20), Vasudeva (1963: 50), Ellis (1976: 250), Hsieh & Goh (1990: 62).

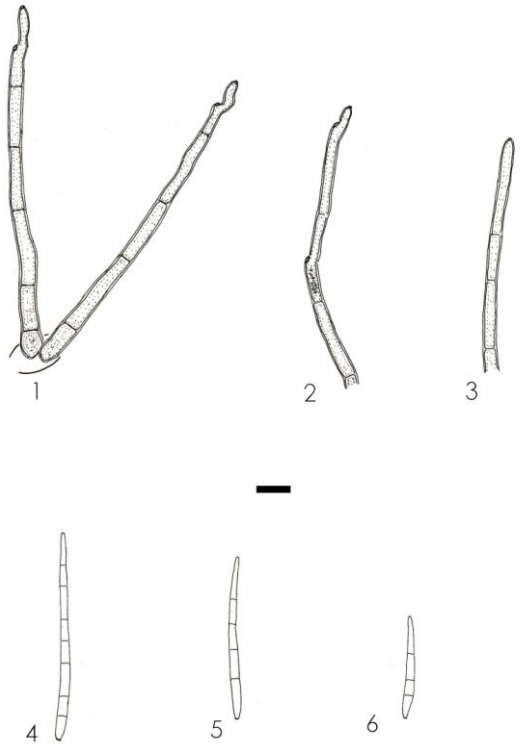

Fig. 14 – *Cercospora bidentis* on *Bidens pilosa*: 1–3. Conidiophores. 4–6. Conidia. Bar = 10 µm.

(8) *Cercospora brassicicola* Henn., Bot. Jahrb. Syst. 37: 166, 1905. Figs 16–17.

= *Cercospora brassicae-campestris* Rangel, Arq. Mus. Nac., Rio de Janeiro 18: 16, 1917.

≡ *Cercosporina brassicae-campestris* (Rangel) Sacc., Syll. Fung. 25: 899, 1931.

= *Cercospora brassicae-junceae* Sawada (*Brassicae-yunceae*), Special Publ. Coll. Agric. Natl. Taiwan Univ. 8: 212, 1959 (nom. nud.).

= *Cercospora bloxami auct. sensu* E. Young, Mycologia 8: 43, 1916.

Leaf spot circular to angular or a long the margin of the leaves, 1–25 mm diam., pale green or pale brown to dark brown or black in the center, and with pale green or yellowish margin. Caespituli amphigenous, dense, grey.

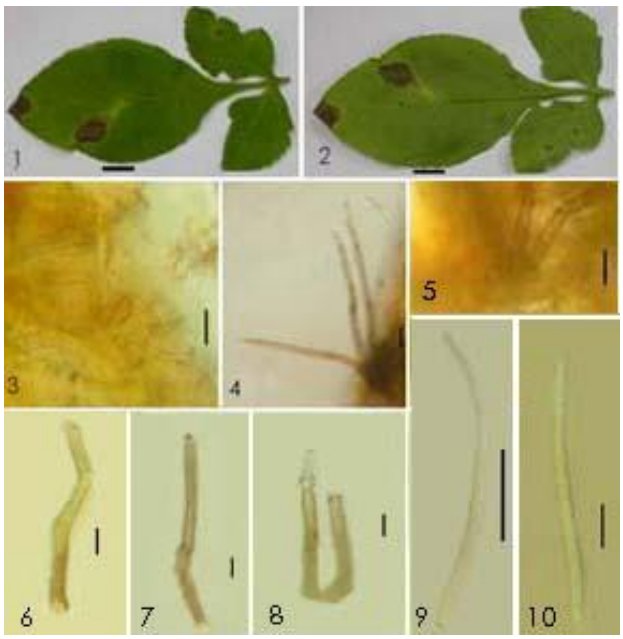

Fig. 15 – *Cercospora bidentis* on *Bidens pilosa* from leaf spots: 1. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Internal mycelium. 4–5. Stromata with attached conidiophores. 6–10. Conidia. Bars 1 = 10 mm, 3–10 = 10 µm.

Mycelium internal; hyphae branched, 1–4 µm wide ($\bar{x}$ = 3.1 µm, n = 30), septate, constricted at the septa, distance between septa 5–15 µm ($\bar{x}$ = 8.17 µm, n = 30), subhyaline or olivaceous brown, wall 0.5–0.9 µm wide ($\bar{x}$ = 0.61 µm, n = 23), smooth. Stromata substomatal, intraepidermal, oval, ellipsoidal, 15–30 µm diam. ($\bar{x}$ = 20.86 µm, n = 8), dark brown, stromatal cells oval, angular, obclavate, 3–9 µm diam. ($\bar{x}$ = 6.47 µm, n = 30), dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.7 µm, n = 30). Conidiophores fasciculate, arising from stromata (2–20 per fascicle), emerging through stomata, cylindrical, 15–232 × 4–6 µm ($\bar{x}$ = 109.4 × 5 µm, n = 30), 1–8-septate, distance between septa 9–58 µm ($\bar{x}$ = 25 µm, n = 30), pale olivaceous to medium brown, oldest ones uniform in colour and width, wall 0.5–1 µm wide ($\bar{x}$ = 0.8 µm, n = 30), smooth, 1–2 times geniculate; conidiogenous cells terminal, 13–68 × 4–6 µm ($\bar{x}$ = 33.27 × 4.7 µm, n = 30); conidiogenous loci conspicuous, subcircular in outline, planate, 2–4 µm wide ($\bar{x}$ = 2.83 µm, n = 30), thickened, darkened. Conidia solitary, acicular, curved or undulate, 30–288 × 1.5–5 µm ($\bar{x}$ = 120 × 3.52 µm, n = 30), 3–20-septate,

hyaline, wall 0.25–0.5 µm wide ($\bar{x}$ = 0.27 µm, n = 30), smooth, tip acute, base truncate to obconically truncate, hila 1–4 µm wide ($\bar{x}$ = 2.47 µm, n = 30), wall of the hila 0.25–0.5 µm thick ($\bar{x}$ = 0.27 µm, n = 30), thickened and darkened.

Hosts – *Brassica alba* (L.) Rabenh., *B. alboglabra* L.H. Bailey, *B. campestris* L., *B. chinensis* L., *B. integrifolia* (H. West) Rupr., *B. juncea* (L.) Coss., *B. kaber* (DC.) L.C. Wheeler, *B. napus* L., *B. nigra* (L.) W.D.J. Koch, *B. oleracea* L., *B. pekinensis* (Lour.) Rupr., *B. rapa* L., *Brassica* sp., *Matthiola incana* (L.) W.T. Aiton, *Raphanus sativus* L. (Brassicaceae).

Distribution – **Africa:** Angola, Kenya, Malawi, Mauritius, Nigeria, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda; **Asia:** China, India, Indonesia, Japan, Kazakhstan, Korea, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Taiwan, Thailand; **Europe:** Armenia, Belarus, Estonia, Great Britain, Latvia, Lithuania, Russia, Ukraine; **North America and West Indies:** Cuba, Dominican Republic, Jamaica, Puerto Rico, Trinidad and Tobago, USA (AL, CA, DE, FL, GA, HI, IN, LA, MS, NC, NH, NJ, OK, TX, VA); **Australia; Oceania:** Niue, Papua New Guinea, Solomon Islands; **South America:** Brazil, Colombia, Peru.

Material examined – Vientiane Capital, Xaythany District, Xay Village, garden, on leaves of *Brassica integrifolia*, 21 April 2006, P. Phengsintham (P14); ibid., 9 June 2007, P. Phengsintham (P281).

Notes – The collections from Laos have conidiophores up to 232 µm long, which is shorter than the conidiophores of *Cercospora brassicicola* described by Chupp (1954), which are up to 500 µm. However, the length of conidiophores in *Cercospora* spp. is often extremely variable and depends on external ecological conditions (Crous & Braun 2003).

Literature – Saccado (1913: 1413), Chupp (1954: 180), Ellis (1971: 255), Crous & Braun (2003: 88), To-anun et al. (2011: 51).

(9) *Cercospora cannabis* Hara & Fukui, Dis. Cult. Plant, 2nd ed.: 594, 1925. Figs 18–19.

= *Cercosporina cannabis* Hara, Pathology of crop plants: 195, 1928.

≡ *Cercospora cannabis* (Hara) Chupp, Trans. Wisconsin Acad. Sci. 36: 262, 1946.

= *Cercospora hosodae* Fukui (*hosodai*), J. Plant Protect. 12: 448, 1925.

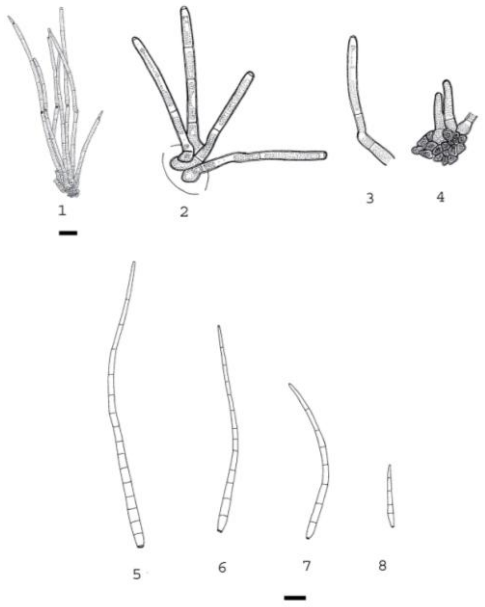

Fig. 16 – *Cercospora brassicicola* from *Brassica integrifolia*: 1–2. Stromata with attached conidiophores. 3. Conidiophore. 4. Stromata with attached young conidiophores. 5–8. Conidia. Bar = 10 µm.

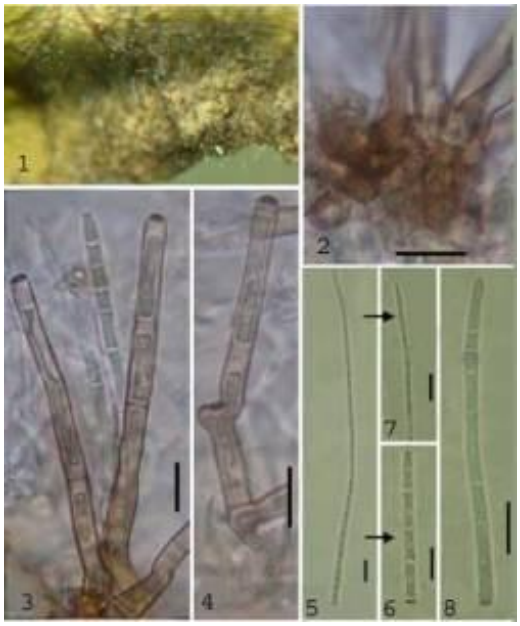

Fig. 17 – *Cercospora brassicicola* from *Brassica integrifolia*: 1. Caespituli. 2–3. Stromata with attached conidiophores. 4. Conidiophore. 5–8. Conidia. Bars = 10 µm.

Leaf spots circular to angular or a long the margin of the leaves, 1–15 mm diam., pale green or pale brown to dark brown or black in the center, and with pale green or yellowish margin. Caespituli amphigenous, dense, grey. Mycelium internal; hyphae branched, 2–3 µm wide ($\bar{x}$ = 2.66 µm, n = 10), septate, constricted at the septa, distance between septa 5–10 µm ($\bar{x}$ = 7.33 µm, n = 10), subhyaline or olivaceous brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.36 µm, n = 10), smooth. Stromata substomatal, intraepidermal, oval, ellipsoidal, 12–22 µm diam. ($\bar{x}$ = 20.5 µm, n = 5), dark brown, stromatal cells oval, angular, obclavate, 4–6 µm diam. ($\bar{x}$ = 5.2 µm, n = 7), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.62 µm, n = 7). Conidiophores solitary or fasciculate, arising from stromata (2–4 per fascicle), emerging through stomata, cylindrical, 12–105 × 3–5 µm ($\bar{x}$ = 50.6 × 4 µm, n = 9), 0–7-septate, distance between septa 8–22 µm ($\bar{x}$ = 14.8 µm, n = 12), pale olivaceous to medium brown, oldest ones uniform in colour and width, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.6 µm, n = 12), smooth, 1–2 times geniculate; conidiogenous cells terminal, 12–22 × 4–6 µm ($\bar{x}$ = 16.22 × 4.7 µm, n = 6); conidiogenous loci conspicuous, subcircular in outline, planate, 2–3.5 µm wide ($\bar{x}$ = 3.63 µm, n = 6), thickened, darkened. Conidia solitary, acicular, curved or undulate, 83–125 × 2.5–3 µm ($\bar{x}$ = 106.33 × 2.8 µm, n = 7), 6–9-septate, hyaline, wall 0.25–0.3 µm wide ($\bar{x}$ = 0.28 µm, n = 7), smooth, tip acute to subacute, base truncate to obconically truncate, hila 1.5–2.5 µm wide ($\bar{x}$ = 2 µm, n = 7), wall of the hila 0.25–0.3 µm thick ($\bar{x}$ = 0.27 µm, n = 7), thickened and darkened.

Hosts – *Cannabis sativa* L., *Humulus lupulus* L. (Cannabaceae).

Distribution – **Asia:** China, India, Japan, Nepal, Laos; **North America and West Indies:** USA (MO, WI); **South America:** Colombia.

Material examined – Khammoune Province, Nakai District, Nahao Village, garden, on leaves of *Cannabis sativa*, 20 July 2011, P. Phengsintham (P646).

Notes – The collection from Laos has conidiophores up to 125 µm long, which is longer than the conidiophores of *Cercospora cannabis* described by Chupp (1954) [conidiophores 10–100 × 3.5–5.5 µm and conidia 20–90 × 2–4 µm].

Literature – Chupp (1954: 394), Vasudeva (1963: 64), Katsuki (1965: 47).

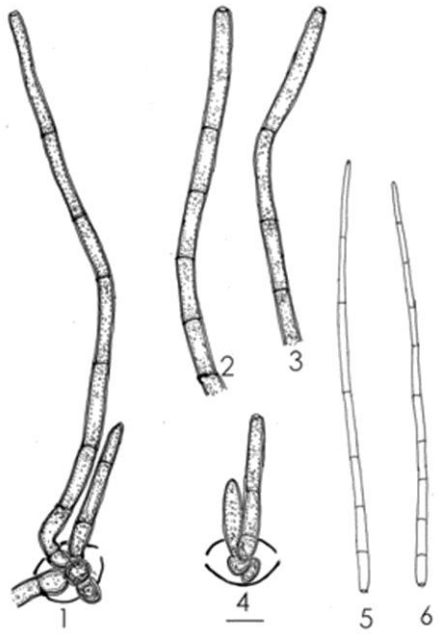

Fig. 18 – *Cercospora cannabis* on *Cannabis sativa*: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4. Stroma with attached conidiophores 5–6. Conidia. Bar = 10 µm.

Fig. 19 – *Cercospora cannabis* on *Cannabis sativa*: 1–3. Stroma with attached conidiophores. 4–5. Conidiophores. 6. Conidia. Bars = 10 µm.

(10) ***Cercospora capsicigena*** Bhartiya, R, Dubey & S.K. Singh, Indian Phytopathol. 5: 149, 2000. Figs 20–21.

(= *Cercospora apii* s. lat.)

Leaf spots suborbicular to irregular, 2–5 mm in diam., grey-brown in the centre, and with dark brown margin. Caespituli amphigenous, scattered, whitish or grey. Mycelium internal; hyphae branched, 2–3 µm wide ($\bar{x}$ = 2.25 µm, n = 9), septate, constricted at the septa, distance between septa 4–9 µm ($\bar{x}$ = 7 µm, n = 9), brownish or green-hyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.45 µm, n = 9), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 18–30 µm in diam. ($\bar{x}$ = 24 µm, n = 4), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 4–7 µm wide ($\bar{x}$ = 6 µm, n = 30), brown to dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.54 µm, n = 30), smooth. Conidiophores solitary or fasciculate, arising from stromata (2–7 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 21–63 × 4–6 µm ($\bar{x}$ = 39.8 × 5 µm, n = 15), 1–3-septate, not geniculate, distance between septa 5–34 µm ($\bar{x}$ = 14.4 µm, n = 30), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.6 µm, n = 30), smooth. Conidiogenous cells terminal, cylindrical, 13–34 × 4–5 µm ($\bar{x}$ = 21.3 × 4.14 µm, n = 7), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 µm wide ($\bar{x}$ = 2.07 µm, n = 5), wall 0.5–0.8 µm thick ($\bar{x}$ = 0.7 µm, n = 5), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 49–70 × 3–4 µm ($\bar{x}$ = 54.75 × 3.25 µm, n = 11), 4–5-septate, hyaline to subhyaline, thin-walled 0.3–0.5 µm ($\bar{x}$ = 0.35 µm, n = 11), smooth, tip acute, base truncate to obconically truncate; hila thickened and darkened, 1.5–3 µm wide ($\bar{x}$ = 2.12 µm, n = 11), wall of the hila 0.3–0.5 µm ($\bar{x}$ = 0.35 µm, n = 11) thick.

Colonies on PDA after 3 weeks at 25°C with grey-brown mycelium, reaching 6–8 mm diam.

Hosts – *Capsicum annuum* L. (Solanaceae).

Distribution – **Asia:** India, Laos, Thailand.

Material examined – Bolikhamsay Province, Lak 20 District, Nongsong Village, garden, on leaves of *Capsicum annuum*, 17 July 2008, P. Phengsintham (P325); Oudomxay Province, Houn District, *C. annuum*, 6 October 2008, P. Phengsintham (P380). GenBank accession no (ITS, KC677884; LSU, KC677918).

Notes – The collections from Laos are close to *C. apii* complex (Crous & Braun, 2003).

Literature – Crous & Braun (2003: 103).

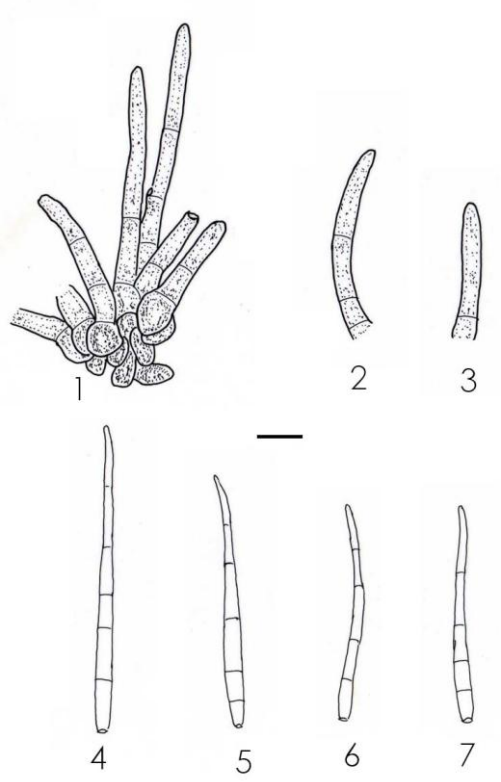

Fig. 20 – *Cercospora capsicigena* on *Capsicum annuum* from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–7. Conidia. Bar = 10 µm.

(11) *Cercospora cocciniae* Munjal, Lall & Chona, Indian Phytopathol. 12: 86, 1959. Figs 22–23.

Leaf spots oval to elliptic in shape, 1–6 mm diam. ($\bar{x}$ = 4 µm, n = 11), white-grey in the centre, and with a white-greyish margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal, substomatal, 15–35 µm diam. ($\bar{x}$ = 24.1 µm, n = 18), brown, composed of swollen hyphal cells, subglobose, angular in out-

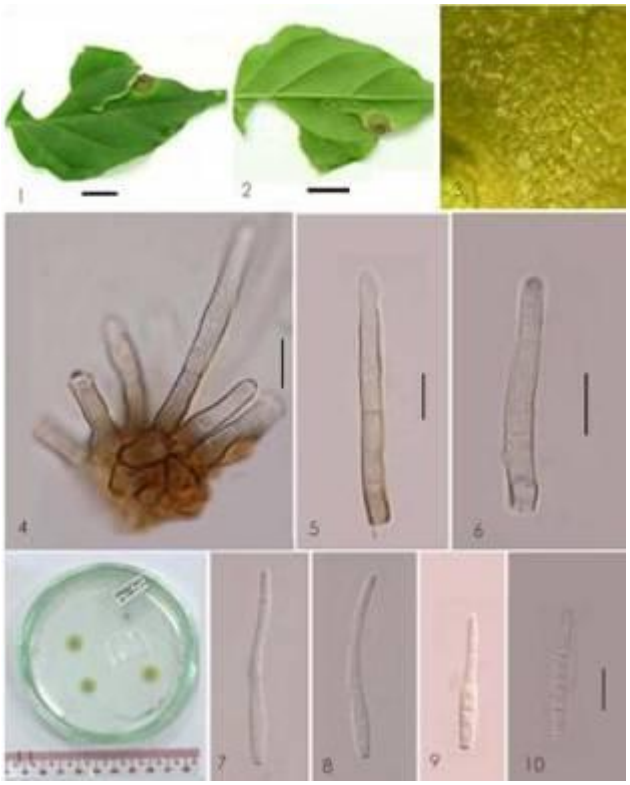

Fig. 21 – *Cercospora capsicigena* on *Capsicum annuum* from leaf spots: 1–2. Lesions on host leaf (1. upper surface. 2. lower surface). 3. Caespituli. 4. Stroma with attached conidiophores. 5–6. Conidiophores. 7–10. Conidia. 11. Culture. Bars 1–2 = 10 mm, 4–10 = 10 µm.

line, 3–7 µm wide ($\bar{x}$ = 5.1 µm, n = 30), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.79 µm, n = 25), smooth. Conidiophores solitary or fasciculate, arising from stromata (2–17 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 7–92 × 4–7 µm ($\bar{x}$ = 32 × 5 µm, n = 26), 0–4-septate, distance between septa 7–35 µm ($\bar{x}$ = 16.28 µm, n = 21), medium brown, paler at the apex, wall 0.8–1 µm wide ($\bar{x}$ = 0.82 µm, n = 26), smooth, 0–1-times geniculate, width uniform. Conidiogenous cells integrated, terminal, cylindrical, 10–24 × 3–5 µm ($\bar{x}$ = 17 × 4.21 µm, n = 17), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 µm wide ($\bar{x}$ = 2.45 µm, n = 30), dark brown, wall 0.8–1 µm thick ($\bar{x}$ = 0.84 µm, n = 30). Conidia solitary, acicular, straight to curved, 24–180 × 3–7 µm ($\bar{x}$ = 53.61 × 3.92 µm, n = 26), 3–13-septate, hyaline, thin-walled, smooth, tip subobtuse to acute, base truncate to obconically truncate, hila thickened and darkened, 1.5–3 µm wide ($\bar{x}$ = 2.21 µm, n = 19), wall of the hila 0.5–1 µm ($\bar{x}$ = 0.81 µm, n = 19) thick.

Hosts – *Coccinia indica* Wight & Arn., *Momordica charantia* L. (Cucurbitaceae).

Distribution – **Asia:** Brunei, India, Laos, Pakistan, Thailand.

Material examined – Vientiane Capital, Xaythany District, Xay Village, on leaves of *Coccinia indica*, Xay Village, 28 June 2006, P. Phengsintham (P106); ibid., on leaves of *C. indica*, 28 December 2008, P. Phengsintham (P392).

Notes – Crous & Braun (2003) classified this species as morphologically distinct from *C. apii* s. str. by having obclavate conidia. The Laos collections have distinctly obclavate conidia, with long obconically truncate bases. The conidiophores and conidia are similar to those reported from Brunei (Braun & Sivapalan 1999).

Literature – Chupp (1954: 65), Hsieh & Goh (1990: 98), Braun & Sivapalan (1999), Crous & Braun (2003: 129).

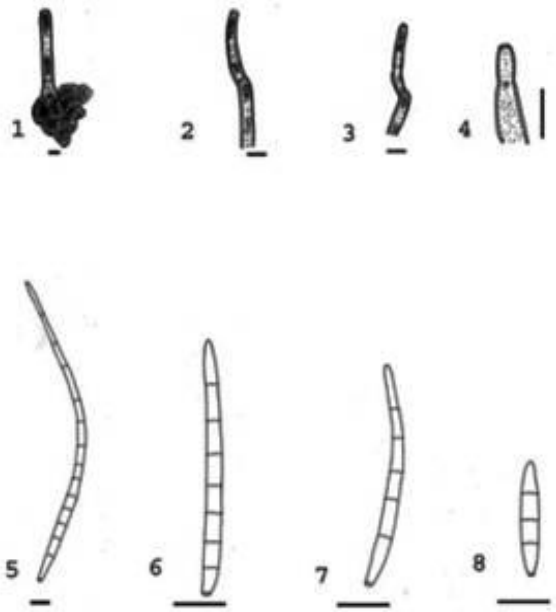

Fig. 22 – *Cercospora cocciniae* on *Coccinia indica*: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–8. Conidia. Bars = 10 µm.

Fig. 23 – *Cercospora cocciniae* on *Coccinia indica* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stromata with Conidiophore. 4–5. Conidiophores. 6–8. Conidia. 9. Based of conidia. Bars 1–2 = 10 mm, 3–9 = 10 µm.

(12) *Cercospora duranticola* sp. nov.

Figs 24–25.

MycoBank, MB 801726.

Diagnosis – *Differs from the Cercospora apii s. lat. complex in having uniformly short conidiophores arising from well-developed stromata and acicular to narrowly obclavate conidia with truncate to distinctly obconically truncate base.*

Leaf spots circular or angular, 1–4 mm diam., grayish brown to brown in the centre, and with brown to dark brown margin. Caespituli amphigenous, scattered, yellow to brown. Mycelium internal; hyphae branched, 2–4 µm wide ($\bar{x}$ = 3 µm, n = 6), septate, constricted at the septa, distance between septa 5–10 µm ($\bar{x}$ = 7.1 µm, n = 6), brownish or green-hyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.36 µm, n = 6), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata well-developed, oval to ellipsoidal, substomatal, 17–52 µm diam. ($\bar{x}$ = 30.3 µm, n = 8), brown, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 5–10 µm wide ($\bar{x}$ = 6.6 µm, n = 27), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.67 µm, n = 27), smooth. Conidiophores fasciculate, arising from stromata (1–11 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical to distinctly geniculate, uniformly short, 17–35 × 4–5 µm ($\bar{x}$ = 23.1 × 4.6 µm, n = 11), 0–2-septate, distance between septa 5–25 µm ($\bar{x}$ = 15.9 µm, n = 14), medium brown, paler at the apex, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.47 µm, n = 14), smooth, 0–2-times geniculate, pale and more narrow towards the tip. Conidiogenous cells integrated, terminal, cylindrical, 8–25 × 3–5 µm ($\bar{x}$ = 17.3 × 4.28 µm, n = 9), pale brown; conidiogenous loci conspicuous, subcircular, 1–3 µm wide ($\bar{x}$ = 1.73 µm, n = 26), dark brown, wall 0.3–0.8 µm thick ($\bar{x}$ = 0.31 µm, n = 26). Conidia solitary, acicular to narrowly obclavate, straight to curved, 24–144 × 2–4 µm ($\bar{x}$ = 52 × 3.35 µm, n = 10), 3–13-septate, hyaline, thin-walled, smooth, tip acute, base truncate to obconically truncate, hila thickened and darkened, 0.5–2 µm wide ($\bar{x}$ = 1.64 µm, n = 10), wall of the hila 0.3–0.5 µm ($\bar{x}$ = 0.32 µm, n = 10) thick.

Hosts – *Duranta repens* L. (Verbenaceae).

Distribution – **Asia:** Laos.

Material examined – Xiengkhouang Province, Phonsavanh District, Phonsavanh Village, urban area, on leaves of *Duranta repens*, 3 January 2010, P. Phengsintham (P515, MFLU12-2197, **holotype**). GenBank accession no (ITS, KC677885).

Notes – *Cercospora durantae* Chupp & A.S. Mull. is an invalid name. The type material was re-examined and the conidiogenous loci and hila at the base of conidia found to be unthickened and not darkened; the species was validated as *Pseudocercospora durantae* Pons, U. Braun & Crous (in Crous & Braun 2003). The collection from Laos is quite distinct and represents a true *Cercospora* s. str. different from *C. apii* s. lat. (sensu Crous & Braun 2003) by having uniformly short conidiophores arising from well-developed stromata and acicular to narrowly obclavate conidia with truncate to distinctly obconically truncate base. *Cercospora* on *Duranta* in Laos warrants to be considered a separate species.

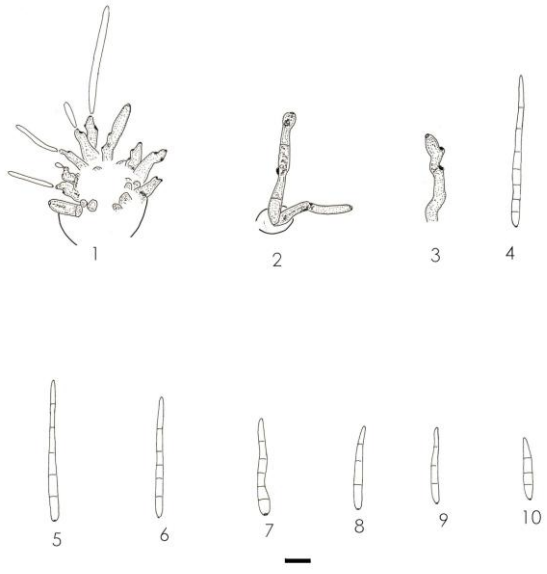

Fig. 24 – *Cercospora duranticola* on *Duranta repens*: 1–2. Stroma with attached conidiophores. 3. Conidiophore. 4–10. Conidia. Bar = 10 µm.

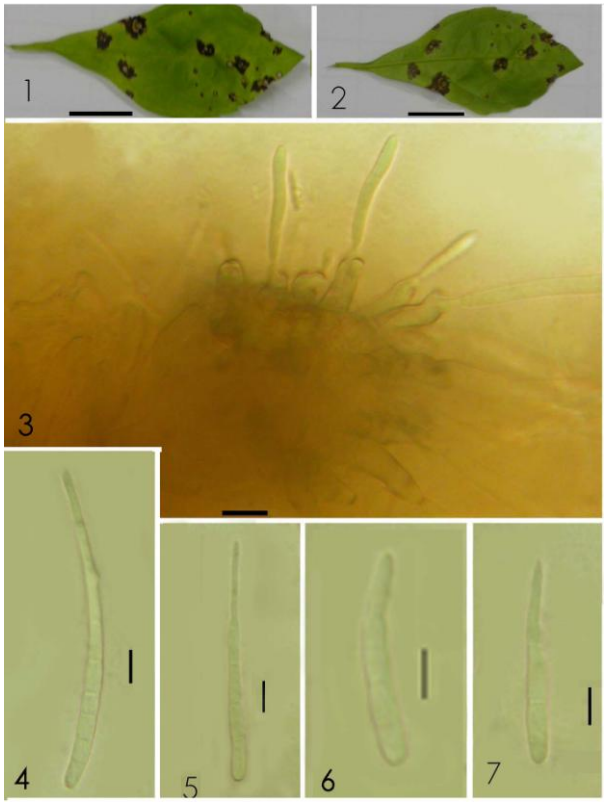

Fig. 25 – *Cercospora duranticola* on *Duranta repens* from leaf spots: 1. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stroma with attached conidiophores. 4–7. Conidia. Bars 1 = 10 mm, 3–7 = 10 µm.

(13) ***Cercospora erechtitis*** G.F. Atk., J. Elisha Mitchell Sci. Soc. 8: 66, 1892. Figs 26–27.

= *Cercospora erechtiticola* Sawada, nom. nud. (Chupp 1954: 134).

Leaf spots circular or suborbicular, 1–12 mm diam., greyish brown to dark brown in the centre, and brown to dark brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–4 µm wide ($\bar{x}$ = 3 µm, n = 30), septate, constricted at the septa, distance between septa 5–13 µm ($\bar{x}$ = 9.37 µm, n = 30), brownish or green-hyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.37 µm, n = 30), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata well developed, oval to ellipsoidal, substomatal, 15–30 µm diam. ($\bar{x}$ = 20 µm, n = 4), brown, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 5–14 µm wide ($\bar{x}$ = 9.23 µm, n = 30), brown to dark brown, wall 0.8–1 µm wide ($\bar{x}$ = 0.89 µm, n = 30), smooth. Conidiophores solitary or fasciculate, arising from stromata (2–5 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 4–35 × 5–8 µm ($\bar{x}$ = 24.1 × 5.68 µm, n = 19), 0–1-septate, distance between septa 7–22 µm ($\bar{x}$ = 15.2 µm, n = 19), medium brown, paler at the apex, wall 0.5–1 µm wide ($\bar{x}$ = 0.65 µm, n = 19), smooth, 0–1-times geniculate, width uniform. Conidiogenous cells integrated, terminal, cylindrical, 12–25 × 5–6 µm ($\bar{x}$ = 19.1 × 5.5 µm, n = 14), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 µm wide ($\bar{x}$ = 2.11 µm, n = 19), dark brown, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.6 µm, n = 19). Conidia solitary, acicular, straight to curved, 28–83 × 2–3 µm ($\bar{x}$ = 62 × 2.67 µm, n = 5), 3–7-septate, hyaline, thin-walled, smooth, tip acute, base truncate to obconically truncate, hila thickened and darkened, 2 µm wide ($\bar{x}$ = 2 µm, n = 5), wall of the hila 0.3–0.5 µm ($\bar{x}$ = 0.37 µm, n = 5) thick.

Hosts – *Erechtites hieraciifolius* (L.) Raf. ex DC., *E. valerianifolius* (Link ex Spreng.) DC., *Hieracium aurantiacum* L., *Ligularia* sp. (Asteraceae).

Distribution – **Asia:** Laos, Taiwan. **South America**: Colombia.

Material examined – Vientiane Capital, Xaythany District, Xay Village, garden, on leaves of *Erechtites valerianifolius*, 8 May 2006, P. Phengsintham (P35).

Notes – Morphologically *Cercospora erechtitis* is indistinguishable from *C. apii* s. lat. (Crous & Braun 2003). However, inoculation results (biological specialization) and molecular sequence analyses are not available, and hence, the taxonomic status of this species remains unclear. The conidiophores and conidia of the *Cercospora* from Laos (conidiophores 4–35 × 5–8 µm, conidia 28–83 × 2–3 µm) are shorter than *C. erechtitis* described in Hsieh & Goh (1990) [conidiophores 30–300 × 4–6 µm and conidia 40–120 × 2–4.5 µm]. The length of conidiophores and conidia in *Cercospora* species is, however, often variable, depending on age and external conditions (Crous & Braun 2003).

Literature – Chupp (1954: 134), Hsieh & Goh (1990: 65), Crous & Braun (2003: 35).

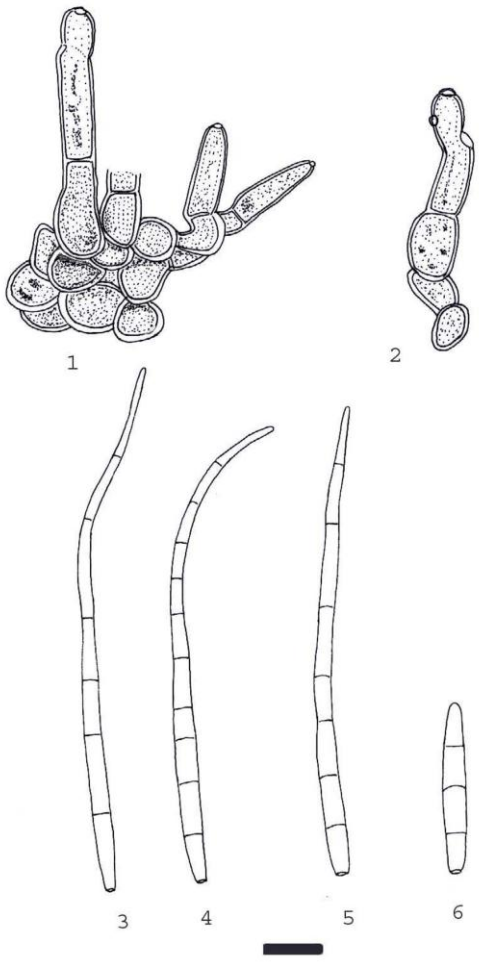

Fig. 26 – *Cercospora erechtitis* from *Erechtites valerianifolius*: 1. Stroma with attached conidiophores. 2. Stromatal cells with attached conidiophore. 3–6. Conidia. Bar = 10 µm.

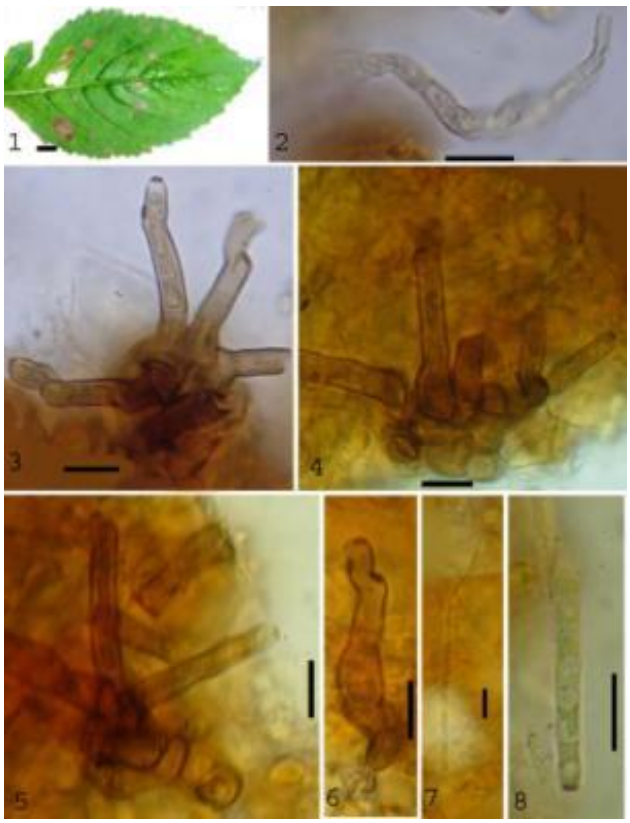

Fig. 27 – *Cercospora erechtitis* on *Erechtites valerianifolius*: 1. Lesions on host leaf (upper surface). 2. Internal hyphae. 3–5. Stromata with attached conidiophores. 6. Stromatal cells with attached conidiophore. 7. Conidium. 8. Hilum of conidium. Bars 1 = 10 mm, 2–8 = 10 µm.

(14) *Cercospora hyptidicola* R.K.Srivast., N. Srivast. & A.K. Srivast., Proc. Natl. Acad. Sci. India, Section B, Biol. Sci., 64: 111, 1994. Figs 28–29.

(= *Cercospora apii* s. lat.)

Leaf spots indistinct to large rusty brown blotches, 1–8 mm diam., reddish brown to grey-brown in the centre, with yellowish to pale brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–4 µm wide ($\bar{x}$ = 3.7 µm, n = 6), septate, constricted at the septa, distance between septa 5–14 µm ($\bar{x}$ = 8.17 µm, n = 6), brownish or green-hyaline, wall 0.25–0.3 µm wide ($\bar{x}$ = 0.29 µm, n = 6), smooth, forming plate like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, substomatal, 13–24 µm diam. ($\bar{x}$ = 17.5 µm, n = 4), brown, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 5–10 µm wide ($\bar{x}$ = 6.21 µm, n = 14), brown to dark brown, wall 0.8–1 µm wide ($\bar{x}$ = 0.87 µm,

n = 14), smooth. Conidiophores fasciculate, arising from stromata (1–7 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 30–120 × 4–6 µm ($\bar{x}$ = 63.3 × 5.33 µm, n = 12), 1–5-septate, distance between septa 9–24 µm ($\bar{x}$ = 15.4 µm, n = 30), medium brown, paler at the apex, wall 0.8–1 µm wide ($\bar{x}$ = 0.91 µm, n = 12), smooth, 0–3-times geniculate, width uniform; conidiogenous cells integrated, terminal, cylindrical, 5–30 × 3–6 µm ($\bar{x}$ = 18 × 4.4 µm, n = 12), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 µm wide ($\bar{x}$ = 2.1 µm, n = 14), dark brown, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.78 µm, n = 14). Conidia solitary, acicular, straight to curved, 22–170 × 1–3 µm ($\bar{x}$ = 68.1 × 2.35 µm, n = 20), 2–20-septate, hyaline, thin-walled, smooth, tip acute, base truncate to obconically truncate, hila thickened and darkened, 1–2 µm wide ($\bar{x}$ = 1.7 µm, n = 23), wall of the hila 0.5–1 µm ($\bar{x}$ = 0.67 µm, n = 23) thick.

Colonies on PDA after 3 weeks at 25°C, grey, 15 mm diam., spreading surface ridged and smooth, hyphae brown, 2–8 µm wide ($\bar{x}$ = 5.27 µm, n = 30), septate, constricted at the septa, distance between septa 4–25 µm ($\bar{x}$ = 14.37 µm, n = 30), hyaline, wall 0.8–1 µm thick ($\bar{x}$ = 0.87 µm, n = 30), smooth. Conidia not formed in culture.

Hosts – *Hyptis suaveolens* (L.) Poit. (Lamiaceae).

Distribution – **Asia:** India, Laos.

Material examined – Vientiane Capital, Xaythany District, Nong Viengkham Village, rice paddy, on leaves of *Hyptis suaveolens*, 26 April 2006, P. Phengsintham (P22).

Notes – The collection from Laos agrees with *Cercospora hyptidicola*, described from India on *Hyptis suaveolens*. *Cercospora hyptidicola* Chupp & A.S. Mull. (nom. inval.) is a synonym of *Pseudocercospora lycopodis* (Ellis & Everh.) Deighton (Crous & Braun 2003).

Literature – Chupp (1954: 268), Crous & Braun (2003: 223).

(15) *Cercospora ipomoeae* G. Winter, Hedwigia 26: 34, 1887. Figs 30–31.

= *Cercospora stuckertiana* Syd & P. Syd., Mem. Herb. Boissier 8(4): 2, 1900.

= *Cercospora dichondrae* Katsuki, Ann. Phytopathol. Soc. Japan 20: 72, 1955.

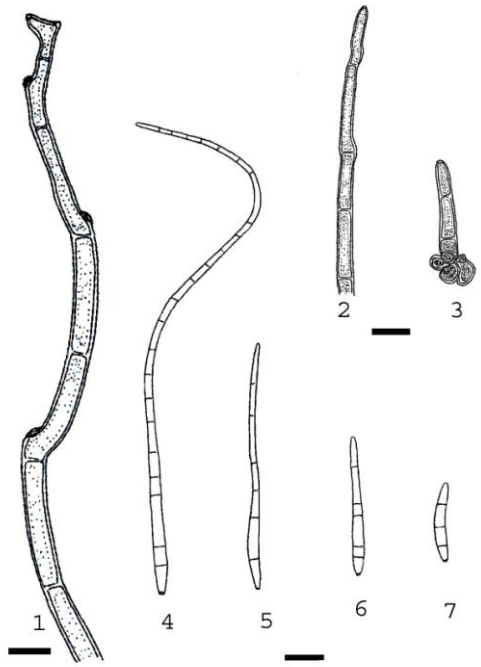

Fig. 28 – *Cercospora hyptidicola* from *Hyptis suaveolens*: 1–2. Conidiophores. 3. Stroma with attached conidiophore. 4–7. Conidia. Bars = 10 µm.

Fig. 29 – *Cercospora hyptidicola* on *Hyptis suaveolens*: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stroma. 4–6. Conidiophores. 7. Internal mycelium. 8–12. Conidia (12. Base of conidia). 13. Culture. Bars 1–2, 13 = 10 mm, 3–12 = 10 µm.

Leaf spots small to fairly large, suborbicular to irregular, 0.5–3 mm in diam., grey-brown in the centre, and with dark brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 1–4 µm wide ($\bar{x}$ = 2.97 µm, n = 30), septate, constricted at the septa, distance between septa 4–21 µm ($\bar{x}$ = 8.5 µm, n = 30), brownish or green-hyaline, wall 0.25–0.5 µm wide ($\bar{x}$ = 0.34 µm, n = 30), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 13–32 µm in diam. ($\bar{x}$ = 20.1 µm, n = 10), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 4–10 µm wide ($\bar{x}$ = 6.2 µm, n = 30), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.9 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (1–6 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 20–70 × 4–6 µm ($\bar{x}$ = 36.1 × 4.8 µm, n = 20), 1–5-septate, distance between septa 7–33 µm ($\bar{x}$ = 15.8 µm, n = 30), medium brown, paler at the apex, wall 0.5–1 µm wide ($\bar{x}$ = 0.63 µm, n = 20), smooth, 0–2-times geniculate. Conidiogenous cells integrated, terminal, cylindrical, 8–28 × 4–5 µm ($\bar{x}$ = 19.4 × 4.08 µm, n = 12), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 µm wide ($\bar{x}$ = 2.07 µm, n = 30), wall 0.5–0.8 µm thick ($\bar{x}$ = 0.53 µm, n = 30), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 12–152 × 2–5 µm ($\bar{x}$ = 59.7 × 3.03 µm, n = 30), 0–16-septate, hyaline to subhyaline, thin-walled 0.25–0.3 µm ($\bar{x}$ = 0.25 µm, n = 30), smooth; tip acute; base truncate to obconically truncate, hila thickened and darkened, 1–3 µm wide ($\bar{x}$ = 1.95 µm, n = 30), wall of the hila 0.3–0.8 µm ($\bar{x}$ = 0.51 µm, n = 30) thick.

Hosts – *Argyreia tiliifolia* (Desr.) Wight, *Convolvulus arvensis* L., *Dichondra repens* J.R. Forst. & G. Forst., *Hewittia bicolor* Wight & Arn., *Hewittia* sp., *Ipomoea acuminata* Ruiz & Pav., *I. alba* L., *I. aquatica* Forssk., *I. armata* Roem. & Schult., *I. asarifolia* (Desr.) Roem. & Schult., *I. batatas* (L.) Lam., *I. biloba* Forssk., *I. bona-nox* L., *I. cairica* (L.) Sweet, *I. carnea* Jacq., *I. clarensis* Alain, *I. coccinea* L., *I. cordofana* Choisy, *I. cymosa* (Desr.) Roem. & Schult., *I. eriocarpa* R. Br., *I. fistulosa* Mart. ex Choisy, *I. forsteri* A. Grey ex Hillebr., *I. hederacea* Jacq., *I. hildebrandtii* Vatke, *I. indica* (Burm.) Merr., *I. involucrata* P. Beauv., *I. kentrocarpa* Hochst. ex A. Rich., *I. lacunosa* L., *I. leari* Knight ex Paxton, *I. longicuspis* Meisn., *I. nil* (L.) Roth, *I. pandurata* (L.) G. Mey., *I. pes-caprae* (L.) R. Br., *I. pestigridis* L., *I. pes-caprae* subsp. *brasiliensis* (L.) Ooststr., *I. purpurea* (L.) Roth, *I. quamoclit* L., *I. ramonii* Choisy, *I. reptans* Poir., *I. sepiaria* Koenig ex Roxb., *I. triloba* L., *I. turpethum* (L.) R. Br., *I. villosa* Ruiz & Pav., *Jacquemontia tamnifolia* (L.) Griseb., *Merremia chryseides* (Ker Gawl.) Hallier f., *M. emarginata* (Burm. f.) Hallier f., *M. umbellata* (L.) Hallier f., *Operculina* sp. (Convolvulaceae).

Distribution – **Africa:** Ivory Coast, Kenya, Mauritius, Sierra Leone, Sudan, Tanzania; **Asia:** Brunei, China, Hong Kong, India, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Pakistan, Taiwan, Thailand; **Europe:** Italy; **North America and West Indies:** Antigua and Barbuda, Barbados, Costa Rica, Cuba, Guam, Jamaica, Kansas, Panama, Puerto Rico, USA (AL, GA, FL, HI, IL, IN, KS, MO, NC, NE, NJ, OH, TX, VA); **Australia**; **Oceania:** America Samoa, Cook Islands, Kiribati, Marshall Islands, New Caledonia, New Zealand, Fiji, Samoa, Solomon Islands, Papua New Guinea, Vanuatu; **South America:** Argentina, Brazil, Venezuela.

Material examined – Vientiane Capital, Xaythany District, Dong Makhai Village, rice paddy, on leaves of *Ipomoea involucrata*, 5 May 2006, P. Phengsintham (P34); Xiangkhouang Province, Paek District, Phonsavan Village, rice paddy, on leaves of *I. aquatica*, 3 January 2010, P. Phengsintham (P514).

Notes – The collections from Laos agree well with *C. ipomoeae* as circumscribed by Chupp (1954), Hsieh & Goh (1990) and other authors. *C. ipomoeae* is part of the *C. apii* complex (Crous & Braun 2003) from which it is morphologically barely distinguishable.

Literature – Chupp (1954: 171), Ellis (1976: 253), Hsieh & Goh (1990: 89–90), Crous & Braun (2003: 228).

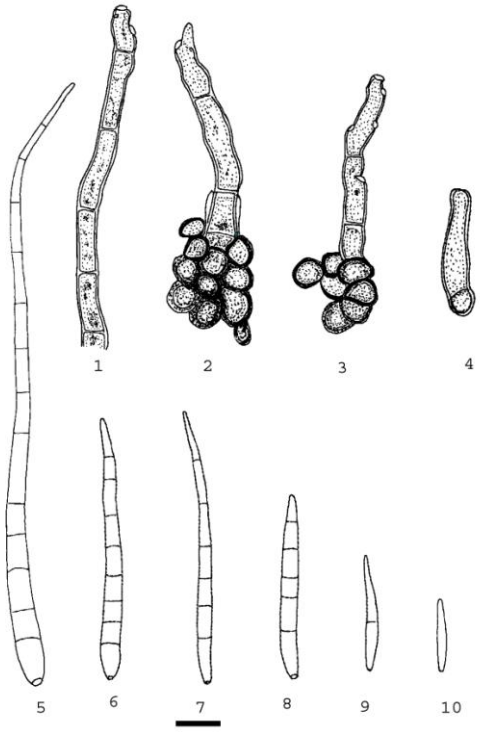

Fig. 30 – *Cercospora ipomoeae* on *Ipomoea involucrata* from leaf spots: 1. Conidiophore. 2–3. Stromata with attached conidiophores. 4. Conidiophore. 5–10. Conidia. Bar = 10 µm.

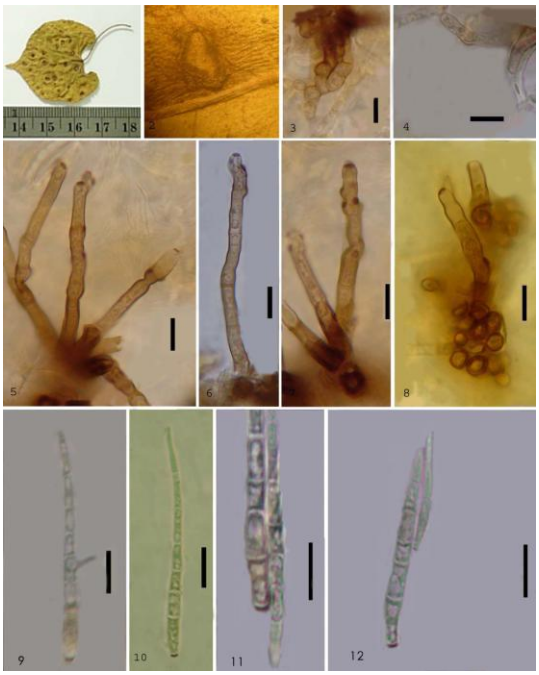

Fig. 31 – *Cercospora ipomoeae* on *Ipomoea involucrata* from leaf spots: 1. Lesions on host leaf (lower surface). 2. Caispituli. 3. Stromatal cells. 4. Internal mycelia. 5–8. Stromata with attached conidiophores. 9–12. Conidia. Bars 1 = 10 mm, 3–12 = 10 µm.

(16) ***Cercospora meliicola*** Speg., Annales Mus. Nac. Buenos Aires 20: 440, 1910. Figs 32–33.

Leaf spots small to fairly large, suborbicular to irregular, 0.5–2 mm in diam., grey-brown in the centre, and with dark brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal, inconspicious. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 10–34 µm in diam. ($\bar{x}$ = 24.7 µm, n = 5), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–10 µm wide ($\bar{x}$ = 8.5 µm, n = 7), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.7 µm, n = 7), smooth. Conidiophores solitary or fasciculate, arising from stromata (2–16 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 10–402 × 4–5 µm ($\bar{x}$ = 200 × 4.4 µm, n = 13), 0–15-septate, distance between septa 7–40 µm ($\bar{x}$ = 24 µm, n = 12), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.65 µm, n = 12), smooth, geniculate. Conidiogenous cells terminal, cylindrical, 13–30 × 4–5 µm ($\bar{x}$ = 19.4 × 4 µm, n = 12), pale brown; conidiogenous loci conspicuous, subcircular, 3–4 µm wide ($\bar{x}$ = 3.25 µm, n = 4), wall 0.5–0.8 µm thick ($\bar{x}$ = 0.56 µm, n = 12), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 83–105 × 3–4 µm ($\bar{x}$ = 94 × 3.5 µm, n = 5), 5–14-septate, hyaline to subhyaline, thin-walled 0.25–0.3 µm ($\bar{x}$ = 0.28 µm, n = 5), smooth, tip acute, base truncate to obconically truncate; hila thickened and darkened, 2–3 µm wide ($\bar{x}$ = 2.5 µm, n = 5), wall of the hila 0.3–0.35 µm ($\bar{x}$ = 0.32 µm, n = 5) thick.

Colonies on PDA after 3 weeks at 25°C are brown-grey mycelium, reaching 25–30 mm diam.

Hosts – *Azadirachta indica* A. Juss., *Chukrasia tabularis* A. Juss., *Melia azadirachta* L., *Toona sinensis* (A. Juss.) M. Roem. (Meliaceae).

Distribution – **Asia:** China, India, Laos; **North America and West Indies:** Panama; **South America:** Argentina.

Material examined – Khammoune Province, Yommalad District, Nahao Village, mixed deciduous forest, on leaves of *Chukrasia tabularis*, 6 March 2010, P. Phengsintham

(P581). GenBank accession no (LSU, KC677920).

Notes – The collection from Laos agrees well with *C. apii* s. lat. as circumscribed by Crous & Braun (2003) [conidiophores 50–250 × 4.5–7 µm and conidia 40–200 × 2–4.4 µm].

Literature – Saccado (1913: 639–640), Chupp (1954: 385).

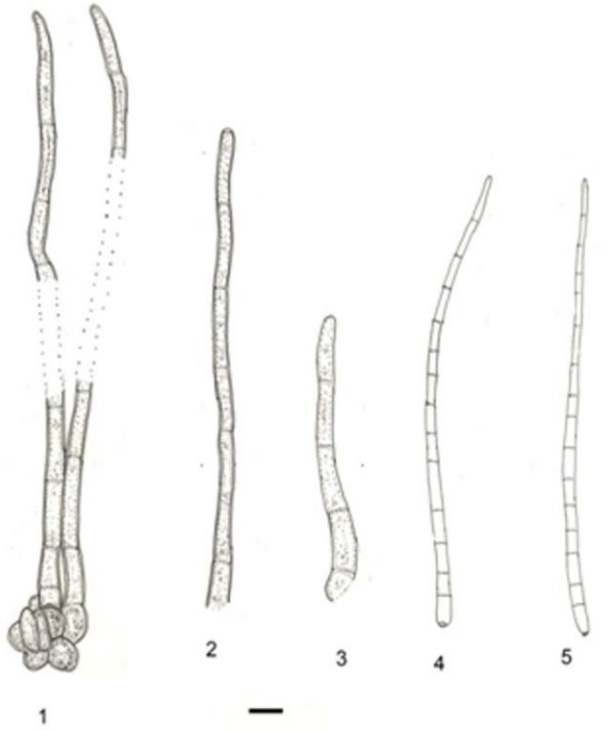

Fig. 32 – *Cercospora meliicola* on *Chukrasia* from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–5. Conidia. Bar = 10 µm.

(17) *Cercospora nasturtii* Pass. Hedwigia 16: 124, 1877. Figs 34–35.

Leaf spots orbicular in shape, 1–7 mm diam., pale tan to dingy grey in the centre, and with a dark grey or brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal. Hyphae branched, 2–5 µm wide ($\bar{x}$ = 3.5 µm, n = 6); septate, constricted at the septa, distance between septa 8–14 µm long ($\bar{x}$ = 8.5 µm, n = 6); brown to subhyaline; wall 0.3–0.5 µm ($\bar{x}$ = 0.43 µm, n = 6), smooth. Stromata developed, oval to ellipsoidal, substomatal, up to 15 µm diam. wide, brown, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 5–10 µm wide ($\bar{x}$ = 7.14 µm, n = 7), brown to dark brown, wall 0.8–1 µm wide ($\bar{x}$ = 0.84 µm, n = 7), smooth.

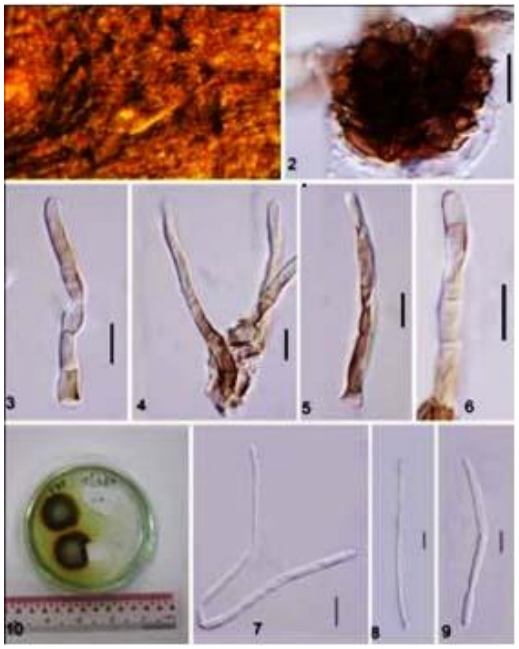

Fig. 33 – *Cercospora meliicola* on *Chukrasia tabularis* from leaf spots: 1 Caespituli. 2. Stroma. 3–6. Conidiophores. 7–9. Conidia. 10. Culture. Bars 2–9 = 10 µm, 10 = 10 mm.

Conidiophores solitary or fasciculate, arising from stromata (2–12 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 20–134 × 4–5 µm ($\bar{x}$ = 64.4 × 4.9 µm, n = 15), 1–9-septate, distance between septa 3–22 µm ($\bar{x}$ = 12.4 µm, n = 30), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.56 µm, n = 15), smooth, 0–2-times geniculate, width uniform. Conidiogenous cells integrated, terminal, cylindrical, 14–55 × 4–5 µm ($\bar{x}$ = 27.4 × 4.5 µm, n = 9), pale brown; conidiogenous loci conspicuous, subcircular, 2–3 µm wide ($\bar{x}$ = 2.42 µm, n = 9), dark brown, wall 0.8–1 µm thick ($\bar{x}$ = 0.81 µm, n = 9). Conidia solitary, acicular, straight to curved, 22–75 × 3–4 µm ($\bar{x}$ = 36.4 × 3.7 µm, n = 10), 1–7-septate, hyaline, thin-walled, smooth, tip subotuse to acute, base truncate to obconically truncate, hila thickened and darkened, 2–3 µm wide ($\bar{x}$ = 2.5 µm, n = 12), wall of the hila 0.5–1 µm ($\bar{x}$ = 0.77 µm, n = 12) thick.

Hosts – *Arabis glabra* (L.) Bernh., *A. pendula* L., *Barbarea orthoceras* Ledeb., *Berteroa incana* (L.) DC., *Cardamine flexuosa* With., *Descurainia pinnata* (Walter) Britton, *Lepidium sativum* L., *Nasturtium officinale* W.T. Aiton, *Rorippa amphibia* (L.) Besser, *R. indica* (L.) L.H. Bailey, *R. islandica* (Oeder ex

Murray) Borbás, *R. montana* (Wall. ex Hook. f. & Thomson) Small, *R. palustris* (L.) Besser, *R. sinapis* (Burm. f.) Ohwi & H. Hara, *R. sinuata* (Nutt.) Hitchc., *R. sylvestris* (L.) Besser, *Rorippa* sp., *Sisymbrium officinale* (L.) Scop., *Stanleya pinnata* (Pursh) Britton (Brassicaceae).

Distribution – **Africa:** Angola, Mauritius, Morocco, Sao Tome Principe; **Asia:** Bhutan, China, Hong Kong, India, Japan, Korea, Kirghizia, Laos, Taiwan, Thailand; **Europe:** Armenia, Azerbaijan, Estonia, Germany, Great Britan, Italy, Latvia, Lithuania, Romania, Russia, Slovakia, Slovenia, Ukraine; **North America and West Indies:** Canada, Cuba, Dominican Republic, Mexico, Panama, USA (CA, CO, DE, FL, HI, IN, KS, NH, OK, TX, WI, WV); **Oceania:** New Caledonia, New Zealand, Papua New Guinea, Vanuatu; **South America:** Brazil.

Material examined – Vientiane Capital, Xaythany District, Dong Dok Village, garden, on leaves of *Nasturtium officinale*, 2 February 2007, P. Phengsintham (P220); Xiangkhouang Province, Kham District, Napa Village, on leaves of *N. officinale*, 3 January 2010, P. Phengsintham (P503). GenBank accession no (ITS, KC731559; LSU, KC731563).

Notes – In the Lao collections the conidiophores are 20–134 × 4–5 µm and the conidia are 22–75 × 3–4 µm, which is similar to those reported by Hsieh & Goh (1990) [conidiophores 35–90 × 4–6 µm and conidia 20–85 × 3–4.5 µm] and Chupp (1954) [conidiophores 20–100(–150) × 4–6.5 µm and conidia 20–85(–125) × 4–5(–6) µm].

Literature – Saccardo (1886: 533), Chupp (1954: 183), Katsuki (1965: 26), Hieh & Goh (1990: 95), Shin & Kim (2001: 89), Crous & Braun (2003: 289).

(18) *Cercospora nicotianae* Ellis & Everh., Proc. Acad. Sci. Philadelphia 45: 170, 1893. Figs 36–37.

(= *Cercospora apii* s. lat.)

Leaf spots small to fairly large, suborbicular to irregular, 0.5–3 mm in diam., grey-brown in the centre, and with dark brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 3–6 µm wide ($\bar{x}$ = 4.2 µm, n = 15), septate, constricted at the septa, distance between septa

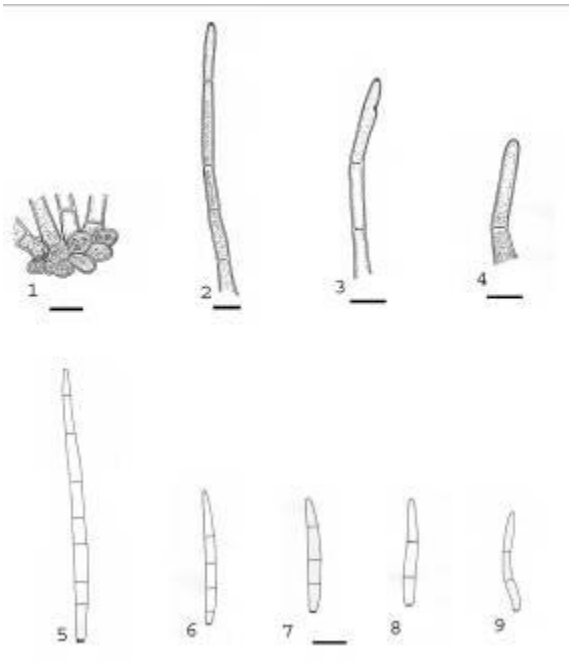

Fig. 34 – *Cercospora nasturtii* from *Nasturtium officinale*: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–9. Conidia. Bars = 10 µm.

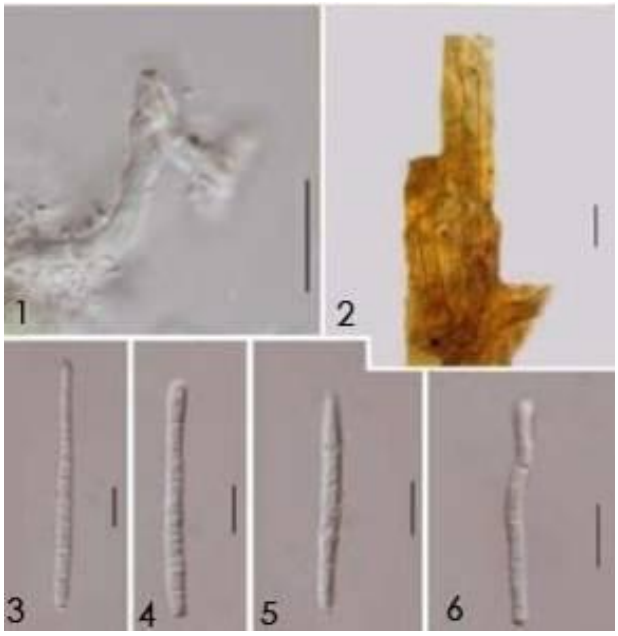

Fig. 35 – *Cercospora nasturtii* from *Nasturtium officinale*: 1. Internal mycelia. 2. Stroma with attached conidiophores. 3–6. Conidia. Bars = 10 µm.

7–15 µm ($\bar{x}$ = 10.73 µm, n = 15), brownish or green-hyaline, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.52 µm, n = 15), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to

medium-sized, globular to subglobular, substomatal and intraepidermal, 10–33 µm in diam. ($\bar{x}$ = 22.7 µm, n = 7), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 6–15 µm wide ($\bar{x}$ = 7.9 µm, n = 30), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.66 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (1–8 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 20–395 × 4–7 µm ($\bar{x}$ = 237 × 5.54 µm, n = 13), 1–18-septate, distance between septa 9–40 µm ($\bar{x}$ = 24.3 µm, n = 30), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.69 µm, n = 30), smooth, 0–2-times geniculate. Conidiogenous cells terminal, cylindrical, 9–40 × 3–4 µm ($\bar{x}$ = 24 × 3.5 µm, n = 8), pale brown; conidiogenous loci conspicuous, subcircular, 3–4 µm wide ($\bar{x}$ = 3.25 µm, n = 4), wall 0.5–0.8 µm thick ($\bar{x}$ = 0.57 µm, n = 4), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 94–267 × 3–4 µm ($\bar{x}$ = 149.6 × 3.6 µm, n = 5), 5–8-septate, hyaline to subhyaline, thin-walled 0.3 µm ($\bar{x}$ = 0.3 µm, n = 5), smooth, tip acute, base truncate to 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.

Hosts – *Nicotiana tabacum* L. and other species of this genus (Solanaceae)

Distribution – Worldwide.

Material examined – Khammoune Province, Yommalad District, Nahao Village, garden, on leaves of *Nicotiana tabacum*, 6 March 2010, P. Phengsintham (P583).

Notes – The collection from Laos agrees well with *C. apii* as circumscribed by Crous & Braun (2003). *C. nicotianae* is part of the *C. apii* complex from which it is morphologically barely distinguishable. *C. nicotianicola* J.M. Yen (Yen & Lim 1980) is distinguished from *C. nicotianae* by its small whitish leaf spots, long conidiophores strongly geniculate in the upper half and long acicular to filiform conidia, up to 480 µm in length.

Literature – Yen & Lim (1980: 163), Crous & Braun (2003).

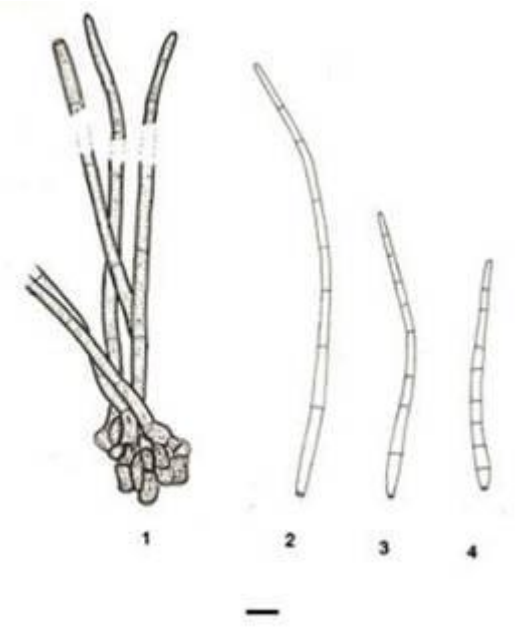

Fig. 36 – *Cercospora nicotianae* on *Nicotiana tabacum* from leaf spots: 1. Stroma with attached conidiophores. 2–4. Conidia. Bar = 10 µm.

Fig. 37 – *Cercospora nicotianae* on *Nicotiana tabacum* from leaf spots: 1. Lesions on host leaf (lower surface). 2. Internal mycelium. 3–4. Stromata with attached conidiophores. 5–6. Conidiophores. 7–9. Conidia. Bars 1 = 10 mm, 2–9 = 10 µm.

(19) ***Cercospora paederiicola*** Y.L. Guo, Mycosystema 4: 119, 1991. Figs 38–39.

Leaf spots subcircular to irregular, 1–8 mm diam., pale brown to greyish brown in the center, and with dark brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–7 µm wide ($\bar{x}$ = 3.76 µm, n = 30), septate, constricted at the septa, distance between septa 5–16 µm ($\bar{x}$ = 9.69 µm, n = 17), brownish or green-hyaline, wall 0.3–0.8 µm wide ($\bar{x}$ = 0.52 µm, n = 30), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata well-developed, oval to ellipsoidal, 15–60 µm diam. ($\bar{x}$ = 27 µm, n = 8), brown, substomatal, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–10 µm wide ($\bar{x}$ = 6 µm, n = 12), brown to dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.53 µm, n = 12). Conidiophores fasciculate, arising from stromata (2–7 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 20–126 × 4–6 µm ($\bar{x}$ = 52.53 × 5 µm, n = 19), 1–4-septate, distance between septa 15–32 µm ($\bar{x}$ = 23.65 µm, n = 20), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.69 µm, n = 30), smooth, 0–2 times geniculate, width uniform; conidiogenous cells integrated, terminal or intercalary, cylindrical, 15–30 × 4–6 µm, pale brown; conidiogenous loci conspicuous, subcircular, 2–3 µm wide ($\bar{x}$ = 2.53 µm, n = 15), dark brown, wall 0.8–1 µm wide ($\bar{x}$ = 0.84 µm, n = 15). Conidia solitary, cylindrical or obclavate-cylindrical when short, fully developed long conidia always acicular, straight to curved, 25–157 × 1.5–3 µm ($\bar{x}$ = 85.86 × 2.7 µm, n = 8), 6–19-septate, hyaline, thin-walled, smooth, tip acute, base truncate to obconically truncate, hila 1.5–3 µm wide ($\bar{x}$ = 2.21 µm, n = 7), wall 0.3–0.5 µm ($\bar{x}$ = 0.41 µm, n = 8), thickened and darkened.

Colonies on PDA after 3 weeks at 25°C grey, 12 mm diam., spreading surface ridged and smooth, mycelium brown, hyphae 2–7 µm wide ($\bar{x}$ = 3.6 µm, n = 30), septate, constricted at the septa, distance between septa 4–17 µm long ($\bar{x}$ = 8.9 µm, n = 30), wall 0.44 µm, smooth. Conidia not formed in culture.

Host – *Paederia scandens* (Lour.) Merr. (Rubiaceae).

Distribution – **Asia:** China, Laos.

Material examined – Vientiane Capital, Xaythany District, Dong Makkhai Village, mixed deciduous forest, on leaves of *Paederia scandens*, 29 March 2006, P. Phengsintham (P01).

Notes – The collection from Laos differs from the Chinese type material of *Cercospora paederiicola* in having well-developed stromata, up to 60 µm diam. (versus small or almost lacking stromata, reduced to a few brown cells). Morphologically this species belongs to the *Cercospora apii* complex, characterized by having long, brown conidiophores and long, acicular, pluriseptate, hyaline conidia (Crous & Braun 2003).

Literature – Crous & Braun (2003: 35).

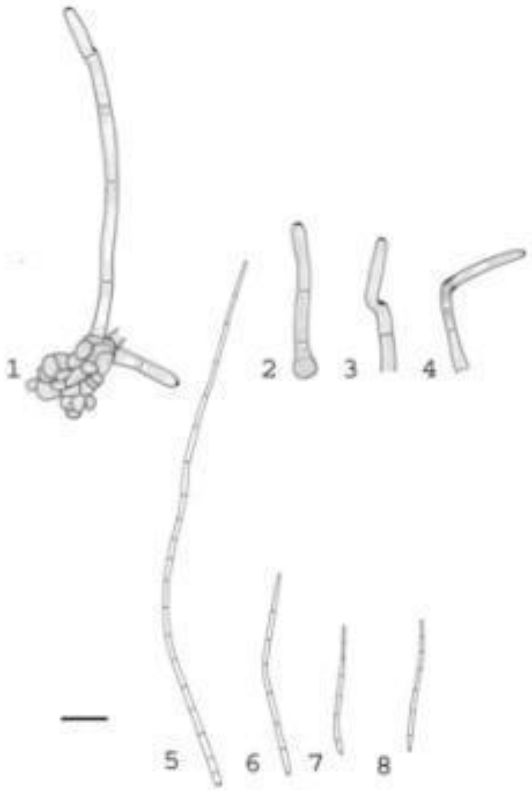

Fig. 38 – *Cercospora paederiicola* on *Paederia scandens* from leaf spots: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–8. Conidia. Bar = 10 µm.

(20) ***Cercospora physalidis*** Ellis, Amer. Naturalist 16: 810, 1882. Figs 40–41.

≡ *Cercosporina physalidis* (Ellis) Miura, South Manch, Railway Co. Agric. Rep. 27: 525, 1928.

= *Cercospora physalidicola* Ellis & Barthol., Erythea 4: 28, 1896.

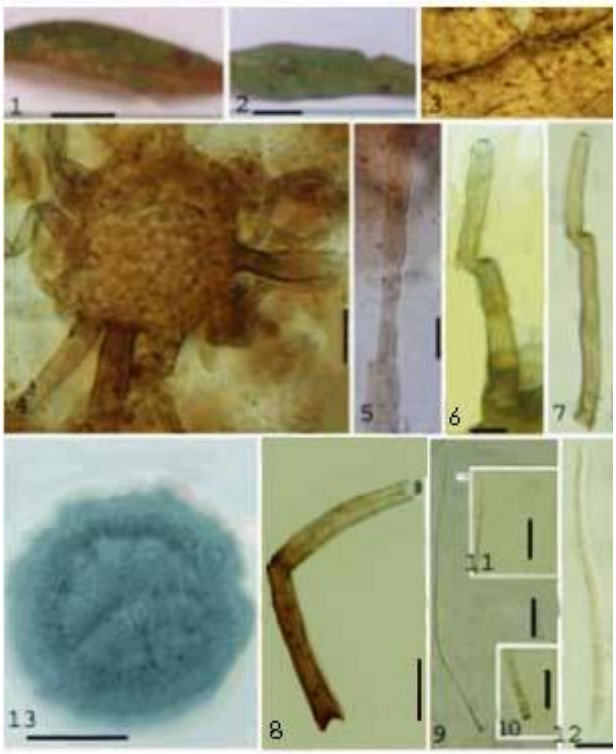

Fig. 39 – *Cercospora paederiicola* on *Paederia scandens* from leaf spots/lesions: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4. Stroma with attached young conidiophores. 5. Internal mycelium. 6–8. Conidiophores. 9–11. Conidia (10. base of conidium, 11. apex of conidium). 13. Culture. Bars 1–2, 13 = 10 mm, 3–12 = 10 µm.

= *Cercospora physalidicola* Speg., Anales Mus. Nac. Buenos Aires II, 3: 342, 1899 (nom. illeg.), homonym of *C. physalidicola* Ellis & Barthol., 1896.

= *Cercosporina physalidicola* Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 20: 425, 1910.

Leaf spots circular or suborbicular, 1–10 mm diam., greyish brown to medium brown in the centre, and with medium brown to dark brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 3–6 µm wide ($\bar{x}$ = 4.5 µm, n = 10), septate, constricted at the septa, distance between septa 6–14 µm ($\bar{x}$ = 10.3 µm, n = 10), brownish or green-hyaline, wall 0.25–0.8 µm wide ($\bar{x}$ = 0.48 µm, n = 10), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata well-developed, oval to ellipsoidal, substomatal, 15–32 µm diam. ($\bar{x}$ = 23 µm, n = 15), brown, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 4–12 µm wide ($\bar{x}$ = 7.83 µm, n = 30), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.72 µm, n = 30), smooth. Conidiophores solitary or fasciculate, arising from stromata (2–8 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 10–56 × 3–6 µm ($\bar{x}$ = 38 × 5.73 µm, n = 22), 0–2-septate, distance between septa 7–35 µm ($\bar{x}$ = 19.7 µm, n = 22), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.51 µm, n = 22), smooth; conidiogenous cells integrated, terminal, cylindrical, 17–35 × 4–6 µm ($\bar{x}$ = 21.8 × 4.62 µm, n = 14), pale brown; conidiogenous loci conspicuous, subcircular, 2–2.5 µm wide ($\bar{x}$ = 2.03 µm, n = 17), dark brown, wall 0.5–1 µm thick ($\bar{x}$ = 0.79 µm, n = 17). Conidia solitary, acicular, straight to curved, 52–59 × 3–4 µm ($\bar{x}$ = 55.5 × 3.4 µm, n = 6), 3–4-septate, hyaline, thin-walled, smooth, tip acute, base truncate to obconically truncate, hila thickened and darkened, 2 µm wide ($\bar{x}$ = 2 µm, n = 6), wall of the hila 0.5–0.8 µm ($\bar{x}$ = 0.65 µm, n = 6) thick.

Hosts – *Physalis alkekengi* L., *P. angulata* L., *P. franchetii* Mast., *P. heterophylla* Nees, *P. hybrida* Vilm., *P. lanceolata* Michx., *P. lobata* Torr., *P. longifolia* Nutt., *P. minima* L., *P. mollis* Nutt., *P. parviflora* Lag., *P. pubescens* L., *P. subglabrata* Mack. & Bush, *P. variabilis* Fries, *P. violacea* Carrière, *P. virginica* A. Grey, *P. viscosa* L., *Physalis* sp. (Solanaceae).

Distribution – **Africa:** Congo, Ethiopia, Gabon, Gambia, Ghana, Guinea, Kenya, Libya, Malawi, Mauritius, Morocco, Nigeria, Samalia, Sourth Africa, Seychelles, Sierra Leone, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe; **Asia:** Afghanistan, Bangladesh, Bhutan, Brunei, Cambodia, China, Guam, Hong Kong, India, Indonesia, Iraq, Japan, Jordan, Laos, Korea, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Yemen; **Europe:** Armenia, Bulgaria, Cyprus, Georgia, Germany, Romania, Russia, Spain, Switzerland, Ukraine; **North America and West Indies:** Barbados, Cuba, Dominican Republic, French Antilles, El Salvador, Guatemala, Haiti, Jamaica, Mexico, Panama, Puerto Rico, Trinidad and Tobago, Virgin islands, USA (CA, CO, Eastern states, FL, GA, HI, IA, IN, KS, KY, MI, NE, OK, TX, WI); **Australia; Oceania:** American Samoa,

Fiji, Micronesia, New Caledonia, New Zealand, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Vanuatu, Wallis and Futuna; **South America:** Argentina, Bolivia, Brazil, Colombia, Surinam, Venezuela.

Material examined – Vientiane Capital, Sisathanak District, Had Donchanh, garden, on leaves of *Physalis angulata*, 3 May 2006, P. Phengsintham (P33).

Notes – The collection from Laos has conidiophores (10–56 × 3–6 µm) and conidia (52–59 × 3–4 µm) with a similar size as *Cercospora physalidis*. They are, however, rather short, probably due to a relatively immature stage in which the fungus has been collected. The taxonomy of *Cercospora* on *Physalis* spp. and other hosts of the Solanaceae is still confused and unclear. Various *Cercospora* species described from different solanaceous hosts are morphologically indistinguishable, so that Braun & Melnik (1997) merged them in a single compound species under the oldest epithet '*physalidis*'. Since *C. physalidis* emend. U. Braun & Melnik is morphologically also indistinguishable from *C. apii*, Crous & Braun (2003) reduced the whole *C. physalidis* complex to synonym with *C. apii* s. lat. However, detailed inoculation experiments and molecular sequence analyses of this complex of fungi are not yet available. Hence, we prefer to use the traditional name.

Literature – Saccado (1886: 450), Chupp (1954: 533), Ellis (1976: 286), Braun & Melnik (1997), Crous & Braun (2003: 321).

(21) ***Cercospora ricinella*** Sacc. & Berl., Atti Reale Ist. Ven. Sci. Lett. Art. 6, Ser. 3: 721, 1885. Figs 42–43.

≡ *Cercosporina ricinella* (Sacc. & Berl.) Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 20: 429, 1910.

= *Cercospora albido-maculans* G. Winter, Hedwigia 24: 202. 1885; also in J. Mycol. 1: 124, 1885.

= *Cercospora ricini* Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires Ser. 2. 3: 343, 1899.

Leaf spots small, suborbicular to irregular, 0.5–2 mm in diam., grey-brown in the centre, and with dark brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal, inconspicuous. Stromata developed,

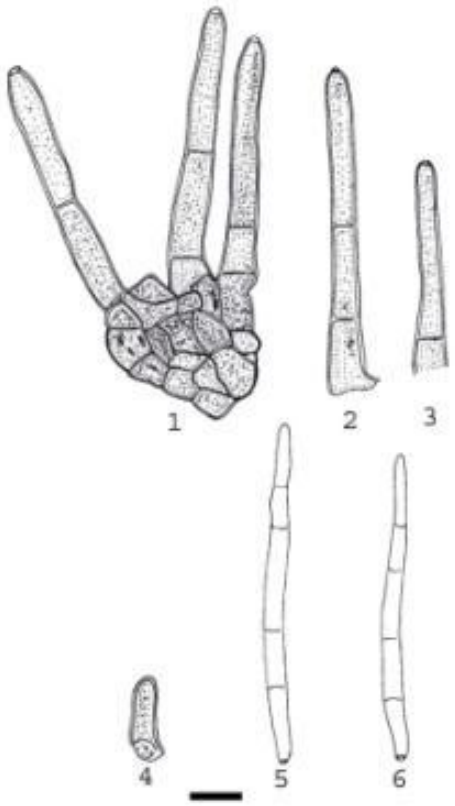

Fig. 40 – *Cercospora physalidis* from *Physalis angulata*: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–6. Conidia. Bar = 10 µm.

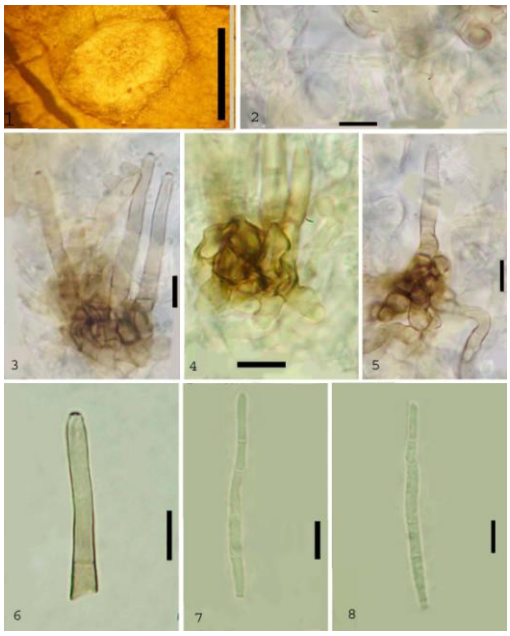

Fig. 41 – *Cercospora physalidis* on *Physalis angulata*: 1. Lesion on host leaf (upper surface). 2. Internal hyphae. 3–5. Stromata with attached conidiophores. 6. Conidiophore. 7–8. Conidia. Bars 1 = 10 mm, 2–8 = 10 µm.

small to medium-sized, globular to subglobular, substomatal and intraepidermal, 15–20 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, 3–7 µm wide ($\bar{x}$ = 5.3 µm, n = 9), brown to dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.58 µm, n = 9), smooth. Conidiophores fasciculate, arising from stromata (2–11 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 15–105 × 4–6 µm ($\bar{x}$ = 46.4 × 4.94 µm, n = 13), 1–3-septate, distance between septa 5–51 µm ($\bar{x}$ = 20.3 µm, n = 30), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.63 µm, n = 30), smooth, 0–2-times geniculate. Conidiogenous cells terminal, cylindrical, 10–28 × 4–6 µm ($\bar{x}$ = 17.4 × 4.8 µm, n = 8), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 µm wide ($\bar{x}$ = 2.12 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, 32–98 × 3–4 µm ($\bar{x}$ = 54.8 × 3.2 µm, n = 5), 3–11-septate, hyaline to subhyaline, thin-walled 0.25–0.3 µm ($\bar{x}$ = 0.29 µm, n = 5), smooth, tip acute, base truncate to obconically truncate; hila thickened and darkened 3–4 µm wide ($\bar{x}$ = 3.2 µm, n = 5), wall of the hila 0.25–0.3 µm ($\bar{x}$ = 0.28 µm, n = 5) thick.

Hosts – *Ricinus communis* L. (Euphorbiaceae).

Distribution – **Africa:** Angola, Egypt, Ethiopia, Ghana, Gulf States, Kenya, Malawi, Mauritius, Morocco, Mozambique, Nigeria, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zimbabwe; **Asia:** Bangladesh, Cambodia, China, India, Indonesia, Japan, Kazakhstan, Korea, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand; **Europe**: Bulgaria, Georgia, Russia, Ukraine; **North America and West Indies:** Barbados, Cuba, Dominican Republic, El Salvador, Guatemala, Haiti, Jamaica, Panama, Puerto Rico, Trinidad and Tobago, USA (CA, FL, MO); **Australia; Oceania:** French Polynesia, New Caledonia, Vanuatu; **South America:** Argentina, Brazil, Colombia, Venezuela.

Material examined – Phongsali Province, Phongsali District, Hathin Village, on leaves of *Ricinus communis*, riverbank, 23 June 2010, P. Phengsintham (P594); Vientiane Capital, Had Donechan, Mekong riverbank, on leaves of *R. communis*, 27 July 2010, P. Phengsintham (P606).

Notes – A true *Cercospora* s. str. close to or identical with *C. apii* s. lat. (Crous & Braun 2003). The collections from Laos agree with *C. ricinella* as circumscribed by Chupp (1954) [conidiophores 10–90 × 4.5–5 µm and conidia 15–120 × 2.5–4.5 µm], and Hsieh & Goh (1990) [conidiophores 10–90 × 4–6 µm and conidia 15–120 × 2.5–5 µm].

Literature – Chupp (1964: 229), Vasudeva (1963: 174), Katsuki (1965: 32), Ellis (1976: 259), Hsieh & Goh (1990: 112), Shin & Kim (2001: 97), Cous & Braun (2003: 255).

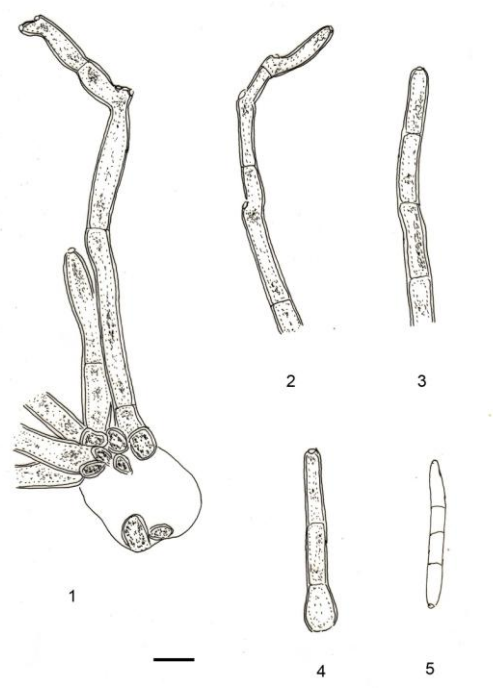

Fig. 42 – *Cercospora ricinella* on *Ricinus communis* from leaf spots: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5. Conidia. Bar = 10 µm.

(22) ***Cercospora senecionis-walkeri*** Phengsintham; Chukeatirote, McKenzie, K.D. Hyde & U. Braun, Pl. Pathol. & Quarantine 2(1): 70–71, 2012. Figs 44–45.

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. Caespituli amphigenous, conspicuous, scattered, dark brown. Mycelium internal, internal hyphae branched, 3–4 µm wide ($\bar{x}$

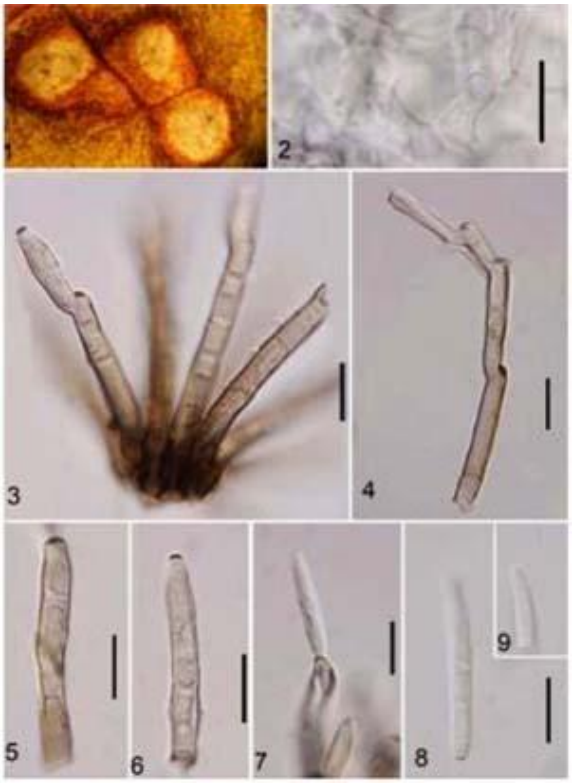

Fig. 43 – *Cercospora ricinella* on *Ricinus communis* from leaf spots: 1. Lesions and Caespituli on host leaf (lower surface). 2. Internal mycelium. 3. Stroma with attached conidiophores. 4–6. Conidiophores. 7. Conidiophore with attached conidium. 8. Conidium. 9. Apex of conidium. Bars = 10 µm.

=3.5 µm, n = 7), septate, constricted at the septa, distance between septa 12–14 µm ($\bar{x}$ = 13 µm, n = 7), subhyaline, wall 0.3 µm wide ($\bar{x}$ = 0.3 µm, n = 7), smooth. Stromata substomatal, intraepidermal, ellipsoidal, lenticular 10–25 µm diam. ($\bar{x}$ = 18.8 µm, n = 6), brown, stromatal cells 4–10 µm diam. ($\bar{x}$ = 6 µm, n = 20), wall 0.5–1 µm wide ($\bar{x}$ = 0.78 µm, n = 20), smooth. Conidiophores single or fasciculate, arising from stromata (1–8 per fascicle), 0–5 geniculate, cylindrical, straight to curved, 67–170 × 5–6 µm ($\bar{x}$ = 114 × 5.53 µm, n = 20), 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 × 4–5 µm ($\bar{x}$ = 21,8 × 4.5 µm, n = 9); 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 × 4–7 µm ($\bar{x}$ = 50.66 × 5.66 µm, n = 10), 0–8-sepate, slightly constricted at the septa, subhyaline or olivaceous-brown, smooth, wall 0.3–0.5 µm thick ($\bar{x}$ = 0.37 µm, n = 10), apex subobtuse, based truncate, hila 2–3 µm wide ($\bar{x}$ = 2.2 µm, n = 10), wall of the hila 0.5 µm wide ($\bar{x}$ = 0.5 µm, n = 10), darkened.

Hosts – *Senecio aureus* L., *S. aureus* var. *balamitea* Torr. & Grey, *S. walkeri* Arn. (Asteraceae).

Distribution – **Asia:** China, Laos, Thailand.

Material examined – Bokeo Province, Houay Xay District, Phimonsine Village, on leaves of *Senecio walkeri*, 20 February 2010, P. Phengsintham (P567, MFLU 12-2478, **holotype**). GenBank accession no (ITS, KC677887; LSU, KC677921).

Notes – Several *Cercospora* species have been described from *Senecio* spp., but all are distinct from this species. *C. senecionis* Ellis & Everh. was reduced to synonym with *C. jacquiniana* Thüm. by Chupp (1954). However, based on a re-examination of type material, Braun (in Braun & Mel'nik 1997) showed that *C. senecionis* represents a distinct true species of *Cercospora* with acicular conidia, similar to those of *C. apii* s. lat., but 80–200 µm long and above all 3–6 µm wide. *C. jacquiniana* is similar to *C. senecionis-walkeri* with regard to its conidial shape and pigmentation, but has much shorter conidiophores and shorter conidia, usually only 1–3-sepate, which are hyaline to faintly pigmented. Therefore, this species was reallocated to *Passalora* by Braun (in Braun & Mel'nik 1997). The Indian *C. senecionis-grahamii* Thirum. & Govindu (Thirumalachar & Govindu 1962) on *Senecio grahamii* Benth. is close to *C. senecionis*, but differs in having acicular to obclavate conidia, only 3–4 µm wide. Collections on *Senecio walkeri* from Laos and Thailand were originally referred to as *C. senecionicola* Davis (Phengsintham et al. 2012), but further examinations and a detailed comparison with the latter species showed that the Asian collections are not conspecific with this North American species, which is morphologically easily distinguishable from *C. senecionis-walkeri* by its narrower acicular-subcylindrical conidia, only 2–3.5 µm wide

(Chupp 1954). The South American *Passalora senecionicola* U. Braun & Delhey (Braun et al. 2006) on *Senecio bonariensis* in Argentina is morphologically very close to *C. senecionis-walkeri* but characterized by having quite distinct lesions, larger stromata, up to 60 µm diam. and short conidia that are cylindrical. *P. senecionicola* was assigned to *Passalora* due to subhyaline to pale olivaceous conidia, but it is possible that this species belongs in *Cercospora* which may be suggested by the phylogenetic position of *C. senecionis-walkeri*. Despite having almost hyaline to somewhat pigmented conidia, the latter species clusters within the *Cercospora* clade in an isolated, basal position adjacent to *C. zeae-maydis* Tehon & E.Y. Daniels and *C. zeina* Crous & U. Braun (Groenewald et al. 2012).

Literature – Chupp (1954: 22), Thirumalachar & Govindu (1962: 244–288), Ellis (1971: 279–284), Braun & Mel'nik (1997), Crous & Braun (2003: 21), Braun et al. (2006).

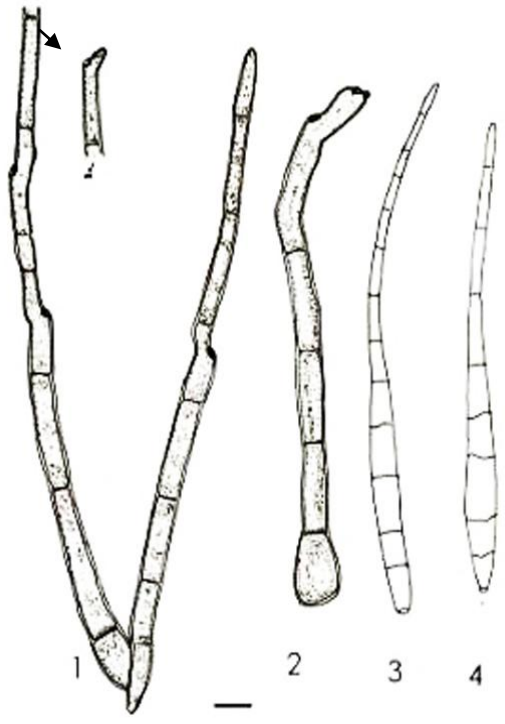

Fig. 44 – *Cercospora senecionis-walkeri* on *Senecio walker* from leaf spots: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–4. Conidia. Bar = 10 µm.

Fig. 45 – *Cercospora senecionis-walkeri* on *Senecio walker* from leaf spots/lesions: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4. Internal mycelium. 5–7. Conidiophores. 8–10. Conidia. Bars 1–2 = 10 mm, 4–10 = 10 µm.

(23) *Cercospora* sp. (*C. apii* s. lat.). Figs 46–47.

Leaf spots angular to irregular, 1–8 mm diam., grey-brown in the centre, and with dark brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; *hyphae* branched, 2–4 µm wide ($\bar{x}$ = 3.5 µm, n = 28), septate, constricted at the septa, distance between septa 6–14 µm ($\bar{x}$ = 7.8 µm, n = 20), brownish or green-hyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.43 µm, n = 28), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 8–52 µm diam. ($\bar{x}$ = 36.6 µm, n = 5), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–12 µm wide ($\bar{x}$ = 8.13 µm, n = 30), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.91 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (1–4 per fascicle), emerging through stomata, unbranched, straight to

curved, cylindrical, 33–80 × 5–7 µm ($\bar{x}$ = 51.9 × 5.27 µm, n = 11), 1–3-septate, distance between septa 8–31 µm ($\bar{x}$ = 19 µm, n = 20), medium brown, paler at the apex, wall 0.5–1 µm wide ($\bar{x}$ = 0.83 µm, n = 11), smooth, 0–1-times geniculate; conidiogenous cells integrated, terminal, cylindrical, 16–31 × 4–5 µm ($\bar{x}$ = 22.8 × 4.67 µm, n = 6), pale brown; conidiogenous loci conspicuous, subcircular, 2–3 µm wide, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.56 µm, n = 4), thickened and darkened. Conidia solitary, acicular, straight to curved, 43–185 × 2 µm ($\bar{x}$ = 81.25 × 2 µm, n = 4), 3–12-septate, hyaline to subhyaline, thin-walled, smooth, tip acute, base truncate to obconically truncate, hila thickened and darkened, 1–1.5 µm wide, wall of the hila 0.5 µm thick.

Colonies on PDA after 3 weeks at 25°C spreading surface ridged, white-grey in the centre, brown margin, reaching 10–25 mm diam., hyphae 1–6 µm wide ($\bar{x}$ = 3.9 µm, n = 30), septate, constricted at the septa, distance between septa 8–16 µm ($\bar{x}$ = 12 µm, n = 30), brownish to subhyaline, wall 0.3–0.8 µm thick ($\bar{x}$ = 0.51 µm, n = 30), smooth or finely verruculose. Conidia not formed in the culture.

Hosts – *Oroxylum indicum* (L.) Kurz (Bignoniaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Houay Daenmeuang Village, fallow forest, on leaves of *Oroxylum indicum*, 26 April 2006, P. Phengsintham (P32).

Notes – *Pseudocercospora oroxyli* (A.K. Kar & M. Mandal) Deighton (≡ *Cercospora oroxyli* A.K. Kar & M. Mandal, 1969) described from India differs from the specimen collected in Laos in having inconspicuous, unthickened conidiogenous loci. The cercosporoid fungus on *Oroxylum indicum* from Laos agrees well with *Cercospora apii* s. lat. (Crous & Braun 2003) [conidiophores 10–450 × 2–8 µm and conidia 10–380 × 1.5–5.5 µm].

Literature – Crous & Braun (2003: key).

(24) ***Cercospora stahlianthi*** Z.D. Jiang & P.K. Chi, in Chi, Fungal diseases of medicinal plants in Guangdong province: 162, 1994. Figs 48–49.

Leaf spots circular to irregular, 1–5 mm diam., pale brown to dark brown in the centre,

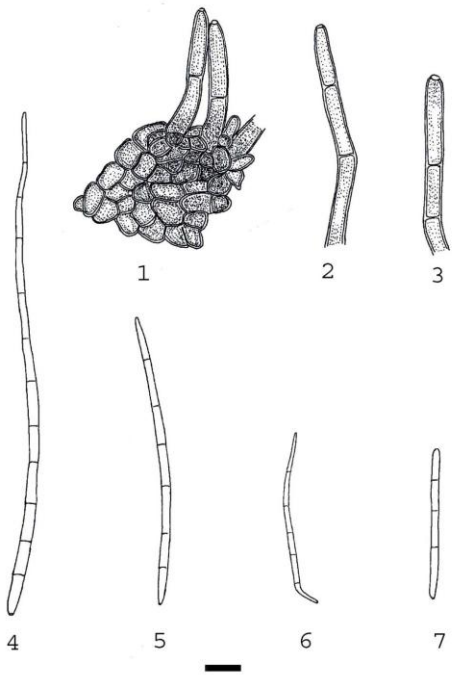

Fig. 46 – *Cercospora* sp. on *Oroxylum indicum* from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–7. Conidia. Bar = 10 µm

Fig. 47 – *Cercospora* sp. on *Oroxylum indicum* from leaf spots: 1. Lesions on host leaf (lower surface). 2. Internal mycelium. 3–4. Stromata with attached conidiophores. 5–6. Conidiophores. 7–8. Conidia. 9. Culture. Bars 2–8 = 10 µm, 9 = 10 mm.

and with yellowish to medium brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–6 µm wide ($\bar{x}$ = 3.8 µm, n = 30),septate, constricted at the septa, distance between septa 6–18 µm ($\bar{x}$ = 10.07 µm, n = 30), brownish, wall approximately 0.3–0.5 µm wide ($\bar{x}$ = 0.46 µm, n = 30), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata well-developed, oval to ellipsoidal, substomatal, 8–40 µm diam. ($\bar{x}$ = 24.14 µm, n = 7), brown, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–17 µm wide ($\bar{x}$ = 8.3 µm, n = 30), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.81 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (2–15 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 20–240 × 4–6 µm ($\bar{x}$ = 78.2 × 4.83 µm, n = 30), 1–6-septate, distance between septa 6–65 µm ($\bar{x}$ = 27.5 µm, n = 30), medium brown, paler at the apex, wall 0.5–1 µm wide ($\bar{x}$ = 0.77 µm, n = 30), smooth, 0–2 times geniculate. Conidiogenous cells integrated, terminal, cylindrical, 15–65 × 4–5 µm ($\bar{x}$ = 34.6 × 4.35 µm, n = 17), pale brown; conidiogenous loci conspicuous, subcircular, 2–4 µm wide ($\bar{x}$ = 2.83 µm, n = 30), dark brown, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.51 µm, n = 30). Conidia solitary, acicular, straight to curved, 30–240 × 2–4 µm ($\bar{x}$ = 83.37 × 3.73 µm, n = 30), 2–23-septate, hyaline, thin-walled, smooth, tip acute, base truncate to obconically truncate, hila thickened and darkened, 1.5–3 µm wide ($\bar{x}$ = 2.28 µm, n = 30), wall of the hila 0.3–0.5 µm ($\bar{x}$ = 0.49 µm, n = 30) thick.

Hosts – *Stahlianthus involucratus* (King ex Baker) Craib and *S. thorelii* Gagnep. (Zingiberaceae).

Distribution – **Asia:** China, Laos.

Material examined – Vientiane Capital, Xaythani District, Dong Makhai village, dry dipterocarp forest, on leaves of *Stahlianthus thorelii*, 20 May 2006, P. Phengsintham (P51); Xaythani District, Dongdok Village, on leaves of *S. thorelii*, 12 August 2006, P. Phengsintham (P141).

Notes – The collections from Laos have a size of conidiophores and conidia close to that of *C. apii* s. lat.

Literature – Crous & Braun (2003: 386).

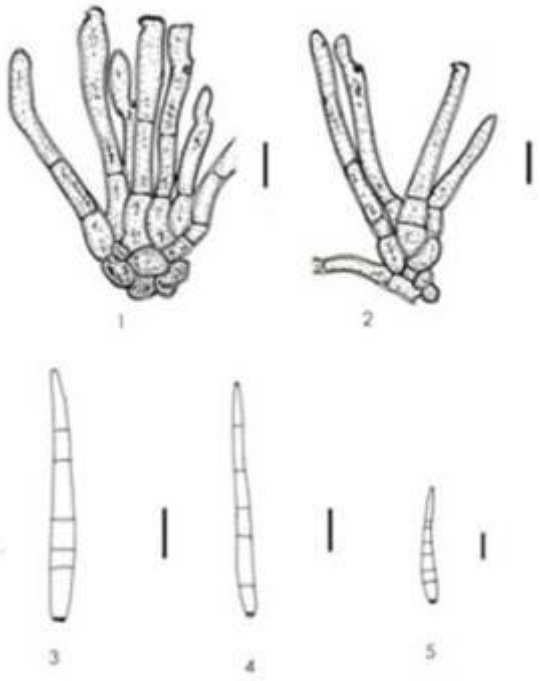

Fig. 48 – *Cercospora stahlianthi* on *Stahlianthus thorelii*: 1–2. Stromata with attached conidiophores. 3–5. Conidia. Bars = 10 µm.

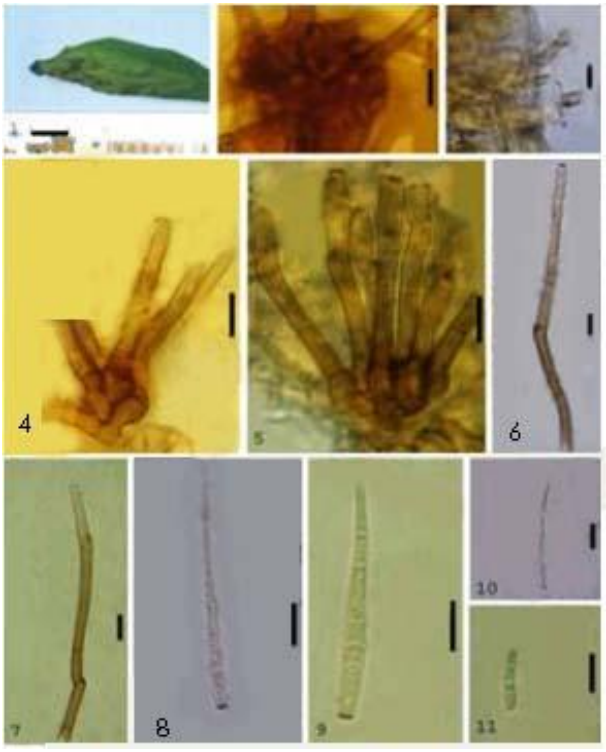

Fig. 49 – *Cercospora stahlianthi* on *Stahlianthus thorelii*: 1. Lesions on host leaf (upper surface). 2. stroma. 3. Internal hyphae. 4–5. Stromata with attached conidiophores. 6–7. Conidiophores. 8–11. Conidia. Bars 1 = 10 mm, 2–11 = 10 µm.

(25) ***Cercospora taccae*** (Syd. & P. Syd.) Chupp. A monograph of the fungus genus *Cercospora* 560, 1954. Figs 50–51.

≡ *Cercosporina taccae* Syd & P. Syd., Ann. Mycol. 11: 406, 1913.

Leaf spots small to fairly large, suborbicular to irregular, 1–22 mm in diam., dark brown in the centre, and with dark brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 3–5 µm wide ($\bar{x}$ = 3.5 µm, n = 7), septate, constricted at the septa, distance between septa 10–15 µm ($\bar{x}$ = 11.25 µm, n = 7), brownish or green-hyaline, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.57 µm, n = 7), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 15–35 µm in diam. ($\bar{x}$ = 21.7 µm, n = 10), 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 = 18), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.83 µm, n = 18), smooth. Conidiophores fasciculate, arising from stromata (1–13 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 35–179 × 4–6 µm ($\bar{x}$ = 98 × 4 µm, n = 11), 1–10-septate, distance between septa 8–38 µm ($\bar{x}$ = 18 µm, n = 24), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.66 µm, n = 24), smooth, geniculate. Conidiogenous cells integrated, terminal, cylindrical, 8–30 × 4–5 µm ($\bar{x}$ = 18.8 × 4.5 µm, n = 6), pale brown; conidiogenous loci conspicuous, subcircular, 1.5–3 µm wide ($\bar{x}$ = 2.5 µm, n = 15), wall 0.5–0.8 µm thick ($\bar{x}$ = 0.6 µm, n = 15), thickened and darkened. Conidia solitary, acicular to obclavate, straight to curved, 73–195 × 3–6 µm ($\bar{x}$ = 115.25 × 4.75 µm, n = 7), 9–20-septate, hyaline to subhyaline, thin-walled 0.25–0.3 µm ($\bar{x}$ = 0.29 µm, n = 9), smooth, tip acute, base truncate to obconically truncate; hila thickened and darkened 1–2 µm wide ($\bar{x}$ = 1.75 µm, n = 9), wall of the hila 0.25–0.3 µm ($\bar{x}$ = 0.28 µm, n = 9) thick.

Hosts – *Tacca chantrieri* André, *T. cristata* Jack, *T. integrifolia* Ker Gawl., *T. involucrata* Schumach. & Thonn., *T. leontopetaloides* (L.) Kuntze, *T. macrantha* H. Limpr., *T. palmata* Blume, *T. pinnatifida* J.R. Forst. & G. Forst., *Tacca* sp. (Taccaceae).

Distribution – **Africa:** Gabon, Malawi, Sierra Leone; **Asia:** India, Indonesia, Laos, Malaysia, Phillipines, Thailand; **Australia; Oceania:** American Samoa, Cook Islands, Fiji, Kiribati, Micronesia, Niue, Palau, Papua New Guinea, Samoa, Tonga, Tuvalu, Wallis and Futuna.

Material examined – Luangprabang province, Xiengngeun District, Lak 10 village, on leaves of *Tacca integrifoia*, 7 February 2007, P. Phengsintham (P244).

Notes – A true *Cercospora* s. str. close to or identical with *Cercospora apii s. lat.* (Crous & Braun 2003). The collection from Laos agrees with *C. taccae* as circumscribed by Chupp (1954) [conidiophores 25–75 × 4–6 µm, conidia 50–150 × 2–4 µm]

Literature – Chupp (1954: 560), Crous & Braun (2003: 395).

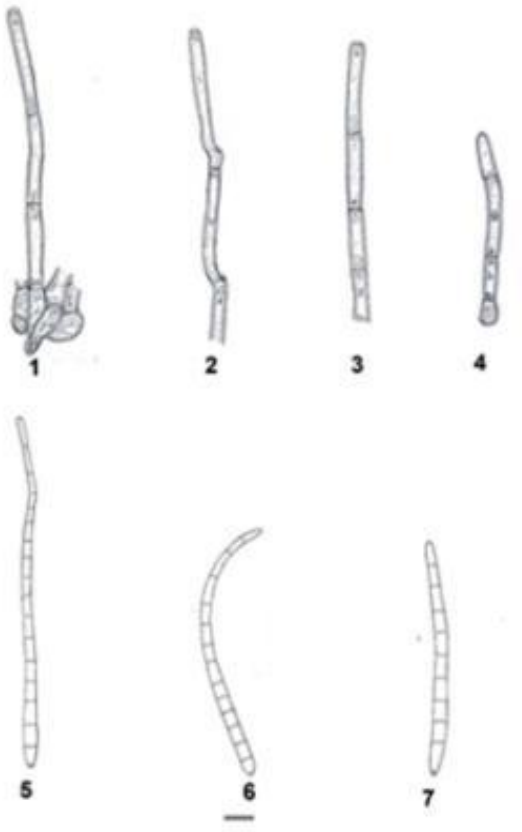

Fig. 50 – *Cercospora taccae* on *Tacca integrifolia*: 1. Stroma with attached conidiophores. 3–4. Conidiophores. 5–7. Conidia. Bar = 10 µm.

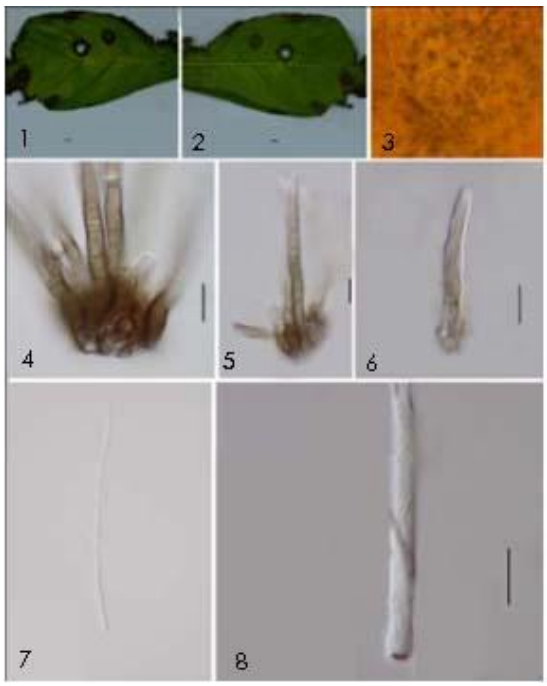

Fig. 51 – *Cercospora taccae* on *Tacca integrifolia* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4. Stroma with attached conidiophores. 5–6. Conidiophores. 7–8. Conidia. Bars 1–2 = 10 mm, 4–8 = 10 µm.

(26) ***Cercospora trewiae*** A.K. Kar & M. Madal, Trans. Brit. Mycol. Soc. 53: 347, 1969.

Figs 52–53.

Leaf spots small to fairly large, suborbicular to irregular, 0.5–10 mm in diam., grey-brown in the centre, and with dark brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 3–6 µm wide ($\bar{x}$ = 4.2 µm, n = 5), septate, constricted at the septa, distance between septa 8–10 µm ($\bar{x}$ = 8.8 µm, n = 5), brownish or green-hyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.46 µm, n = 5), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, small to medium-sized, globular to subglobular, substomatal and intraepidermal, 10–72 µm in diam. ($\bar{x}$ = 39.2 µm, n = 9), dark brown to black in mass, composed of swollen hyphal cells, subglobose, rounded to angular in outline, 5–13 µm wide ($\bar{x}$ = 8.2 µm, n = 21), brown to dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.64 µm, n = 21), smooth. Conidiophores fasciculate, arising from stromata (2–23 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 35–215 × 4–7 µm ($\bar{x}$ = 130 × 5.33 µm, n = 9), 1–9-septate, distance between septa 8–35 µm ($\bar{x}$ = 20 µm, n = 30), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.59 µm, n = 30), smooth, 1–2-times geniculate. Conidiogenous cells terminal, cylindrical, 15–38 × 4–5 µm ($\bar{x}$ = 27.1 × 4.57 µm, n = 7), pale brown; conidiogenous loci conspicuous, subcircular, 2–3 µm wide ($\bar{x}$ = 2.33 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, 74–135 × 3–5 µm ($\bar{x}$ = 108 × 3.75 µm, n = 8), 4–11-septate, hyaline to subhyaline, thin-walled 0.3–0.5 µm ($\bar{x}$ = 0.33 µm, n = 8), smooth, tip acute, base truncate to obconically truncate; hila thickened and darkened 1.5–2 µm wide ($\bar{x}$ = 1.9 µm, n = 5), wall of the hila 0.3–0.5 µm ($\bar{x}$ = 0.34 µm, n = 5) thick.

Colonies on PDA after 3 weeks at 25 °C grey, 10–15 mm diam., grey green in colour in the centre and dark green margin, smooth, hyphae brown.

Hosts – *Trewia nudiflora* L. (Euphorbiaceae)

Distribution – **Asia:** India, Laos.

Material examined – Khammoune Province, Yommalad District, Nahao Village, Riverbank, on leaves of *Trewia nudiflora*, 6 March 2010, P. Phengsintham (P580); Phongsali Province, Phongsali District, Hathin Village, riverbank, on leaves of *T. nudiflora*, 23 June 2010, P. Phengsintham (P595).

Notes – A true *Cercospora* s. str. distinct from *C. apii* s. lat. (Crous & Braun 2003).

Literature – Kar & Madal (1969: 347), Crous & Braun (2003: 409).

(27) ***Cercospora volkameriae*** Speg., Revista Mus. La Plata 15: 47, 1908. Figs 54–55**.**

Leaf spots angular to irregular, 1–8 mm diam., reddish brown to grey brown in the center, margin yellowish to pale brown. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–6 µm wide ($\bar{x}$ = 4.1 µm, n = 20), septate, constricted at the septa, distance between septa 6–14 µm ($\bar{x}$ = 7.8 µm, n = 20), brownish or green-hyaline, wall 0.5–1 µm wide ($\bar{x}$ = 0.70 µm, n = 20), smooth, forming plate-like plectenchymatous stromatic hyphal

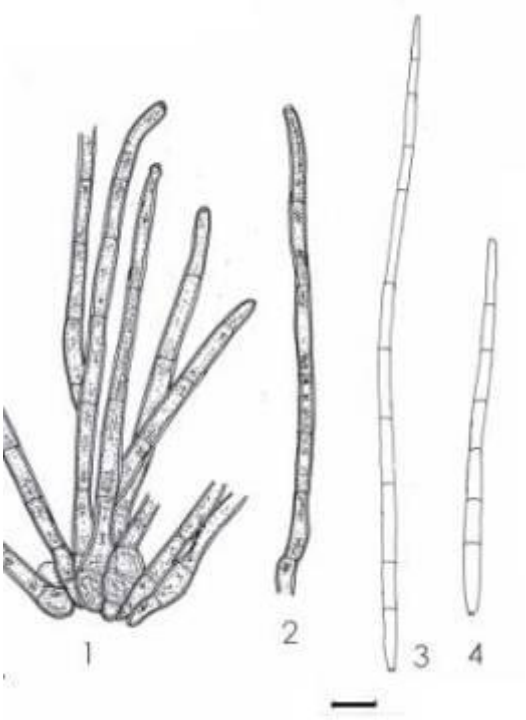

Fig. 52 – *Cercospora trewiae* on *Trewia nudiflora* from leaf spots: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–4. Conidia. Bar = 10 µm.

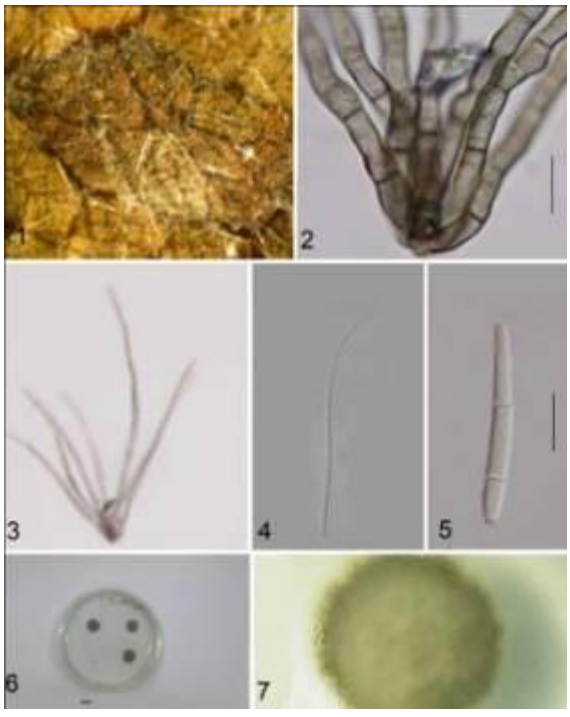

Fig. 53 – *Cercospora trewiae* on *Trewia nudiflora* from leaf spots: 1. Caespituli. 2–3. Stromata with attached conidiophores. 4–5. Conidia. 6–7. Culture. Bars 1, 6–7 = 10 mm, 2–5 = 10 µm.

aggregations. Stromata well-developed, oval to ellipsoidal, substomatal and intraepidermal, 19–45 µm diam. ($\bar{x}$ = 37.6 µm, n = 8), brown, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 4–8 µm diam. ($\bar{x}$ = 6.2 µm, n = 15), brown to dark brown, wall 1–2 µm wide ($\bar{x}$ = 1.47 µm, n = 15), smooth. Conidiophores fasciculate, arising from stromata (2–22 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 12–148 × 4–5 µm ($\bar{x}$ = 48.9 × 4.4 µm, n = 30), 1–5-septate, distance between septa 9–24 µm ($\bar{x}$ = 15.4 µm, n = 30), medium brown, paler at the apex, wall 0.5–1 µm wide ($\bar{x}$ = 0.79 µm, n = 26), smooth, 0–5 times geniculate, width uniform; conidiogenous cells integrated, terminal or intercalary, cylindrical, 9–30 × 4–5 µm ($\bar{x}$ = 21 × 4.3 µm, n = 20), pale brown; conidiogenous loci conspicuous, subcircular, 1–3 µm wide, dark brown, wall of the loci 0.5–1 µm wide ($\bar{x}$ = 0.54 µm, n = 12). Conidia solitary, acicular, straight to curved, 47–145 × 2–3 µm ($\bar{x}$ = 77 × 3 µm, n = 5), 3–16-septate, hyaline, thin-walled, smooth, tip acute, base truncate to obconically truncate; hila 1–2 µm wide, wall of the hila 0.3 µm wide, thickened and darkened.

Hosts – *Clerodendrum fragrans* var. *pleniflora* Schauer and *C. schmidtii* C.B. Clarke (Verbenaceae).

Distribution – **Africa:** Ghana, Guinea, Nigeria, Sierra Leone, Sudan, Tanzania; **Asia:** Brunei, China, India, Java, Laos, Taiwan; **North America and West Indies:** Cuba, Jamaica.

Material examined – Vientiane Capital, Xaythany District, Nong Viengkham Village, fallow forest, on leaves of *Clerodendron schmidtii*, 22 April 2006 (P17); Bolikhamsai Province, Lak 20 District, Nongxong Village, on leaves of *C. schmidtii*, 28 August 2008, P. Phengsintham (363).

Notes – Chupp (1954), based on an examination of type material, described *Cercospora volkameriae* as lacking stromata. In the collections from Laos, well-developed stromata are, however, present. Morphologically this species belongs to the *Cercospora apii* complex, characterized by having long, brown conidiophores and long, acicular, pluriseptate, hyaline conidia (Crous & Braun 2003).

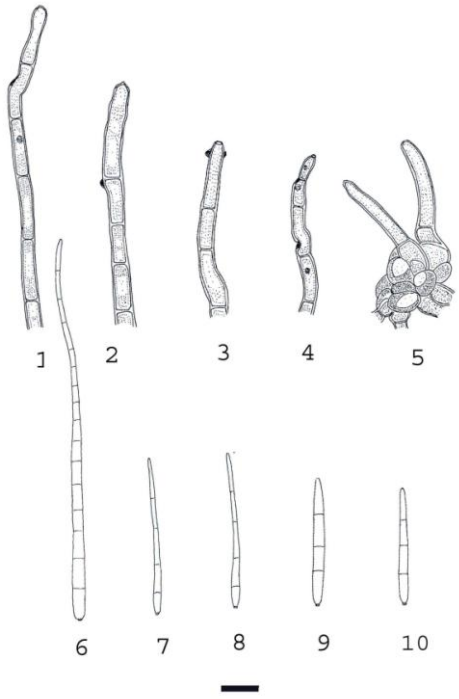

Fig. 54 – *Cercospora volkameriae* from *Clerodendron schmidtii*: 1–4. Conidiophores. 5. Stroma with attached conidiophores. 6–10. Conidia. Bar = 10 µm.

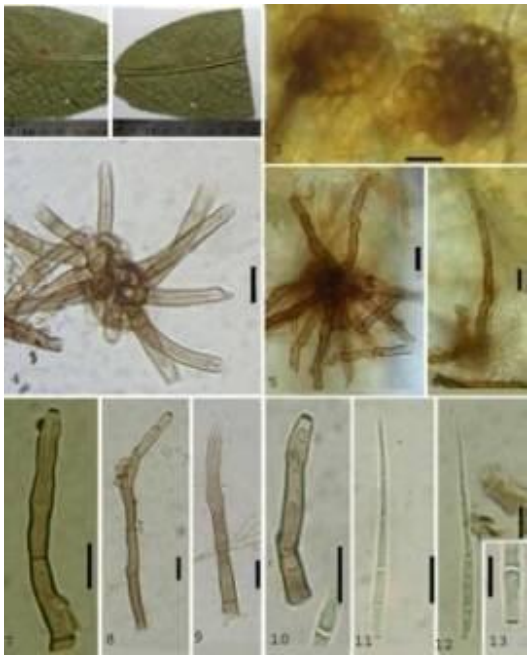

Fig. 55 – *Cercospora volkameriae* on *Clerodendron schmidtii*: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stromata. 4–5. Stromata with attached conidiophores. 6–10. Conidiophores. 11–12. Conidia. 13. Base of conidium. Bars 1–2 = 10 mm, 3–13 = 10 µm.

Literature – Saccardo (1913:1424), Chupp (1954: 597), Vasudeva (1963: 212), Ellis (1976: 292), Hsieh & Goh (1990: 346), Braun (2000: 74), Shin & Kim (2001: 107), Crous & Braun (2003: 428).

(28) *Cercospora zinniae* Ellis & G. Martin, J. Mycol. 1: 20, 1885. Figs 56–57.

= *Cercospora atricincta* Heald & F.A. Wolf, Mycologia 3: 14, 1911.

= *Cercosporina zinniae* Takah. & Yosh., Pl. Protect. Tokyo 7: 17, 1953.

(= *Cercospora apii s. lat.*).

Leaf spots angular to irregular, 1–3 mm diam., reddish brown to grey- brown in the centre, with yellowish to pale brown margin. Caespituli amphigenous, scattered, dark brown. Mycelium internal; hyphae branched, 2–4 µm wide ($\bar{x}$ = 3 µm, n = 9), septate, constricted at the septa, distance between septa 5–10 µm ($\bar{x}$ = 9 µm, n = 9), brownish or green-hyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.49 µm, n = 9), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata lacking to well developed, oval to ellipsoidal, substomatal, 10–20 µm diam. ($\bar{x}$ = 16.3 µm, n = 4), brown, composed of swollen hyphal cells, subglobose, rounded and angular in outline, 5–10 µm wide ($\bar{x}$ = 5.5 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 (2–10 per fascicle), emerging through stomata, unbranched, straight to curved, cylindrical, 32–95 × 4–6 µm ($\bar{x}$ = 77.6 × 5.14 µm, n = 7), 1–7-septate, distance between septa 12–25 µm ($\bar{x}$ = 16.6 µm, n = 18), medium brown, paler at the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.7 µm, n = 18), smooth, 0–1 times geniculate, width uniform. *Conidiogenous cells* integrated, terminal, cylindrical, 14–25 × 4–5 µm ($\bar{x}$ = 19 × 4.4 µm, n = 12), pale brown; *conidiogenous loci* conspicuous, subcircular, 1–3 µm wide ($\bar{x}$ = 2 µm, n = 10), dark brown, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.56 µm, n = 10). Conidia solitary, acicular, straight to curved, 30–102 × 2–3 µm ($\bar{x}$ = 72 × 2.4 µm, n = 12), 3–9-septate, hyaline, thin-walled, smooth, tip acute, base truncate to obconically truncate, hila thickened and darkened, 1.5–3 µm wide ($\bar{x}$ = 2.2 µm, n = 12), wall of the hila 0.3–0.5 µm ($\bar{x}$ = 0.34 µm, n = 12) thick.

Hosts – *Cosmos* sp., *Zinnia elegans* Jack., *Z. multiflora* L., *Z. pauciflora* L., *Z. peruviana* L., *Z. violacea* Cav., *Zinnia* sp. (Asteraceae).

Distribution – **Africa:** Ghana, Malawi, Mauritius, Nigeria, Tanzania, Togo, South Africa, Sudan, Uganda, Zambia, Zimbabwe; **Asia:** Bangladesh, Bhutan, Brunei, China, Hong Kong, India, Indonesia, Laos, Malaysia, Japan, Korea, Myanmar, Nepal, Pakistan, Philippines, Singapore, Taiwan; **Europe**: Lithuania; **North America and West Indies:** Cuba, Dominican Republic, El Salvador, Guatemala, Haiti, Jamaica, Mexico, Panama, Puerto Rico, Trinidad & Tobago, USA (AI, CO, FL, IN, KS, MS, NC, PA, SC, SE states, TX); **Oceania:** American Samoa, Cook Islands, Fiji, Guam, Micronesia, New Caledonia, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Virgin Islands; **South America:** Brazil, Colombia, Venezuela.

Material examined – Luang Prabang Province, Nan District, Phonhin Village, on leaves of *Zinnia elegans*, July 2006, P. Phengsintham (P82).

Notes – The collection from Laos agrees with the description of *Cercospora zinniae* published by Chupp (1954).

Literature – Saccardo (1886, 443; 1931, 873), Chupp (1954: 186), Vasudeva (1963: 216), Katsuki (1965: 24), Ellis (1976: 252), Shin & Kim (201: 111), Crous & Braun (2003: 434).

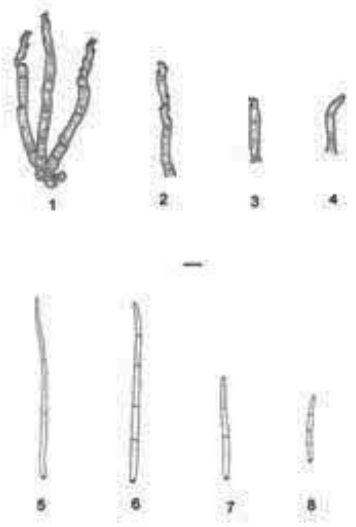

Fig. 56 – *Cercospora zinniae* from *Zinnia elegans*: 1. Stroma with attached conidiophore. 2–4. Conidiophores. 5–8. Conidia. Bar = 10 µm.

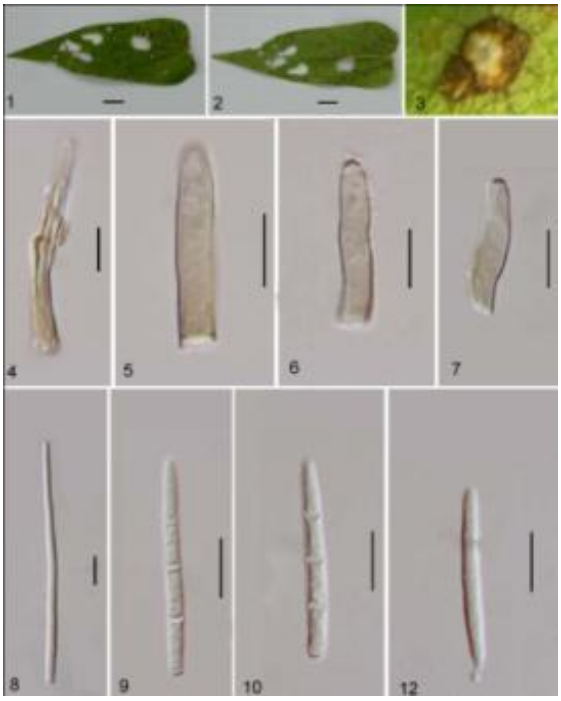

Fig. 57 – *Cercospora zinniae* from *Zinnia elegans*: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4–7. Conidiophores. 8–12. Conidia. Bars 1–2 = 10 mm, 4–12 = 10 µm.

(29) ***Passalora aenea*** (Cif.) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Series 1: 46, 2003. Figs 58–59.

≡ *Berteromyces aeneus* Cif., Sydowia 8: 267, 1954.

= *Cercospora cassiae* Henn., Bull. Herb. Boissier 1: 121, 1893, non *Passalora cassiae* Syd., 1939.

≡ *Cercosporidium cassiae* (Henn.) Deighton, Mycol. Pap. 112: 66, 1967.

≡ *Phaeoisariopsis cassiae* (Henn.) Arx, Proc. K. Ned. Akad. Wet., C 86: 43, 1983.

≡ *Passalora cassiae* (Henn.) Poonam Srivast, J. Living World 1: 114, 1994 (nom. inval. et illeg.).

≡ *Passalora cassiae* (Henn.) U. Braun, Mikol. Fitopatol. 30: 6, 1996 (nom. illeg.).

= *Cercospora cassiicola* Roum, Fungi sel. exs. No 4486, 1888.

Leaf spots subcircular to irregular, zonate spots, 1–5 mm diam., brown or dark brown in the centre, and with dark brown margin. Caespituli hypophyllous, scattered. Mycelium internal, inconspicuous. Stromata oval or ellipsoidal, 10–35 µm diam. ($\overline{x}$ = 23.72

µm, n = 11), dark brown, stromatal cells angular in outline, 4–7 µm wide ($\bar{x}$ = 5.83 µm, n = 30), wall 0.3–0.8 µm ($\bar{x}$ = 0.64 µm, n = 30), smooth**.** Conidiophores densely fasciculate, arising from stromata (1–7 per fascicle), emerging through stromata, unbranched, not geniculate, mostly short, cylindrical, 15–140 × 3–5 µm ($\bar{x}$ = 58.6 × 4.26 µm, n = 19), 3–5-septate, distance between septa 6–40 µm ($\bar{x}$ = 20.6 µm, n = 30), uniformly pale to medium olivaceous-brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.78 µm, n = 30), smooth. Conidiogenous cells terminal, cylindrical, 17–40 × 3–5 µm ($\bar{x}$ = 24.5 × 4 µm, n = 17); conidiogenous loci small, at the apex, conspicuous, ovoid to oval, 1.5–2 µm wide ($\bar{x}$ = 1.83, n = 17), slightly thickened, but distinctly darkened, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.7 µm, n = 17). Conidia solitary, obclavate or cylindrical, straight to curved, 19–53 × 4–6 µm ($\bar{x}$ = 40.8 × 5.12 µm, n = 30), 2–5-septate, pale olivaceous brown, wall 0.5–1 µm thick ($\bar{x}$ = 0.74 µm, n = 30), smooth, tip subobtuse, base obconic to somewhat obconically truncate, 1.5–3 µm wide ($\bar{x}$ = 2.16 µm, n = 30), wall of the hila 0.5–1 µm ($\bar{x}$ = 0.64 µm, n = 30), somewhat thickened and darkened.

Hosts – *Cassia fistula* L., *C. floribunda* Cav., *C. goratensis* Fresen., *C. grandis* L. f., *C. javanica* L., *C. leptocarpa* Benth., *C. marylandica* L., *C. Cassia sp.*, *Chamaecrista nictitans* (L.) Moench, *Senna alata* (L.) Roxb., *S. bicapsularis* (L.) Roxb., *S. hirsuta* (L.) H.S. Irwin & Barneby, *S. macranthera* (DC. ex Collad.) H.S. Irwin & Barneby, *S. occidentalis* (L.) Link, *S. petersiana* (Bolle) Lock, *S. septemtrionalis* (Viv.) H. S. Irwin & Barneby, *S. siamae* Lamk. (Fabaceae).

Distribution – **Africa:** Ethiopia, Tanzania, Uganda, Zambia; **Asia:** India, Laos, Thailand; **North America and West Indies:** Barbador, Jamaica, USA (MO); **South America:** Brazil, Colombia.

Material examined – Vientiane Capital, Xaythany District, Xay Village, Village area, on leaves of *Cassia siamea*, 28 December 2008, P. Phengsintham (P399).

Notes – The conidiophores are 15–140 × 3–5 µm and conidia are 19–53 × 4–6 µm in the collection from Laos, which is narrower than the data given in Ciferri's (1954) original description [conidiophores 46–57 × 7–12 µm and conidia 60–75 × 6–9 µm]. This species is well characterized by having rather wide clavate conidiophores in compact fascicles.

Literature – Chupp (1954: 290), Deighton (1976: 66), Ellis (1976: 269), Crous & Braun (2003: 46).

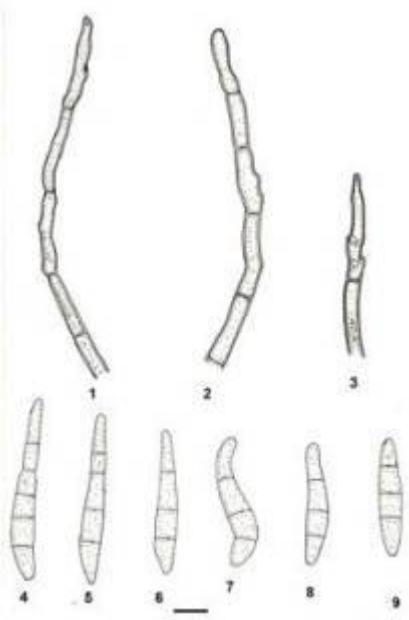

Fig. 58 – *Passalora aenea* on *Cassia siamea*: 1–3. Conidiophores. 4–9. Conidia. Bar = 10 µm.

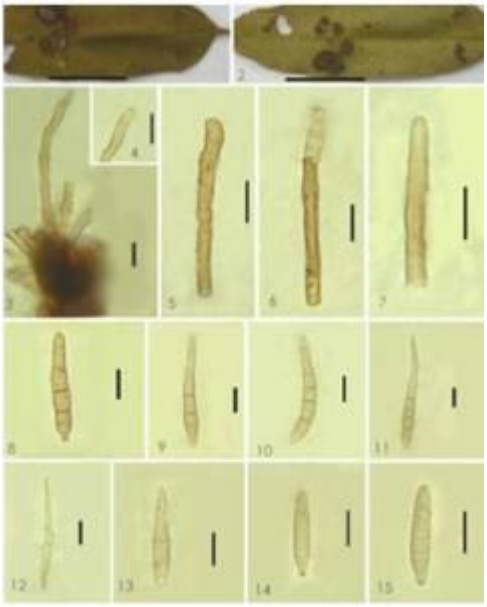

Fig. 59 – *Passalora aenea* on *Cassia siamea*: 1. Lesions on host leaf (upper surface). 2. Stroma with attached conidiophores. 3–5. Conidiophores. 6–11. Conidia. Bars 1 = 10 mm, 2–11 = 10 µm.

(30) ***Passalora bougainvilleae*** (Munt.-Cvetk.) R.F. Castañeda & U. Braun, Cryptog. Bot. 2: 291, 1991. Figs 60–61.

≡ *Cercospora bougainvilleae* Munt.-Cvetk., Revista Argent. Agron. 24: 84, 1957

≡ *Cercosporidium bouganvilleae* (Munt.-Cvetk.) Sobers & C.P. Seymour, Proc. Florida State Hort. Soc. 81: 398 '1968', 1969.

Leaf spots circular to irregular, 1–5 mm diam., pale brown or white in the centre, and with dark brown margin. Caespituli hypophyllous, inconspicuous. Mycelium internal; hyphae branched, 2–3 µm wide, septate, constricted at the septa, distance between septa 11–13 µm, subhyaline, wall smooth. Stromata oval or ellipsoidal, 15–45 µm diam. ($\bar{x}$ = 28 µm, n = 9), dark brown, stromatal cells angular in outline, 5–10 µm wide ($\bar{x}$ = 7.67 µm, n = 12), wall 0.8–1 µm ($\bar{x}$ = 0.95 µm, n = 12), smooth. Conidiophores fasciculate, arising from stromata (14–24 per fascicle), emerging through stromata, not branched, not geniculate, mostly short, cylindrical, 12–63 × 4–6 µm ($\bar{x}$ = 31.87 × 4.97 µm, n = 30), 0–2-septate, distance between septa 8–16 µm ($\bar{x}$ = 11 µm, n = 6), uniformly pale to medium olivaceous-brown, wall 0.5–0.7 µm wide ($\bar{x}$ = 0.57 µm, n = 9), smooth. Conidiogenous cells integrated, terminal, cylindrical, 12–35 × 5–6 µm ($\bar{x}$ = 20 × 5 µm, n = 8); conidiogenous loci small, at the apex, conspicuous, ovoid to oval, 1–3 µm ($\bar{x}$ = 2 µm, n = 21), slightly thickened, but distinctly darkened, wall 0.5–0.9 µm wide ($\bar{x}$ = 0.68 µm, n = 21). Conidia solitary, obclavate or cylindrical, straight to curved, 6–65 × 4.5–6 µm ($\bar{x}$ = 43 × 5.87 µm, n = 30), 2–4-septate, pale olivaceous brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.78 µm, n = 30), smooth, tip subobtuse, base obconic, hila 1–3 µm wide ($\bar{x}$ = 1.9 µm, n = 6), wall 0.5–1 µm ($\bar{x}$ = 0.7 µm, n = 6), thickened and darkened.

Colonies on PDA after 3 weeks at 25°C with white-grey in the centre, and dark grey at the margin, reaching 4 mm diam., hyphae 2–8 µm wide ($\bar{x}$ = 4.23 µm, n = 30), septate, constricted at the septa, distances between septa 7–10 µm ($\bar{x}$ = 13.4 µm, n = 30), hyaline or brownish, wall 0.3–1 µm ($\bar{x}$ = 0.65 µm, n = 10), smooth. Conidia not formed in culture.

Hosts – *Bougainvillea glabra* Choisy, *B. spectabilis* Willd. (Nyctaginaceae).

Distribution – **Asia:** Brunei, China, India, Indonesia, Japan, Laos, Thailand; **North America and West Indies:** Cuba, El Salvador, Jamaica, USA (FL, HI); **South America:** Argentina, Brazil, Venezuela.

Material examined – Vientiane Capital, Xaythany District, Dong Dok Village, on leaves of *Bougainvillea spectabilis*, 15 April 2006, P. Phengsintham (P05); Vientiane Province, Home District, Houay Xay Village, on leaves of *B. spectabilis*, 28 May 2009, P. Phengsintham (P411).

Notes – On account of conspicuous, slightly thickened and somewhat darkened conidiogenous loci and conidial hila, the collections from Laos clearly belong to *Passalora bougainvilleae*. In the collections from Laos, the conidia are quite smooth-walled, differing from Ellis (1976) who described minutely verruculose conidia. However, conidia of this species are at first smooth and may turn asperulate with age.

Literature – Ellis (1976: 297), Crous & Braun (2003: 86).

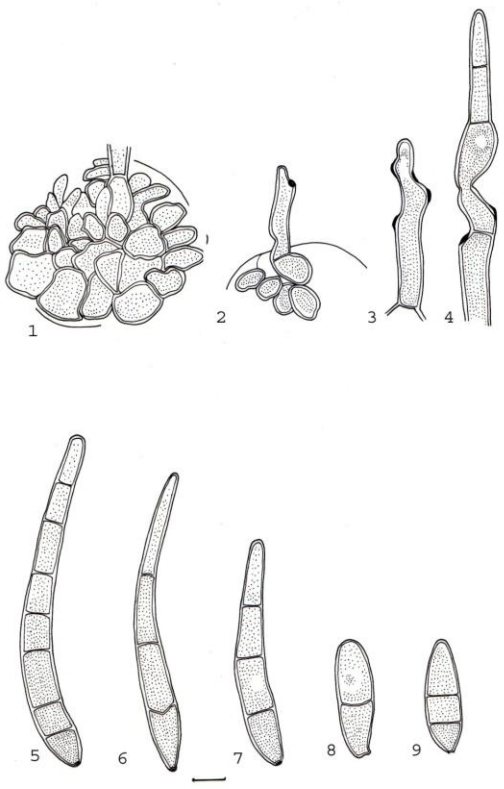

Fig. 60 – *Passalora bougainvilleae* on *Bougainvillea spectabilis*: 1. Stroma. 2. Stroma with Conidiophore. 3. Conidiophore. 4. Conidiophore with attached young conidium. 5–9. Conidia. Bar = 10 µm.

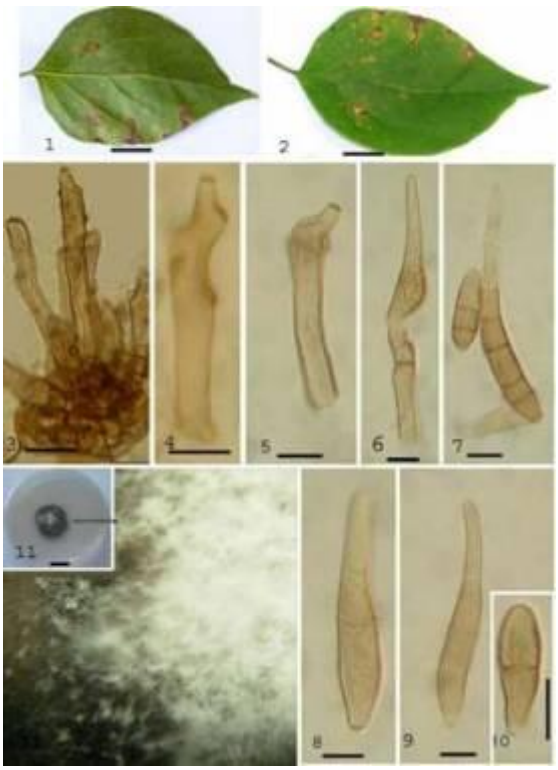

Fig. 61 – *Passalora bougainvilleae* from *Bougainvillea spectabilis* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stroma with attached conidiophores. 4–5. Conidiophores. 6. Conidiophore with attached Conidium. 7–10. Conidia. 11–12. Culture. Bars 1–2, 11 = 10 mm, 3–10 = 10 µm.

(31) *Passalora capsicicola* (Vassiljevsky) U. Braun & F.O. Freire, Cryptog. Mycol. 23: 299, 2002. Figs 62–63.

≡ *Cercospora capsicicola* Vassiljevsky, in Vassiljevsky & Karakulin, Fungi imperfecti parasitici, 1, Hyphomycetes: 344, 1937.

≡ *Phaeoramularia capsicicola* (Vassiljevsky) Deighton, in Ellis, More Dermatiaceous Hyphomycetes: 323, 1976.

≡ *Phaeoramularia capsicicola* (Vassiljevsky) Deighton, Trans. Brit. Mycol. Soc. 67: 140, 1976.

= *Cercospora capsici* E.J. Marchal & Stayaert, Bull. Soc. Roy. Bot. Belgique 61: 167, 1929.

≡ *Cladosporium capsici* Kovatch., Z. Pflanzenkr. 48: 321, 1938.

= *Cercospora capsici* Unamuno, Bol. Soc. Esp. Hist. Nat. 32: 161, 1932.

= *Cercospora unamunoi* Castell., Revista Agric. Subtrop. Trop. 42: 20, 1948.

= *Phaeoramularia unamunoi* (Castell.) Munt.-Cvetk., Lilloa. 30: 183, 1960.

Leaf spots circular to slightly irregular, 1–8 mm diam., dark brown in the centre, dark brown to yellowish margin. Caespituli amphigenous, inconspicuous. Mycelium internal; internal hyphae branched, 2–3 µm wide ($\bar{x}$ = 2.5 µm, n = 8), septate, constricted at the septa, distances between septa 5–18 µm ($\bar{x}$ = 9.75 µm, n = 8), subhyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.4 µm, n = 8), smooth. Stromata substomatal, intraepidermal, ellipsoidal, 17–50 µm diam. ($\bar{x}$ = 36.3 µm, n = 9), brown, stromatal cells 5–9 µm diam. ($\bar{x}$ = 7 µm, n = 10), wall 0.5–0.8 µm wide ($\bar{x}$ = 0.53 µm, n = 10), smooth. Conidiophores fasciculate, arising from stromata (1–5 per fascicle), or born on external mycelium, unbranched, 0–1 geniculate, cylindrical, straight to curved, 13–34 × 4–6 µm ($\bar{x}$ = 23.3 × 5 µm, n = 10), 0–1-septate, distance between septa 5–25 µm ($\bar{x}$ = 14 µm, n = 14), pale brown or olivaceous-brown; wall 0.5–0.8 µm wide ($\bar{x}$ = 0.52 µm, n = 14), smooth. Conidiogenous cells integrated, terminal, cylindrical, tapering to the apex, 10–20 × 4–5 µm ($\bar{x}$ = 16.7 × 4.5 µm, n = 6); conidiogenous loci (scars) small, slightly thickened and darkened, 1–2 µm diam. ($\bar{x}$ = 1.42 µm, n = 6); wall of the loci 0.5–0.8 µm thick ($\bar{x}$ = 0.5 µm, n = 7). Conidia solitary or catenate, cylindrical or narrowly obclavate, straight to curved, 14–92 × 3–6 µm ($\bar{x}$ = 44.07 × 4.28 µm, n = 14), 0–9-septate, slightly constricted at the septa, subhyaline or olivaceous-brown, wall 0.3–0.5 µm thick ($\bar{x}$ = 0.47 µm, n = 14); apex subobtuse, 1.5–2 µm wide ($\bar{x}$ = 1.58 µm, n = 6), wall of the hila 0.3–0.5 µm wide ($\bar{x}$ = 0.46 µm, n = 6), darkened; based long obconically truncate, hila 1.5–2 µm wide ($\bar{x}$ = 1.9 µm, n = 14), wall of the hila 0.3–0.5 µm wide ($\bar{x}$ = 0.48 µm, n = 14), darkened.

Colonies on PDA after 3 weeks at 25°C white to grey in the centre, margin dark grey, reaching 3–6 mm diam., hyphae 1–4(–5) µm wide ($\bar{x}$ = 1.9 µm, n = 30), septate, distance between septa 5–19 µm ($\bar{x}$ = 12.37 µm, n = 30), primary mycelium brownish, but the second and following ones hyaline, wall smooth. Conidia not formed in culture.

Hosts – *Capsicum annuum* L., *C. frutescens* L., *C. grossum* L., *Capsicum* sp. (Solanaceae).

Distribution – **Africa:** Congo, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Morocco, Nigeria, Senegal, Sierra Leone, Somalia, Sudan, Tanzania, Uganda, Zambia, Zimbabwe; **Asia:** Cambodia, China, India, Indonesia, Jordan, Laos, Malaysia, Myanmar, Nepal, Thailand, Yemen; **Europe:** Romania; **North America and West Indies:** French Antilles, Jamaica, Panama, USA (CA, FL, GA, TX); **South America:** Argentina, Brazil.

Material examined – Xiengkhouang Province, Paek District, Phonsavan Village, garden, on leaves of *Capsicum annuum*, 3 January 2010, P. Phengsintham (P513).

Notes – The collection from Laos is similar to the description of *Passalora capsicicola* in Ellis (1976) [conidiophores up to 70 × 3–5 µm and conidia 17–80 × 3–5 µm].

Literature – Saccardo (1971: 1336), Chupp (1954: 552), Vadsudeva (1963: 206), Ellis (1976: 323), Crous & Braun (2003: 103).

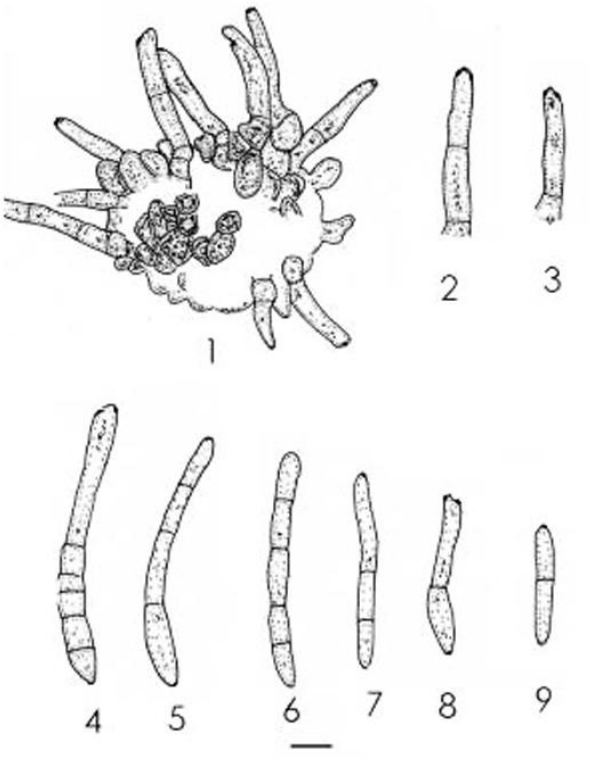

Fig. 62 – *Passalora capsicicola* on *Capsicum annuum*: 1. Stroma with attached conidiophores. 2–3. Conidiophore. 4–9. Conidia. Bar = 10 µm.

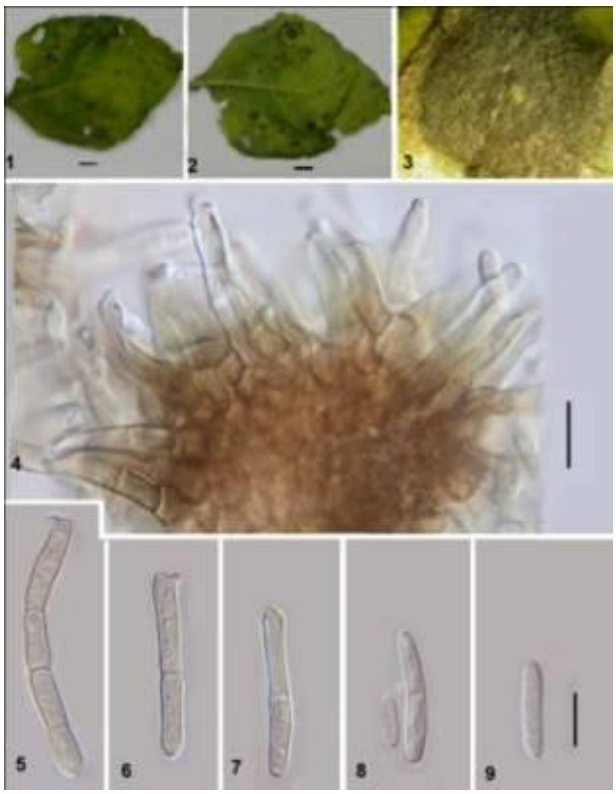

Fig. 63 – *Passalora capsicicola* on *Capsicum annuum* on host leaf: 1. Lesions on host leaf (upper surface). 3. Caespituli. 4. Stroma with attached conidiophores. 5–9. Conidia. Bars 1–2 = 10 mm, 4–9 = 10 µm.

(32) *Passalora dipterocarpi* Phengsintham, Chukeatirote, Abdelsalam, K.D. Hyde & U. Braun, Cryptog.. Mycol. 31(2): 167, 2010. Figs 64–65.

Leaf spots circular to slightly irregular, 2–7 mm diam., at first reddish, later becoming dark brown in the centre, the oldest leaf spots having a grey to reddish margin. Caespituli amphigenous, inconspicuous. Mycelium internal and external. Internal hyphae branched, 1–3 µm wide ($\bar{x}$ = 2 µm, n = 17), septate, constricted at the septa, distances between septa 4–10 µm ($\bar{x}$ = 6.47 µm, n = 17), subhyaline, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.63 µm, n = 17), smooth; external hyphae, branched, 2–5 µm wide ($\bar{x}$ = 2.60 µm, n = 30), septate, constricted at the septa, distance between septa 4–19 µm ($\bar{x}$ = 10.1 µm, n = 30), brownish to dark brown, wall 0.3–0.9 µm wide ($\bar{x}$ = 0.63 µm, n = 30), smooth. Stromata substomatal, intraepidermal,

ellipsoidal, 15–45 µm diam. ($\bar{x}$ = 27.27 µm, n = 15) brown, stromatal cells 3–7 µm diam. ($\bar{x}$ = 4.9 µm, n = 30), wall 0.5–0.8 µm wide ($\bar{x}$ = 0.69 µm, n = 30), smooth. Conidiophores single or fasciculate, arising from stromata (1–12 per fascicle), or born on external mycelium, unbranched or branched, 0–1 geniculate, cylindrical, straight to curved, (9–)14–48(–67) × (2–)3–4 µm ($\bar{x}$ = 27 × 3.3 µm, n = 30), 1–9-septate, distance between septa 4–10 µm ($\bar{x}$ = 6.7 µm, n = 30), pale brown or olivaceous-brown; wall 0.3–0.9 µm wide ($\bar{x}$ = 0.70 µm, n = 25), smooth. Conidiogenous cells intergratae, terminal, cylindrical, tapering to the apex, 5–10 × 2–4 µm ($\bar{x}$ = 6,55 × 2.95 µm, n = 22); conidiogenous loci (scars) small, thickened and slightly darkened, 1–2 µm diam., wall of the loci approximately 0.8 µm thick. Conidia solitary or caternate, cylindrical or narrowly obclavate, straight to curved, 4–30(–36) × (1–)2–5 µm ($\bar{x}$ = 15.33 × 2.71 µm, n = 30), 0–5-sepate, slightly constricted at the septa, subhyaline or olivaceous brown, wall 0.25–1 µm thick ($\bar{x}$ = 0.57 µm, n = 30), apex subobtuse, based long obconically truncate, hila 0.8–2 µm wide ($\bar{x}$ = 1.2 µm, n = 14), wall of the hila 0.6–1 µm wide ($\bar{x}$ = 0.86 µm, n = 14), darkened.

Colonies on PDA after 3 weeks at 25°C white–grey in the centre, margin dark grey, reaching 3–6 mm diam., hyphae 1–5 µm wide ($\bar{x}$ = 1.9 µm, n = 30), septate, distances between septa 5–19 µm ($\bar{x}$ = 12.37 µm, n = 30), primary mycelium brownish, but the second and following ones hyaline, wall smooth. Conidia not formed in culture.

Hosts – *Dipterocarpus alatus* Roxb., *D. obtusifolius* Teijsm. ex Miq. (Dipterocarpaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Xay Village, on leaves of *Dipterocarpus alatus*, rice paddy area, 19 April 2006, P. Phengsintham (P11, MFLU12-2198, **holotype)**; same locality and collector, on leaves of *D. obtusifolius*, 8 August 2006, P. Phengsintham (P129, **paratype)**.

Notes – Several cercosporoid hyphomycete species are known from hosts of the Dipterocarpaceae, but all of them have been described from *Shorea* spp. and belong in the genera *Pseudocercospora* (conidiogenous loci inconspicuous, unthickened, not darkened) and *Stenella* (verruculose superficial mycelium), viz., *Pseudocercospora shoreae-robustae* U. Braun (1995) [≡ *Pseudocercosporella shoreae* A.N. Rai, B. Rai & Kamal], *Stenella shoreae* M.K. Khan & Kamal (Khan et al. 1995) and *S. shoreicola* Crous & U. Braun (2003) [≡ *Cercospora shoreae* Thirum. & Chupp, *Pseudocercospora shoreae* (Thirum. & Chupp) Deighton, *Stenella shoreae* (Thirum. & Chupp) Crous & U. Braun, non M.K. Khan & Kamal 1995]. The new species on *Dipterocarpus* spp. from Laos belongs, however, in *Passalora*, characterized by having smooth mycelium, conspicuous conidiogenous loci and pigmented conidia.

Literature – Braun (1995), Khan et al. (1995), Crous & Braun (2003).

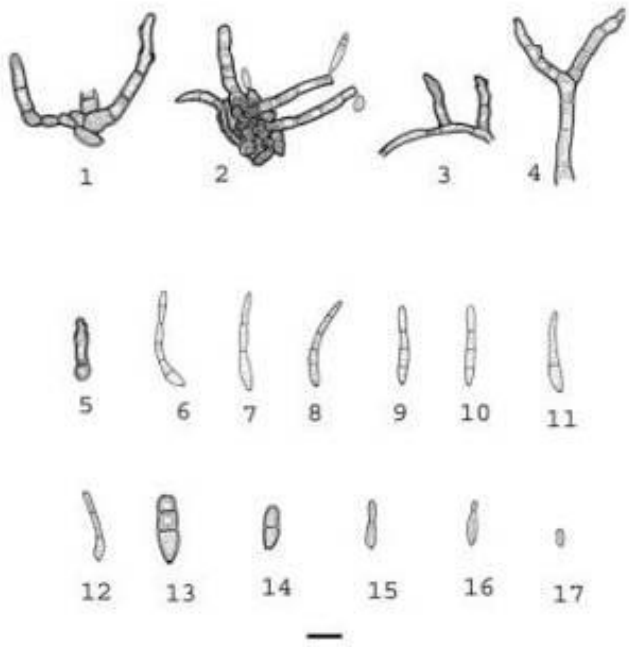

Fig. 64 – *Passalora dipterocarpi* on *Dipterocarpus alatus*: 1. Stroma with attached conidiophores. 2. Stroma with attached conidiophores and conidia. 3. External hypha with attached young conidiophores. 5. Conidiophore. 6–17. Conidia. Bar = 10 µm.

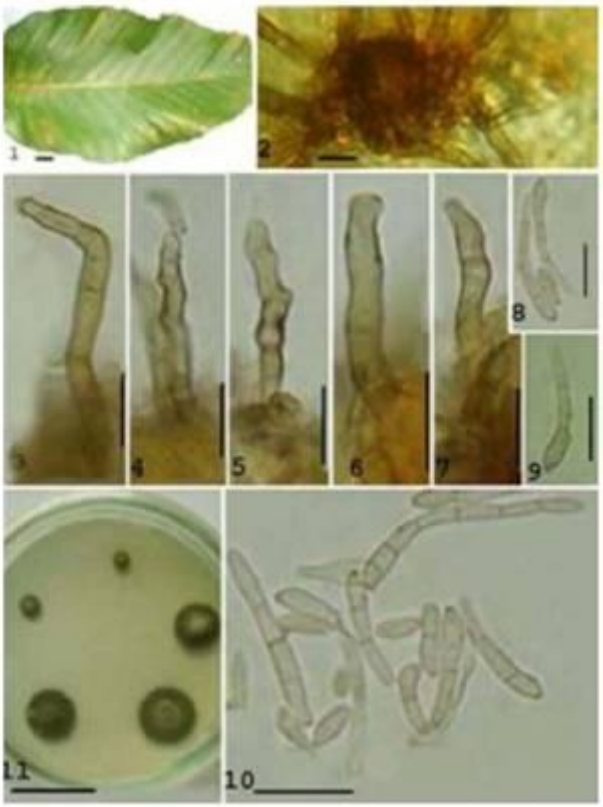

Fig. 65 – *Passalora dipterocarpi* on *Dipterocarpus alatus* from leaf spots: 1. Lesions on host leaf (upper surface). 2. Stroma with attached conidiophoes. 3–7. Conidiophores. 8–10. Conidia. 11. Culture. Bars 1, 11 = 10 mm, 3–6 = 10 µm.

(33) *Passalora erythrinae* **(**Ellis & Everh.) U. Braun & Crous, CBS Biodiversity Series 1: 176, 2003. Figs 66–67.

≡ *Cercospora erythrinae* Ellis & Everh., J. Mycol. 3: 18, 1888.

Leaf spots subcircular to irregular, zonate spots, 1–3 mm diam., pale brown or dark brown in the centre, and with yellow-brown margin. Caespituli hypophyllous, scattered. Mycelium internal, inconspicuous. Stromata oval or ellipsoidal, up to 40 µm diam., dark brown. Conidiophores densely fasciculate, arising from stromata (up to 17 per fascicle), emerging through stromata, unbranched, not geniculate, mostly short, cylindrical, 18–54 × 4–6 µm ($\bar{x}$ = 36.67 × 4.67 µm, n = 5), 0–1-septate, distance between septa 5–19 µm ($\bar{x}$ = 10.5 µm, n = 6), uniformly pale to medium olivaceous-brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.60 µm, n = 5), smooth. Conidiogenous cells terminal, cylindrical, 13 × 5 µm; conidiogenous loci small, at the apex, conspicuous, ovoid to oval, 2 µm wide, slightly thickened, but distinctly darkened, wall 0.8–1 µm thick ($\bar{x}$ = 0.9 µm, n = 5). Conidia solitary, obclavate or cylindrical, straight to curved, 43–58 × 4–5 µm ($\bar{x}$ = 50.29 × 4.86 µm, n = 8), 0–3-septate, pale olivaceous brown, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.6 µm, n = 8), smooth, tip subobtuse, base obconic, 2–3 µm wide ($\bar{x}$ = 2.2 µm, n = 8), wall of the hila 0.8–1 µm ($\bar{x}$ = 0.9 µm, n = 8), somewhat thickened and darkened.

Hosts – *Erythrina crista-galli* L. and *E. stricta* Roxb. (Fabaceae).

Distribution – **Asia:** Laos; **North America:** USA (FL, LA, TX).

Material examined – Vientiane Capital, Xaythany District, Xay Village, garden, on leaves of *Erythrina stricta*, 27 April 2006, P. Phengsintham (P27).

Notes – This species is characterized by having conspicuous conidiogenous loci and narrowly obclavate, subhyaline to pale olivaceous conidia (Crous & Braun 2003). The Laos collection is similar to the description of *Passalora erythrinae* in Ellis (1976) [conidiophores 30–50 × 3–5 µm and conidia 22–55× 3–3.5 µm, 2–5-septate].

Literature – Chupp (1954: 305), Ellis (1976: 269), Crous & Braun (2003: 176).

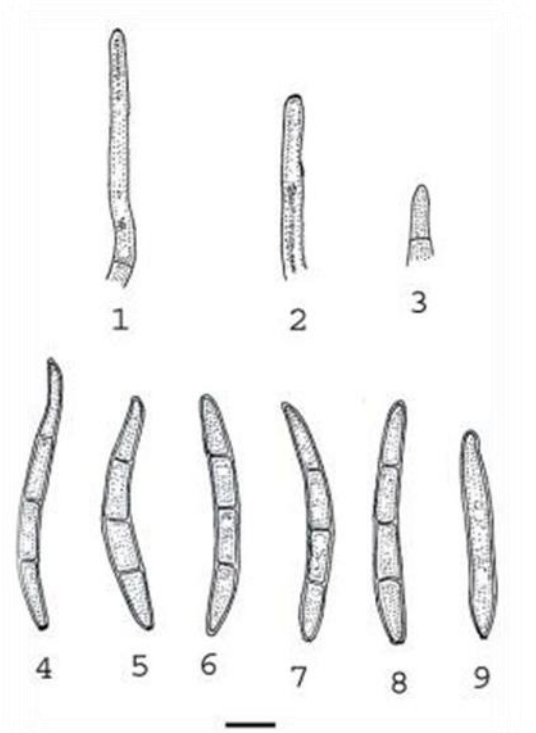

Fig. 66 – *Passalora erytrinae* on *Erytrina stricta*: 1–3. Conidiophores. 4–9. Conidia. Bar = 10 µm.

Fig. 67 – *Passalora erythrinae* on *Erytrina stricta*: 1. Lesions on host leaf (upper surface). 2. Stroma with attached conidiophores. 3–5. Conidiophores. 6–11. Conidia. Bars 1 = 10 mm, 2–11 = 10 µm.

(34) ***Passalora haldinae*** C. Nakash. & Meeboon [as '*haldiniae*'], in Nakashima, Meeboon, Motohashi & To-anun, Fungal Diversity 26(1): 259, 2007. Figs 68–69.

Leaf spots circular to irregular, 2–24 mm diam. ($\bar{x}$ = 9 mm, n = 18), pale olivaceous in the centre, and with dark olivaceous margin. Caespituli inconspicuous. Mycelium internal not seen; External hyphae branched, 4–5 µm wide, septate, constricted at the septa, distances between septa 5–15 µm, subhyaline, wall smooth. Stromata oval or ellipsoidal, up to 32 µm diam. ($\bar{x}$ = 28 µm, n = 9), dark brown, stromatal cells angular in outline, 5–10 µm wide ($\bar{x}$ = 7.67 µm, n = 12), wall 0.8–1 µm ($\bar{x}$ = 0.95 µm, n = 12), smooth. Conidiophores fasciculate, arising from stomata (1–7 per fascicle) and solitary borne on external mycelial hyphae, unbranched, 0–1-geniculate, cylindrical, 12–70 × 2–5 µm ($\bar{x}$ = 31 × 3 µm, n = 16), 1–8-septate, distance between septa 5–10 µm ($\bar{x}$ = 8 µm, n = 9), uniformly pale to medium olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.45 µm, n = 12), smooth. Conidiogenous cells integrated, terminal, cylindrical, 5–21 × 2–3 µm ($\bar{x}$ = 11.8 × 2.4 µm, n = 5); conidiogenous loci small, at the apex, conspicuous, ovoid to oval, slightly thickened, but distinctly darkened. Conidia solitary, obclavate or cylindrical, straight to curved, 65–70 × 2–3 µm ($\bar{x}$ = 67.5 × 2.3 µm, n = 3), 3–4-septate, pale olivaceous-brown, wall 0.3 µm wide, smooth, tip subobtuse, base obconic, hila 1–2 µm wide ($\bar{x}$ = 1.3 µm, n = 3), wall 0.3 µm ($\bar{x}$ = 0.3 µm, n = 3), thickened and darkened.

Colonies on PDA after 3 weeks at 25 °C with white-grey in the centre, and dark grey at the margin, reaching 4 mm diam.

Hosts – *Haldina cordifolia* (Roxb.) Ridsdale (Rubiaceae).

Distribution – **Asia:** Laos, Thailand.

Material examined – Vientiane Capital, Xaythany District, Dong Makkhai Village, on leaves of *Haldina cordifolia*, dry dipterocarp forest, 20 May 2006, P. Phengsintham (P53); ibid., 9 December 2008, P. Phengsintham (P382). GenBank accession no (ITS, KC677893; LSU, KC677925).

Notes – The Laos collections agree with the description of *Passalora haldiniae* in Nakashima et al. (2007) [conidiophores 15–63 × 2.8–3.6 µm and conidia 24–80 × 2.7–5 µm], but the material from Laos differs in having smaller stromata (up to 32 µm diam.).

Literature – Nakashima et al. (2007: 257–270).

(35) ***Passalora helicteris-viscidae*** Phengsintham, Chukeatirote, Abdelsalam, K.D. Hyde & U. Braun, Cryptog. Mycol. 31(2): 171, 2010. Figs 70–71.

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. Caespituli amphigenous, scattered. Mycelium internal, inconspicuous. Stromata lacking or moderately developed, substomatal, subglobular, 8–24 µm diam. ($\bar{x}$ = 15 µm, n = 4), brown to dark brown, stroma cells oval, ellipsoidal to angular in outline, 5–10 µm wide ($\bar{x}$ = 7.14 µm, n = 7), dark brown, wall 0.8–1 µm wide ($\bar{x}$ = 0.93 µm, n = 7), smooth. Conidiophores fasciculate, arising from stromata (2–6 per fascicle), erect, straight or curved, unbranched or branched, 22–58 × 4–6 µm ($\bar{x}$ = 43.7 × 4.75 µm, n = 12), 0–4-septate,

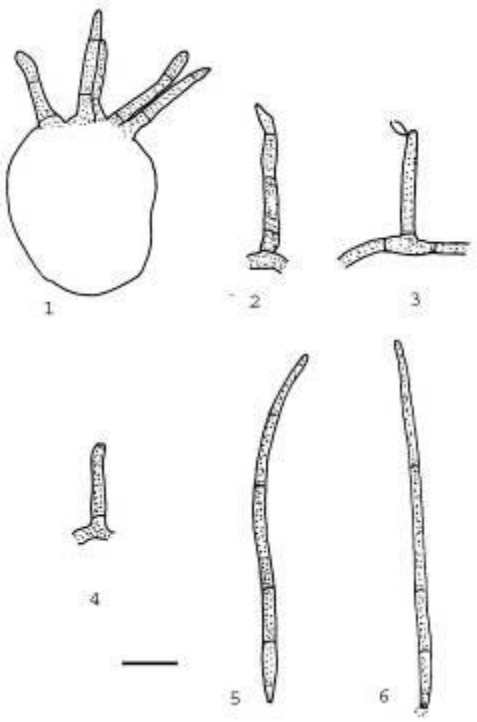

Fig. 68 – *Passalora haldiniae* on *Haldina cordifolia*: 1. Stroma with Conidiophore. 2. Conidiophores. 3. Conidiophore with attached young Conidium. 4. Conidiophore, 5–6. Conidia. Bar = 10 µm.

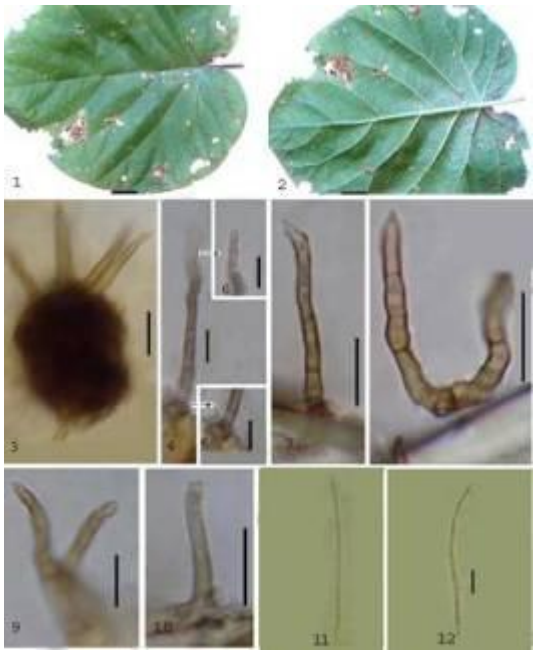

Fig. 69 – *Passalora haldiniae* from *Haldina cordifolia* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stroma with attached conidiophores. 4–10. Conidiophores. 11–12. Conidia. Bars 1–2 = 10 mm, 3–12 = 10 µm.

distance between septa 5–23 µm ($\bar{x}$ = 14.9 µm, n = 18), pale to moderately olivaceous-brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.55 µm, n = 12), smooth. Conidiogenous cells integrated, 12–20 × 3–4 µm ($\bar{x}$ = 15.4 × 3.5 µm, n = 8), apex 1–2 µm wide, wall 0.8 µm thick, subtruncate, cicatrized, pale olivaceous or brown; conidiogenous loci conspicuous, 1–2 µm wide ($\bar{x}$ = 1.5 µm, n = 8), wall 0.3–0.8 µm wide ($\bar{x}$ = 0.52 µm, n = 8), smooth. Conidia solitary or catenate, cylindrical, straight to moderately curved, (8–)10–44 × 1–3 µm ($\bar{x}$ = 21.7 × 1.93 µm, n = 30), 0–4-septate, slightly constricted at the septa, pale olivaceous, wall 0.2–0.3 µm wide ($\bar{x}$ = 0.25 µm, n = 30), smooth or finely verruculose, both ends subtruncate when catenate, bluntly rounded at the apex in solitary and primary conidia, apical hila 1–1.5 µm wide ($\bar{x}$ = 1.76 µm, n = 22), wall 0.3–0.5 µm ($\bar{x}$ = 0.32 µm, n = 15) thick, with subtruncate base, basal hila 0.5–1 µm wide ($\bar{x}$ = 1.87 µm, n = 22), wall 0.3–0.5 µm ($\bar{x}$ = 0.32 µm, n = 22) thick.

Colonies on PDA after 3 weeks at 25°C black in the centre and margin, reaching 2–6 mm diam., hyphae 2–7 µm wide ($\bar{x}$ = 3.3 µm, n = 30), septate, distance between septa 4–32 µm ($\bar{x}$ = 13.8 µm, n = 30), primary mycelium brownish, but the second and following ones hyaline, wall smooth. Conidia not formed in culture.

Hosts – *Helicteres viscida* Blume (Malvaceae).

Distribution – **Asia:** Laos

Material examined – Vientiane Capital, Xaythany District, Nongviengkham Village, on leaves of *Helicteres viscida*, fallow forest, 14 May 2006, P. Phengsintham (P47, MFLU12-2199, **holotype**); ibid., Houay Ngang, fallow forest, 17 July 2009, P. Phengsintham (P414). GenBank accession no (ITS, KC677894; LSU, KC677926).

Notes – Several species of *Passalora* on *Sterculia* spp. are known. *P. sterculiacearum* U. Braun & Crous (≡ *Cercospora helicteris* Syd. & P. Syd., *Cercosporina helicteris* (Syd. & P. Syd.) Sacc., *Passalora helicteris* (Syd. & P. Syd.) U. Braun & Crous, 2003, nom. illeg., non *Passalora helicteris* (Soni, Dadwal & Jamaluddin) Poonam Srivast., 1994) differs from the new species described from Laos in having well-developed superficial hyphae with

solitary narrower conidiophores (mycovellosiella-like) and longer subhyaline conidia, up to 120 µm in length, with up to six septa (Chupp 1954, Crous & Braun 2003, Braun & Crous 2007). *Passalora meridiniana* (Chupp) U. Braun & Crous is a phaeoramularia-like species with densely fasciculate conidiophores in coremioid conidiomata and much longer conidia, up to 125 µm in length (Chupp 1954, Crous & Braun 2003). *Passalora helicteris* is easily distinguishable from the new species by its much longer conidiophores, up to 450 µm, and much wider conidia, 20–50 × 7.5–12.5 µm, formed singly (Soni et al. 1984, Crous & Braun 2003).

Literature – Crous & Braun (2003: key).

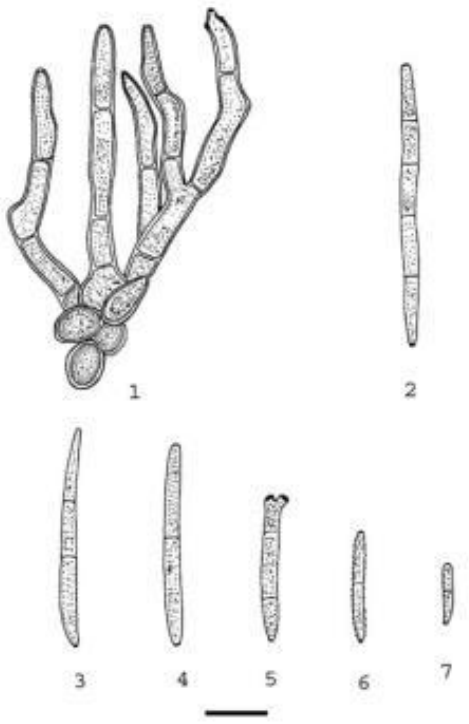

Fig. 70 – *Passalora helicteris-viscidae* on *Helicteres viscida*: 1. Stroma with attached conidiophores. 2–7. Conidia. Bar = 10 µm.

(36) ***Passalora henningsii*** **(**Allesch.) R.F. Castañeda & U. Braun, Cryptog. Bot. 1(1): 46, 1989. Figs 72–73.

≡ *Cercospora henningsii* Allesch., in Engler, Pflanzenwelt Ostafrikas, Teil C: 35, 1895.

≡ *Cercospora henningsii* (Allesch.) Deighton, in Ellis, More dematiaceous hyphomycetes: 295, 1976.

≡ *Passalora henningsii* (Allesch.) Poonam Srivast., J. Living World 1: 116, 1994.

= *Cercospora cassavae* Ellis & Everh., Bull. Torrey Bot. Club. 22: 438, 1895.

= *Cercospora manihotis* Henn., Hedwigia 41: 18, 1902.

Fig. 71 – *Passalora helicteris-viscidae* on *Helicteres viscida* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4–5. Stroma with attached conidiophores and conidium. 6. Conidiophore; 6–9. Conidia.10. Culture. Bars 1–2, 10 = 10 mm, 4–9 = 10 µm.

= *Cercospora cearae* Petch, Ann. Roy. Bot. Gard. Peradeniya 3: 10, 1910.

= *Septogloeum manihotis* Zimm., Centralbl. Bakteriol., Abt. 2, 8: 218, 1912.

= *Helminthosporium manihotis* Rangle, Arch. Jard. Bot. Rio de Janeiro 2: 71, 1902.

Leaf spots circular to irregular, 4–15 mm diam., pale brown or dark brown. Caespituli amphigenous, scattered. Mycelium internal; hyphae branched, 3–6 µm wide ($\bar{x}$ = 4 µm, n = 9), septate, constricted at the septa, distance between septa 5–20 µm ($\bar{x}$ = 10.33 µm, n = 9), subhyaline, wall smooth. Stromata oval or ellipsoidal, 17–40 µm diam. ($\bar{x}$ = 28.36 µm, n = 11), dark brown, stroma cells angular in outline, 3–8 µm wide ($\bar{x}$ = 5.17 µm, n = 30),

wall 0.3–1 µm ($\bar{x}$ = 0.65 µm, n = 30), smooth. Conidiophores densely fasciculate, arising from stromata (8–30 per fascicle), emerging through stromata, not branched, not geniculate, mostly short, cylindrical, 10–48 × 4–6 µm ($\bar{x}$ = 31.87 × 5.07 µm, n = 30), 0–2-septate, distance between septa 5–26 µm ($\bar{x}$ = 14.4 µm, n = 30), uniformly pale to medium olivaceous-brown, wall 0.5-0.8 µm wide ($\bar{x}$ = 0.55 µm, n = 30), smooth. Conidiogenous cells terminal, cylindrical, 10–26 × 4–5 µm ($\bar{x}$ = 19.1 × 4 µm, n = 14); conidiogenous loci small, at the apex, conspicuous, ovoid to oval, 1–2 µm wide ($\bar{x}$ = 1.83 µm, n = 14), slightly thickened, but distinctly darkened, wall 0.5–1 µm thick ($\bar{x}$ = 0.91 µm, n = 30). Conidia solitary, obclavate or cylindrical, straight to curved, 14–53 × 4–6 µm ($\bar{x}$ = 43 × 5.37 µm, n = 30), 0–7-septate, pale olivaceous brown, wall 0.5–1 µm thick ($\bar{x}$ = 0.78 µm, n = 30), smooth, tip subobtuse, base obconic, 1–2 µm wide ($\bar{x}$ = 1.87 µm, n = 19), wall of the hila 0.5–1 µm ($\bar{x}$ = 0.9 µm, n = 19), somewhat thickened and darkened.

Colonies on PDA after 3 weeks at 25°C with grey to dark grey, reaching 15–17 mm diam., hyphae 2–9 µm wide ($\bar{x}$ = 5 µm, n = 20), septate, constricted at the septa, distance between septa 5–26 µm ($\bar{x}$ = 11.37 µm, n = 20), brownish or subhyaline, wall 0.3–1 µm wide ($\bar{x}$ = 0.61 µm, n = 20), smooth. Conidia not formed in culture.

Hosts – *Manihot glaziovii* Müll. Arg., *M. manihot* (L.) H. Karst., *M. piauhyensis* Ule, *M. utilissima* Pohl (= *M. esculenta* Crantz) (Euphorbiaceae).

Distribution – **Africa:** Angola, Congo, Gabon, Ghana, Ivory Coast, Kenya, Madagascar, Malawi, Mauritius, Nigeria, Sierra Leone, Somalia, South Africa, Sudan, Taiwan, Tanzania, Togo, Uganda, Zimbabwe; **Asia:** Brunei, Cambodia, China, India, Indonesia, Laos, Malaysia, Philippines, Singapore, Sri Lanka, Timor. Thailand; **North America and West Indies:** Antigua and Barbuda, Barbados, Costa Rica, Cuba, Dominican Republic, El Salvador, Haiti, Jamaica, Panama, Puerto Rico, Trinidad and Tobago, USA (FL, HI, TX), Virgin Islands; **Australia; Oceania:** Fiji, French Polynesia, New Caledonia, Palau, Solomon Islands, Vanuatu, Wallis and Futuna Islands; **South America:** Brazil, Colombia, Peru, Suriname, Venezuela.

Material examined – Vientiane Capital, Xaythany District, Xay Village, on leaves of *Manihot utilissima*, garden, 27 April 2006, P. Phengsintham (P26); Bolikhamsay Province, Nongsong Village, garden, on leaves of *M. utilissima*, 27 July 2008, P. Phengsintham (P327).

Notes – The collection from Laos has been compared with these species and proved to be conspecific with *Passalora heningsii* as redescribed by Castañeda & Braun (1989), based on material from Cuba, but differs in having 0–7-septate conidia (versus 1–3-septate in the Cuba specimens.

Literature – Chupp (1954: 220), Ellis (1976: 295), Castañeda & Braun (1989: 46), Hsieh & Goh (1990: 116), Crous & Braun (2003: 215).

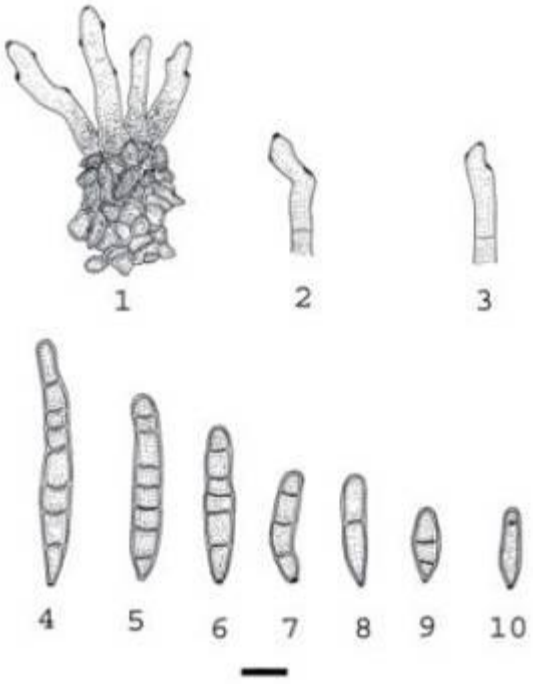

Fig. 72 – *Passalora henningsii* on *Manihot utilissima*: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–10. Conidia. Bar = 10 µm.

(37) *Passalora perfoliati* (Ellis & Everh) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Series 1: 46, 2003. Figs 74–75.

≡ *Cercospora perfoliati* Ellis & Everh. J. Mycol. 5, 71, 1889.

≡ *Mycovellosiella perfoliati* (Ellis & Everh.) Munt.-Cvetk., Lilloa 30: 201, 1960.

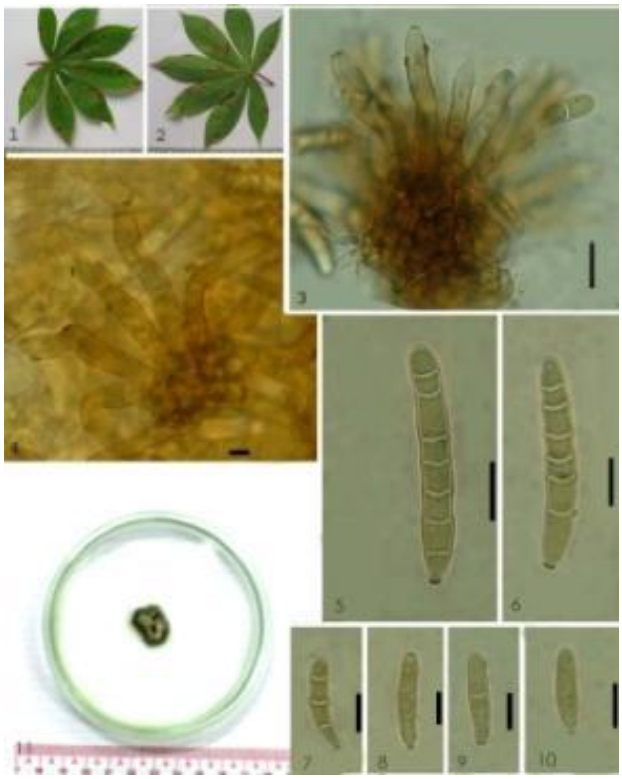

Fig. 73 – *Passalora henningsii* on *Manihot utilissima*: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3–4. Stromata with attached conidiophores. 5–10. Conidia. 11. Culture. Bars 1–2 = 10 mm, 4–10 = 10 µm.

= *Cercospora agerati* F. Stevens. Bull. Bernice P. Bishop. Mus. 19: 154, 1925.

≡ *Ragnhildiana agarati* (F. Stevens) F. Stevens & Solheim, Mycologia 23: 402, 1931.

Leaf spots circular to irregular, 1–7 mm diam., brown in the centre, and with dark brown margin. Caespituli amphigenous, scattered, dark blackish brown, hairy. Mycelium internal, inconspicuous. Stromata substomatal, intraepidermal, ellipsoidal, 10–45 µm diam. ($\bar{x}$ = 25.60 µm, n = 25), brown, stromatal cells 4–10 µm diam. ($\bar{x}$ = 6.43 µm, n = 30), wall 0.5–1 µm wide ($\bar{x}$ = 0.65 µm, n = 30), smooth. Conidiophores solitary or fasciculate, arising from stromata (1–8 per fascicle), 15–150 × 3–6 µm ($\bar{x}$ = 57.36 × 4.46 µm, n = 30), 0–7-septate, unbranched, geniculate, distance between septa 7–32 µm ($\bar{x}$ = 14.26 µm, n = 30), medium brown, paler at the apex, wall 0.5–1 µm wide ($\bar{x}$ = 0.73 µm, n = 30), smooth. Conidiogenous cells integrated, terminal, cylindrical, 7–32 × 3–5 µm ($\bar{x}$ = 16.52 × 3.8 µm, n = 19), wall 0.5–1 µm wide ($\bar{x}$ = 0.69 µm, n = 19), pale brown; conidiogenous loci conspicuous, integrated, terminal, subcircular, 1–2 µm wide ($\bar{x}$ = 1.3 µm, n = 5), dark brown, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.7 µm, n = 3). Conidia solitary, cylindrical or fusiform, straight or slightly fcurved, 8–57 × 3–6 µm ($\bar{x}$ = 34.21 × 4.10 µm, n = 23), 0–4-septate, subhyaline to olivaceous-brown or dark brown, smooth, tip rounded, subtruncate at the ends with thickened hila, 1–2 µm wide ($\bar{x}$ = 1.3 µm, n = 5), wall of apex 0.3–0.5 µm ($\bar{x}$ = 0.4 µm, n = 5) thick., base truncate 1–2 µm wide ($\bar{x}$ = 1.42 µm, n = 7), wall of the hila 0.3–0.5 µm ($\bar{x}$ = 0.47 µm, n = 7) thick.

Hosts – *Ageratum conyzoides* L., *Chromolaena odorata* (L.) R.M. King & H. Rob., *Chromolaena* sp., *Eupatorium ageratifoium* DC., *E. perfoliatum* L., *E. purpureum* L., *E. repandum* Willd., *E. rugosum* Houtt., *E. sessilifolium* L., *Eupotorium* sp.(Asteraceae).

Distribution – **Africa:** Kenya, Malawi, South Africa, Sudan, Tanzania, Uganda; **Asia:** China, India, Laos, Sri Lanka, Taiwan, Thailand; **Europe:** Canary Islands (Spain); **North America and West Indies:** Dominican Republic, Jamaica, Haiti, Puerto Rico, Trididad and Tobago, USA (FL, HI, IL, MI, WI); **Oceania:** New Caledonia, Papua New Guinea.

Material examined – Luang Prabang Province, Phoukhoun district, Pha Ngeng Noi village, fallow forest, on leaves of *Chromolaena* sp., 17 June 2006, P. Phengsintham (P101).

Notes – The collection from Laos differs from *Passalora perfoliati* described by Hsieh & Goh (1990) [stromata lacking, conidiophores mostly not fasciculate but borne as branches from the external mycelial hyphae which climb up the leaf hairs] by well-developed stromata, and fasciculate.

Literature – Chupp (1954: 152), Vasudeva (1963: 162), Deighton (1974: 69), Hsieh & Goh (1990: 74).

(38) ***Passalora tithoniae*** (R.E.D. Baker & W.T. Dale) U. Braun & Crous, in Crous & Braun, CBS Diversity Series 1: 404, 2003. Figs 76–77.

≡ *Cercospora tithoniae* R.E.D. Baker & W.T. Dale, Mycol. Pap. 33: 106, 1951.

≡ *Phaeoramularia tithoniae* (R.E.D. Baker & W.T. Dale) Deighton, in Ellis, More

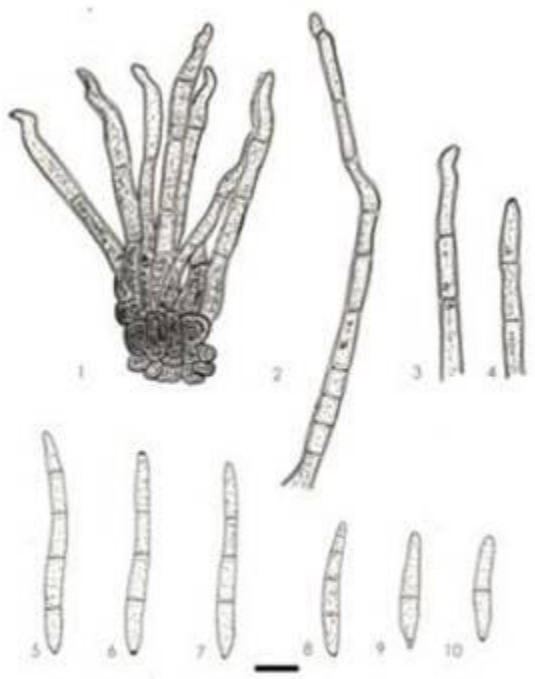

Fig. 74 – *Passalora perfoliati* on *Chromolaena* sp. from leaf spots. 1. Stromata with attached conidiophores, 2–4. Conidiophores, 5–10. Conidia. Bar = 10 µm.

Fig. 75 – *Passalora perfoliati* on *Chromolaena* sp. from leaf spots. 1–2. Lesions on host leaves (1. upper surface, 2. lower surface), 3. Caespituli, 4–5. Stromata with attached conidiophores and young conidia, 6–7. Conidiophores, 8–12. Conidia. Bars 1–2 = 10 mm, 4–12 = 10 µm.

dematiaceous hyphomycetes: 319, 1976.

= *Cercospora tithoniae* Chidd., Mycopathol. Mycol. Appl. 17: 80, 1962.

= *Cercospora tithoniicola* J.M. Yen., Rev. Mycol. 31: 144, 1936.

Leaf spots circular to irregular, 1–15 mm diam., brown to dark brown in the centre, and with a brown margin. Caespituli amphigenous, scattered. Mycelium internal, conspicuous; internal hyphae branched, 2–3 µm wide ($\bar{x}$ = 2.75 µm, n = 5), septate, constricted at the septa, distance between septa 6–12 µm ($\bar{x}$ = 9 µm, n = 5), brownish, subhyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.45 µm, n = 5), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata developed, substomatal, subglobular, 33–50 µm diam. ($\bar{x}$ = 42.4 µm, n = 5), brown to dark brown, stroma cells oval, ellipsoidal to angular in outline, 5–14 µm wide ($\bar{x}$ = 8 µm, n = 24), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.7 µm, n = 24), smooth. Conidiophores fasciculate, arising from stromata (8–36 per fascicle), erect, straight or curved, unbranched, not geniculate, 14–144 × 3–5 µm ($\bar{x}$ = 61.7 × 3.33 µm, n = 12), 1–5-septate, distance between septa 5–23 µm ($\bar{x}$ = 15.9 µm, n = 20), pale to moderately olivaceous-brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.55 µm, n = 20), smooth. Conidiogenous cells integrated, subtruncate, cicatrized, 9–23 × 3–4 µm ($\bar{x}$ = 17.1 × 3.1 µm, n = 9), pale olivaceous or brown; conidiogenous loci conspicuous, 1–2 µm wide ($\bar{x}$ = 1.7 µm, n = 5), wall 0.5–0.8 µm wide ($\bar{x}$ = 0.56 µm, n = 5), smooth. Conidia solitary or catenate, cylindrical, straight to moderately curved, 17–75 × 3–6 µm ($\bar{x}$ = 32.23 × 3.46 µm, n = 20), 0–3-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.33 µm, n = 20), smooth or finely verruculose, both ends subtruncate when catenate, bluntly rounded at the apex in solitary and primary conidia, apical hila 1.5–2 µm wide ($\bar{x}$ = 1.54 µm, n = 10), wall 0.3–0.5 µm ($\bar{x}$ = 0.36 µm, n = 10) thick, with subtruncate base; basal hila 1.5–2 µm wide ($\bar{x}$ = 1.55 µm, n = 20), wall 0.3–0.5 µm ($\bar{x}$ = 0.35 µm, n = 20) thick.

Colonies on PDA after 3 weeks at 25°C with grey to dark grey, reaching 10–18 mm diam., hyphae 2–5 µm wide ($\bar{x}$ = 53.53 µm, n = 26), septate, constricted at the septa, distance between septa 6–20 µm ($\bar{x}$ = 15.46 µm, n =

26), brownish or subhyaline, wall 0.3–0.8 µm wide ($\bar{x}$ = 0.60 µm, n = 26), smooth. Conidia solitary or catenate, cylindrical, straight to moderately curved, 9–35 × 3–5 µm ($\bar{x}$ = 20.72 × 3.72 µm, n = 11), 0–2-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.46 µm, n = 11) thick; apical hila 1–2 µm wide ($\bar{x}$ = 1.66 µm, n = 5), wall 0.3–0.5 µm ($\bar{x}$ = 0.43 µm, n = 5) thick, with subtruncate base; basal hila 0.5–2 µm wide ($\bar{x}$ = 1.63 µm, n = 11), wall 0.3–0.5 µm ($\bar{x}$ = 0.42 µm, n = 11) thick.

Hosts – *Tithonia diversifolia* (Hemsl.) A. Grey, *T. speciosa* (Hook.) Hook. ex Griseb., *T. tagetiflora* Lam., *Viguera dentata* (Cav.) Spreng. (Asteraceae).

Distribution – **Africa:** Ivory Coast, Mauritius; **Asia:** Hong Kong, India, Laos, Singapore, Taiwan; **North America and West Indies:** Barbados, Cuba, Trinidad and Tobago.

Material examined – Luangnamtha Province, Luangnamtha District, Chaleunsouk Village, fallow forest, on leaves of *Tithonia diversifolia*, 20 February 2010, P. Phengsintham (P572). GenBank accession no (ITS, KC677895; LSU, KC677927).

Notes – The collection from Laos agrees with the description of *Passolora tithoniae* in Hsieh & Goh (1990) [conidiophores 30–90 × 3–4 µm and conidia 30–50 × 3.5–5 µm].

Literature – Chupp (1954: 162), Ellis (1976: 319), Hsieh & Goh (1990: 76), Crous & Braun (2003: 404).

(39) ***Pseudocercospora alangii*** Y.L. Guo & X.L. Liu, Mycosystema 2: 226, 1989. Figs 78–79.

= *Cercospora alangii* M. Madal, Indian J. Mycol. Res. 16: 311, 1978.

Leaf spots circular, 1–5 mm in diam., with brown to dark brown and brown margin. Caespituli amphigenous, but chiefly hypophyllous. Mycelium internal; hyphae branched, 2–3 µm wide ($\bar{x}$ = 2.5 µm, n = 5), septate, constricted at the septa, distance between septa 10–14 µm ($\bar{x}$ = 12 µm, n = 5), subhyaline or hyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.4 µm, n = 5), smooth. Stromata developed, substomatal, subglobular, 12–46 µm wide ($\bar{x}$ = 29 µm, n = 5), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 2–6 µm wide ($\bar{x}$ = 3.8 µm, n = 30), dark brown,

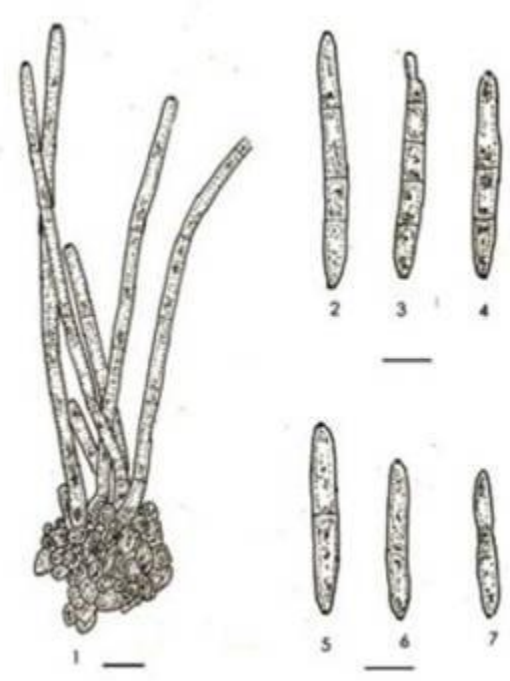

Fig. 76 – *Passalora tithoniae* on *Tithonia diversifolia*: 1. Stroma with attached conidiophores. 2–7. Conidia. Bars = 10 µm.

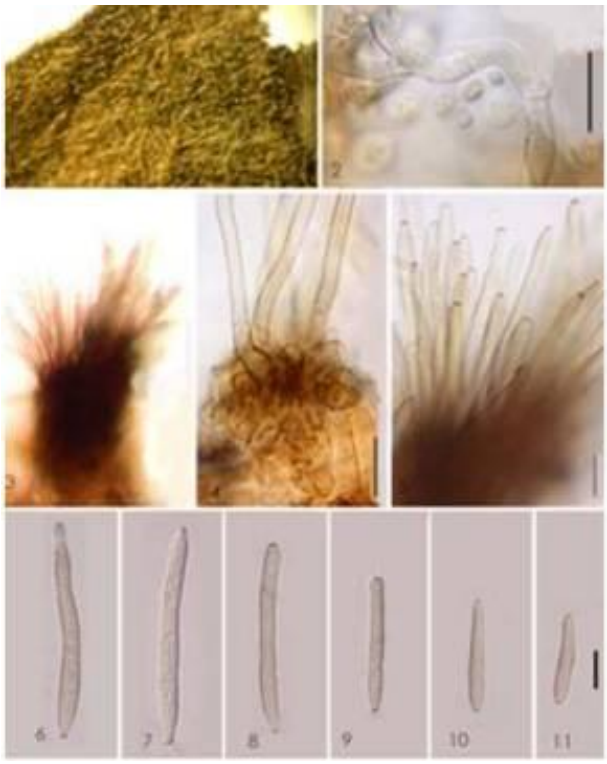

Fig. 77 – *Passalora tithoniae* on *Tithonia diversifolia* from leaf spots: 1. Caespituli. 2. Internal mycelium. 3–4. Stromata with attached conidiophores. 5. Apex of conidiophores. 6–11. Conidia. Bars 2 –11 = 10 µm.

wall 0.3–0.5 µm wide ($\bar{x}$ = 0.35 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (4–15 per fascicle), erect, straight or curved, unbranched, geniculate, 6–19 × 2–4 µm ($\bar{x}$ = 10.1 × 2.88 µm, n = 30), 0–1-septate, distance between septa 4–14 µm ($\bar{x}$ = 10 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, acute, 6–14 × 2–4 µm ($\bar{x}$ = 9.25 × 2.94 µm, n = 15), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, 40–71 × 2–3 µm ($\bar{x}$ = 60.4 × 2.6 µm, n = 15), 5–7-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.38 µm, n = 15), smooth, obtuse at the apex, with long obconically truncate base.

Colonies on PDA after 3 weeks at 25°C dark grey in the centre and grey margin, spreading surface ridged and smooth, 13–125 mm diam.

Hosts – *Alangium kurzii* Craib, *A. salviifolium* (L. f.) Wangerin (Cornaceae, incl. Alangiaceae).

Distribution – **Asia:** China, India, Laos.

Material examined: Phongsali Province, Phongsali District, Hathin Village, Nam Ou riverbank, on leaves of *Alangium kurzii*, 23 June 2010, P. Phengsintham (P596).

Notes – The collection from Laos agrees with the description of *Pseudocercospora alangii* published by Guo et al. (1998).

Literature – Guo et al. (1998: 17–18), Crous & Braun (2003: 49).

(40) ***Pseudocercospora baliospermi*** (S. Chowdry) Deighton, Mycol. Pap. 140: 139, 1976. Figs 80–81.

≡ *Cercospora baliospermi* S. Chowdry, Lloydia 24: 94, 1961.

= *Cercospora baliospermi* Pavgi & U.P. Singh, Mycopathol. Mycol. Appl. 27: 90, 1965.

Leaf spots circular to irregular, 1–6 mm diam., brown to dark brown in the centre, with a brown to dark brown margin. Caespituli amphigenous, scattered. Mycelium internal, inconspicuous. Stromata developed, substomatal, subglobular, 15–35 µm diam. ($\bar{x}$ = 23 µm, n = 5), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 5–7

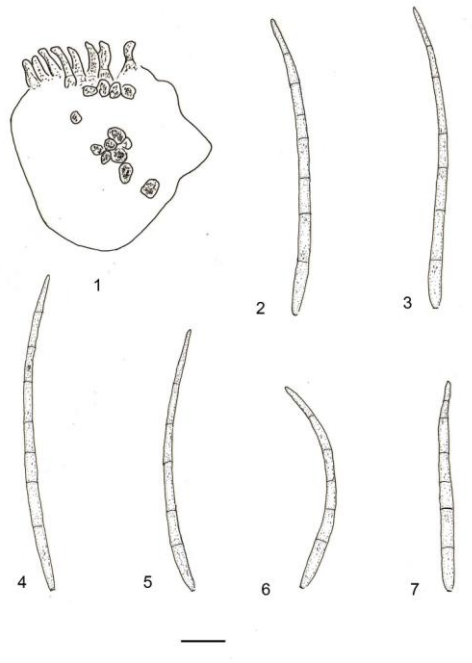

Fig. 78 – *Pseudocercospora alangii* on *Alangium kurzii*: 1. Stroma with attached conidiophores. 2–7. Conidia. Bar = 10 µm.

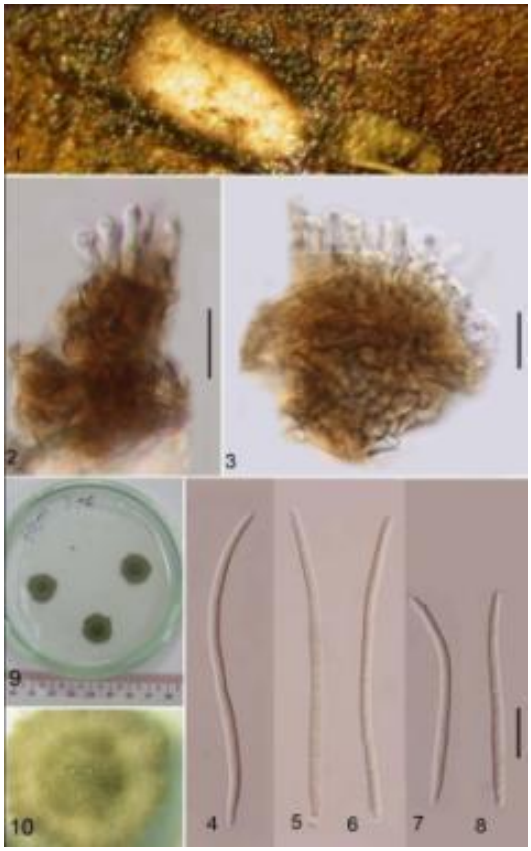

Fig. 79 – *Pseudocercospora alangii* on *Alangium kurzii* from leaf spots: 1. Lesions on host leaf with caespituli. 2–3. Stromata with attached conidiophores. 4–8. Conidia. 9–10. Cultures. Bars 2–5 = 10 µm, 9 = 10 mm.

µm wide ($\bar{x}$ = 6.3 µm, n = 30), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.57 µm, n = 30), smooth. Conidiophores solitary or fasciculate, arising from stromata (5–9 per fascicle), erect, straight or curved, unbranched, geniculate, 16–60 × 2–5 µm ($\bar{x}$ = 44.2 × 4.4 µm, n = 15), 2–5-septate, distance between septa 5–16 µm ($\bar{x}$ = 10.6 µm, n = 30), pale to moderately olivaceous-brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.55 µm, n = 30), smooth. Conidiogenous cells integrated, subtruncate, cicatrized, 10–17 × 4–5 µm ($\bar{x}$ = 13.5 × 4.25 µm, n = 9), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, 15–101 × 3–5 µm ($\bar{x}$ = 51.1 × 3.77 µm, n = 30), 1–8-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.45 µm, n = 30), smooth, bluntly rounded at the apex, with subtruncate base, basal hila 1.5–2 µm wide ($\bar{x}$ = 1.78 µm, n = 30), wall 0.3–0.5 µm ($\bar{x}$ = 0.47 µm, n = 30) thick.

Hosts – *Baliospermum montanum* (Willd.) Müll. Arg. (Euphorbiaceae).

Distribution – **Asia:** India, Laos, Myanmar.

Material examined – Xiengkhouang Province, Kham District, Napa Village, Fallow forest, on leaves of *Baliospermum montanum*, 3 January 2010, P. Phengsintham (P504); Vientiane Province, Thalad, fallow forest, on leaves of *B. montanum,* April 2010, P. Phengsintham (P548).

Notes – The collection from Laos agrees well with the description in Deighton (1976).

Literature – Deighton (1976: 139), Crous & Braun (2003: 755).

(41) ***Pseudocercospora buddlejae*** (W. Yamam) Goh & W.H. Hsieh, Trans. Mycol. Soc. Republ. China 2: 114, 1987. Figs 82–83.

≡ *Cercospora buddlejae* W. Yamam., Trans. Nat. Hist. Soc. Formosa 26: 279, 1936.

= *Pseudocercospora buddlejae* (Yamam.) X.J. Liu & Y.L. Guo, Mycosystema. 2: 230, 1989.

Leaf spots subcircular to irregular, 1–8 mm diam., at first greyish, later becoming brown to dark brown in the center, brown to dark brown at the margin. Caespituli amphigenous, conspicuous. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal,

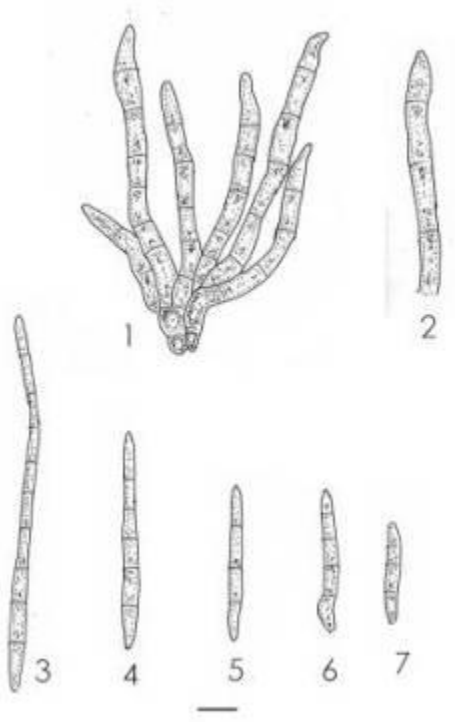

Fig. 80 – *Pseudocercospora baliospermi* on *Baliospermum montanum*: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–7. Conidia. Bar = 10 µm.

Fig. 81 – *Pseudocercospora baliospermi* on *Baliospermum montanum* from leaf spots: 1–2. Stromata with attached conidiophores. 4–7. Conidia. Bar = 10 µm.

20–45 µm diam. ($\bar{x}$ = 32.2 µm, n = 5), brown to dark brown, stromatal cells oval, ellipsoidal and angular, 4–10 µm wide ($\bar{x}$ = 7.5 µm, n = 30), dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.7 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (16–31 per fascicle), unbranched, geniculate, 25–315 × 3–5 µm ($\bar{x}$ = 103 × 4 µm, n = 15), 1–15-septate, slightly constricted at the septa, distance between septa 11–25 µm long ($\bar{x}$ = 19.8 µm, n = 30), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.3–0.8 µm ($\bar{x}$ = 0.55 µm, n = 30), smooth. Conidiogenous cells terminal, 10–17 × 2–4 µm ($\bar{x}$ = 13.4 × 2.88 µm, n = 14), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 33–53 × 2–3 µm ($\bar{x}$ = 46 × 2.76 µm, n = 15), 3–4-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.45 µm, n = 15), smooth, tip subacute, base obconically truncate, hila 1–2 µm wide ($\bar{x}$ = 1.75 µm, n = 15).

Hosts – *Buddleja asiatica* Lour., *B. curviflora* Hook. & Arn., *B. davidii* Franch., *B. lindleyana* Fortune, *B. madagascariensis* Lam., *Buddleja* sp. (Scrophulariaceae).

Distribution – **Asia:** China, India, Indonesia, Laos, Japan, Philippines, Taiwan.

Material examined – Luangnamtha Province, Luangnamtha District, Chaleunsouk Village, fallow forest, on leaves of *Buddleja asiatica*, 19 February 2010, P. Phengsintham (P560).

Notes – The collection from Laos differs from the description of this species in Hsieh & Goh (1990) in having larger stromata (20–45 µm diam.) and larger conidiophore fascicles (16–31 per fascicle) [versus stromata small, and conidiophores 2–12 per fascicle]. The conidiophores are 35–315 × 4–5 µm (versus 40–120 × 3.5–6 µm) and the conidia are 33–53 × 3–4 µm (versus 25–75 × 3.5–5 µm).

Literature – Chupp. (1954: 358), Hsieh & Goh (1990: 210), Crous & Braun (2003: 90).

(42) ***Pseudocercospora catappae*** (Henn.) X.J. Liu & Y. L. Guo, Mycosystema 2: 230. 1989. Figs 84–85.

≡ *Cercospora catalparum* Henn., Bot. Jahrb. Syst. 34: 56, 1905.

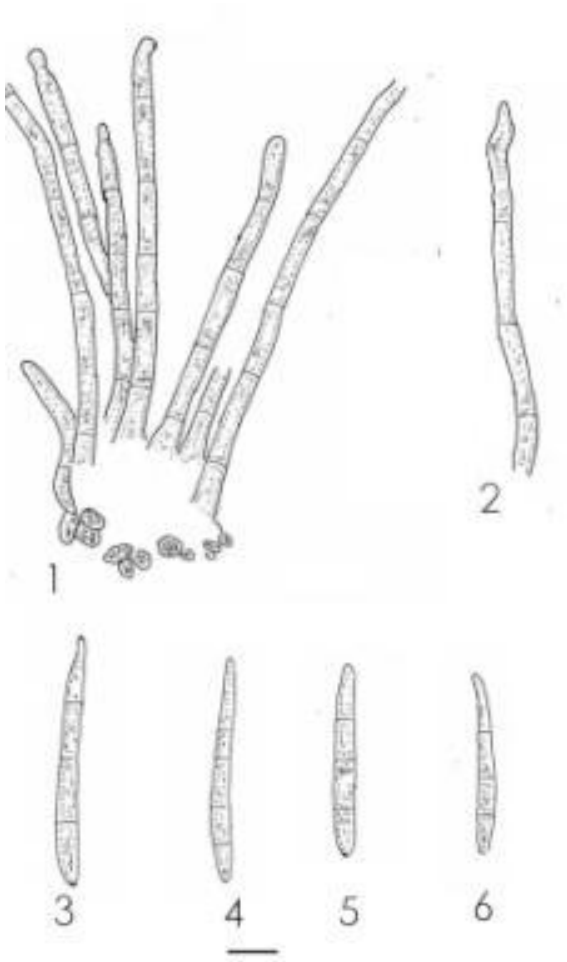

Fig. 82 – *Pseudocercospora buddlejae* on *Buddleja asiatica*: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–6. Conidia. Bar = 10 µm.

= *Pseudocercospora catappae* Goh & W.H. Hsieh, in Hsieh & Goh, *Cercospora* and similar fungi from Taiwan: 57, 1990.

= *Ramularia catappae* Racib, Paras. Algen und Pilze Javas II, Batavia: 41, 1900.

= *Cercospora terminaliae* Sawada, Taiwan Agric. Rev. 38: 701, 1942.

Leaf spots subcircular to irregular, 1–14 mm diam., brown to dark brown in the centre, yellowish at the margin. Caespituli hypophyllous, conspicuous. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal, 20–55 µm diam. ($\bar{x}$ = 38.5 µm, n = 9), brown to dark brown, stromatal cells oval, ellipsoidal and angular, 5–9 µm wide ($\bar{x}$ = 6 µm, n = 13), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.53 µm, n = 13), smooth. Conidiophores fasciculate, arising from stromata (7–18 per fascicle), unbranched, 0–

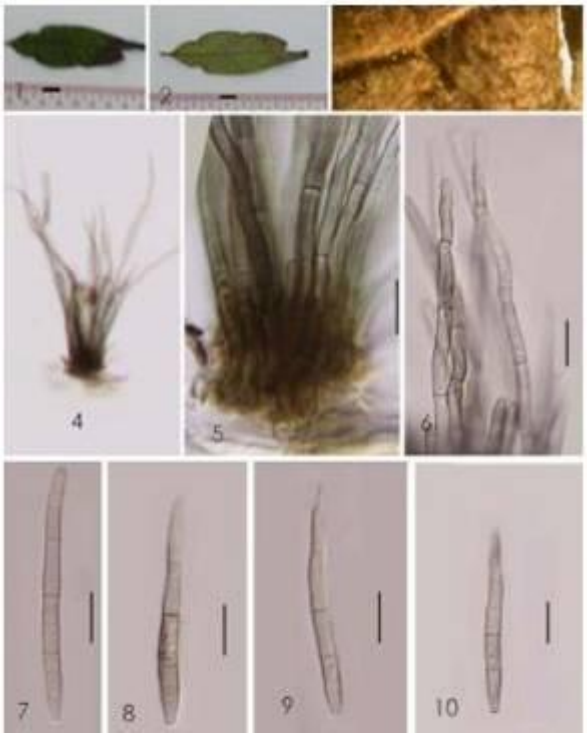

Fig. 83 – *Pseudocercospora buddlejae* on *Buddleja asiatica* from leaf spots: 1–2. Lesions on host leaves (1. upper surface and 2. lower surface). 3. Caespituli. 4–5. Stromata with attached conidiophores. 6. Apices of conidiophores. 7–10. Conidia. Bars 1–2 = 10 mm, 4–10 = 10 µm.

1-geniculate, 12–25 × 3–5 µm ($\bar{x}$ = 18.5 × 4 µm, n = 11), 0–2-septate, slightly constricted at the septa, distance between septa 5–14 µm long ($\bar{x}$ = 8.25 µm, n = 17), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.3–0.5 µm ($\bar{x}$ = 0.48 µm, n = 17), smooth. Conidiogenous cells terminal, 8–14 × 3–4 µm ($\bar{x}$ = 10.1 × 3.29 µm, n = 11), obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 51–80 × 3–4 µm ($\bar{x}$ = 65 × 3.7 µm, n = 7), 4–12-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.33 µm, n = 7), smooth, tip subacute, base obconically truncate, hila 1–2 µm wide ($\bar{x}$ = 1.6 µm, n = 5).

Hosts – *Terminalia arjuna* (Roxb.) Wight & Arn., *T. catappa* L., *T. chebula* Retz., *T. crenulata* Roth., *T. tomentosa* Wight & Arn., *Terminalia* sp. (Combretaceae).

Distribution – **Africa:** Guinea. Tanzania; **Asia:** China, India, Indonesia, Laos. Myanmar, Taiwan; **North America and West Indies:** Cuba, Dominican Republic, Panama; **Oceania:** America Samoa, Fiji, Micronesia, New Caledonia, Papua New Guinea, Samoa, Solomon Islands.

Material examined – Vientiane Capital, Xaythany District, Dongmakhai Village, dry dipterocarp forest, on leaves of *Terminalia tomentosa*, 4 February 2010, P. Phengsintham (P543).

Notes – In the Laos specimen the conidiophores are 12–25 × 3–5 µm and the conidia are 51–80 × 3–4 µm, which is similar to those described in Hsieh & Goh (1990) [conidiophores 20–80 × 3.5–5 µm, conidia 35–145 × 3–5 µm].

Literature – Chupp. (1954: 114), Hsieh & Goh (1990: 57), Guo & Hsieh (1995: 58), Crous & Braun (2003: 111).

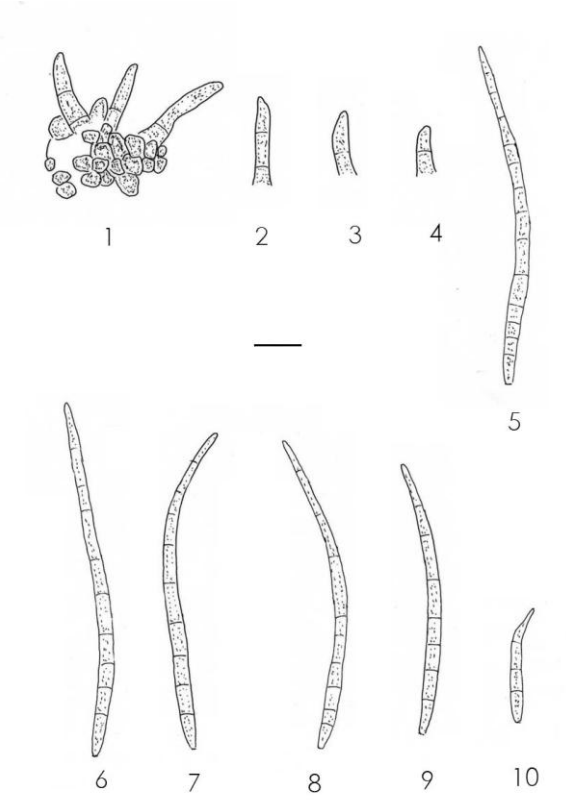

Fig. 84 – *Pseudocercospora catappae* on *Terminalia tomentosa*: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–10. Conidia. Bar = 10 µm.

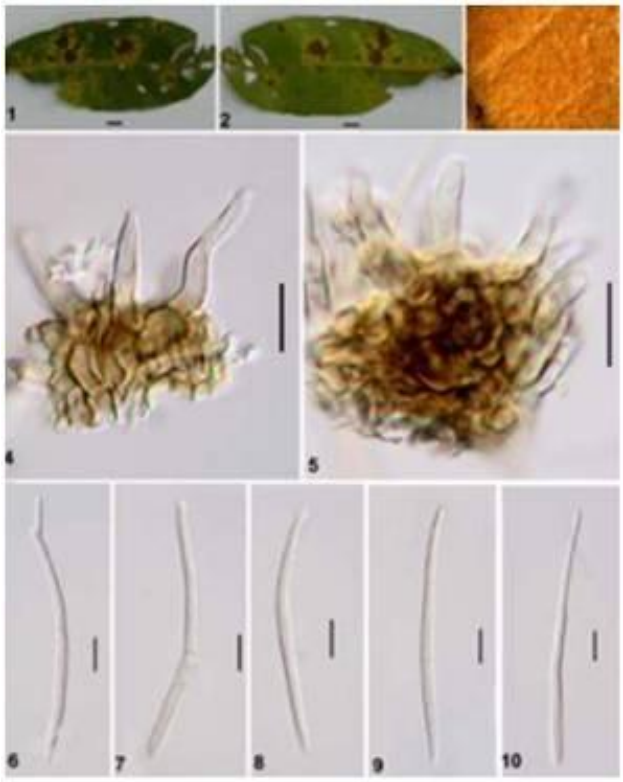

Fig. 85 – *Pseudocercospora catappae* on *Terminalia tomentosa* from leaf spots: 1–2. Lesions on host leaves (1. upper surface and 2. lower surface). 3. Caespituli. 4–5. Stromata with attached conidiophores. 6.7. Conidiophores. 8–10. Conidia. Bars 1–2 = 10 mm, 4–10 = 10 µm.

(43) ***Pseudocercospora cotizensis*** (A.S. Mull. & Chupp) Deighton, Mycol. Pap. 140: 142, 1976. Figs 86–87.

≡ *Cercospora cotizensis* A.S. Mull. & Chupp, Ceiba 1: 173, 1950.

= *Cercospora crotalariae* Syd., Ann. Mycol. 28: 208, 1930 (*nom.illeg.*), homonym of *C. crotalariae* Sacc., 1906.

= *Cercospora crotalariae* Sawada, J. Taihoku Soc. Agric. 7: 118, 1942 (*nom. illeg.*), homonym of *C. crotalariae*, 1930.

Leaf spots subcircular, 1–12 mm diam., at first yellowish, later becoming brown, dingy grey to pale tan, yellowish margin. Caespituli hypophyllous. Mycelium internal; hyphae branched, 1–4 µm wide ($\bar{x}$ = 2.56 µm, n = 16), septate, constricted at the septa, distance between septa 5–18 µm ($\bar{x}$ = 10.5 µm, n = 16), brownish, subhyaline, wall 0.3–0.8 µm wide ($\bar{x}$ = 0.53 µm, n = 8), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 8–30 µm diam. ($\bar{x}$ = 19.13 µm, n = 30), brown to dark brown, stromatal cells oval, ellipsoidal and angular, 4–8 µm wide ($\bar{x}$ = 5.67 µm, n = 30), dark brown, wall 0.8–1 µm wide ($\bar{x}$ = 0.95 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (2–8 per fascicle), slightly geniculate, unbranched or branched, 13–60 × 3–6 µm ($\bar{x}$ = 32.27 × 4.45 µm, n = 30), 1–4-septate, constricted at the septa, distance between septa 5–14 µm long ($\bar{x}$ = 9.77 µm, n = 30), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.5–1 µm ($\bar{x}$ = 0.68 µm, n = 21), smooth. Conidiogenous cells terminal, 7–15 × 3–5 µm ($\bar{x}$ = 12.83 × 4.8 µm, n = 8), apex obtuse; conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 28–85 × 3–5 µm ($\bar{x}$ = 50.6 × 3.44 µm, n = 30), 0–8-septate, pale olivaceous-brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.63 µm, n = 30), smooth; apex subacute; base obconically truncate, hila 1–2 µm wide ($\bar{x}$ = 0.62 µm, n = 30).

Colonies on PDA after 3 weeks at 25°C black-grey mycelium, reaching 2–3 mm diam.; hyphae 2–10 µm wide ($\bar{x}$ = 4.33 µm, n = 30), septate, constricted at the septa, distance between septa 7–22 µm ($\bar{x}$ = 13.57 µm, n = 30), brownish or subhyaline, wall 0.25–1 µm wide ($\bar{x}$ = 0.64 µm, n = 30), smooth. Conidia not formed in culture.

Hosts – *Crotalaria anagyroides* Kunth, *C. greensis* Guill. & Perr., *C. incana* L., *C. jucea* L., *C. mucronata* Desv., *C. pallida* Aiton., *C. retusa* L., *C. spectabilis* Roth, *C. sericea* Willd., *C. striata* DC., *C. uncinella* subsp. *elliptica* (Roxb.) Polhill., *C. verrucosa* L. (Fabaceae).

Distribution – **Africa:** Guinea. **Asia:** China, Hong Kong, India, Laos, Malaysia, Philippines, Sabah, Singapore, Sri Lanka, Taiwan; **North America and West Indies:** Cuba, Guatemala, Puerto Rico, USA (FL), Virgin Islands; **Oceania:** Cook Island, Micronesia, New Caledonia, Niue, Papua New Guinea, Samoa, Solomon Islands; **South America:** Venezuela.

Material examined – Vientiane Capital, Xaythany District, Xay Village, rice paddy, on leaves of *Crotalaria uncinella* subsp. *elliptica*, 15 April 2006, P. Phengsintham (P06); ibid., 28 August 2008, P. Phengsintham (P412).

Notes – The collections from Laos have well developed stromata more so than *Pseudocercospora cotizensis* as circumscribed by Hsieh & Goh (1990) [conidiophores 15–75 × 3–5.6 µm and conidia 20–80 × 3–5 µm].

Literature – Chupp (1954: 297), Hsieh & Goh (1990: 184–185), Crous & Braun (2003: 141).

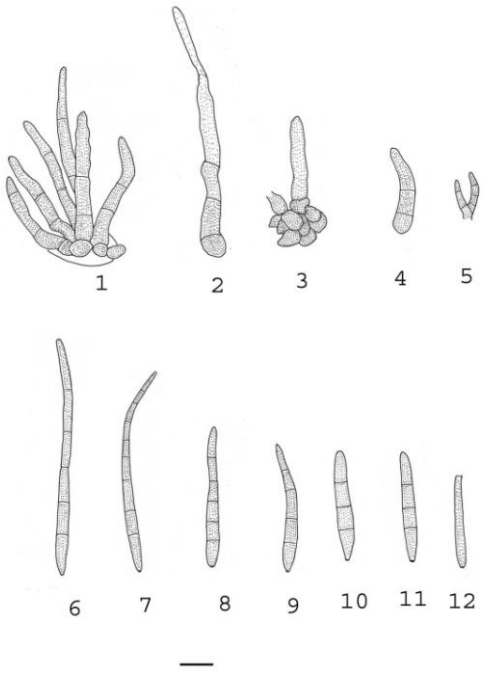

Fig. 86 – *Pseudocercospora cotizensis* on *Crotalaria uncinella* subsp. *elliptica*: 1. Stroma with attached conidiophores. 2. Conidiophore with attached young conidium. 3. Stroma with attached conidiophores. 4–5. Conidiophores. 6–12. Conidia. Bar = 10 µm.

(44) *Pseudocercospora duabangae* M.D. Mehrotra & R.K. Verma. Mycol. Res. 95: 116, 1991. Figs 88–89.

Leaf spots subcircular to irregular, 1–4 mm diam., at first yellowish, later becoming brown, dingy grey to pale tan, brown to dark brown at the margin. Caespituli hypophyllous, conspicuous. Mycelium internal; hyphae branched, 2–5 µm wide ($\bar{x}$ = 2.96 µm, n = 30), septate, constricted at the septa, distances between septa 8–25 µm ($\bar{x}$ = 14 µm, n = 30), brownish, subhyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.35 µm, n = 30), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 4–65 µm diam. ($\bar{x}$ = 37.9 µm, n = 30), brown to dark brown, stroma cells oval, ellipsoidal to angular, 3–7 µm wide ($\bar{x}$ = 4.4 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 (2–45 per fascicle), geniculate, unbranched, 8–34 × 2–5 µm ($\bar{x}$ = 18.1 × 3.7 µm, n = 15), 0–3-septate, slightly constricted at the septa, distance between septa 5–14 µm long ($\bar{x}$ = 8.37 µm, n = 30), uniformly pale to medium brown, much paler and narrower towards the tip, wall 0.3–0.5 µm ($\bar{x}$ = 0.47 µm, n = 30), smooth. Conidiogenous cells terminal, 8–14 × 3–4 µm ($\bar{x}$ = 10.1 × 3.43 µm, n = 14), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 18–61 × 2–3 µm ($\bar{x}$ = 38.4 × 2.76 µm, n = 15), 1–7-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.31 µm, n = 15), smooth, tip subacute, base obconically truncate, hila 1–2 µm wide ($\bar{x}$ = 1.61 µm, n = 9).

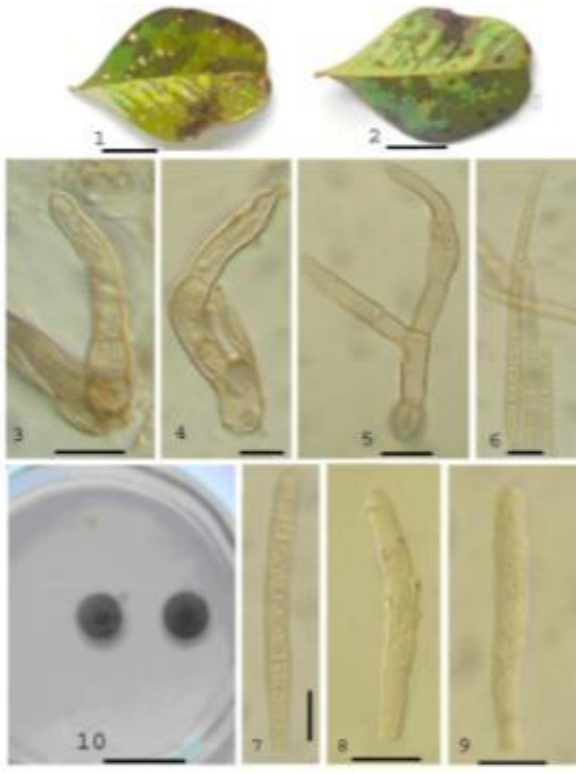

Fig. 87 – *Pseudocercospora cotizensis* on *Crotalaria uncinella* subsp. *elliptica* from leaf spots: 1–2 Lesions on host leaves (1. upper surface and 2. lower surface). 3–5. Conidiophores. 6–9. Conidia. 10. Culture. Bars 1–2, 10 = 10 mm, 3–9 = 10 µm.

Colonies on PDA after 3 weeks at 25°C with dark grey mycelium, reaching 6–8 mm diam., hyphae 2–5 µm wide ($\bar{x}$ = 2.96 µm, n = 30), septate, constricted at the septa, distance between septa 7–25 µm ($\bar{x}$ = 14.96 µm, n = 30), brownish or subhyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.35 µm, n = 30), smooth. Conidia not formed in culture.

Hosts – *Duabanga grandiflora* (Roxb. ex DC.) Walp. (Lythraceae).

Distribution – **Asia:** India, Laos, Thailand.

Material examined – Vientiane Province, Home District, Pha En Village, on leaves of *Duabanga grandiflora*, 18 November 2009, P. Phengsintham (P465); Xiangkhouang Province, Phoukood District, Namchad Village, on leaves of *D. grandiflora*, 3 January 2010, P. Phengsintham (P511). GenBank accession no (ITS, KC677899; LSU, KC677929).

Notes – *Duabanga* has previously been placed in the Duabangaceae or Sonneratiaceae. However, according to new phylogenetic results, *Duabanga* is now placed in the Lythraceae (see "Angiosperm Phylogeny Webside" of Missouri Botanical Garden). Among *Pseudocercospora* spp. on other hosts of the Lythraceae, *P. duabangae* is morphologically comparable with *P. lagerstroemiae-subcostatae* (Sawada) Goh & W.H. Hsieh (conidiophores up to 60 µm long, conidia cylindrical to obclavate-cylindrical) and *P. lythracearum* (Heald & F.A. Wolf) X.J. Liu & Y.L. Guo (caespituli amphigenous, conidiophores uniformly olivaceous or pale olivaceous-brown, conidia up to 90 × 4 µm) [Chupp 1954, Hsieh & Goh 1990, Guo & Hsieh 1995]. Other species on hosts of the Lythraceae are quite distinct, e.g. *P. lagerstroemiigena* Goh & W.H. Hsieh (with superficial hyphae and solitary conidiophores, conidiophores narrower, only 2–3 µm wide), *P. woodfordiae* X.J. Liu & Y.L. Guo (conidiophores up to 260 µm long, often subsynnematous, conidia 4–6.5 µm wide) or *P. woodfordiigena* U. Braun & Crous (stromata very large, 60–120 µm diam., conidiophores up to 65 µm long, conidia narrowly linear, up to 130 × 2–3.5 µm) [Chupp 1954, Hsieh & Goh 1990, Guo & Hsieh 1995, Crous & Braun 2003].

Literature – Chupp 1954, Hsieh & Goh 1990, Merhostra & Verma (1991, 1163–1168), Guo & Hsieh 1995, Crous & Braun (2003).

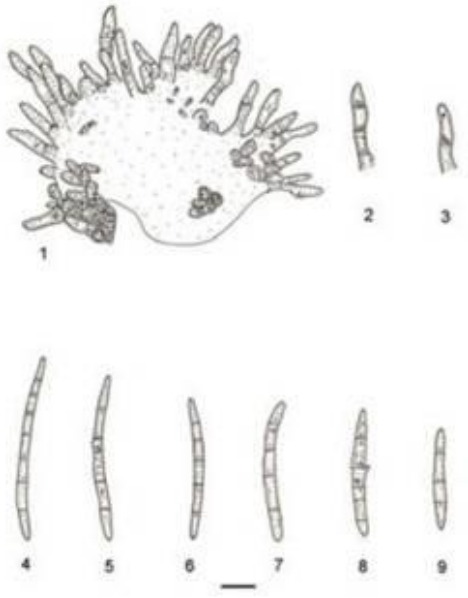

Fig. 88 – *Pseudocercospora duabangae* on *Duabanga grandiflora*: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–9. Conidia. Bar = 10 µm.

Fig. 89 – *Pseudocercospora duabangae* on *Duabanga grandiflora* from leaf spots: 1–2. Lesions on host leaves (1. upper surface and 2. lower surface). 3. Caespituli. 4–5. Stromata with attached conidiophores. 6.7. Conidiophores. 8–11. Conidia. 12. Culture. Bars 1–2, 12 = 10 mm, 4–11 = 10 µm.

(45) ***Pseudocercospora eupatorii-formosani*** U. Braun & Bagyan., Sydowia 51: 8, 1999. Figs 90–91.

≡ *Cercospora eupatorii-formosani* Sawada, Rep. Gov. Agric. Res. Inst. Taiwan 86: 169, 1943 (nom. inval., Art. 36.1).

≡ *Pseudocercospora eupatorii-formosani* (Sawada) J.M. Yen, in Yen & Lim, Gard. Bull. Singapore 33: 175, 1980 (comb. inval.).

≡ *Pseudocercospora eupatorii-formosani* (Sawada ex Y.L. Guo & W.H. Hsieh) J.M. Yen ex Y.L. Guo & W.H. Hsieh, The genus *Pseudocercospora* in China: 67, 1995 (nom. inval., Art. 37.1).

Leaf spots angular to irregular, 1–5 mm diam., at first yellowish, later becoming dark brown or black, and with yellowish margin. Caespituli amphigenous, inconspicuous. Mycelium internal, sparsely developed; hyphae small, branched, intercellular, 2–3.5 µm wide, septate, constricted at the septa, distance between septa 4–8 µm, hyaline to subhyaline, thin-walled 0.3–0.5 µm wide, smooth, forming plate-like plectenchymatous structures; external hyphae lacking. Stromata well-developed, substomatal, oval, ellipsoidal, 15–40 µm wide ($\bar{x}$ = 29.93 µm, n = 14), brown to dark brown, stomatal cells oval, angular to obclavate in outline, 3–8 µm wide ($\bar{x}$ = 4.75 µm, n = 16), wall 0.6–1 µm wide ($\bar{x}$ = 0.74 µm, n = 16), smooth. Conidiophores single or fasciculate, arising from stromata (1–16 per fascicle), emerging through stomata, nearly straight or cylindrical to moderately geniculate-sinuous, simple, unbranched, 4–22 × 2–4 µm ($\bar{x}$ = 45.45 × 2. 45 µm, n = 30), aseptate, uniformly pale to medium brown, or much paler and more narrower toward the tip, thin-walled 0.50 µm, smooth. Conidiogenous cells terminal, 6–22 × 2–3 µm, nearly straight or cylindrical to moderately geniculate-sinuous; conidiogenous loci inconspicuous or subdenticalate, unthickened, and not darkened. Conidia formed singly, narrowly obclavate, straight to slightly curved, 15–71 × 2–4 µm ($\bar{x}$ = 45.45 × 2. 45 µm, n = 30), 1–5-septate, pale olivaceous-brown, wall 0.5–0.8 µm ($\bar{x}$ = 0.68 µm, n = 13), smooth, apex (tip) subacute, base truncate, hila 1.33 µm wide, wall 0.73 µm wide, unthickened and not darkened.

Colonies on PDA after 3 weeks at 25°C with grey mycelium, reaching 6 mm diam., hyphae constricted at the septa, width of hyphae variable, hyphae of the primary mycelium wider than those of secondary and all following mycelia, 1–6 µm wide ($\bar{x}$ = 2.69 µm, n = 30), distance between septa 4–23 µm ($\bar{x}$ = 13 µm, n = 30), thin-walled 0.3–0.8 µm ($\bar{x}$ = 0.53 µm, n = 30), hyaline or brownish, smooth. Conidia not formed in culture.

Hosts – *Ageratina adenophora* (Spreng.) R.M. King & H. Rob., *Chromolaena odorata* (L.) King & Robinson., *Eupatorium ayapana* Vent., *E. formosanum* Hayata, *Eupatorium* sp. (Asteraceae).

Distribution – **Africa:** Ivory Coast; **Asia:** Brunei, Cambodia, China, India, Indonesia, Laos, Nepal, Malaysia, Taiwan; **North America and West Indies:** Cuba; **Australia; Oceania:** New Zealand; **South America:** Brazil.

Material examined – Vientiane Capital, Xaythany District, Dong Makhai Village, fallow forest, on leaf of *Chromolaena odorata*, 19 April 2006, P. Phengsintham (P09). GenBank accession no (ITS, KC677900; LSU, KC677930).

Notes – The determination of the collection from Laos was difficult due to problems to distinguish *Pseudocercospora eupatorii* (Peck) U. Braun & R.F. Castañeda and *P. eupatorii-formosani*. The two species are morphologically very similar. The true *P. eupatorii* is only known from North America (U. Braun, in litt.). Based on its type material, it is characterized by having short, broad conidiophores, about 5–30 × 3–8 µm, and consistently lacking superficial hypha. The collection from Cuba on *Eupatorium* sp., which was referred to as *P. eupatorii* by Braun & Castañeda (1991), rather belongs to *P. eupatorii-formosani*. The latter species differs from *P. eupatorii* in having short but much narrower conidiophores, ca. 2–4.5 µm wide. Furthermore, superficial hyphae with solitary conidiophores are often present in vivo, but they can also be absent. Hsieh & Goh (1990), based on type material of *P. eupatorii-formosani*, as well as Yen & Lim (1980), based on material from Malaysia on *Chromolaena odorata*, did not find any superficial mycelium,

whereas Guo & Hsieh (1995) described and illustrated superficial hyphae with solitary conidiophores. U. Braun (in litt.) examined material on *Chromolaena odorata* and *Eupatorium* spp. from Brunei, Cuba and India, occasionally also without, but mostly with superficial hyphae. All collections from Asia have narrow conidiophores and seem to belong to *P. eupatorii-formosani*. The collection from Laos agrees well with the descriptions of Yen & Lim (1980) as well as Hsieh & Goh (1990). *Pseudocercospora eupatorii* and *P. eupatorii-formosani* are tentatively maintained as two different species. The true affinity of the two species and a possible identity can only be proven on the basis of inoculation experiments or molecular sequence analyses.

Literature – Chupp (1954: 135), Braun & Castañeda (1991: 293), Guo & Hsieh (1995: 67–68), Hsieh & Goh (1990: 84), Yen & Lim (1980: 175–176), Crous & Braun (2003: 179).

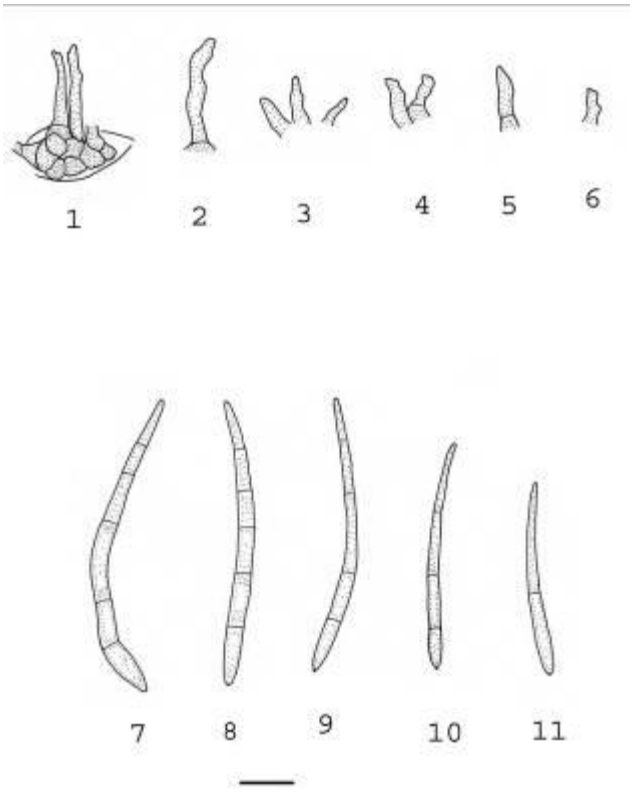

Fig. 90 – *Pseudocercospora eupatorii-formosani* on *Chromolaena odorata*: 1–6. Conidiophores. 7–11. Conidia. Bar = 10 µm.

(46) *Pseudocercospora formosana* (W. Yamam.) Deighton, Mycol. Pap. 140: 144, 1976. Figs 92–93.

≡ *Cercospora formosana* W. Yamam., J. Soc. Trop. Agric. 6: 600, 1934.

= *Cercospora lantanae-aculeatae* J.M. Yen, Rev. Mycol. 31: 124, 1996.

≡ *Pseudocercospora lantanae-aculeatae* (J.M. Yen) J.M. Yen, Bull. Trimestriel Soc. Mycol. France 96:33, 1980.

cospora lantanae-camarae J.M. Yen & Gilles, Cah. Maboke 9: 106, (1971) 1973.

= *Mycovellosiella lantanae* var. *verbenacearum* Bhalla, S.K. Singh & A.K. Srivast., Austral. Syst. Bot. 12: 369, 1999.

Leaf spots irregular, 1–2.5 mm diam., brown-purple to dark brown in the centre, and with pale to purplish-brown margin. Caespituli hypophillous, scaterred, brown. Mycelium internal; hyphae branched, 3–5 µm wide ($\bar{x}$ = 4.16 µm, n = 12), septate, constricted at the septa, distance between septa 7–20 µm ($\bar{x}$ = 11.15 µm, n = 12), subhyaline or hyaline, wall approximately 0.5–0.8 µm wide ($\bar{x}$ = 0.52 µm, n = 12), smooth. Stromata developed, substomatal, subglobular, 15–45 µm diam. ($\bar{x}$ = 27.5 µm, n = 7), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 3–5

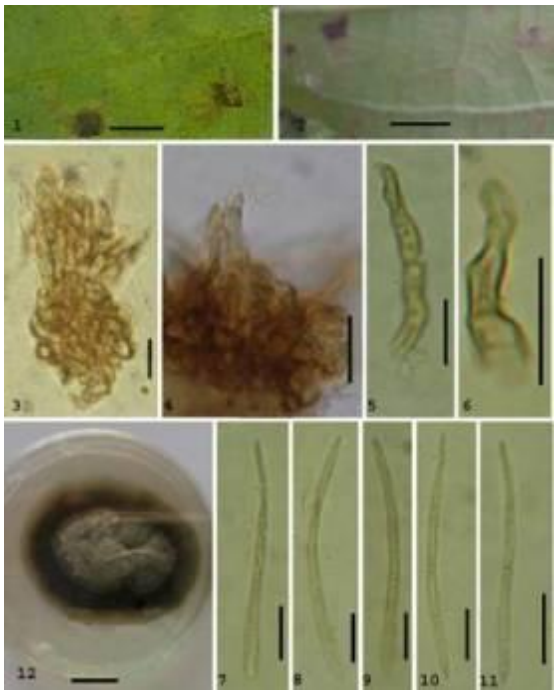

Fig. 91 – *Pseudocercospora eupatorii-formosani* on *Chromolaena odorata* from leaf spots: 1–2 Lesions on host leaves (1. upper surface and 2. lower surface). 3–4. Stroma with attached conidiophores. 5–6. Conidiophores. 7–11. Conidia. 12. Culture. Bars 1–2, 12 = 10 mm, 3–11 = 10 µm.

µm wide ($\bar{x}$ = 4 µm, n = 13), dark brown, wall approximately 0.5–0.8 µm wide ($\bar{x}$ = 0.7 µm, n = 13), smooth. Conidiophores fasciculate, arising from stromata (1–7 per fascicle), erect, straight or curved, unbranched, geniculate, 23–30 × 3–5 µm ($\bar{x}$ = 26.6 × 4.27 µm, n = 11), 0–3-septate, distance between septa 6–18 µm ($\bar{x}$ = 11.5 µm, n = 22), pale to moderately olivaceous brown, paler and narrower towards the apex, wall approximately 0.5–0.8 µm wide ($\bar{x}$ = 0.6 µm, n = 22), smooth. Conidiogenous cells integrated, apex obtuse, 10–18 × 3–5 µm ($\bar{x}$ = 14.6 × 4.2 µm, n = 9), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, cylindrical to cylindrical-obclavate, straight to moderately curved, 32–98 × 3–4 µm ($\bar{x}$ = 54.8 × 3.2 µm, n = 7), 3–10-septate, slightly constricted at the septa, pale olivaceous, wall 0.25–0.3 µm wide ($\bar{x}$ = 0.29 µm, n = 7), smooth, rounded at the apex, with long obconic to long obconically truncate base.

Hosts – *Lantana aculeata* L., *L. camara* L., *L. mista* L. (Verbenaceae).

Distribution – **Africa:** Gabon, Mozambique, South Africa, Sudan; **Asia:** Brunei, China, Hong Kong, India, Laos, Singapore, Taiwan; **Oceania:** Vanuatu; **South America:** Brazil.

Material examined – Khammoune Province, Nakai District, Nahao Village, fallow forest, on leaves of *Lantana camara*, 6 March 2008, P. Phengsintham (P576).

Notes – In the collection from Laos the conidiophores are 23–30 × 3–5 µm and the conidia are 32–98 × 3–4 µm, which is similar [conidiophores 15–40 × 3–4.5 µm and conidia 30–120 × 2–3.7 µm] to those reported in Guo & Hsieh (1995) and Hsieh & Goh (1990) [conidiophores 5–35 × 2–4 µm and conidia 17–100 × 2–3 µm].

Literature – Hsieh & Goh (1990: 349), Guo & Hsieh (1995: 345), Crous & Braun (2003: 187).

(47) ***Pseudocercospora fuligena*** (Roldan) Deighton, Mycol. Pap. 140: 144, 1976. Figs 94–95.

≡ *Cercospora fuligena* Roldan, Phillipp. J. Sci. 66: 8, 1938.

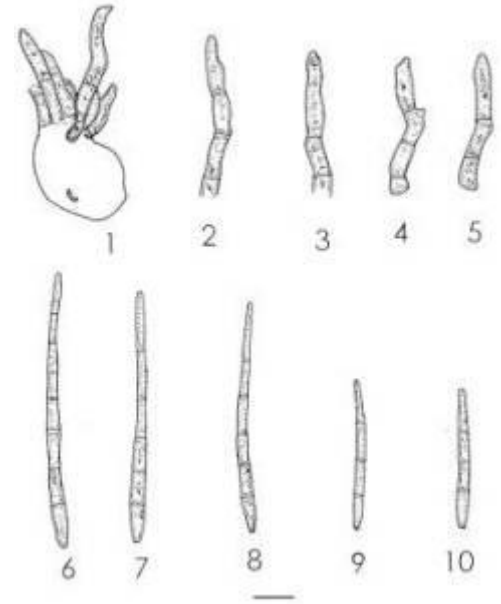

Fig. 92 – *Pseudocercospora formosana* on *Lantana camara* from leaf spots: 1. Stroma with attached conidiophores. 2–5. Conidiophores. 6–10. Conidia. Bar = 10 µm.

Fig. 93 – *Pseudocercospora formasna* on *Lantana camara* from leaf spots: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–8. Conidia. 9–10. Culture. Bars 1–8 = 10 µm, 9 = 10 mm.

Leaf spots irregular, 2–8 mm diam., brown to dark brown in the centre, and with yellowish to yellowish-brown margin. Caespituli amphigenous. Mycelium internal; hyphae branched, 1–4 µm wide ($\bar{x}$ = 2.86 µm, n = 21), septate, constricted at the septa, distances between septa 4–15 µm ($\bar{x}$ = 9.14 µm, n = 21), subhyaline or hyaline, wall approximately 0.3–0.5 µm wide ($\bar{x}$ = 0.38 µm, n = 21), smooth. Stromata well developed, substomatal, subglobular, 15–25 µm diam. ($\bar{x}$ = 0.38 µm, n = 10), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 3–6 µm wide ($\bar{x}$ = 4.43 µm, n = 30), dark brown, wall approximately 0.5–1 µm wide ($\bar{x}$ = 0.68 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (4–18 per fascicle), erect, straight or curved, unbranched, geniculate, 8–31 × 4–5 µm ($\bar{x}$ = 16.1 × 4.32 µm, n = 30), 0–2-septate, distance between septa 4–23 µm ($\bar{x}$ = 9.43 µm, n = 30), pale to moderately olivaceous brown, paler and narrower towards the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.67 µm, n = 30), smooth. Conidiogenous cells integrated, apex obtuse, 8–19 × 3–5 µm ($\bar{x}$ = 12.9 × 4.12 µm, n = 30), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, cylindrical to cylindrical-obclavate, straight to moderately curved, 21–76 × 2.5–4 µm ($\bar{x}$ = 49.67 × 3.12 µm, n = 30), 1–6-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.4 µm, n = 30), smooth, rounded at the apex, with long obconic to long obconically truncate base.

Colonies on PDA after 3 weeks at 25 °C grey-brown, spreading surface ridged and smooth, 10–13 mm diam., hyphae 2–11 µm wide ($\bar{x}$ = 4.77 µm, n = 30), septate, constricted at the septa, distance between septa 5–16 µm ($\bar{x}$ = 10.97 µm, n = 30), brown, wall 0.3–1 µm wide ($\bar{x}$ = 0.54 µm, n = 30), smooth. Conidia not formed in culture.

Hosts – *Capsicum annuum* L., *C. baccatum* L., *C. chinense* Jacq., *C. frutescens* L., *Lycopersicon chilense* Dunal, *L. chmielewskii* C.M. Rick, Kesicki, Fobes & M. Holle, *L. esculentum* Mill., *L. glandulosum*, *L. parviflorum* C.M. Rick, Kesicki, Fobes & M. Holle, *L. pennellii* (Correll) D'Arcy, *L. peruvianum* Mill., *L. pimpinellifolium* L., *Solanum indicum* L., *S. melongena* L. and *S. nigrum* L. (Solanaceae).

Distribution – **Africa:** Gabon, Gambia, Ivory Coast, Nigeria, Senegal, Somalia, Tanzania, Togo, Uganda; **Asia:** Bangladesh, Brunei, Cambodia, China, Hong Kong, India, Japan, Laos, Malaysia, Philippines, Taiwan, Thailand, Vietnam; **North America and West Indies:** Cuba, Mexico, Netherlands Antilles, USA (FL); **Australia; Oceania:** Cook Islands, New Caledonia, New Zealand, Palau, Papua New Guinea, Solomon Islands, Vanuatu; **South America:** Brazil, Chile.

Material examined – Vientiane Capital, Xaythany District, Xay Village, garden, on leaves of *Lycopersicon esculentum*, 14 May 2006, P. Phengsintham (P49). GenBak accession no (EF 1 alpha, JQ837455).

Notes – The collection from Laos is similar to *Pseudocercospora fuligena* as described by Chupp (1954), Guo & Hsieh (1995), Hsieh & Goh (1990).

Literature – Chupp (1954: 540), Ellis (1976: 287), Hsieh & Goh (1990: 314), Guo & Hsieh (1995: 318), Crous & Braun (2003: 190).

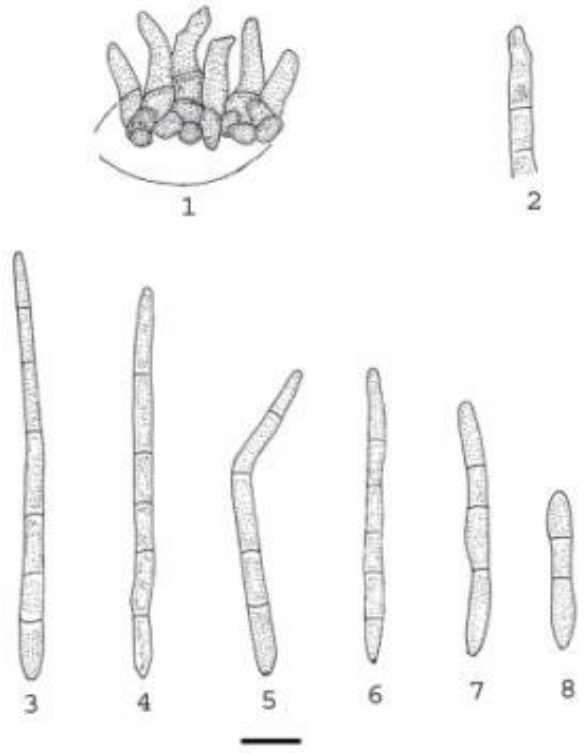

Fig. 94 – *Pseudocercospora fuligena* on *Lycopersicon esculentum*: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–8. Conidia. Bar = 10 µm.

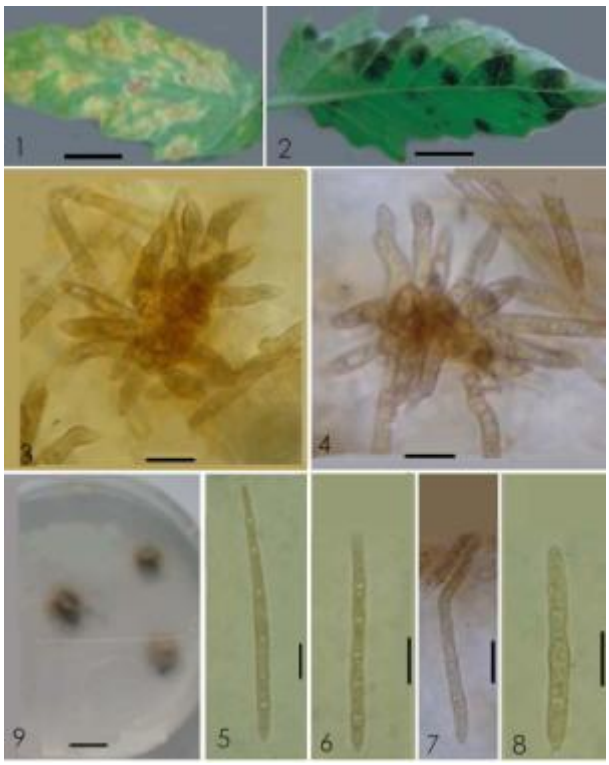

Fig. 95 – *Pseudocercospora fuligena* on *Lycopersicon esculentum* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3–4. Stromata with attached conidiophores. 5–8. Conidia. 9. Culture. Bars 1–2, 9 = 10 mm, 3–8 = 10 µm.

(48) *Pseudocercospora getoniae* sp. nov. Figs 96–97.

MycoBank, MB 801727

Morphologically close to Pseudocercospora combretigena, but easily distinguishable by the formation of conspicuous, definite leaf spots, hypophyllous caespituli and by its smaller stromata, 10–30 µm diam., pluriseptate conidiophores (with up to 8 septa) and obclavate conidia.

Leaf spots subcircular to irregular, 1–10 mm diam., at first yellowish, later becoming brown to dark brown in the center, brown to dark brown at the margin. Caespituli hypophyllous, conspicuous. Mycelium internal; hyphae branched, 4–8 µm wide ($\bar{x}$ = 5.33 µm, n = 11), septate, constricted at the septa, distance between septa 10–15 µm ($\bar{x}$ = 10.17 µm, n = 11), brownish, subhyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.46 µm, n = 11), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 10–30 µm diam. ($\bar{x}$ = 23.3 µm, n = 5), brown to dark brown, stromatal cells oval, ellipsoidal and angular, 5–11 µm wide ($\bar{x}$ = 7.3 µm, n = 30), dark brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.48 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (1–14 per fascicle), unbranched, geniculate, 26–99 × 4–5 µm ($\bar{x}$ = 72 × 4.75 µm, n = 15), 1–8-septate, slightly constricted at the septa, distance between septa 5–22 µm long ($\bar{x}$ = 11.3 µm, n = 30), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.3–0.5 µm ($\bar{x}$ = 0.49 µm, n = 30), smooth. Conidiogenous cells terminal, 15–22 × 3–4 µm ($\bar{x}$ = 18.5 × 3.5 µm, n = 15), obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 50–70 × 2–4 µm ($\bar{x}$ = 52 × 3 µm, n = 15), 3–8-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.33 µm, n = 15), smooth, tip subacute, base obconically truncate, hilla 1–2 µm wide ($\bar{x}$ = 1.66 µm, n = 15).

Hosts – *Getonia floribunda* Roxb. [≡ *Calycopteris floribunda* (Roxb.) Lam. ex Poir.] (Combretaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Dongmakhai Village, dry dipterocarp forest, on leaves of *Getonia floribunda*, 4 February 2010, P. Phengsintham (P545, MFLU 12-2201, **Holotype**).

Notes – *Pseudocercospora getoniae* resembles *P. combretigena* (Braun 2001), but the latter species does not form any definite leaf spots, epiphyllous caespituli, larger stromata, 30–50 µm diam., 0–2(–6)-septate conidiophores, often reduced to conidiogenous cells, and obclavate-cylindrical conidia. The genus *Getonia* is phylogenetically clearly distinct from *Combretum* (Tan et al. 2002).

Literature – Crous & Braun (2003: key).

(49) ***Pseudocercospora gmelinae*** (J.M. Yen & Gilles) J.M. Yen, Bull. Trimestriel Soc. Mycol. France 94: 383, 1979. Figs 98–99.

= *Cercospora gmelinae* J.M. Yen & Gilles, Bull. Trimestriel Soc. Mycol. France 91: 99, 1975.

Leaf spots circular, 1–8 mm in diam., with brown to dark brown and brown margin. Caespituli amphigenous, but chiefly hypophyllous. Mycelium internal; hyphae branched, 2–3 µm wide ($\bar{x}$ = 2.25 µm, n = 6),

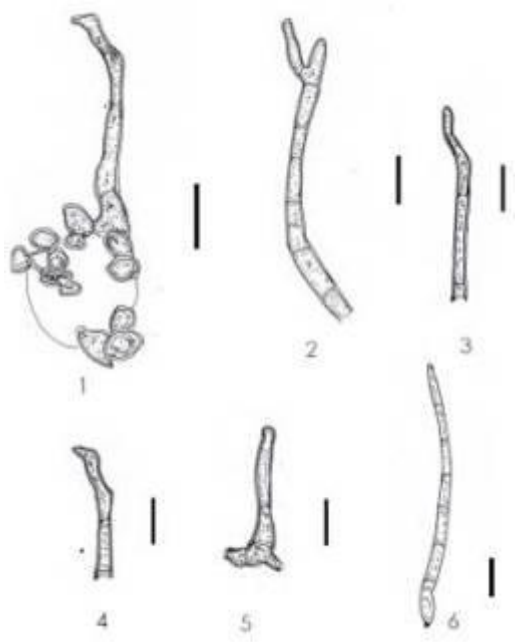

Fig. 96 – *Pseudocercospora getoniae* on *Getonia floribunda* from leaf spots: 1. Stroma with attached conidiophores. 2–5. Conidiophores. 6. Conidia. Bars = 10 µm.

Fig. 97 – *Pseudocercospora getoniae* on *Getonia floribunda* from leaf spots: 1–2 Lesions on host leaves (1. upper surface and 2. lower surface). 3. Caespituli. 4. Internal hyphae. 5–6. Stromata with attached conidiophores. 7. Conidiophore. 8. Conidium. Bars 1–2 = 10 mm, 4–8 = 10 µm.

septate, constricted at the septa, distance between septa 10–14 µm ($\bar{x}$ = 12.25 µm, n = 8), subhyaline or hyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.45 µm, n = 8), smooth. Stromata well-developed, substomatal, subglobular, 40–80 µm wide, brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 4–10 µm wide ($\bar{x}$ = 6 µm, n = 30), dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.65 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (4–55 per fascicle), erect, straight or curved, unbranched, 27–70 × 5–7 µm ($\bar{x}$ = 49.9 × 5.17 µm, n = 18), 3–8-septate, distance between septa 6–15 µm ($\bar{x}$ = 10 µm, n = 30), pale to moderately olivaceous-brown, paler and narrower towards the apex, wall 0.5–1 µm wide ($\bar{x}$ = 0.77 µm, n = 30), smooth. Conidiogenous cells integrated, 6–14 × 3–5 µm ($\bar{x}$ = 9.27 × 4.07 µm, n = 30), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, 14–40 × 4–6 µm ($\bar{x}$ = 29.4 × 5.05 µm, n = 20), 1–10-septate, slightly constricted at the septa, pale olivaceous, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.56 µm, n = 20), smooth, obtuse at the apex, with long obconically truncate base.

Colonies on PDA after 3 weeks at 25°C whire-grey in the centre and grey margin, spreading surface ridged and smooth, 10–12 mm diam, hyphae 2–8 µm wide ($\bar{x}$ = 4.43 µm, n = 30), septate, constricted at the septa, distance between septa 8–25 µm ($\bar{x}$ = 15.46 µm, n = 30), brown, wall 0.3–1 µm wide ($\bar{x}$ = 0.54 µm, n = 30), smooth. Conidia not formed in culture.

Hosts – *Gmelina arborea* Roxb., *Gmelina* sp. (Verbenaceae).

Distribution – **Africa:** Ivory Coast; **Asia:** Laos, Philippines, Thailand; **South America:** Venezuela.

Material examined – Bolikhamxay Province, Khamkeud District, Nongxong village, mixed deciduous forest, on leaves of *Gmelina arborea*, 10 August 2008, P. Phengsintham (P358); Xiengkhouang Province, Phoukood district, Namchat village, fallow forest, on leaves of *G. arborea*, 3 January 2010, P. Phengsintham (P505). GenBank accession no (ITS, KC677901; LSU, KC677931).

Notes – The Laos collections agree with the description of *Pseudocercospora gmelinae* published by Yen (1979).

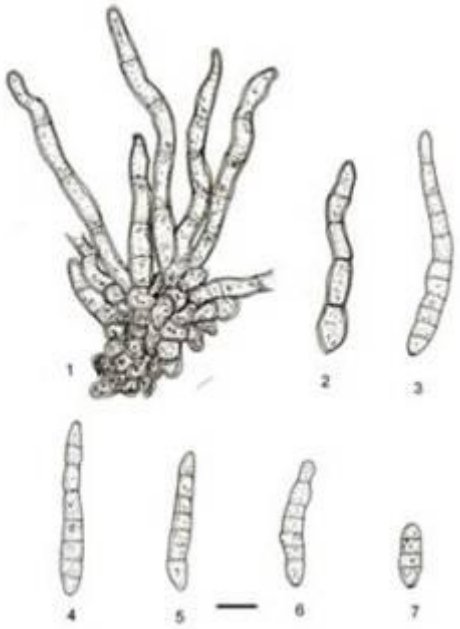

Fig. 98 – *Pseudocercospora gmelinae* on *Gmelina arborea*: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–7. Conidia. Bar = 10 µm.

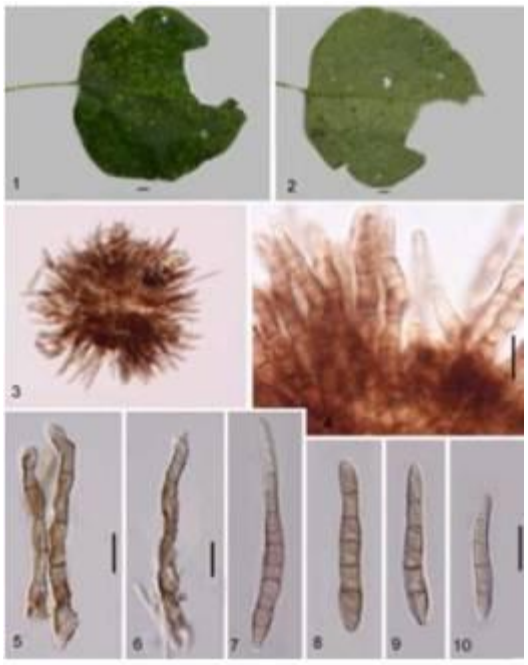

Fig. 99 – *Pseudocercospora gmelinae* on *Gmelina arborea* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3–4. Stromata with attached conidiophores. 5–6. Conidiophores. 7–10. Conidia. Bars 1–2 = 10 mm, 3–10 = 10 µm.

Literature – Index of Fungi 4 (1981: 603), Yen (1979: 383).

(50) *Pseudocercospora holarrhenae* (Thirum. & Chupp) Deighton, Mycol. Pap. 140: 145, 1976. Figs 100–101.

≡ *Cercospora ho1arrhenae* Thirum. & Chupp, Mycologia 40: 355, 1948.

= *Pseudocercosporella ho1arrhenae* A.N. Ray, B. Ray & Kamal, Mycol. Res. 97: 28, 1991.

Leaf spots subcircular to irregular, 2–15 mm diam., at first brown yellowish, later becoming brown-grey in the center, brown to dark brown at the margin. Caespituli hypophyllous, conspicuous. Mycelium internal; hyphae branched, 2–3 µm wide ($\bar{x}$ = 2.28 µm, n = 10), septate, constricted at the septa, distance between septa 7–15 µm ($\bar{x}$ = 8.7 µm, n = 7), brownish, subhyaline, wall approximately 0.3–0.5 µm wide ($\bar{x}$ = 0.37 µm, n = 7), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 20–40 µm diam. ($\bar{x}$ = 30.9 µm, n = 5), brown to dark brown, stromatal cells oval, ellipsoidal and angular, 5–7 µm wide ($\bar{x}$ = 5.9 µm, n = 22), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.64 µm, n = 22), smooth. Conidiophores fasciculate, arising from stromata (6–19 per fascicle), geniculate, unbranched, 23–37 × 4–6 µm ($\bar{x}$ = 30.6 × 4.8 µm, n = 9), 1–3-septate, slightly constricted at the septa, distance between septa 5–18 µm long ($\bar{x}$ = 10.5 µm, n = 25), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.5–0.8 µm ($\bar{x}$ = 0.57 µm, n = 25), smooth. Conidiogenous cells terminal, 9–18 × 3–5 µm ($\bar{x}$ = 13.5 × 4 µm, n = 10), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 27–86 × 2–4 µm ($\bar{x}$ = 60.61.4 × 3.15 µm, n = 13), 2–7-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.32 µm, n = 13), smooth, tip subacute, base obconically truncate, hilla 1–2 µm wide ($\bar{x}$ = 1.61 µm, n = 9).

Hosts – *Holarrhena antidysenterica* (L.) Wall. ex A. DC., *H. curtisii* King & Gamble (Apocynaceae).

Distribution – **Asia:** India, Laos.

Material examined – Vientiane Province, Phonhong District, Thalad Village, fallow forest, on leaves of *Holarrhena curtisii*, 4 February 2010, P. Phengsintham (P540).

GenBank accession no (ITS, KC677902; LSU, KC677932).

Notes – In the sample from Laos the conidiophores are 23–37 × 4–6 µm and the conidia are 27–86 × 2–4 µm, which is similar to those described by Chupp (1954) [conidiophores 10–40 × 2–4 µm and conidia 20–75 × 2–4 µm].

Literature – Chupp (1954: 47), Vasudeva (1963: 121), Braun (1995: 193).

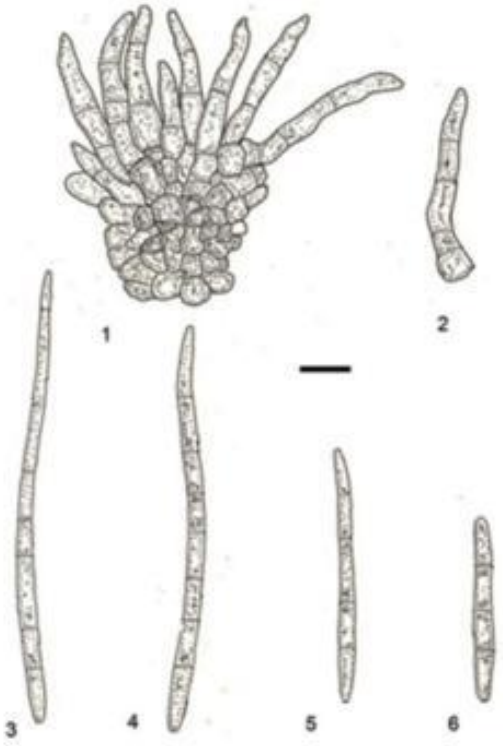

Fig. 100 – *Pseudocercospora ho1arrhenae* on *Holarrhena curtisii*: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–6. Conidia. Bar = 10 µm.

(51) *Pseudocercospora jussiaeae* (G.F. Atk.) Deighton, Mycol. Pap. 140: 146, 1976. Figs 102–103.

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

≡ *Cercospora ludwigiae* G.F. Atk., J. Elisha Mitchell Sci. Soc. 8: 58, 1892.

Leaf spots circular or irregular, 1–7 mm diam., dingy grey to brown or reddish brown to bright red in the center, and with dark brown margin. Caespituli amphigenous, inconspicuous. Mycelium internal; internal hyphae 1–4 µm wide ($\bar{x}$ = 2.26 µm, n = 23),

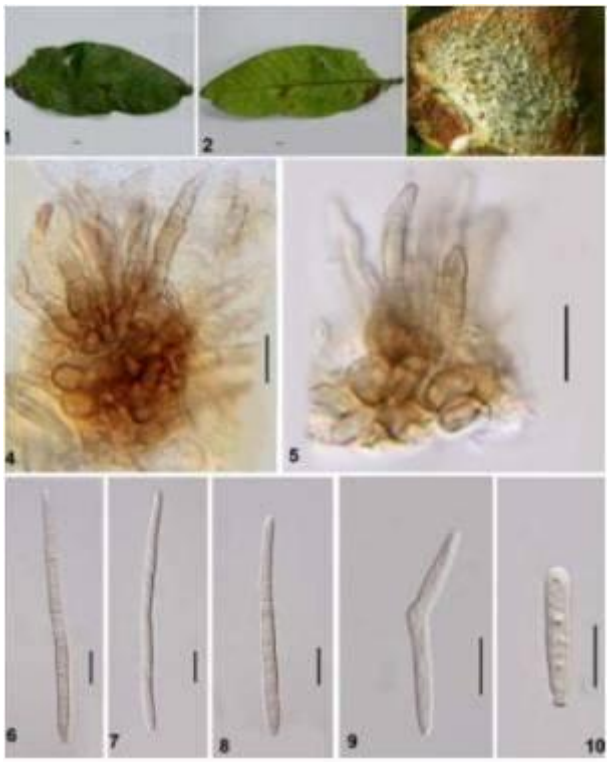

Fig. 101 – *Pseudocercospora holarrhenae* on *Holarrhena curtisii* from leaf spots: 1–2. Lesions on host leaves (1. upper surface and 2. lower surface). 3. Caespituli. 4–5. Stromata with attached conidiophores. 6–10. Conidia. Bars 1–2 = 10 mm, 4–10 = 10 µm.

septate, 5–12 µm ($\bar{x}$ = 7.70 µm, n = 23), pale brownish to subhyaline, wall 0.2–0.5 µm wide ($\bar{x}$ = 0.25 µm, n = 20), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata well-developed, ellipsoidal, 11–25 µm diam. ($\bar{x}$ = 15.84 µm, n = 25), dark brown, stromatal cell 3–5 µm wide ($\bar{x}$ = 3.57 µm, n = 30), wall 0.5–1 µm wide ($\bar{x}$ = 0.6 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (1–12 per fascicle), cylindrical, erect, straight or curved, branched, 5–47 × 2–6 µm ($\bar{x}$ = 29.75 × 3 µm, n = 28), 0–3-septate, distance between septa 5–25 µm ($\bar{x}$ = 11 µm, n = 13), pale to medium brown near the base, upper half pale in colour, wall 0.4–0.6 µm wide ($\bar{x}$ = 0.48 µm, n = 13), smooth, small rounded to subconic tips. Conidiogenous cells terminal, 3–15 µm, cylindrical and pale brown or greenish; conidiogenous loci inconspicuous, unthickened, not darkened, only outer rim slightly darkened and visible as minute rings up to 1 µm. Conidia solitary, narrowly obclavate, variously curved,

some conidia have an occasionally with lateral branches, 4–92 × 2–4 µm ($\bar{x}$ = 39 × 3 µm, n = 30), 1–8-septate, subhyaline to pale olivaceous, wall 0.3–0.8 µm wide ($\bar{x}$ = 0.59 µm, n = 30), smooth; apex subacute; base long obconically truncate, 1–2 µm wide ($\bar{x}$ = 1.78 µm, n = 9), wall 0.5–1 µm wide ($\bar{x}$ = 0.73 µm, n = 9), thickened and darkened.

Colonies on PDA after three weeks at 25 °C with spreading mycelium, surface ridged, white-grey in the centre and grey margin, reaching 10–27 mm diam., hyphae 1–5 µm ($\bar{x}$ = 2.7 µm, n = 30), septate, distance between septa 5–27 µm ($\bar{x}$ = 15.36 µm, n = 30), wall thin, 0.5–0.8 µm ($\bar{x}$ = 0.58 µm, n = 12), constricted at the septa, hyaline or brownish, smooth. Conidia not formed in culture.

Hosts – *Ludwigia adscendens* (L.) Hara, *L. octovalvis* (Jacq.) P.H. Raven, *L. prostrata* Roxb. (Onagraceae).

Distribution – **Asia:** Japan, Laos; **Oceania**: American Samoa.

Material examined – Vientiane Capital, Xaythany District, Xay Village, rice paddy, on leaves of *Ludwigia prostrata*, 2 April 2006, P. Phengsintham (P3); on leaves of *Ludwigia adscendens*, 11 July 2009, P. Phengsintham (P427).

Notes – *Ludwigia prostrata* is the type host of *Pseudocercospora yoshinagiana* (Chupp) U. Braun & Crous, but the collection from Laos has much shorter conidiophores and conidia than those the latter species described from Japan (Chupp 1954) [conidiophores 20–125 × 3–4 µm and conidia 30–100 × 3–4 µm]. However, the fungus collected in Laos agrees well with *P. jussiaeae*, which is widespread on numerous *Jussiaea* and *Ludwigia* species.

Literature – Chupp (1954: 423), Crous & Braun (2003: 43).

(52) *Pseudocercospora lythracearum* (Heald & F.A. Wolf) X.J. Liu & Y.L. Guo, Acta Mycol. Sin. 11: 294, 1992. Figs 104–105.

≡ *Cercospora lythracearum* Heald & F.A. Wolf, Mycologia 3: 18, 1911.

≡ *Cercosporina lythracearum* (Heald & F.A. Wolf) Sacc., Syll. Fung. 25: 909, 1931.

= *Cercospora lagerstroemiae* Syd. & P. Syd., Ann. Mycol. 12: 203, 1914.

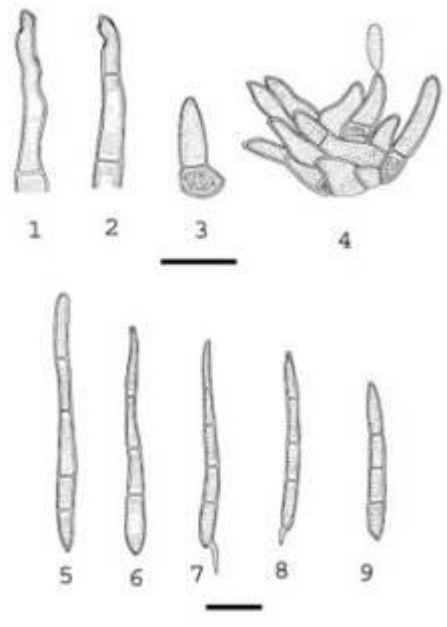

Fig. 102 – *Pseudocercospora jussiaeae* on *Ludwigia prostrata*: 1–3. Conidiophores. 4. Stroma with attached conidiophores. 5–9. Conidia. Bars = 10 µm.

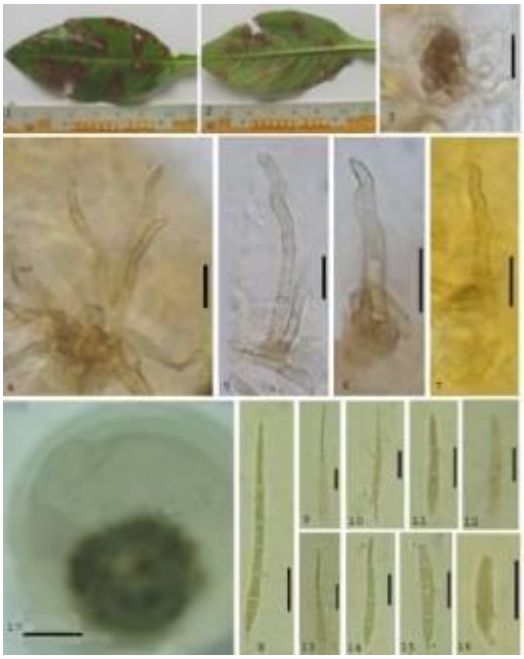

Fig. 103 – *Pseudocercospora jussiaeae* on *Ludwigia prostrata*: 1–2 Lesions on host leaves (1. upper surface and 2. lower surface). 3. Stroma. 4–7. Stromata with attached conidiophores. 8–16. Conidia. 17. Culture. Bars 1–2, 17 = 10 mm, 3–16 µm.

= *Cercospora lagerstroemiae-subcostatae* Sawada, Taiwan Agric. Res. Inst. Rept. 51: 129, 1931.

≡ *Pseudocercospora lagerstroemiae-subcostatae* (Sawada) Goh & W.H. Hsieh, in Hsieh & Goh, *Cercospora* and similar fungi from Taiwan: 212, 1990.

= *Cercospora lagerstroemiicola* Sawada, Taiwan Agric. Res. Inst. Rept. 85: 112, 1943.

Leaf spots subcircular to irregular, 2–12 mm diam., at first brown, and than grey-brown in the centre, brown to dark brown at the margin. Caespituli amphigenous, conspicuous, scattered, grey. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal, 8–49 µm diam. ($\bar{x}$ = 27.27 µm, n = 5), brown to dark brown, stromatal cells oval, ellipsoidal to angular, 4–7 µm wide ($\bar{x}$ = 5.52 µm, n = 10), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.65 µm, n = 10), smooth. Conidiophores fasciculate or solitary, arising from stromata (1–4 per fascicle), not geniculate, unbranched, 5–16 × 3–5 µm ($\bar{x}$ = 11.17 × 3.64 µm, n = 7), 0–1-septate, slightly constricted at the septa, distance between septa 2–13 µm long ($\bar{x}$ = 6.96 µm, n = 6), uniformly pale to medium brown, much paler and narrower towards the tip, wall 0.3–0.5 µm ($\bar{x}$ = 0.36 µm, n = 6), smooth. Conidiogenous cells terminal, 5–13 × 3–5 µm ($\bar{x}$ = 8.97 × 3.67 µm, n = 6), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 36–52 × 2–3 µm ($\bar{x}$ = 45.24 × 2.22 µm, n = 10), 3–5-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.36 µm, n = 10), smooth, tip subacute, base obconically truncate, hila 1–2 µm wide ($\bar{x}$ = 1.18 µm, n = 10).

Hosts – *Lagerstroemia flos-reginae* Retz., *L. indica* L., *L. macrocarpa* Wall., *L. parviflora* Roxb., *L. speciosa* (L.) Pers., *L. subcostata* Koehne (Lythraceae).

Distribution – **Africa:** Mauritius, Uganda; **Asia:** Brunei, China, Hong Kong, India, Japan, Korea, Myanmar, Philippines, Taiwan, Thailand; **Europe:** Bulgaria; **North America and West Indies:** Dominican Republic, Panama, Puerto Rico, Trinidad and Tobago, USA (FL, TX), Virgin Islands; **Oceania:** Papua New Guinea.

Material examined – Vientiane Capital Province, Xaythany District, Xay Village, on leaves of *Lagerstroemia macrocarpa*, 20 August 2011, P. Phengsintham (P659). GenBank accession no (ITS, KC677904).

Notes – The collection from Laos differs to the description of *Pseudocercospora* published by Hsieh & Goh (1990) in having short conidiophores and conidia.

Literature – Saccardo (1931: 883, 909), Chupp (1954: 361), Vasudeva (1963: 138), Katsuki (1965: 44), Hsieh & Goh (1990: 212), Guo & Hsieh (1995: 189–190), Shin & Kim (2001: 204), Crous & Braun (2003: 259).

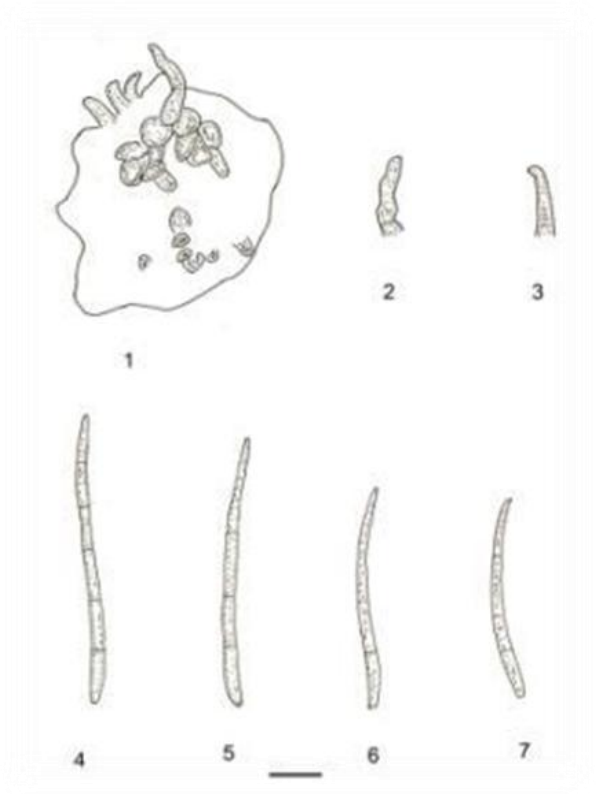

Fig. 104 – *Pseudocercospora lythracearum* on *Lagerstroemia macrocarpa*: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–7. Conidia. Bar = 10 µm.

(53) *Pseudocercospora macarangae* (Syd. & P. Syd.) Deighton, Mycol. Pap. 140: 47, 1976.

Figs 106–107.

≡ *Cercospora macarangae* Syd. & P. Syd., Ann. Mycol. 12: 575, 1914.

≡ *Cercospora macarangae* J.M. Yen & Lim, Bull. Trimestriel Soc. Mycol. France. 86: 749, 1971.

Leaf spots subcircular to irregular, 1–25 mm diam., at first yellowish, later becoming brown, dark brown in the center, brown to dark brown at the margin. Caespituli hypophyllous, conspicuous. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal, 35–45 µm diam. ($\bar{x}$ = 41 µm, n = 6), brown to dark brown, stromatal cells oval, ellipsoidal and angular, 5–9 µm wide ($\bar{x}$ = 6.6 µm, n = 30), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.54 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (9–31 per fascicle), up to 10–15 in a divergent or coremoid fascicle, geniculate, unbranched, 30–210 × 4–5 µm ($\bar{x}$ = 119 × 4.29 µm, n = 30), 1–6-septate, slightly constricted at the septa, distance between septa 8–35 µm long ($\bar{x}$ = 21.6 µm, n = 30), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.5–0.8 µm ($\bar{x}$ = 0.66 µm, n = 30), smooth. Conidiogenous cells terminal, 10–14 × 3–4 µm ($\bar{x}$ = 12.5 × 3.25 µm, n = 15), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 22–58 × 3–5 µm ($\bar{x}$ = 35.54 × 3.8 µm, n = 30), 1–5-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.48 µm, n = 30), smooth, tip obtuse, base subtruncate or obconically truncate, hilla 1–2 µm wide ($\bar{x}$ = 1.8 µm, n = 30).

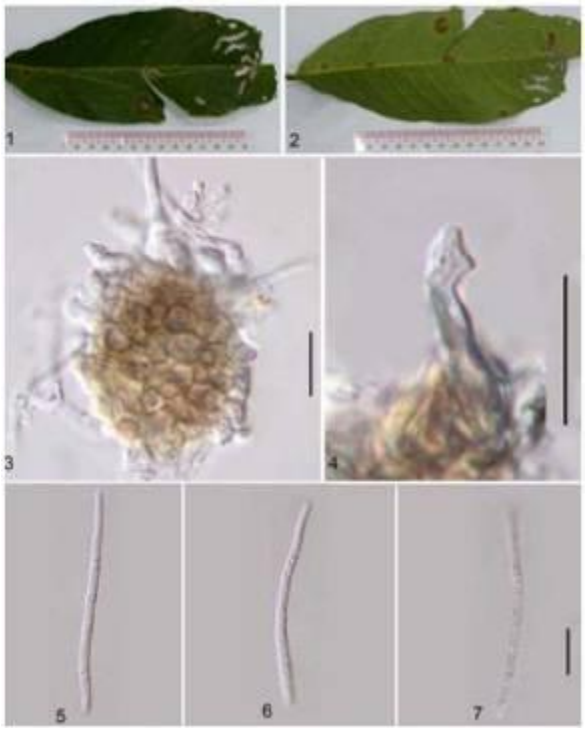

Fig. 105 – *Pseudocercospora lythracearum* on *Lagerstroemia macrocarpa* from leaf spots: 1–2. Lesions on host leaves (1. upper surface and 2. lower surface). 3–4. Stromata with attached conidiophores. 5–7. Conidia. Bars 1–2 = 10 mm, 3–7 = 10 µm.

Hosts – *Macaranga denticulata* (Blume) Müll. Arg., *M. grandifolia* (Blanco) Merr., *M. indica* Wight, *M. peltata* Roxb., *M. tanarius* (L.) Müll. Arg. (Euphorbiaceae).

Distribution – **Asia**: China, India, Laos, Philippines, Singapore, Taiwan.

Material examined – Luangnamtha Province, Luangnamtha District, Chaleunsouk Village, fallow forest, on leaves of *Macaranga denticulata*, 19 February 2010, P. Phengsintham (P564).

Notes – The collection from Laos agrees well with the description of *Pseudocercospora macaranga* published by Hsieh & Goh (1990).

Literature – Saccardo (1931: 876), Chupp. (1954: 223), Deighton (1976: 47), Yen & Lim (1980: 180), Hsieh & Goh (1990: 123), Guo & Hsieh (1995: 108), Crous & Braun (2003: 259).

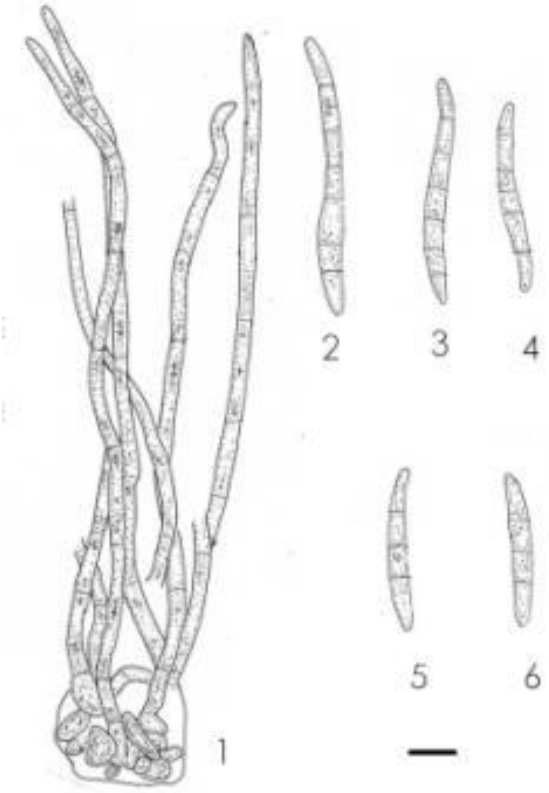

Fig. 106 – *Pseudocercospora macarangae* on *Macaranga denticulata*: 1. Stroma with attached conidiophores. 2–6. Conidia. Bar = 10 µm.

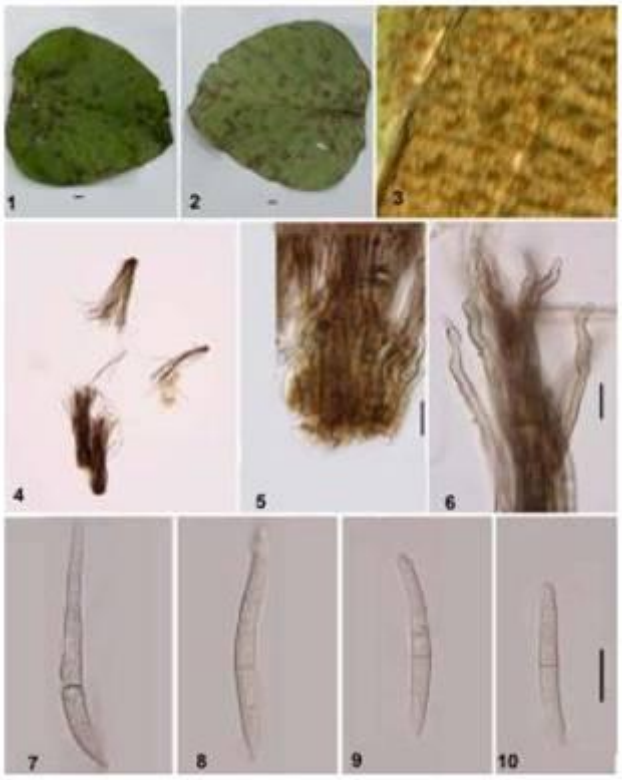

Fig. 107 – *Pseudocercospora macarangae* on *Macaranga denticulata* from leaf spots: 1–2. Lesions on host leaves (1. upper surface. 2. lower surface). 3. Caespituli. 4–5. Stromata with attached conidiophores. 6. Apices of conidiophores. 7–10. Conidia. Bars 1–2 = 10 mm, 4–10 = 10 µm.

(54) *Pseudocercospora maesae* (Hansf.) X.J. Liu & Y.L. Guo, Acta Mycol. Sin. 11: 295, 1992. Figs 108–109.

≡ *Cercospora maesae* Hansf., Proc. Linn. Soc. London 1942–1943: 53, 1943.

Leaf spots subcircular to irregular, 1–34 mm diam., at first yellowish, later becoming brown to dark brown in the center, brown to brown-yellowish at the margin. Caespituli amphigenous, conspicuous. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal, 15–56 µm diam., brown to dark brown, stromatal cells ellipsoidal and angular, 4–10 µm wide ($\bar{x}$ = 6 µm, n = 9), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 67 µm, n = 9), smooth. Conidiophores fasciculate, arising from stromata (up to 16 per fascicle), geniculate, unbranched, 25–46 × 4–6 µm ($\bar{x}$ = 35.9 × 4.86 µm, n = 7), 2–4-septate, slightly constricted at the septa, distance between septa 5–18 µm long ($\bar{x}$ = 11.3 µm, n = 13), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.5–0.8 µm ($\bar{x}$ = 0.64 µm, n = 13), smooth. Conidiogenous cells terminal, 8–13 × 4–5 µm ($\bar{x}$ = 9.67 × 4.83 µm, n = 6), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 70–95 × 3–3.5 µm ($\bar{x}$ = 81.4 × 3.1 µm, n = 5), 6–9-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.34 µm, n = 5), smooth, tip subacute, base obconically truncate, hilla 1.5–2 µm wide ($\bar{x}$ = 1.75 µm, n = 5).

Colonies on PDA after 3 weeks at 25°C dark grey mycelium, reaching 6–8 mm diam., hyphae 2–5 µm wide ($\bar{x}$ = 3.53 µm, n = 15), septate, constricted at the septa, distance between septa 8–18 µm ($\bar{x}$ = 12.46 µm, n = 15), brownish or subhyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.42 µm, n = 15), smooth. Conidia not formed in culture.

Hosts – *Maesa hupehensis* Rehd., *M. indica* (Roxb.) DC., *M. lanceolata* Forssk., *M. ramentacea* (Roxb.) A. DC., *Myrsine africana* L. (Myrsinaceae).

Distribution – **Africa:** Uganda; **Asia:** China, India, Laos; **North America and West Indies:** Cuba, USA (FL).

Material examined – Luangnamtha Province, Luangnamtha District, Chaleunsouk Village, fallow forest, on leaves of *Maesa ramentacea*, 20 February 2010. P. Phengsintham (P575).

Notes – The collection from Laos agrees with the description of *Pseudocercospora maesae* in Guo & Goh (1995) [conidiophores 4–40 × 3–5 µm and conidia 25–100 × 3–5 µm]

Literature – Chupp. (1954: 404), Guo & Hsieh (1995: 221), Crous & Braun (2003: 263).

(55) ***Pseudocercospora mannanorensis*** Bagyan., U. Braun & Jagad. var. *paucifasciculata* Phengsintham, E. Chukeatirote, Abdelsalam, K.D. Hyde & U. Braun, Crypt. Mycol. 31(2): 175, 2010. Figs 110–111.

Leaf spots suborbicular to angular, 1–3 mm diam., grey brown to medium brown in the centre, and with brown to dark brown margin. Caespituli amphigenous, scattered. Mycelium internal, inconspicuous. Stromata developed, substomatal, subglobular, 15–23 µm diam. ($\bar{x}$ = 18.5 µm, n = 4), brown to dark brown, stroma cells oval, ellipsoidal to angular in outline, 3–6

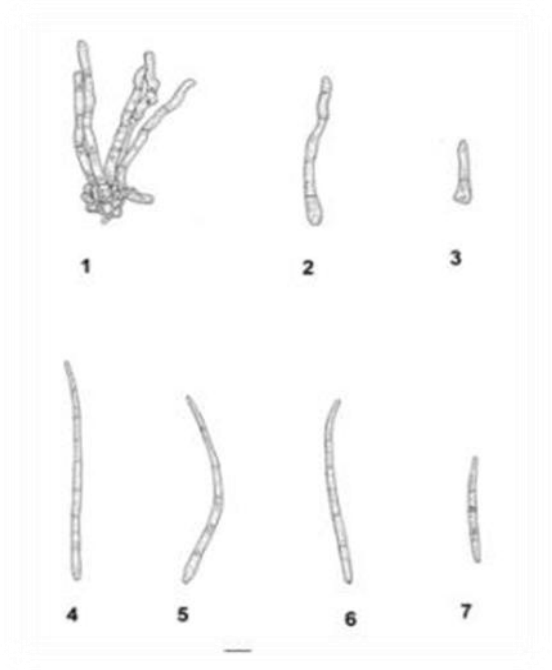

Fig. 108 – *Pseudocercospora maesae* on *Maesa ramentacea*: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–7. Conidia. Bar = 10 µm.

Fig. 109 – *Pseudocercospora maesae* on *Maesa ramentacea* from leaf spots: 1–2. Lesions on host leaves (1. upper surface and 2. lower surface). 3. Caespituli. 4–5. Stromata with attached conidiophores. 6–9. Conidia. 10–11. Culture. Bars: 1–2, 10 = 10 mm, 4–9 = 10 µm, 10. = 10 mm.

µm wide ($\bar{x}$ = 4.53 µm, n = 17), dark brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.39 µm, n = 17), smooth. Conidiophores fasciculate, arising from stromata (5–10 per fascicle), erect, straight or curved, unbranched, aseptate, i.e. conidiophores reduced to conidiogenous cells. Conidiogenous cells 6–10 × 1.5–3 µm ($\bar{x}$ = 7.75 × 2.13 µm, n = 8), aseptate, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.33 µm, n = 8), smooth, apex obtuse, pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, subcylindrical to narrowly obclavate, straight to moderately curved, 27–69 × 1–3 µm ($\bar{x}$ = 49.38 × 1.95 µm, n = 13), 1–5–septate, occasionally slightly constricted at the septa, pale olivaceous, wall 0.2–0.3 µm wide ($\bar{x}$ = 0.28 µm, n = 13), smooth, subacute to obtuse at the apex, base obconically truncate, 1–1.5 µm wide ($\bar{x}$ = 1.3 µm, n = 5), wall 0.2–0.3 µm ($\bar{x}$ = 0.28 µm, n = 5) thick.

Colonies on PDA after 3 weeks at 25°C dark brown in the centre and brown-green margin, reaching 4–10 mm diam.; hyphae 2–5 µm wide ($\bar{x}$ = 3.6 µm, n = 30), septate, distance between septa 7–40 µm ($\bar{x}$ = 19.21 µm, n = 30), primary mycelium brownish, but the second and following ones hyaline, wall smooth or verruculose. Conidia not formed in culture.

Hosts – *Microcos paniculata* L. (≡ *Grewia microcos* L.) (Tiliaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Nong Viengkham Village, on leaves of *Microcos paniculata*, 13 May 2006, P. Phengsintham (P45, MFLU 12-2202, **holotype**); ibid., 20 December 2009, P. Phengsintham (P488).

Notes – The collection from Laos is similar to *Pseudocercospora mannanorensis* described by Bagyanarayana et al. (1995) on *Grewia* sp. from India, but can only tentatively be assigned to this species since obvious differences in the size and length of conidiophores are evident. *Pseudocercospora mannanorensis* has much longer, 0–2-septate, subhyaline, pale greenish to olivaceous conidiophores, 15–50 × 1.5–3 µm, arranged in dense, very rich fascicles (up to more than 100). The conidia are solitary, subcylindrical to narrowly obclavate, straight to somewhat curved, 40–80 × 2–4 µm, subhyaline to pale greenish or olivaceous, i.e. they agree well the

fungus on *M. paniculata*. The status of the fungus from Laos is, however, uncertain. The features of the lesions and conidia agree well with *P. mannanorensis*, but the conidiophores are much shorter and only formed in small fascicles. It is unclear if two distinct species are involved or if these differences have been caused by the host plant or a possible immaturity of the sample. Additional collections are necessary to prove the consistency of the conidiophore characters on *Microcos paniculata*, but due to the obvious differences we prefer to introduce a new variety for this fungus.

Literature – Bagyanarayana et al. (1995), Crous & Braun 2003 (key).

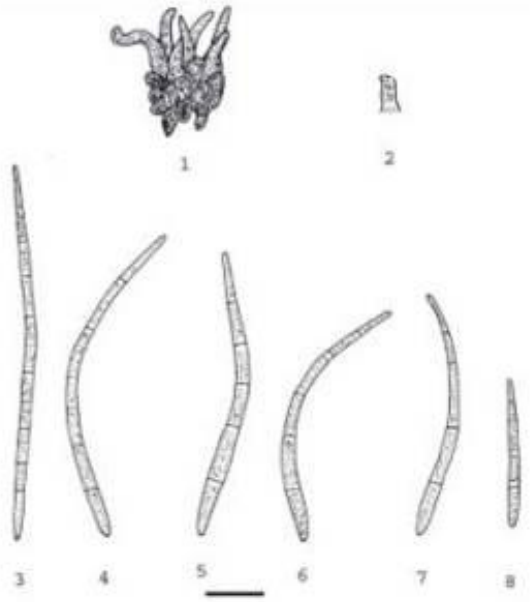

Fig. 110 – *Pseudocercospora mannanorensis* var. *paucifasciculata* on *Microcos paniculata*: 1. Stroma with attached conidiophores. 2. Conidiophore. 3–8. Conidia. Bar = 10 µm.

(56) ***Pseudocercospora melochiae*** (Henn.) Deighton, Mycol. Pap. 140: 147, 1976. Figs 112–113.

≡ *Cercospora melochiae* Henn., Hedwigia 43: 395, 1904.

= *Cercospora guineensis* J. Kranz, Sydowia 19: 76, (1965) 1966.

Leaf spots oval or irregular, 1–3 mm diam., with brown to dark brown and yellowish margin. Caespituli amphigenous, inconspicuous. Mycelium internal and external. Internal hyphae branched, 1–4 µm wide ($\bar{x}$ = 2.7 µm, n = 7), septate, constricted at the septa, distance between septa 4–10 µm ($\bar{x}$ = 6.43 µm, n = 7), subhyaline or hyaline, wall 0.2–0.3 µm wide ($\bar{x}$ = 0.26 µm, n = 7), smooth; external hyphae branched, 1–3 µm wide ($\bar{x}$ = 1.8 µm, n = 12), septate, constricted at the septa, distance between septa 6–19 µm ($\bar{x}$ = 11.7 µm, n = 12), brown, wall 0.25–0.3 µm wide ($\bar{x}$ = 0.26 µm, n = 7), smooth. Stromata developed, substomatal, subglobose, 12–26 µm diam., brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 3–6 µm wide ($\bar{x}$ = 4.87 µm, n = 30), dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.66 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (3–17 per fascicle), and secondary conidiophores borne terminally and laterally on external mycelial hyphae, very variable in length even when formed on a single hypha , erect, straight or curved, unbranched, obtuse, 8–25 × 3–4 µm ($\bar{x}$

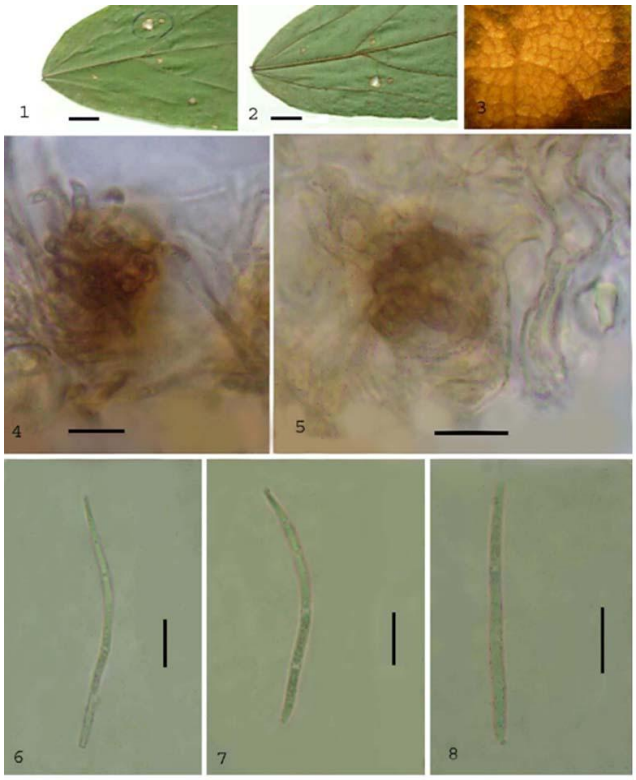

Fig. 111 – *Pseudocercospora mannanorensis* var. *paucifasciculata* on *Microcos paniculata*: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4. Stromata with attached conidiophores. 5. Stroma. 6–8. Conidia. 9. Culture. Bars 1–2, 9 = 10 mm, 4–8 = 10 µm.

= 17 × 3.77 µm, n = 30), 0–1-septate, distance between septa 5–16 µm ($\bar{x}$ = 11 µm, n = 14), pale to medium brown, wall 0.57 µm wide, smooth. Conidiogenous cells integrated, obtuse, 12–16 × 3–4 µm, 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, 49–132 × 3–5 µm ($\bar{x}$ = 87.84 × 4.44 µm, n = 30), 5–11-septate, slightly constricted at the septa, pale olivaceous, wall 0.5–0.8 µm thick ($\bar{x}$ = 0.51 µm, n = 30), smooth, apex subacute or broadly rounded, base long obconically truncate or obconic.

Hosts – *Melochia corchorifolia* L., *M. lupulina* Sw., *M. melissifolia* Benth., *M. odorata* L. f., *Waltheria american* L. and *W. indica* L. (Malvaceae, incl. Sterculiaceae).

Distribution – **Africa:** Gabon, Ghana, Guinea, Sierra Leone, Sudan; **Asia:** India, Laos; **North America and West Indies:** Dominican Republic, El Salvador, Jamaica, USA (GA); **Oceania:** Papua New Guinea; **South America:** Brazil, Columbia,

Material examined – Vientiane Capital, Xaythany District, Xay Village, rice paddy, on leaves of *Melochia corchorifolia*, 3 May 2006, P. Phengsintham (P30).

Notes – The collection from Laos agrees well with the description of *Pseudocercospora melochiae* published by Chupp (1954) [conidiophores pale to medium in colour, 3–5 µm in width, conidia 40–150 × 2–4.5 µm].

Literature – Chupp (1954: 556–557), Crous & Braun (2003: 271)

(57) ***Pseudocercospora micromeli*** sp. nov.

Figs 114–115.

MycoBank, MB 801728

Morphologically somewhat similar to Pseudocercospora glycosmidis but leaf spots not vein-limited, stromata much larger (30–60 µm), conidiophores in larger fasciles (up to 27), shorter (7–18 µm) and superficial hyphae with solitary conidiophores lacking.

Leaf spots subcircular to irregular, 2–10 mm diam., at first yellowish, than becomes brown to dark brow in the centre, brown to brown yellowish at the margin. Caespituli amphigemous, conspicuous. Mycelium internal, inconspicuous.

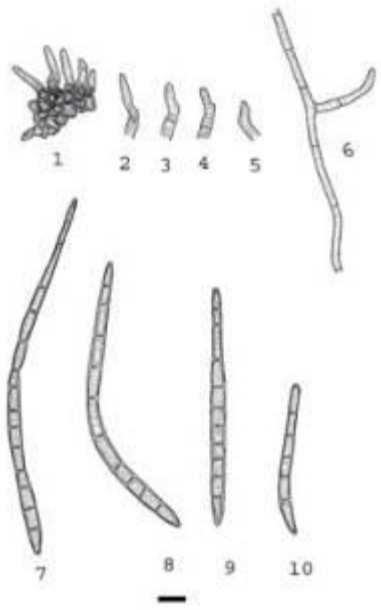

Fig. 112 – *Pseudocercospora melochiae* on *Melochia corchorifolia*: 1. Stroma with attached conidiophores. 2–5. Conidiophores. 6. External mycelium with attached conidiophore. 7–10. Conidia. Bar = 10 µm.

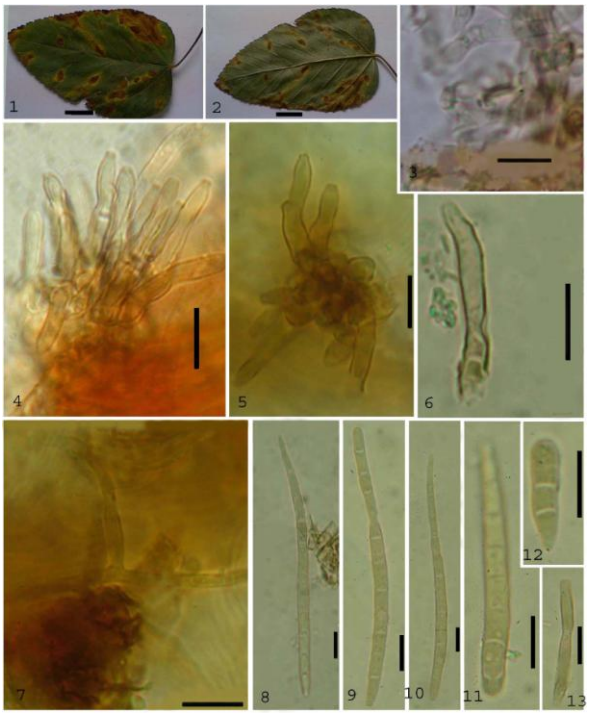

Fig. 113 – *Pseudocercospora melochiae* on *Melochia corchorifolia* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Internal mycelium. 4–5. Stromata with attached conidiophores. 6. Conidiophore. 7. External mycelium with attached young conidiophore. 8–13. Conidia. Bars 1–2 = 10 mm, 3–13 = 10 µm.

Stromata oval to ellipsoidal, 30–60 µm diam., brown to dark brown, stromatal cells oval, ellipsoidal to angular, 3–7 µm wide ($\bar{x}$ = 5.2 µm, n = 12), dark brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.38 µm, n = 12), smooth. Conidiophores fasciculate, arising from stromata (up to 27 per fascicle), unbranched, not geniculate, 7–18 × 3–4 µm ($\bar{x}$ = 12.5 × 3.5 µm, n = 10), 0–2-septate, slightly constricted at the septa, distance between septa 7–10 µm long ($\bar{x}$ = 8.33 µm, n = 15), uniformly pale to medium brown, much paler and narrower towards the tip, wall 0.5–0.8 µm ($\bar{x}$ = 0.6 µm, n = 15), smooth. Conidiogenous cells terminal, 7–8 × 3–3.5 µm ($\bar{x}$ = 7.5 × 3.25 µm, n = 6), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 27–64 × 2–3 µm ($\bar{x}$ = 44.6 × 2.5 µm, n = 15), 1–4-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.37 µm, n = 15), smooth, tip subacute, base obconically truncate, hila 0.5–1 µm wide ($\bar{x}$ = 0.8 µm, n = 15).

Colonies on PDA after 3 weeks at 25°C with dark green mycelium, reaching 4–7 mm diam.

Hosts – *Micromelum hirsutum* Oliv. (Rutaceae).

Distribution – **Asia:** Laos.

Material examined – Khammoune Province, Nakai District, Nahao Village, fallow forest, on leaves of *Micromelum hirsutum*, 3 June 2010, P. Phengsintham (P582, MFLU12-2203, **Holotype**).

Notes – The Indian *Pseudocercospora glycomidis* is somewhat similar, above all its conidia, but this species forms vein-limited leaf spots, has smaller stromata (–20 µm), small fascicles of longer conidiophores (1–6, up to 42.5 µm long) and forms superficial hyphae with solitary conidiophores (Mandal 1978).

Literature – Crous & Braun (2003: key).

(58) ***Pseudocercospora musae*** (Zimm.) Deighton, Mycol. Pap. 140: 148, 1976. Figs 116–117.

≡ *Cercospora musae* Zimm., Centralbl. Bacteriol., Abt. 2, 8: 219, 1902.

= *Cercospora musae* Massee, Bull. Misc. Inform. 28: 159, 1914.

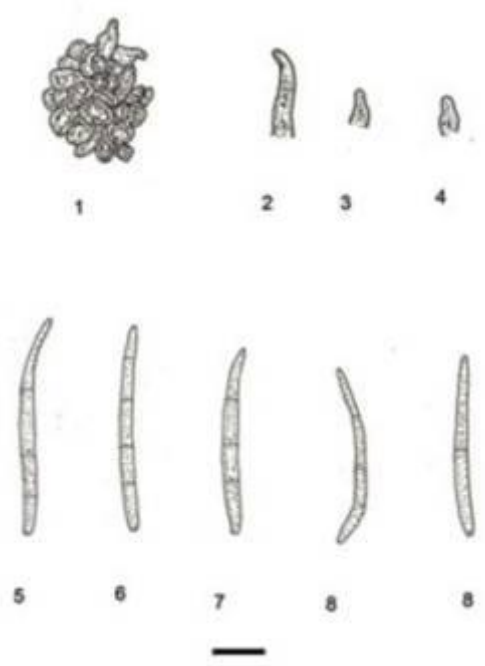

Fig. 114 – *Pseudocercospora micromeli* on *Micromelum hirsutum*: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–8. Conidia. Bar = 10 µm.

Fig. 115 – *Pseudocercospora micromeli* on *Micromelum hirsutum* from leaf spots: 1–2. Lesions on host leaves (1. upper surface and 2. lower surface). 3. Caespituli. 4. Stromata. 5. Stroma with attached conidiophores. 6. Conidiophore. 7–10. Conidia. 11. Culture. Bars: 1–2, 11 = 10 mm, 4–10 = 10 µm.

≡ *Mycosphaerella musicola* R. Leach, J.L. Mulder & R.H. Stover, Trans. Brit. Mycol. Soc. 67: 77, 1976.

Leaf spots circular to irregular, 1–15 mm diam., brown to dark brown in the centre, with a brown to brown-greenish margin. Caespituli amphigenous, scattered, brown. Mycelium internal, inconspicuous. Stromata more developed, substomatal, subglobular, 12–65 µm diam. ($\bar{x}$ = 37.6 µm, n = 8), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 5–10 µm wide ($\bar{x}$ = 6.9 µm, n = 16), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.65 µm, n = 16), smooth. Conidiophores solitary or fasciculate, arising from stromata (6–13 per fascicle), erect, straight or curved, unbranched, 10–22 × 5–6 µm ($\bar{x}$ = 15.2 × 5.67 µm, n = 6), 0–1-septate, distance between septa 7–15 µm ($\bar{x}$ = 9.83 µm, n = 6), pale to moderately olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.47 µm, n = 6), smooth. Conidiogenous cells integrated, subtruncate, 9–15 × 4–6 µm ($\bar{x}$ = 12.7 × 5.5 µm, n = 6), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, 19–70 × 3–5 µm ($\bar{x}$ = 46.41 × 4.23 µm, n = 17), 1–7-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.45 µm, n = 17), smooth, bluntly rounded at the apex, with subtruncate base, basal hila 1.5–2 µm wide ($\bar{x}$ = 1.91 µm, n = 17), wall 0.3–0.5 µm ($\bar{x}$ = 0.47 µm, n = 17) thick.

Hosts – *Musa acuminata* Colla (= *M. cavendishii*, *M. nana*), *M. banksii* F. Muell., *M. basjoo* Siebold & Zucc. ex Iinuma, *M. liukiuensis* Colla, *M. paradisiaca* L. (= *M.* ×*sapientum* L.), *M. textilis* L., *Ensete ventricosa* (Welw.) Cheesman (Musaceae).

Distribution – **Africa:** Angola, Cameroon, Cape Verde, Congo, Egypt, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya, Madagascar, Nigeria, São Tomé and Príncipe, Sierra Leone, Somalia, South Africa, Tanzania, Togo, Tunisia, Uganda Zambia, Zimbabwe; **Asia:** Bhutan, Brunei, Cambodia, China, Hong Kong, India, Indonesia, Laos, Nepal, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam, Yemen; **North America and West Indies:** Antigua and Barbuda, Bahamas, Barbados, Belize, Costa Rica, Cuba, Cayman Islands, Dominican Republic, El Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, USA (FL, HI); **Australia; Oceania:** American Samoa, Fiji, French Polynesia, Kiribati, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Vanuatu, Wallis and Futuna Islands; **South America:** Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela,.

Material examined – Vientiane Capital, Xaythany District, Xay Village, garden, on leaves of *Musa paradisiaca*, 29 July 2006, P. Phengsintham (P113). GenBank accession no (ITS, KC677908).

Notes – The collection from Laos agrees with the description of *Pseudocercospora musae* published by Ellis (1971), Hsieh & Goh (1990) and Guo & Hsieh (1995) [conidiophores 5–45 × 3–5 µm and conidia 10–70 × 4–6 µm].

Literature – Chupp (1954: 402), Hsieh & Goh (1990: 243), Guo & Hsieh (1995: 218), Guo et al. (1998: 230–231), Crous & Braun (2003: 286).

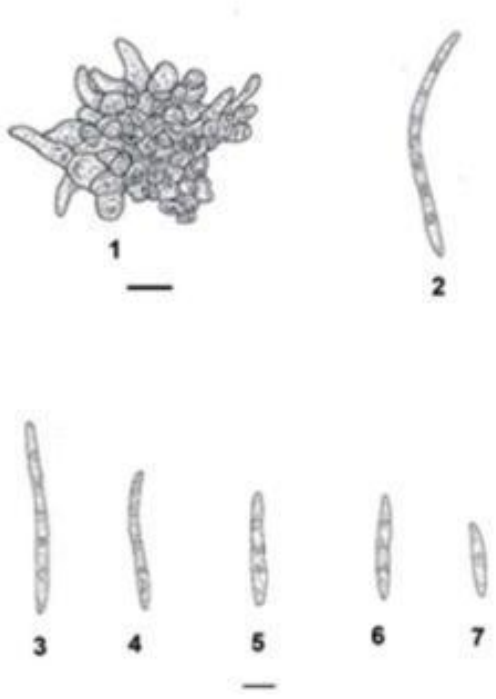

Fig. 116 – *Pseudocercospora musae* on *Musa paradisiaca*: 1. Stroma with attached conidiophores. 2–7. Conidia. Bars = 10 µm.

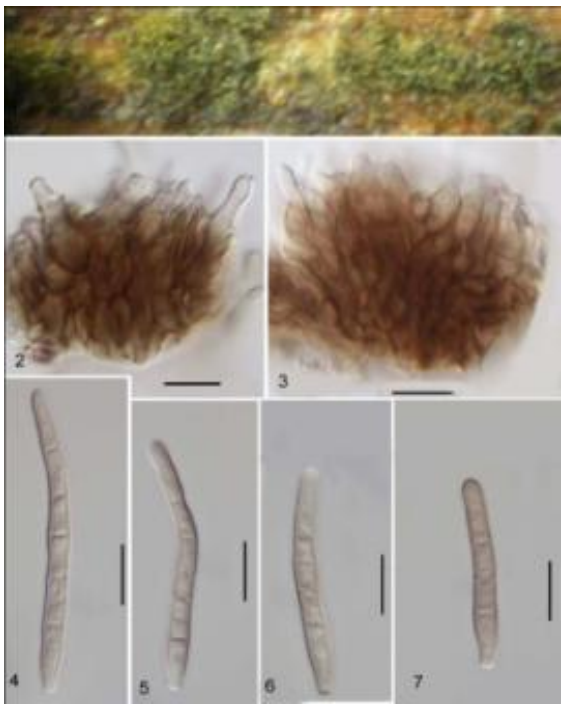

Fig. 117 – *Pseudocercospora musae* on *Musa paradisiaca* from leaf spots: 1. Lesions on host leaf (upper surface). 2–3. Stromata with attached conidiophores. 4–7. Conidia. Bars 1 = 10 mm, 2–7 = 10 µm.

(59) ***Pseudocercospora nigricans*** (Cooke) Deighton, Mycol. Pap.140: 149, 1976. Figs 118–119.

= *Cercospora nigricans* Cooke, Grevillea 12: 30, 1883.

Leaf spots circular to irregular, 2–6 mm diam., pale brown or dark brown in the centre, and with yellow margin. Caespituli amphigenous, inconspicuous. Mycelium internal. Stromata oval or ellipsoidal, 10–40 µm diam. ($\bar{x}$ = 16.3 µm, n = 10), dark brown, stromatal cells angular in outline, 3–8 µm wide ($\bar{x}$ = 4.5 µm, n = 30), wall 0.5–1 µm ($\bar{x}$ = 0.77 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (3–10 per fascicle), emerging through stomata, branched, one time geniculate, cylindrical, 15–69 × 3–5 µm ($\bar{x}$ = 43.6 × 4.33 µm, n = 30), 0–6-septate, distance between septa 5–19 µm ($\bar{x}$ = 12.3 µm, n = 30), uniformly pale to medium olivaceous–brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.65 µm, n = 24), smooth. Conidiogenous cells integrated, terminal, cylindrical, 10–28 × 3–4 µm ($\bar{x}$ = 20.17 × 3.4 µm, n = 29); conidiogenous loci small, at the lateral and apex, conspicuous, slightly thickened, but distinctly darkened, 1.5–2 µm, wall 0.5–0.8 µm. Conidia solitary, obclavate or cylindrical, entire and verruculose, straight to curved, 10–53 × 2.5–4 µm ($\bar{x}$ = 30.4 × 3.2 µm, n = 26), 0–5-septate, pale olivaceous brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.44 µm, n = 23), smooth, tip subobtuse, base obconically truncate, hila 1–2 µm wide ($\bar{x}$ = 1.68 µm, n = 8), wall 0.5–1 µm ($\bar{x}$ = 0.78 µm, n = 8), thickened and darkened.

Hosts – *Cassia acutifolia* Delile, *C. auriculata* L., *C. fasciculata* Michx., *C. fistula* L., *C. grandis* L. f., *C. renigera* Wall., *C. torosa* Cav., *Cassia* sp., *Chamaecrista nictitans* (L.) Moench, *Macroptilium lathyroides* (L.) Urb., *Senna alata* (L.) Roxb., *S. marilandica* (L.) Link, *S. obtusifolia* (L.) H.S. Irwin & Barneby, *S. occidentalis* (L.) Link, *S. sophera* (L.) Roxb., *S. tora* (L.) Roxb. (Fabaceae).

Distribution – **Africa:** Gabon, Mauritius, Sudan, Tanzania; **Asia:** China, India, Japan, Laos, Malaysia, Myanmar, Pakistan, Philippines, Sabah, Taiwan; **North America and West Indies:** Cuba, Puerto Rico, Trinidad & Tobago, USA (AI, FL, LA, MO, MS, SC, TX, WI, WV), Virgin Islands; **Oceania:** Kiribati, Solomon Islands, Tonga, Vanuatu; **South America:** Brazil, Colombia.

Material examined – Vientiane Capital, Xaythany District, Dong Dok Village, on leaves of *Cassia occidentalis*, 25 July 2006, P. Phengsintham (P108); Dong Dok village, on leaves of *C. occidentalis*, 9 December 2008, P. Phengsintham (P382).

Notes – The identification of the Laos collections is rather difficult as they do not agree in all details with any of the numerous *Pseudocercospora* species described on *Cassia* and *Senna*, but can be tentatively assigned to *Pseudocercospora nigricans*, although they differ from this species, as keyed out in Braun (1989), in having somewhat larger stromata and narrower, sometimes verruculose conidia [10–53 × 2.5–4 µm ($\bar{x}$ = 30.4 × 3.2 µm, n = 26), versus (15–)20–65(–80) × 3.5–6 µm]. *Pseudocercospora cassia-occidentalis* (J.M. Yen) J.M. Yen, considered to be a possible synonym of *P. nigricans* in Braun (1989) but treated as distinct taxon in Crous & Braun (2003), is distinguished by much longer conidiophores and conidia (Hsieh & Goh, 1990).

Literature – Saccardo (1886: 462; 1892: 644; 1931: 879), Chupp (1954: 321), Ellis (1976: 267), Hsieh & Goh (1990: 195), Guo & Hsieh (1995: 172), Crous & Braun (2003: 291).

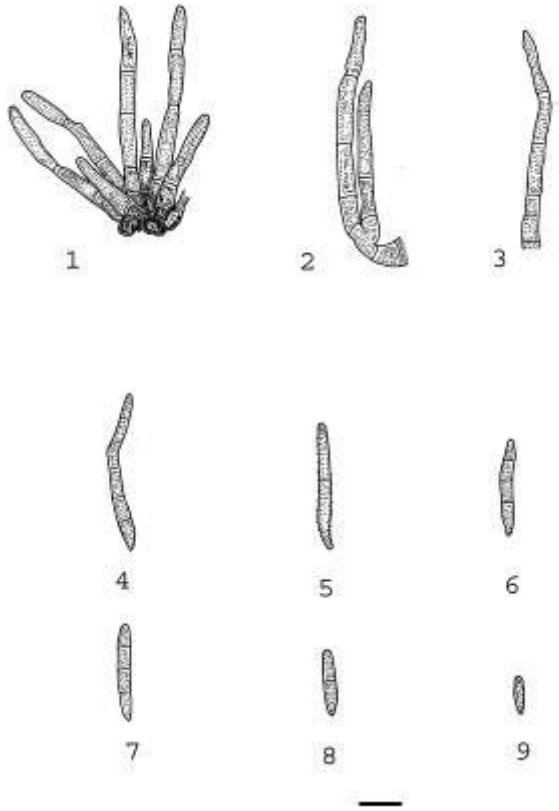

Fig. 118 – *Pseudocercospora nigricans* on *Senna occidentalis*: 1. Stroma with Conidiophores. 2–3. Conidiophores. 4–9. Conidia. Bar = 5 µm.

(60) ***Pseudocercospora ocimicola*** (Petr. & Cif.) Deighton, Mycol. Pap. 140: 149, 1976. Figs 120–121.

≡ *Cercospora ocimicola* Petr. & Cif., Ann. Mycol. 30: 324, 1932.

= *Cercospora ocimi* Sawada, Unknown (nom. nud).

Leaf spots subcircular to irregular, 1–4 mm diam., at first yellowish, later becoming brown, dingy grey to pale tan, brown to dark brown at the margin. Caespituli hypophyllous, conspicuous. Mycelium internal; hyphae branched, 3–5 µm wide ($\bar{x}$ = 3.6 µm, n = 5), septate, constricted at the septa, distance between septa 7–19 µm ($\bar{x}$ = 10.6 µm, n = 5), brownish, subhyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.46 µm, n = 5), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 20–23 µm diam., brown to dark brown, stromatal cells oval, ellipsoidal and angular, 5–9 µm wide ($\bar{x}$ = 6 µm, n = 8), dark brown, wall 0.5 µm wide, smooth. Conidiophores fasciculate, arising from stromata (1–4 per fascicle), geniculate, unbranched, 8–24 × 3–5 µm ($\bar{x}$ = 16.1 × 4.06 µm, n = 8), 0–2–septate, slightly constricted at the septa, distance between septa 5–10 µm long ($\bar{x}$ = 8.5 µm, n = 10), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.3–0.5 µm ($\bar{x}$ = 0.47 µm, n = 10), smooth. Conidiogenous cells terminal, 8–10 × 3–4 µm ($\bar{x}$ = 10.3 × 3.67 µm, n = 8), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 28–82 × 3–4 µm ($\bar{x}$ = 51.8 × 3.4 µm, n = 8), 2–7–septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.46 µm, n = 8), smooth, tip subacute, base obnically truncate, hilla 1.5–2.5 µm wide ($\bar{x}$ = 2.12 µm, n = 8).

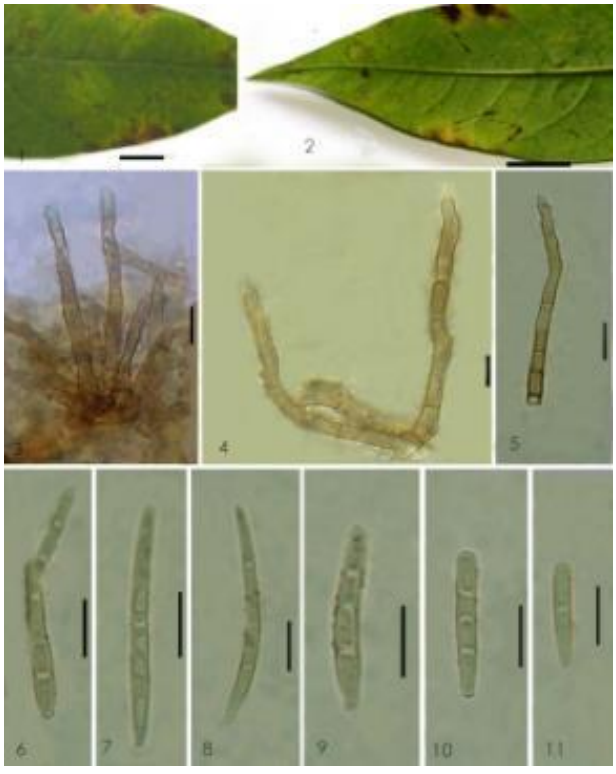

Fig. 119 – *Pseudocercospora nigricans* from *Senna occidentalis* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3–4. Stromata with attached conidiophores. 5. Conidiophore. 6–11. Conidia. Bars 1–2 = 10 mm, 3–11 = 10 µm.

Hosts – *Marsypianthes chamaedrys* (Vahl) Kuntze, *Ocimum americanum* L., *O. basilicum* L., *O. micranthum* Willd., *O. sanctum* L., *Ocimum* sp. (Lamiaceae).

Distribution – **Asia:** China, India, Laos, Taiwan; **North America and West indies:** Cuba, Dominican Republic; **Oceania:** Fiji, New Zealand, Vanuatu; **South America:** Brazil.

Material examined – Vientiane Capital, Xaythany District, Xay Village, on leaves of *Ocimum tenuiflorum*, 4 February 2010, P. Phengsintham (P541).

Notes – In the Laos collection the conidiophores are 8–24 × 3–5 µm and the conidia are 28–82 × 3–4 µm, which is similar to those described in Hsieh & Goh (1990) [conidiophores 10–30 × 3–5 µm, conidia 25–70 × 3–4 µm].

Literature – Chupp (1954: 270), Hsieh & Goh (1990: 155), Guo & Hsieh (1995: 130), Guo et al. (1998: 144), Crous & Braun (2003: 295).

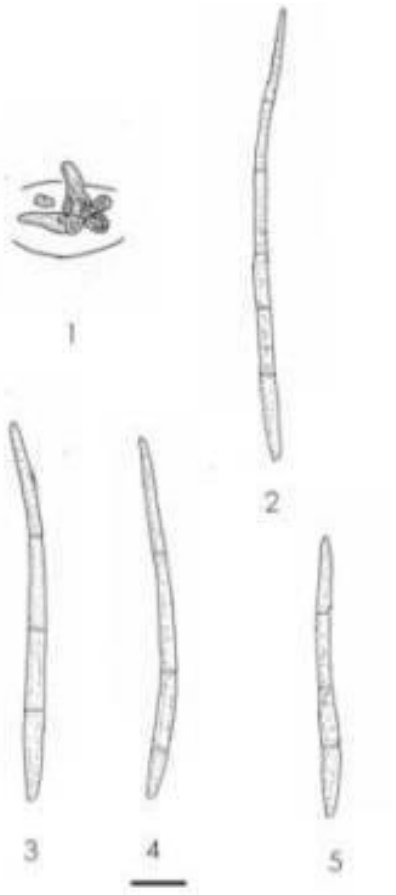

Fig. 120 – *Pseudocercospora ocimicola* on *Ocimum tenuiflorum*: 1. Stroma with attached conidiophores. 2–5. Conidia. Bar = 10 µm.

Fig. 121 – *Pseudocercospora ocimicola* on *Ocimum tenuiflorum* from leaf spots: 1–2. Lesions on host leaves (1. upper surface and 2. lower surface). 3. Stroma with attached conidiophores. 4–5. Conidiophores. 6–10. Conidia. 11. Culture. Bars 1–2, 10 = 10 mm, 3–9 = 10 µm.

(61) ***Pseudocercospora paraguayensis*** (Tak. Kobay.) Crous, Mycotaxon 57: 270, 1996. Figs 122–123.

≡ *Cercosporina paraguayensis* Tak. Kobay., Trans. Mycol. Soc. Japan 23: 263, 1984.

= *Pseudocercospora eucalypti* Goh & W.H. Hsieh, *Cercospora* and similar fungi from Taiwan: 244, 1990.

Leaf spots suborbicular to angular, 2–15 mm diam., grey-brown to medium brown in the centre, and with brown to dark brown margin. Caespituli amphigenous, scattered. Mycelium internal, inconspicuous. Stromata developed, substomatal, subglobular, 14–20 µm diam. ($\bar{x}$ = 17 µm, n = 5), brown to dark brown, stroma cells oval, ellipsoidal to angular in outline, 3–5 µm wide ($\bar{x}$ = 4 µm, n = 30), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.6 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (4–7 per fascicle), erect, straight or

curved, branched, geniculate, 10–53 × 3–4 µm ($\bar{x}$ = 24.2 × 3.67 µm, n = 15), 0–4-septate, distance between septa 5–10 µm ($\bar{x}$ = 7.6 µm, n = 20), pale to moderately olivaceous-brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.68 µm, n = 20), smooth. Conidiogenous cells 4–10 × 3–4 µm ($\bar{x}$ = 7.67 × 3.33 µm, n = 5), aseptate, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.6 µm, n = 5), smooth, apex obtuse, pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, subcylindrical to narrowly obclavate, straight to moderately curved, 18–25 × 2–4 µm ($\bar{x}$ = 23 × 2.75 µm, n = 15), 3–4-septate, occasionally slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.45 µm, n = 15), smooth, subacute to obtuse at the apex, with obconically truncate base, 1–1.5 µm wide ($\bar{x}$ = 1.12 µm, n = 5), wall 0.3–0.5 µm ($\bar{x}$ = 0.35 µm, n = 5) thick.

Hosts – *Eucalyptus globulus* Labill., *E. nitens* H. Deane & Maiden, *Eucalyptus* sp. (Myrtaceae).

Distribution – **Asia:** China, Israel, Laos, Taiwan, Thailand; **South America**: Brazil, Paraguay.

Material examined – Vientiane Capital, Xaythany District, Nong Viengkham Village, on leaves of *Eucalyptus* sp., 23 December 2008, P. Phengsintham (P405).

Notes – The collection from Laos agrees well with the description of *Pseudocercospora paraguayensis* published by Guo & Hsieh (1995) and Meeboon (2009), but shorter than *P. paraguayensis* described by Meeboon (2009) [conidiophores 27–43 × 2.5–5 µm, 12–20 in a densely fasciculate, 1–4-septate; conidia 31.5–60 × 2–4 µm, 6–16-septate].

Literature – Guo & Hsieh (1995: 221), Crous & Braun (2003: 307), Meeboon (2009).

(62) *Pseudocercospora piperis* (Pat.) Deighton, Mycol. Pap. 140: 150, 1976. Figs 124–125.

≡ *Cercospora piperis* Pat., Bull. Soc., Mycol. France 11: 233, 1895.

= *Cercospora piperis* Ellis & Everh., Annual Rep. Missouri Bot. Gard. 9: 119, 1898.

≡ *Cercospora pipericola* Sacc. & P. Syd., Syll. Fungi 16: 1073, 1902.

= *Cercospora portoricensis* Earle, Muhlenbergia 1: 15, 1901.

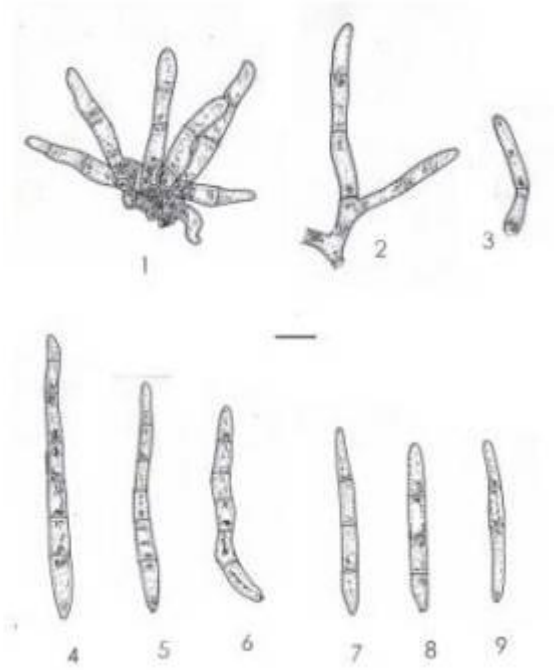

Fig. 122 – *Pseudocercospora paraguayensis* on *Eucalyptus* sp.: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–9. Conidia. Bar = 10 µm.

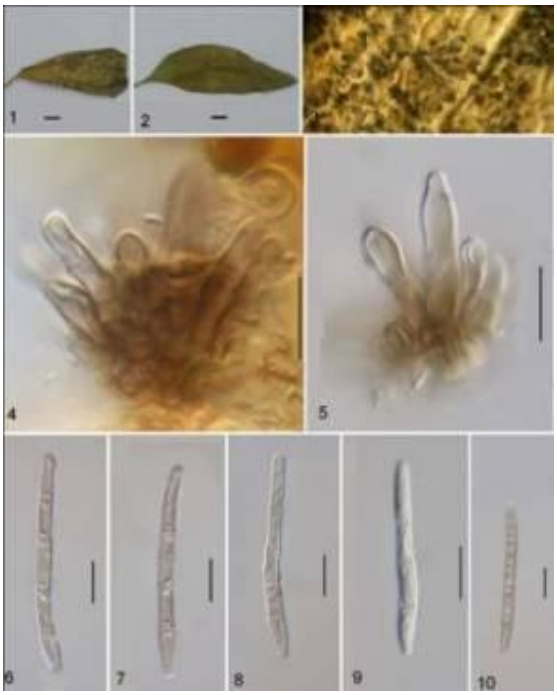

Fig. 123 – *Pseudocercospora paraguayensis* on *Eucalyptus* sp.: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4–5. Stromata with attached conidiophores. 6–10. Conidia. Bars 1–2, 9 = 10 mm, 4–10 = 10 µm.

Leaf spots circular to irregular, 2–10 mm diam., brown to dark brown in the centre, with a brown to brown-yellowish margin. Caespituli hypophyllous, scattered. Mycelium internal; hyphae branched, 3–4 µm wide ($\bar{x}$ = 3.2 µm, n = 5), septate, constricted at the septa, distance between septa 6–15 µm ($\bar{x}$ = 9 µm, n = 5), brown to subhyaline, wall smooth. Stromata more developed, substomatal, subglobular, 15–52 µm diam. ($\bar{x}$ = 27.5 µm, n = 10), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 5–8 µm wide ($\bar{x}$ = 6.3 µm, n = 30), dark brown, wall approximately 0.5–0.8 µm wide ($\bar{x}$ = 0.57 µm, n = 30), smooth. Conidiophores solitary or fasciculate, arising from stromata (4–8 per fascicle), erect, straight or curved, unbranched, 10–75 × 3–5 µm ($\bar{x}$ = 27.1 × 4.57 µm, n = 15), 0–3-septate, distance between septa 5–12 µm ($\bar{x}$ = 8.6 µm, n = 30), pale to moderately olivaceous-brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.56 µm, n = 30), smooth. Conidiogenous cells integrated, subtruncate, cicatrized, 5–12 × 3–5 µm ($\bar{x}$ = 8 × 4 µm, n = 15), pale olivaceous or brown; conidiogenous loci inconspicuous, smooth. Conidia solitary, obclavate, straight to moderately curved, 5–14 × 3–5 µm ($\bar{x}$ = 9.8 × 4 µm, n = 20), 2–5–septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.42 µm, n = 20), smooth, bluntly rounded at the apex, with subtruncate base, basal hila 1–1.5 µm wide ($\bar{x}$ = 1.2 µm, n = 20), wall 0.3–0.5 µm ($\bar{x}$ = 0.46 µm, n = 20) thick.

Hosts – *Piper aduncum* L., *P. auritum* Kunth, *P. dilatatum* Rich., *P. hispidum* Sw., *P. jamaicens* C. DC., *P. lolot* C. DC., *P. longum* L., *P. marginatum* Acq., *P. nigrum* L., *P. peltatum* L., *P. tuberculatum* Jacq., *P. umbellatum* L. (Piperaceae).

Distribution – **Asia:** Laos; **North America and West Indies:** Cuba, Jamaica, Puerto Rico, Dominican Republic, Trinidad; **South America:** Venezuela.

Material examined – Xiengkhouang Province, Kham District, Napa Village, on leaves of *Piper lolot*, 3 January 2010, P. Phengsintham (P516).

Notes – The collection from Laos agrees with the description of *Pseudocercospora piperis* (≡ *Cercospora piperis*) in Ellis (1976) [conidiophores 50–120 × 4–6 µm and conidia

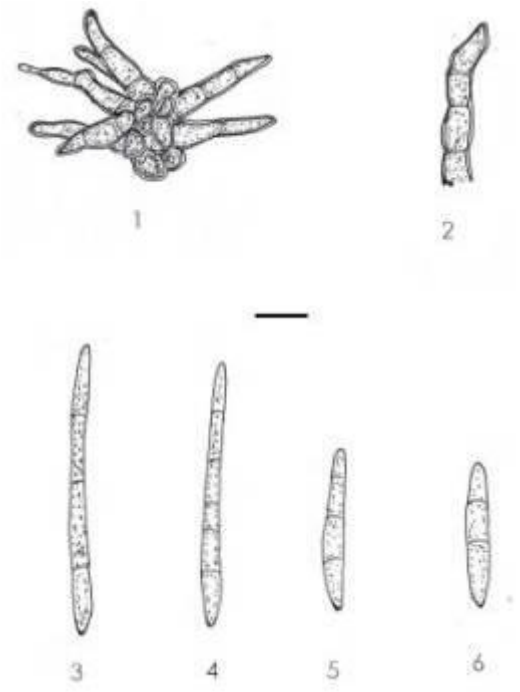

Fig. 124 – *Pseudocercospora piperis* on *piper lolot* from leaf spots: 1. Stroma with attached conidiophores. 2. Conidiophores. 3–6. Conidia. Bar = 10 µm.

Fig. 125 *Pseudocercospora piperis* on *Piper lolot* from leaf spots: 1. Upper surface. 2. Stroma. 3. Internal mycelium. 4. Stroma with attached conidiophores. 5–7. Conidia. 8. Culture. Bars 1, 8 = 10 mm, 2–7 = 10 µm.

45–100 × 4–6 µm], but it has conidiophores and conidia that are shorter.

Literature – Saccardo (1902: 1073; 1906: 609), Chupp (1954: 442), Ellis (1976: 279), Crous & Braun (2003: 325).

(63) *Pseudocercospora polygonicola* (A.K. Kar & M. Mandal) Deighton, Trans. Brit. Mycol. Soc. 88: 388, 1987. Figs 126–127.

≡ *Cercospora polygonicola* A.K. Kar & M. Mandal, Trans. Brit. Mycol. Soc. 53: 354, 1969.

≡ *Cercospora polygoni* Sawada, Rep. Gov. Agric. Res. Inst. Taiwan 85: 119, 1943.

Leaf spots subcircular to irregular, 1–5 mm diam., at first yellowish, later becoming brown in the centre, brown at the margin. Caespituli amphigenous, conspicuous. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal, 13.8–27 µm diam., brown to dark brown, stromatal cells oval, ellipsoidal and angular, 4–7 µm wide ($\bar{x}$ = 6 µm, n = 30), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.68 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (2–25 per fascicle), geniculate, unbranched, 33–55 × 3–4.2 µm ($\bar{x}$ = 41.9 × 3.3 µm, n = 30), 1–2-septate, slightly constricted at the septa, distance between septa 7–27.6 µm long ($\bar{x}$ = 15.4 µm, n = 30), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.5–0.8 µm ($\bar{x}$ = 0.58 µm, n = 30), smooth. Conidiogenous cells terminal, 18–27 × 3–3.6 µm ($\bar{x}$ = 24 × 3.4 µm, n = 14), obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 50–87 × 3.6–4.2 µm ($\bar{x}$ = 61.65 × 3.75 µm, n = 15), 3–5-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.45 µm, n = 15), smooth, tip subacute, base truncate, hilla 0.5–2 µm wide ($\bar{x}$ = 1.2 µm, n = 15).

Hosts – *Polygonum barbatum* L., *P. hydropiper* L., *P. pulchrum* Blume (Polygonaceae).

Distribution – **Asia:** China, India, Laos, Taiwan.

Material examined – Oudomxay Province, Ngoi District, Ngoi Village, on leaves of *Polygonum pulchrum*, 24 June 2010, P. Phengsintham (P599). GenBank accession no (LSU, KC677936).

Notes – The collection from Laos agrees with the description of *Pseudocercospora polygonicola* published by Hiseh & Goh (1990) [conidiophores 25–40 × 3–4 µm and conidia 40–100 × 3–4.5 µm], but the collection from Laos has slightly geniculate conidiophores.

Literature – Hsieh & Goh (1990: 270), Guo & Hsieh (1995: 255), Crous & Braun (2003: 332).

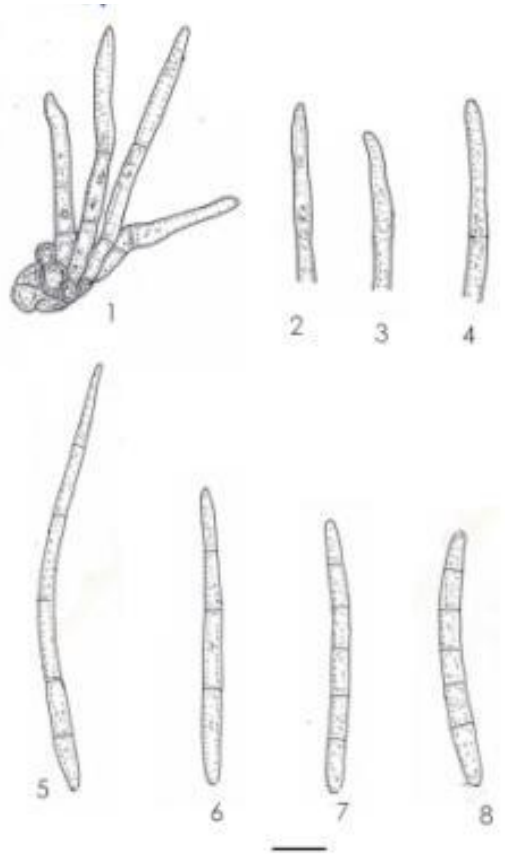

Fig. 126 – *Pseudocercospora polygonicola* on *Polygonum pulchrum*: 1. Stroma with attached conidiophores. 2–4. Conidiophores. 5–8. Conidia. Bar = 10 µm.

(64) *Pseudocercospora puerariicola* (W. Yamam.) Deighton, Mycol. Pap. 140: 151, 1976. Figs 128–129.

≡ *Cercospora puerariicola* W. Yamam., Trans. Sapporo Nat. Hist. Soc. 13: 142, 1934.

Leaf spots circular to irregular, 1–6 mm diam., grey-brown to medium brown in the centre, and with brown to dark-brown margin. Caespituli amphigenous, scattered. Mycelium internal; hyphae branched, 2–4 µm wide ($\bar{x}$ = 2.93 µm, n = 14), septate, constricted at the septa, distance between septa

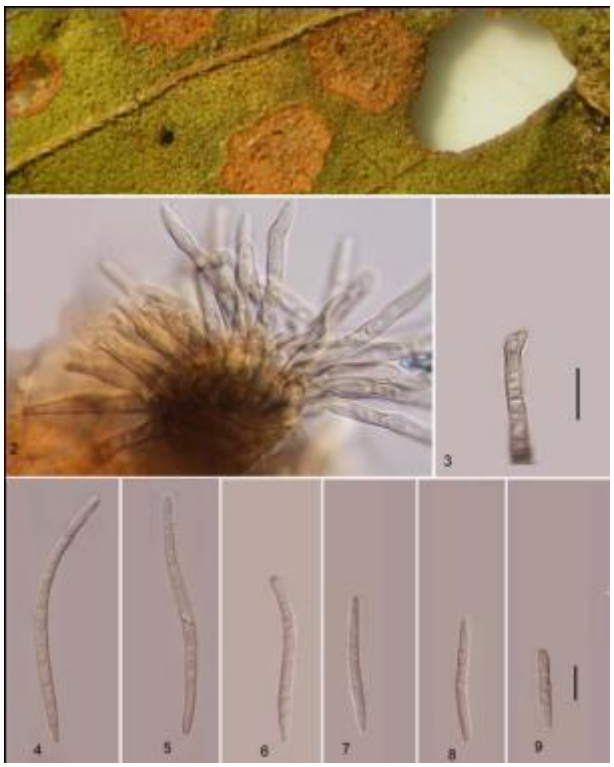

Fig. 127 – *Pseudocercospora polygonicola* on *Polygonum pulchrum* from leaf spots: 1. Lesions on host leaf (lower surface). 2. Stroma with attached conidiophores. 3. Conidiophore. 4–9. Conidia. Bars = 10 µm.

4–14 µm ($\bar{x}$ = 9.14 µm, n = 14), subhyaline or hyaline, wall 0.3–0.8 µm wide ($\bar{x}$ = 0.5 µm, n = 14), smooth. Stromata well developed, substomatal, subglobular, 10–40 µm diam. ($\bar{x}$ = 23.57 µm, n = 10), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 4–10 µm wide ($\bar{x}$ = 5.6 µm, n = 30), dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.78 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (4–30 per fascicle), erect, straight or curved, branched, 9–30 × 3–5 µm ($\bar{x}$ = 20 × 3.8 µm, n = 30), 0–3-septate, distance between septa 5–20 µm ($\bar{x}$ = 9.43 µm, n = 30), pale to moderately olivaceous brown, paler and narrower towards the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.51 µm, n = 30), smooth. Conidiogenous cells integrated, obtuse to subacute, 6–20 × 3–4 µm ($\bar{x}$ = 11.8 × 3.4 µm, n = 30), pale olivaceous or brown; conidiogenous loci inconspicuous. Conidia solitary, cylindrical to cylindrical-obclavate, straight to moderately curved, 6–82 × 2–3 µm ($\bar{x}$ = 53.97 × 2.85 µm, n = 30), 1–6-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.47 µm, n = 30), smooth, rounded to obtuse at the apex, with long obconic to truncate base, 1–2 µm wde ($\bar{x}$ = 1.87 µm, n = 30), wall 0.3–0.5 µm ($\bar{x}$ = 0.43 µm, n = 30) thick.

Colonies on PDA after 3 weeks at 25 °C grey-brown, spreading surface ridged and smooth, 3–5 mm diam., hyphae 1–2 µm wide ($\bar{x}$ = 1.53 µm, n = 30), septate, constricted at the septa, distance between septa 6–18 µm ($\bar{x}$ = 10.8 µm, n = 30), subhyaline to greenish brown, wall 0.2–0.25 µm wide ($\bar{x}$ = 0.22 µm, n = 30), smooth. Conidia not formed in culture.

Hosts – *Pueraria javanica* (Benth.) Benth., *P. lobata* (Willd.) Ohwi, *P. phaseoloides* (Roxb.) Benth., *P. thunbergiana* Benth, *P. tonkinensis* Gagnep. (Fabaceae).

Distribution – **Asia:** Cambodia, China, Hong Kong, Indonesia, Japan, Korea, Laos, Malaysia, Philippines, Singapore, Taiwan; **North America:** USA (AL, FL, GA, MS, NC).

Material examined – Vientiane Capital, Xaythany District, Nakhae Village, on leaves of *Pueraria phaseoloides*, 11 May 2006, P. Phengsintham (P44). GenBank accession no (ITS, KC731556; LSU, KC731562).

Notes – The collection from Laos is similar to the description of *Pseudocercospora puerariicola* published by Hsieh & Goh (1990) [conidiophores 20–70 × 3–4.5 µm and conidia 20–64 × 3–4.5 µm].

Literature – Chupp (1954: 327), Hsieh & Goh (1990: 199), Guo & Hsieh (1995: 178), Crous & Braun (2003: 341).

(65) *Pseudocercospora sphaerellae-eugeniae* (Sacc.) Crous, Alfenas & R.W. Barreto, Mycotaxon 64: 425, 1997 Figs 130–131.

≡ *Cercosporina sphaerellae-eugeniae* Sacc., Syll. Fung. 25: 912, 1931.

= *Cercospora eugeniae* Sawada, Rep. Gov. Agric. Res. Inst. Taiwan 85: 104, 1943.

= *Cercospora eugeniae* Chupp, Bol. Soc. Brasil. Argron. 8: 25, 1945.

= *Cercospora eugeniae* Chupp, A monograph of the fungus genus *Cercospora*: 406, 1954.

= *Cercospora eugeniae* Puckdeedindan, Techn. Bull. Depart. Agric. (Bangkok) 7: 6, 1966.

= *Cercospora eugeniae* Chantarasrikul & Puckdeedinnan, Tech. Doc. Pl. Protect.

Committee SE Asia Pacific Region: 72: 15, 1969.

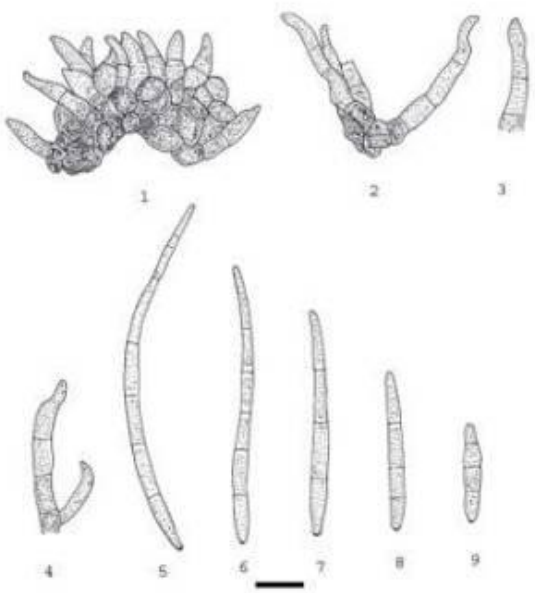

Fig. 128 – *Pseudocercospora puerariicola* on *Pueraria phaseoloides*: 1–2. Stromata with attached conidiophores. 3–4. Conidiophores. 5–9. Conidia. Bar = 10 µm.

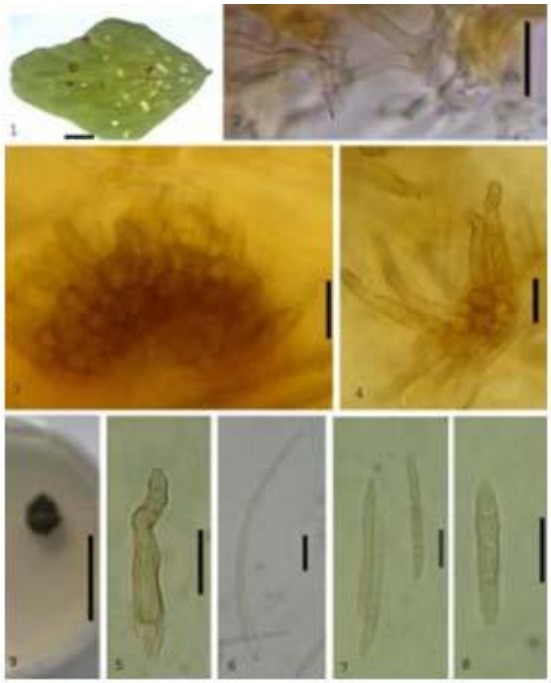

Fig. 129 – *Pseudocercospora puerariicola* on *Pueraria phaseoloides* from leaf spots: 1. Lesions on host leaf (upper surface). 2. Internal hyphae. 3–4. Stromata with attached conidiophores. 5. Conidiophore. 6–8. Conidia. 9. Culture. Bars 1, 9 = 10 mm, 2–8 = 10 µm.

Leaf spots circular to irregular, 2–10 mm diam., red or dark red in the centre, and with reddish margin. Caespituli amphigenous. Mycelium internal, inconspicuous. Stromata oval or ellipsoidal, 8–40 µm diam. ($\bar{x}$ = 25 µm, n = 11), dark brown, stromatal cells angular in outline, 2–4 µm wide ($\bar{x}$ = 3 µm, n = 14), wall 0.3–0.5 µm ($\bar{x}$ = 0.38 µm, n = 14), smooth. Conidiophores fasciculate, arising from stromata (1–5 per fascicle), emerging through stomata, unbranched, geniculate, mostly short, cylindrical, 8–24 × 3–6 µm ($\bar{x}$ = 14.8 × 4 µm, n = 13), 0–2-septate, distance between septa 4–10 µm ($\bar{x}$ = 7.4 µm, n = 9), uniformly pale to medium olivaceous-brown, wall 0.3–0.8 µm wide ($\bar{x}$ = 0.37 µm, n = 8), smooth. Conidiogenous cells integrated, terminal, cylindrical, 4–10 × 2–4 µm ($\bar{x}$ = 7.5 × 3 µm, n = 4); conidiogenous loci small, at the apex, conspicuous, ovoid to oval, 1–2 µm ($\bar{x}$ = 1.5 µm, n = 5), slightly thickened, but distinctly darkened, wall 0.5 µm wide ($\bar{x}$ = 0.5 µm, n = 5). Conidia solitary, obclavate or cylindrical, straight to curved, 5–78 × 2–3 µm ($\bar{x}$ = 30.87 × 2.35 µm, n = 30), 0–6-septate, pale olivaceous brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.35 µm, n = 12), smooth, tip subobtuse, base obconically truncate, hila 0.5–1.5 µm wide ($\bar{x}$ = 1.08 µm, n = 8), wall 0.3–0.6 µm ($\bar{x}$ = 0.53 µm, n = 8), unthickened and not darkened.

Colonies on PDA after 3 weeks at 25 °C with dark green in the centre, and green-grey to dark green at the margin, reaching 4 mm diam.

Hosts – *Eugenia jambolana* Lam., *E. jambos* L., *E. javanica* Lam., *E. uniflora* L., *Syzygium cumini* (L.) Skeels, *S. samarangense* Merr. & Perry (Myrtaceae).

Distribution – **Asia:** China, India, Iran, Laos, Taiwan, Thailand; **North America and West Indies:** Bermuda, Panama, USA (FL); **South America:** Brazil,

Material examined – Vientiane Capital, Xaythany District, Nakhae Village, dry dipterocarp forest, on leaves of *Syzygium cuminii*, 29 June 2006, P. Phengsintham (P111); ibid., Nakhae Village, 9 December 2008, P. Phengsintham (P383). GenBank accession no (ITS, KC731558).

Notes – The collections from Laos differ to the description of *Pseudocercospora sphaerellae-eugeniae* in Hsieh & Goh and Chupp (1954) by the dark red colour of leaf

spots, but the species described in Chupp (1954) is uniform brown or purple border.

Literature – Chupp (1954: 406), Vesudeva (1963: 104), Hsieh & Goh (1990: 245).

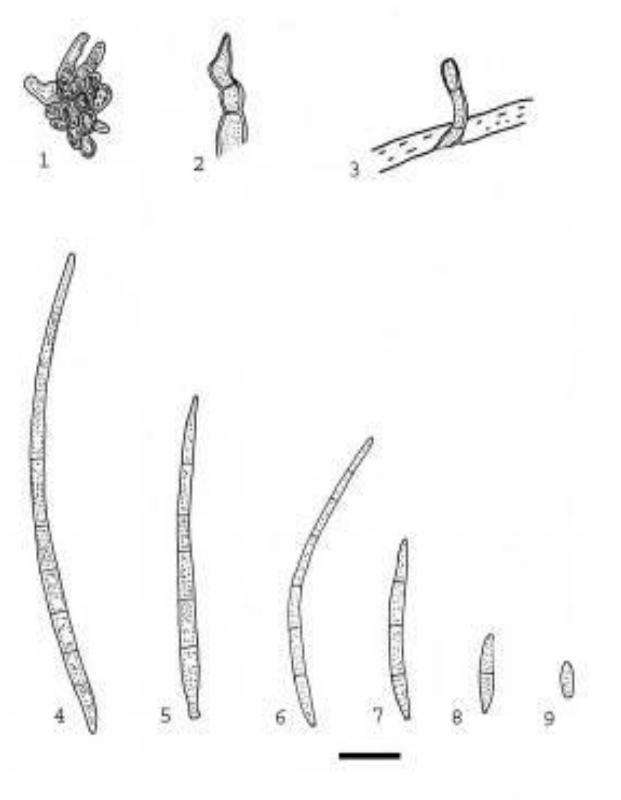

Fig. 130 – *Pseudocercospora sphaerellae-eugeniae* on *Syzygium cuminii*: 1. Stroma with Conidiophores. 2–3. Conidiophores. 4–9. Conidia. Bar = 5 µm.

(66) ***Pseudocercospora stahlii*** (F. Stevens) Deighton, Mycol. Pap. 140: 82, 1976. Figs 132–133.

≡ *Helminthosporium stahlii* F. Stevens. Trans. Illinois Acad. Sci. 10: 208, 1917.

≡ *Cercospora stahlii* (F. Stevens.) Subram., J. Indian Bot. Soc. 35: 460, 1956.

≡ *Helicomina stahlii* (F. Stevens) M.B. Ellis, More dematiaceous hyphomycetes: 178, 1976.

= *Cercospora passiflorae-foetidae* J.M. Yen, Rev. Mycol. 29: 228, 1964.

= *Cercospora passiflorae-longipedis* J.M. Yen, Bull. Trimestriel Soc. Mycol. France 90: 44, 1974.

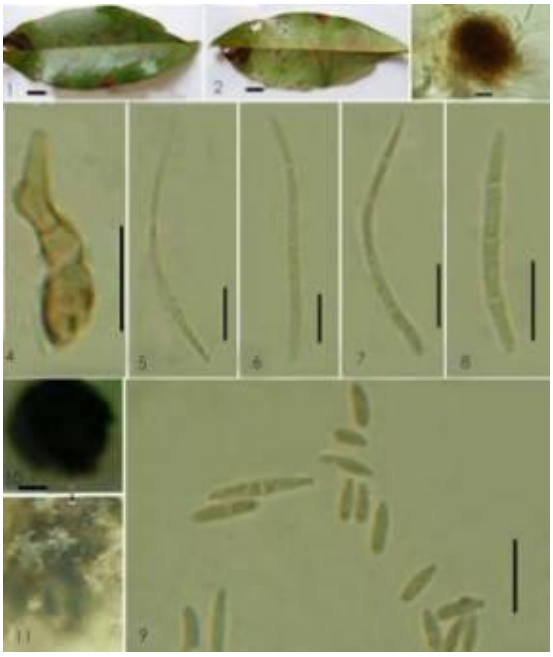

Fig. 130 – *Pseudocercospora sphaerellae-eugeniae* from *Syzygium cuminii* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stroma. 4. Conidiophore. 5–9. Conidia. 10–11. Culture. Bars: 1–2, 10 = 10 mm, 3–9 = 10 µm.

Leaf spots merely indistinct or irregular, 3–10 mm diam., olivaceous-grey in the centre, margin yellow on upper surface and dark brown or black patches on the lower surface. Caespituli amphigenous, scattered, dense, but more abundant on the lower surface. Mycelium internal; hyphae 1–4 µm wide ($\bar{x}$ = 2.2 µm, n = 15), septate, constricted at the septa, distance between septa 3–14 µm ($\bar{x}$ = 8.8 µm, n = 15), hyaline or subhyaline, wall 0.25–0.3 µm wide ($\bar{x}$ = 0.26 µm, n = 15), smooth. Stromata substomatal, oval or ellipsoidal, 5–19 µm diam. ($\bar{x}$ = 11.28 µm, n = 8), stromatal cells oval, angular, 3–6 µm diam. ($\bar{x}$ = 4.50 µm, n = 30), wall 0.6–1 µm wide ($\bar{x}$ = 0.77 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (4–11 per fascicle), emerging through stomata, almost straight or slightly sinuous, geniculate, branched, 23–157 × 3–6 µm ($\bar{x}$ = 102 × 4.69 µm, n = 30), 1–7-septate, constricted at the septa, distance between septa 10–29 µm ($\bar{x}$ = 18.3 µm, n = 30), yellowish olivaceous to olivaceous brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.75 µm, n = 30), smooth. Conidiogenous cells integrated, terminal or lateral, 12–33 × 4–5 µm

($\bar{x}$ = 22.3 × 4.43 µm, n = 30), brownish; conidiogenous loci small, short tapered towards an apical conidiogenous locus, which is later displaced to remain visible as a short lateral peg, 1–1.5 µm wide. Conidia solitary, mostly clavate or cylindrical, 14–46 × 3–7 µm ($\bar{x}$ = 28 × 5 µm, n = 30), 1–5-septate, sometimes slightly constricted at the septa, concolorous with the conidiophores, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.73 µm, n = 30), smooth, apex broadly rounded, based apiculate with a truncate hilum.

Colonies on PDA after 3 weeks at 25 °C black grey, reaching 4 mm diam., hyphae 2–7 µm wide, septate, constricted at the septa, distances between septa 5–29 µm, occasionally with a nodulose swellings, up to 7 µm wide, brown, wall smooth, short tapered towards a truncate apex which is later displaced to remain visible as a short lateral peg, 1–1.5 µm wide. Conidia solitary, 15–32 × 4–6 µm, brownish, wall smooth.

Hosts – *Passiflora foetida* L., *P. quadrangularis* L. (Passifloraceae).

Distribution – **Africa:** Gabon, Ivory Coast; **Asia:** Brunei, India, Laos, Malaysia, Myanmar, Sabah, Singapore, Taiwan, Thailand; **North America and West Indies:** Puerto Rico, Trinidad and Tobago; **Oceania:** American Samoa, Australia, Fiji, Micronesia, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Vanuatu.

Material examined – Vientiane Capital, Xaythany District, Nakhae Village, on leaves of *Passiflora foetida*, 23 April 2006, P. Phengsintham (P20).

Notes – There is no difference in the size of conidia formed in vivo or in vitro (Crous & Braun 2003).

Literature – Deighton (1976: 82), Ellis (1976: 178), Hsieh & Goh (1990: 260), Crous & Braun (2003: 386).

(67) ***Pseudocercospora stizolobii*** (Syd. & P. Syd.) Deighton, Mycol. Pap. 140: 153, 1976. Figs 134–135.

≡ *Cercospora stizolobii* Syd. & P. Syd., Ann. Mycol. 11: 270, 1913.

= *Cercospora lussoniensis* Sacc., Ann. Mycol. 12: 314, 1914.

= *Cercospora mucunae-capitatae* Sawada, Rep. Gov. Agric. Res. Inst. Taiwan 85: 116, 1943 (nom.inval.).

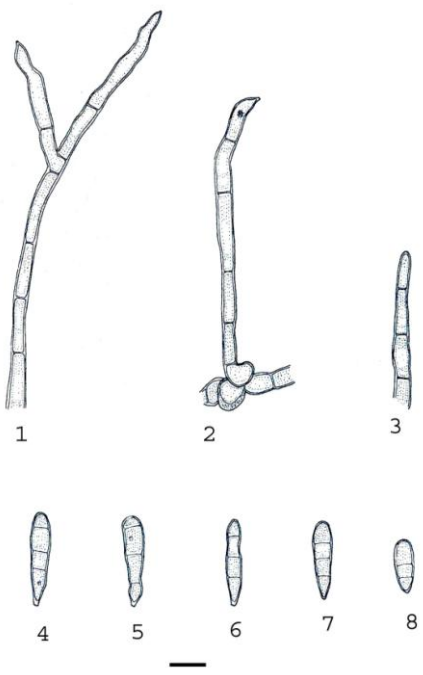

Fig. 132 – *Pseudocercospora stahlii* on *Passiflora foetida*: 1. Conidiophore. 2. Stroma with attached conidiophores. 5. Apex of conidiophore. 4–8. Conidia. Bar = 10 µm.

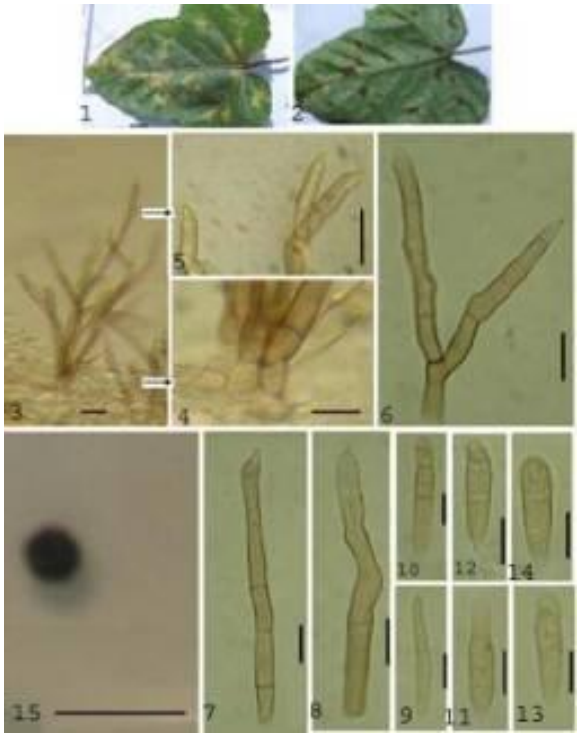

Fig. 133 – *Pseudocercospora stahlii* on *Passiflora foetida*: 1–2 Lesions on host leaves (1. upper surface and 2. lower surface). 3. Conidiophores. 4. Stroma with attached conidiophores. 5. Apex of conidiophores. 6–8. Conidiophores. 9–14. Conidia. 15. Culture. Bars 1–2, 15 = 10 mm, 3–14 = 10 µm.

Leaf spots indistinct or distinct, orbicular or vein-limited and angular to irregular, 1–6 mm diam., at first yellowish or pale brown, later becoming dark brown or reddish, and sometimes with grey center with a darker margin; Caespituli amphigenous; stromata small, dark brown. Mycelium internal, inconspicuous. Stromata oval to ellipsoidal, 20–50 µm diam. ($\bar{x}$ = 30 µm, n = 5), brown to dark brown, stromatal cells oval, ellipsoidal and angular, 5–7 µm wide ($\bar{x}$ = 5.8 µm, n = 30), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.58 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (2–11 per fascicle), slightly geniculate, unbranched, 50–118 × 3–4 µm ($\bar{x}$ = 85.5 × 3.9 µm, n = 30), 3–7-septate, constricted at the septa, distance between septa 6–35 µm long ($\bar{x}$ = 16 µm, n = 30), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.5–1 µm ($\bar{x}$ = 0.61 µm, n = 30), smooth. Conidiogenous cells terminal, 14–18 × 3–4 µm ($\bar{x}$ = 15.5 × 3.67 µm, n = 7), apex obtuse; conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, cylindrical-obclavate, straight to slightly curved, 17–64 × 4–5 µm ($\bar{x}$ = 46.5 × 4.6 µm, n = 30), 1–7-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.48 µm, n = 30), smooth; apex subacute; base obconically truncate, hila 1–3 µm wide ($\bar{x}$ = 2.08 µm, n = 30).

Hosts – *Mucuna aterrima* (Piper & Tracy) Holland, *M. capitata* Wight & Arn., *M. cochinchinensis* (Lour.) A. Chev., *M. deeringiana* (Bort) Hanelt, *M. ferruginea* Matsum., *M. nivea* (Roxb.) DC. ex Wight & Arn., *M. pruriens* (L.) DC., *M. prurita* Wight, *M. urens* (L.) Medik., *Mucuna* sp., *Stizolobium* sp. (Fabaceae).

Distribution – **Africa:** Gabon, Ghana, Malawi, Nigeria, Sierra Leone, South Africa, Togo, Zambia, Zimbabwe; **Asia:** Cambodia, China, Hong Kong, India, Japan, Java Laos, Nepal, Philippines, Taiwan, Thailand; **North America and West Indies:** Barbados, Cuba, Guatemala, Haiti, Jamaica, Panama, Puerto Rico, Saint Vincent and the Grenadines, Trinidad and Tobago, USA (FL, MS, NC), Virgin Islands; **Oceania:** Australia, Fiji, Papua New Guinea; **South America:** Brazil, Columbia, Guyana, Venezuela.

Material examined – Luang Namtha Province, Luang Namtha District, Chaleunsouk Village, fallow forest, on leaves of *Mucuna pruriens*, 19 February 2010, P. Phengsintham (P565).

Notes – The collection from Laos agrees well with *Pseudocercospora stizolobii* described by Chupp (1954).

Literature – Saccado (1931: 882), Chupp (1954: 298), Vasudeva (1963: 198), Deighton (1976: 153), Ellis (1976: 270), Hsieh & Goh (1990: 203), Hsieh & Goh (1990: 203), Guo & Hsieh (1995: 182), Crous & Braun (2003: 389).

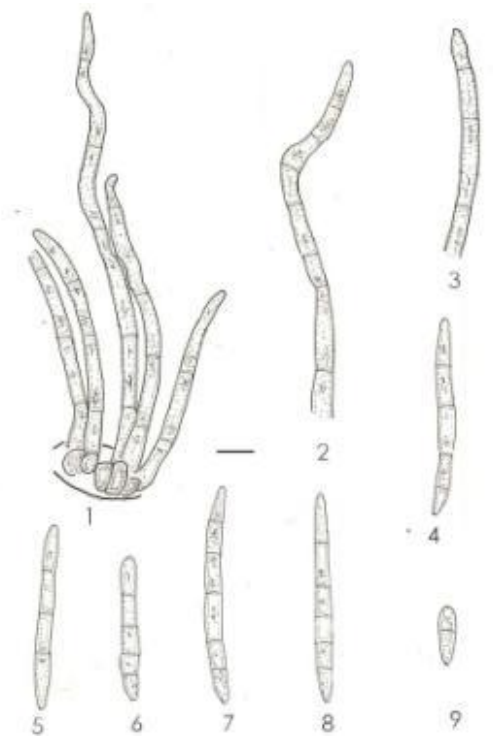

Fig. 134 – *Pseudocercospora stizolobii* on *Mucuna pruriens*: 1. Stroma with attached conidiophores. 2–3. Conidiophores. 4–9. Conidia. Bar = 10 µm.

(68) *Pseudocercospora tabernaemontanae* (Syd. & P. Syd.) Deighton, Mycol. Pap. 140: 154, 1976. Figs 136–137.

≡ *Cercospora tabernaemontanae* Syd. & P. Syd., Philipp. J. Sci. (Bot.) 8: 507, 1913.

= *Cercospora tabernaemontanae* Thirum. & Govindu, Sydowia 7: 45, 1953.

= *Cercospora ervataniae* J.M. Yen & Lim, Bull. Trimestestriel Soc. Mycol. France 86: 745, 1971.

≡ *Pseudocercospora ervataniae* (J.M. Yen & Lim) J.M. Yen, Gard. Bull., Singapore 33: 175, 1980.

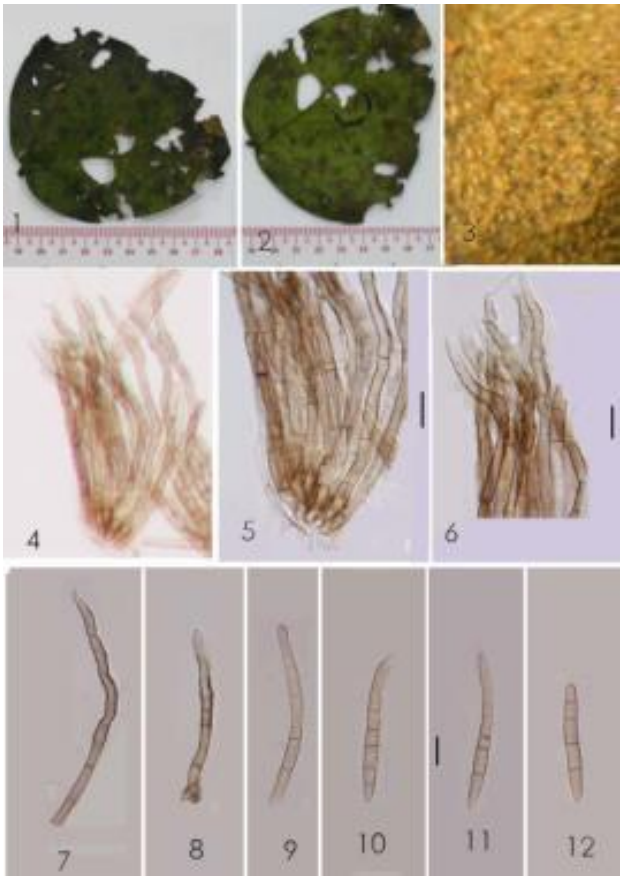

Fig. 135 – *Pseudocercospora stizolobii* on *Mucuna pruriens*: 1. Lesions on host leaves (1. upper surface. 2. Lower surface). 3. Caespituli. 4–5. Stromata with attached conidiophores. 7–8. Conidiophores. 9–12. Conidia. Bars 1–2 = 10 mm, 4–12 = 10 µm.

Leaf spots circular to irregular, 3–15 mm diam., brown or dark brown in the centre, and with yellow or yellow-grey margin. Caespituli amphigenous. Mycelium internal and external not seen. Stromata globose to elongated, 15–70 µm diam. ($\bar{x}$ = 42 µm, n = 12), dark brown, stromatal cells angular in outline, 3–7 µm wide ($\bar{x}$ = 5 µm, n = 22), wall 0.8–1 µm ($\bar{x}$ = 0.85 µm, n = 22), smooth. Conidiophores solitary or fasciculate, dense to very dense, arising from stromata (2–25 per fascicle or more), emerging through stomata, unbranched, rarely geniculate, mostly short, cylindrical, 7–17 × 2–5 µm ($\bar{x}$ = 13 × 4 µm, n = 5), 0–1-septate, distance between septa 4–11 µm ($\bar{x}$ = 7.3 µm, n = 3), pale to medium olivaceous-brown, wall 0.3–0.8 µm wide ($\bar{x}$ = 0.37 µm, n = 8), smooth. Conidiogenous cells terminal, cylindrical, 7–13 × 3–5 µm ($\bar{x}$ = 9.3 × 3.6 µm, n = 4), wall 0.5–0.8 µm wide ($\bar{x}$ = 0.6 µm, n = 5), conically rounded or subtruncate at the apex; conidiogenous loci inconspicuous. Conidia solitary, cylindrical-obclavate to obclavate, straight to curved, 15–77 × 2–4 µm ($\bar{x}$ = 36.25 × 3.25 µm, n = 24), 0–5-septate, pale olivaceous brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.33 µm, n = 24), smooth, tip conic to subobtuse, base obconically truncate, hila 1.5–2 µm wide ($\bar{x}$ = 1.9 µm, n = 10), wall 0.5–1 µm ($\bar{x}$ = 0.67 µm, n = 10), slightly darkened.

Colonies on PDA after 3 weeks at room temperature 25 °C white-grey to grey, spreading surface, 12 mm in diam.

Hosts – *Tabernaemontana coronaria* (Jacq.) Willd., *T. heyneana* Wall., *T. pandacaque* Lam. (Apocynaceae).

Distribution – **Asia:** India, Laos, Malaysia, Myanmar, Pakistan, Philippines, Sabah, Singapore, Taiwan.

Material examined – Vientiane Capital, Xaythany District, Xay Village, on leaves of *Tabernaemontana coronaria*, 25 July 2006, P. Phengsintham (P107); Don Noune Village, on leaves of *T. coronaria*, 12 June 2008, P. Phengsintham (P319). GenBank accession no (ITS, KC677911).

Notes – The collections from Laos have shorter conidiophores than those described in Hsieh & Goh (1990) [conidiophores 10–45 × 2–4 µm and conidia 30–90 × 3–4.5 µm] and Chupp (1954) [conidiophores 10–35 × 2–4 µm and conidia 15–65 × 2–3.5 µm].

Literature – Saccado (1931: 896), Chupp (1954: 50), Vesudeva (1963: 192), Hsieh & Goh (1990: 26), Guo & Hsieh (1995: 19), Guo et al. (1998: 31), Crous & Braun (2003: 395).

(69) *Pseudocercospora tectonae* sp. nov.

Figs 138–139.

MycoBank, MB 801729

Distinct from Pseudocercospora tectonicola by its much shorter, narrower, 0–1-septate conidiophores, 5–20 × 3–4 µm and much narrower, 2–5-septate conidia 35–63 × 3–4 µm. Furthermore, distinct leaf spots are developed and the stromata are larger, 25–40 µm diam.

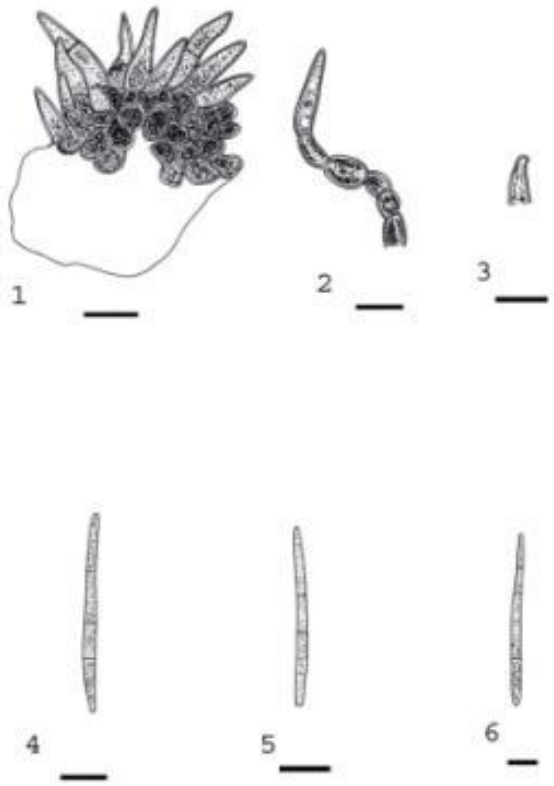

Fig. 136 – *Pseudocercospora tabernaemontanae* on *Tabernaemontana coronaria*: 1. Stroma with Conidiophores. 2. Stromatal cells with Conidiophore. 3. Conidiophore. 4–6. Conidia. Bars = 5 µm.

Leaf spots subcircular to irregular, 1–25 mm diam. ($\bar{x}$ = 11.3 µm, n = 6), at first yellowish, later becoming brown to dark brown, dark brown and yellowish at the margin. Caespituli hypophyllous, inconspicuous. Mycelium internal, inconspicuous. Stromata well-developed, oval to ellipsoidal, 25–40 µm diam. ($\bar{x}$ = 31.7 µm, n = 4), brown to dark brown, stromatal cells oval, ellipsoidal and angular, 3–5 µm wide ($\bar{x}$ = 4 µm, n = 9), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.6 µm, n = 9), smooth. Conidiophores fasciculate, arising from stromata (3–7 per fascicle), emerging through stomata, unbranched, 5–20 × 3–4 µm ($\bar{x}$ = 11.9 × 3.56 µm, n = 9), 0–1-septate, constricted at the septa, distance between septa 5–11 µm long ($\bar{x}$ = 8.23 µm, n = 13), uniformly pale to medium brown, much paler and more narrow toward the tip, wall 0.3–0.5 µm ($\bar{x}$ = 0.43 µm, n = 13), smooth. Conidiogenous cells terminal, 5–10 × 2.5–4 µm ($\bar{x}$ = 7.89 × 3.28 µm, n = 9), apex obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, obclavate-cylindrical, straight to slightly curved, 35–63 × 3–4 µm ($\bar{x}$ = 51.75 × 3.25 µm, n = 4), 2–5-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.4 µm, n = 4), smooth, tip rounded, base obconically truncate, hila 1.5–2 µm wide ($\bar{x}$ = 1.8 µm, n = 4).

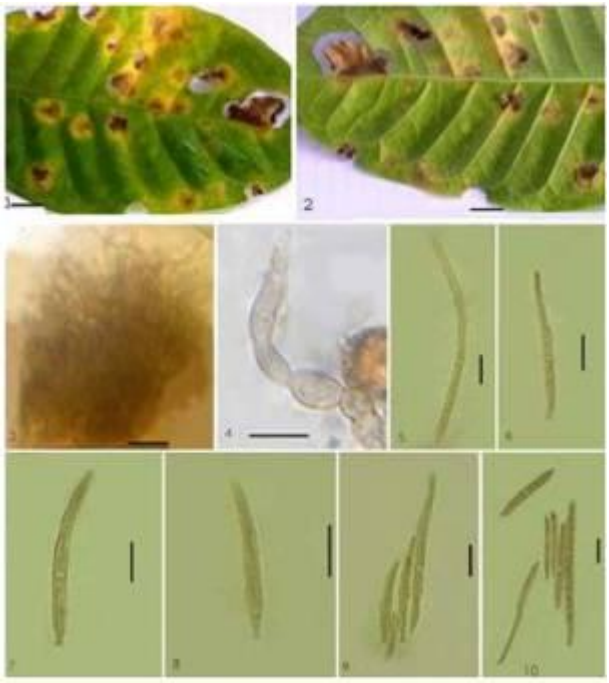

Fig. 137 – *Pseudocercospora tabernaemontanae* on *Tabernaemontana coronaria* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stroma with attached Conidiophores. 4. Stromatal cells with attached conidiophore. 5–10. Conidia. Bars 1–2 = 10 mm, 3–10 = 10 µm.

Hosts – *Tectona grandis* L. f. (Verbenaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Nong Viengkham Village, on leaves of *Tectona grandis*, 10 August 2006, P. Phengsintham (P138, MFLU12-2204, **Holotype**).

Notes – *Pseudocercospora tectonicola* J.M. Yen, A.K. Kar & B.K. Das (Yen et al. 1982), the only other *Pseudocercospora* species on *Tectona*, is distinct from *P. tectonae* and has smaller stromata (lacking or up to 20 µm diam.), very long and broad conidiophores 36–120 × 5.5–8 µm, much broader conidia, 30–100 × 6.5–8 µm, with up to 9 septa. In addition, leaf spots are lacking in *P. tectonicola*.

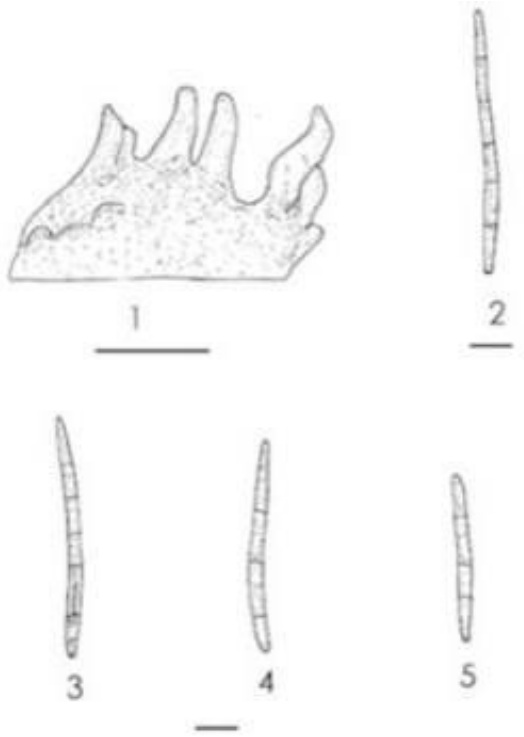

Fig. 138 – *Pseudocercospora tectonae* on *Tectona grandis*: 1. Stroma with attached conidiophores. 2–5. Conidia. Bars = 10 µm.

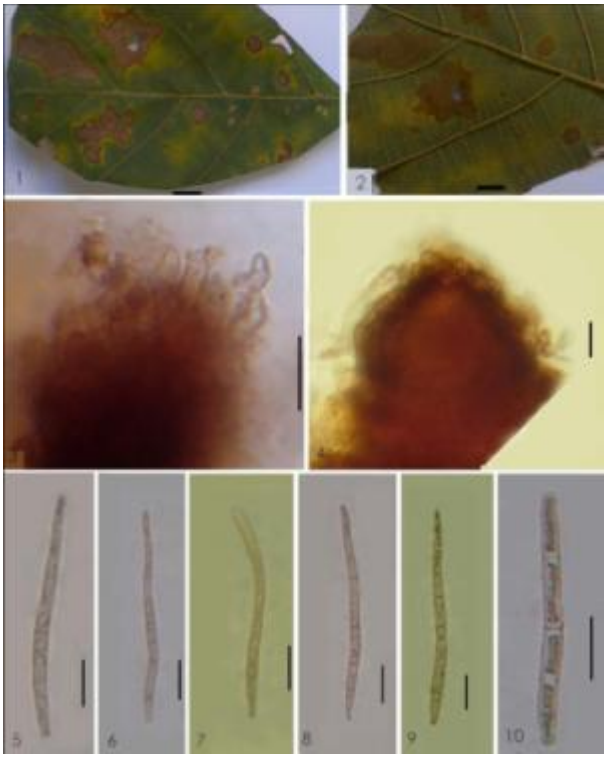

Fig. 139 – *Pseudocercospora tectonae* on *Tectona grandis* from leaf spots: 1–2. Lesions on host leaves (1. upper surface and 2. lower surface). 3–4. Stromata with attached conidiophores. 5–10. Conidia. Bars 1–2 = 10 mm, 3–10 = 10 µm.

(70) *Pseudocercospora tetramelis* A.N. Shukla & Sarmah, Curr. Sci. 53(4): 204, 1984. Figs 140–141.

Leaf spots circular to irregular, 1–5 mm diam., brown to dark brown in the centre, with a brown to brown-greenish margin. Caespituli hypophyllous, scattered. Mycelium internal; hyphae branched, 2–4 µm wide ($\bar{x}$ = 2.85 µm, n = 28), septate, constricted at the septa, distance between septa 2–17 µm ($\bar{x}$ = 10.21 µm, n = 28), brown to subhyaline, wall smooth. Stromata more developed, sub-stomatal, subglobular, 10–45 µm diam. ($\bar{x}$ = 26.9 µm, n = 10), brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 3–10 µm wide ($\bar{x}$ = 6.3 µm, n = 30), dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.7 µm, n = 30), smooth. Conidiophores solitary or fasciculate, arising from stromata (2–14 per fascicle), erect, straight or curved, unbranched, 75–202 × 4–5 µm ($\bar{x}$ = 121 × 4.73 µm, n = 11), 3–8-septate, distance between septa 10–32 µm ($\bar{x}$ = 21.2 µm, n = 30), pale to moderately olivaceous-brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.58 µm, n = 30), smooth. Conidiogenous cells integrated, subtruncate, cicatrized, 12–30 × 3–5 µm ($\bar{x}$ = 19.3 × 4.36 µm, n = 11), pale olivaceous or brown; conidiogenous loci inconspicuous, 1–3 µm wide ($\bar{x}$ = 1.7 µm, n = 5), wall 0.5–0.8 µm wide ($\bar{x}$ = 0.56 µm, n = 5), smooth, unthickened and not darkened. Conidia solitary, obclavate, straight to moderately curved, 46–87 × 6–8 µm ($\bar{x}$ = 60.7 × 6.9 µm, n = 10), 3–8-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.48 µm, n = 10), smooth, bluntly rounded at the apex, with subtruncate base, basal hila 1.5–2 µm wide ($\bar{x}$ = 1.8 µm, n = 8), wall 0.3–0.5 µm ($\bar{x}$ = 0.47 µm, n = 8) thick.

Colonies on PDA after 3 weeks at 25°C grey, 1–2 mm diam., surface ridged and smooth, mycelium dark brown, hyphae 3–8 µm wide ($\bar{x}$ = 4.6 µm, n = 30), septate, constricted at the septa, distance between septa 7–30 µm long ($\bar{x}$ = 18 µm, n = 30), hyaline, wall 0.3–1 µm ($\bar{x}$ = 0.52 µm, n = 30) thick, smooth. Conidiophores not formed in culture. Conidia solitary, arising from apices of mycelium, obclavate, straight to moderately curved, 20–62 × 5–9 µm ($\bar{x}$ = 36.9 × 6.8 µm, n = 30), 1–4-septate, slightly constricted at the septa, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.46

µm, n = 30), smooth, bluntly rounded at the apex, with subtruncate base, basal hila 1.5–3 µm wide ($\bar{x}$ = 2.05 µm, n = 30), wall 0.3–0.5 µm ($\bar{x}$ = 0.48 µm, n = 30) thick.

Host – *Tetrameles nudiflora* R. Br. & Benn. (Datiscaceae).

Distribution – **Asia:** India, Laos.

Material examined – Vientiane Province, Home District, Pha En Village, mixed deciduous forest, on leaves of *Tetrameles nudiflora*, 18 November 2009, P. Phengsintham (P462). GenBank accession no (ITS, KC677938).

Notes – This is true intermediate between *Passalora* and *Pseudocercospora*. Such intermediate taxa are common in species with synnematous conidiomata. The conidiogenous cells are barely geniculate, rather subcylindrical. *Phaeoisariopsis griseola*, the type species of *Phaeoisariopsis*, has similar conidiogenous cells. This species is now placed in *Pseudocercospora* (confirmed by molecular studies). *Pseudocercospora tetramelis* has a similar range in conidiogenous loci from being unthickened, not darkened to slightly darkened-refractive or only the ultimate rim somewhat darkened. The hila of the conidia are all unthickened and not darkened. Hence it is preferable to assign this species to *Pseudocercospora* (as in the case of *Phaeoisariopsis griseola*).

Literature – Shukla & Sarmah (1984: 204), Crous & Braun (2003: 27).

(71) *Pseudocercospora tiliacorae* (A.K. Kar & M. Mandal) Deighton, Trans. Brit. Mycol. Soc. 88: 388, 1987. Figs 142–143.

≡ *Cercospora tiliacorae* A.K. Kar & M. Mandal, Trans. Brit. Mycol. Soc. 53: 353, 1969.

Leaf spots subcircular, 2–6 mm diam., with pale grey centre, and dark grey to dark brown margin. Caespituli amphigenous, inconspicuous. Mycelium internal; hyphae branched, 1–7 µm wide ($\bar{x}$ = 3.37 µm, n = 30), septate, constricted at the septa, distance between septa 5–20 µm ($\bar{x}$ = 12.13 µm, n = 30), brownish, subhyaline, wall 0.25–0.9 µm wide ($\bar{x}$ = 0.50 µm, n = 30), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata globular, subglobose to ellipsoidal, subglobose, 28–30 µm diam, brown

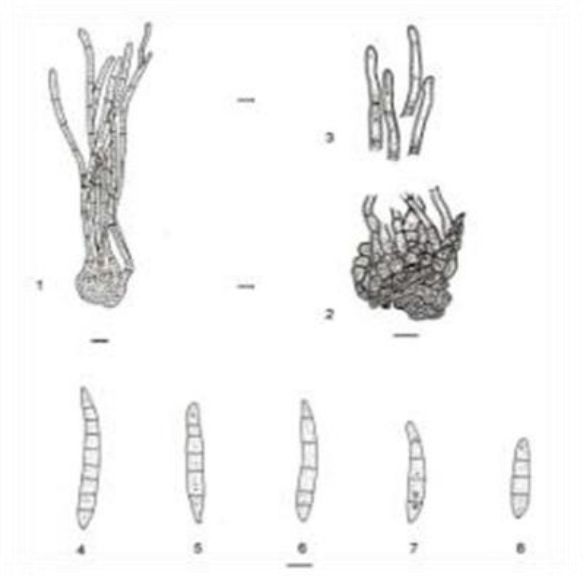

Fig. 140 – *Pseudocercospora tetramelis* on *Tetrameles nudiflora*: 1. Stroma with attached conidiophores. 2. Stroma. 3. Apices of Conidiophores. 4–8. Conidia. Bars = 10 µm.

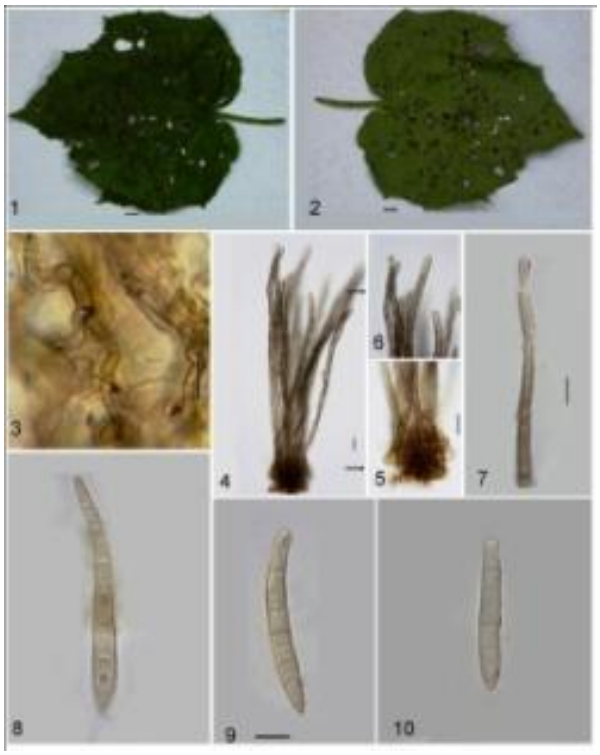

Fig. 141 – *Pseudocercospora tetramelis* on *Tetrameles nudiflora* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Internal mycelium. 4. Stroma with attached conidiophores. 5. Stroma. 6. Apices of conidiophores. 7. Conidiophore with attached conidium. 8–10. Conidia. Bars 1–2 = 10 mm, 3–10 = 10 µm.

to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 3–5 µm wide ($\bar{x}$ = 4.67 µm, n = 11), brownish or dark brown, wall 0.8–1 µm wide ($\bar{x}$ = 0.82 µm, n = 11), smooth. Conidiophores fasciculate, arising from stromata (up to 50 per fascicle), slightly geniculate, unbranched, 9–20 × 2–3 µm ($\bar{x}$ = 13.7 × 2.5 µm, n = 6), septate indistinctly, 0–1-septate, constricted at the septa, distance between septa 5–15 µm, uniformly pale to medium olivaceous brown, uniform in colour, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.43 µm, n = 6), smooth. Conidiogenous cells terminal, 15 × 2 µm, apex subobtuse to obtuse; conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, cylindrical-obclavate, obclavate, cylindrical, straight to slightly curved, 15–79 × 2–3 µm ($\bar{x}$ = 35.9 × 2.3 µm, n = 30), 1–5-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.45 µm, n = 30), smooth, tip subobtuse or obtuse, base subobconically truncate, hilum1.5 µm wide, wall of the hila 0.5 µm wide.

Colonies on PDA after 3 weeks at 25°C grey, reaching 9–15 mm diam., hyphae 1–7 µm wide ($\bar{x}$ = 3.37 µm, n = 30), septate, constricted at the septa, distance between septa 5–20 µm ($\bar{x}$ = 12.13 µm, n = 30), branched, breaking easily into parts, brownish or subhyaline, wall 0.25–0.9 µm wide ($\bar{x}$ = 0.50 µm, n = 30), smooth. Conidia obclavate, 12 × 3 µm, subhyaline, wall 0.3 µm wide, smooth.

Hosts – *Tiliacora acuminata* Miers, *T. triandra* Diels (Menispermaceae).

Distribution – **Asia:** India, Laos.

Material examined – Vientiane Capital, Xaythany District, Nong Viengkham Village, on leaves of *Tiliacora triandra*, 22 April 2006, P. Phengsintham (P16).

Notes – The collection from Laos differs from Indian type material in having shorter conidiophores and in being indistinctly, 0–1-septate (conidiophores in the Indian collection are longer and distinctly 0–8-septate).

Literature – Chupp (1954: 297), Kar & Madal (1969: 253), Crous & Braun (2003: 404).

(72) *Pseudocercospora trichophila* (F. Stevens) Deighton var. *punctata* U. Braun & Urtiaga, Mycosphere 3(3): 322, 2012. Figs 144, 145.

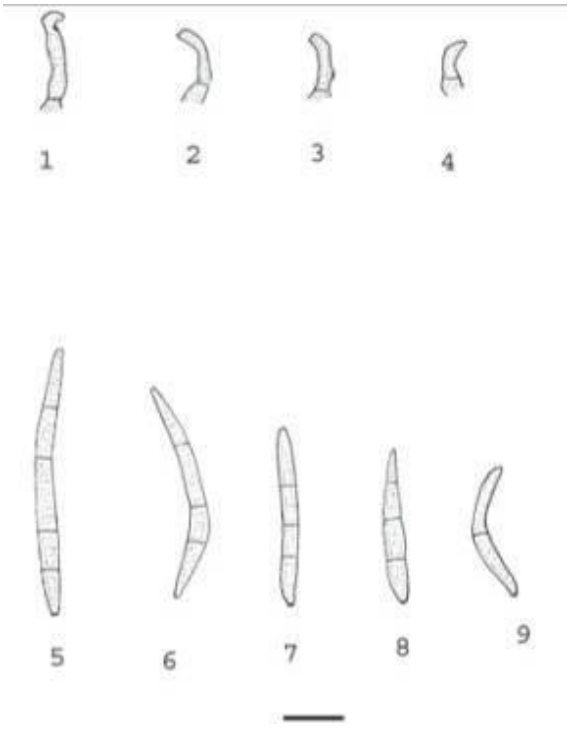

Fig. 142 – *Pseudocercospora tiliacorae* on *Tiliacora triandra*: 1–4. Conidiophores. 5–9. Conidia. Bar = 10 µm.

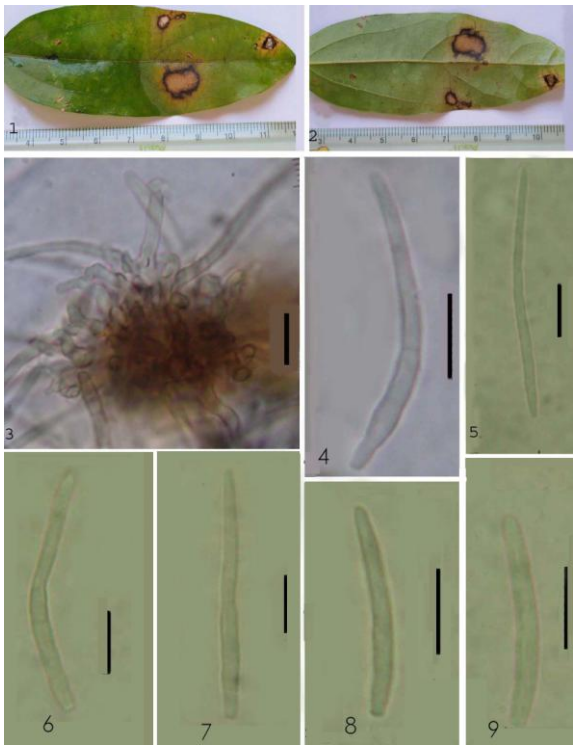

Fig. 143 – *Pseudocercospora tiliacorae* on *Tiliacora triandra*: 1–2 Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stroma with attached conidiophores. 4–9. Conidia. Bars 1–2 = 10 mm, 3–9 = 10 µm.

Leaf spots suborbicular or angular, 1–13 mm diam., pale brown or grey to brown in the centre, and with yellowish margin. Caespituli amphigenous, but chiefly hypophyllous. Mycelium external; hyphae branched, 2–4 µm wide ($\bar{x}$ = 2.25 µm, n = 30), septate, constricted at the septa, distance between septa 4–31 µm ($\bar{x}$ = 17.2 µm, n = 30), brownish, subhyaline, wall 0.3–0.8 µm wide ($\bar{x}$ = 0.4 µm, n = 17), smooth. Stromata developed, oval to ellipsoidal, 9–40 µm diam., stromatal cells oval, ellipsoidal to angular in outline, 2–4 µm wide, dark brown, wall 0.6 µm wide, smooth. Conidiophores fasciculate, arising from stromata (6–7 per fascicle), and secondary conidiophores borne on terminally and laterally on the external mycelial hyphae, very variable in length in one on the same hyphae, erect, straight or curved, branched, obtuse, 6–50 × 3–4 µm ($\bar{x}$ = 19.11 × 3.46 µm, n = 30), 0–3-septate, distance between septa 8–21 µm ($\bar{x}$ = 11.17 µm, n = 6), pale to medium brown; wall 0.50 µm wide, smooth. Conidiogenous cells integrated, 6–9 × 3–4 µm, pale olivaceous or brown, apex obtuse; conidiogenous loci inconspicuous. Conidia solitary, subcylindrical, slightly obclavate-cylindrical, or sometimes slightly clavate-cylindrical, substraight or slightly to strongly curved, 30–60 × 3–5 µm ($\bar{x}$ = 42.45 × 3.46 µm, n = 30), 1–6-septate, slightly note constricted at the septa, pale olivaceous, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.67 µm, n = 30), smooth, broadly rounded at the apex, the basal cell rounded at the base or more abruptly tapering towards the base, hilum 1–2 µm wide, wall 0.6–1 µm wide, unthickened, not darkened.

Colonies on PDA after 3 weeks at 25°C black-grey mycelium, reaching 2–3 mm diam., hyphae 1–7 µm wide ($\bar{x}$ = 3.37 µm, n = 30), septate, constricted at the septa, distance between septa 4–21 µm ($\bar{x}$ = 12.33 µm, n = 30), brownish or subhyaline, wall 0.25–0.9 µm ($\bar{x}$ = 0.43 µm, n = 30), smooth. Conidiogenous cells terminal, consists of swollen cells 5–6 µm wide; conidiogenous loci inconspicuous. Conidia solitary, subcylindrical, slightly obclavate-cylindrical, or sometimes slightly clavate-cylindrical, substraight or slightly or strongly curved, 11–84(–94) × 3–7 µm ($\bar{x}$ = 58.9 × 4.23 µm, n = 30), 1–6-septate, slightly or occasionally distinctly constricted at the septa, pale olivaceous, wall approximately 0.85 µm wide, smooth, broadly rounded at the apex, the basal cell rounded toward the base or more abruptly tapering towards the base.

Hosts – *Solanum aculeatissimum* Acq., *S. biflorum* Lour., *S. erianthum* D. Don, *S. ferox* L., *S. hirtum* Vahl, *S. jamaicensis* (L.) Vahl., *S. melongena* L., *S. nigrum* L., *S. torvum* Sw., *S. umbellatum* Mill., *S. undatum* Poir and *S. verbascifolium* L. (Solanaceae).

Distribution – **Asia:** Brunei, China, India, Laos, Malaysia, Sabah, Taiwan; **North America and West Indies:** Costa Rica, Cuba, Dominican Republic, Jamaica, Panama, Puerto Rico, Trinidad and Tobago, USA (FL), Virgin Islands; **Oceania:** Papua New Guinea, Solomon Islands; **South America:** Brazil, Columbia, Guyana, Venezuela.

Material examined – Vientiane Capital, Xaythany District, Xay Village, on leaves of *Solanum undatum*, 15 April 2006, P. Phengsintham (P07).

Notes – Deighton (1976) did not describe any stromata, but in the collection of *Pseudocercospora trichophila* from Laos small stromatic hyphal aggregations are developed. Such deviating collections with stromata have recently been described as *P. trichophila* var. *punctata* (Braun & Urtiaga 2012).

Literature – Braun & Urtiaga (2012: 301–329).

(73) ***Pseudocercospora wendlandiphila*** **sp.** nov. Figs 146–147. MycoBank, MB 801730

Superficially similar to Cercospora wendlandiae, but distinct by its pluriseptate conidiophores and longer, narrower and pigmented conidia.

Leaf spots subcircular to irregular, 1–15 mm diam., at first reddish, later becoming brown, brown to dark brown at the margin. Caespituli hypophyllous, conspicuous. Mycelium internal; hyphae branched, 2–3 µm wide ($\bar{x}$ = 2.5 µm, n = 7), septate, constricted at the septa, distance between septa 5–10 µm ($\bar{x}$ = 7 µm, n = 7), brownish, subhyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.45 µm, n = 7), smooth, forming plate-like plectenchymatous stromatic hyphal aggregations. Stromata oval to ellipsoidal, 15–40 µm diam. ($\bar{x}$ = 29.5 µm, n = 11), brown to dark brown, stromatal cells oval,

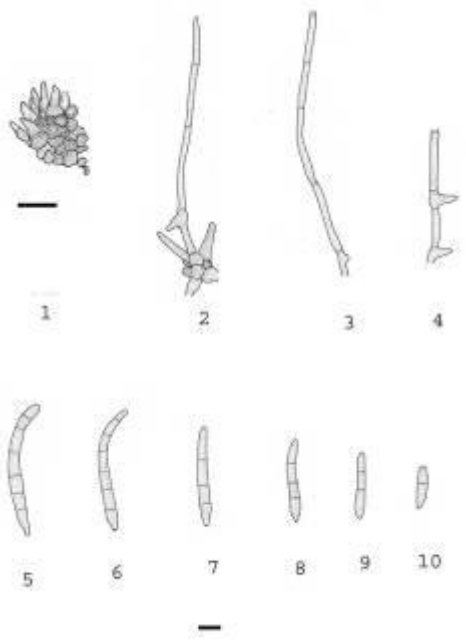

Fig. 144 – *Pseudocercospora trichophila* var. *punctata* on *Solanum undatum*: 1. Stroma with attached conidiophores. 2 Stroma with attached conidiophores and external hyphae. 3–4. External hyphae. 5–10. Conidia. Bars = 10 µm.

Fig. 145 – *Pseudocercospora trichophila* var. *punctata* on *Solanum undatum* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Stroma with attached conidiophores. 4–5. External hyphae. 6–8. Conidia. 9. Culture. Bars 1–2, 9 = 10 mm, 4–8 = 10 µm.

ellipsoidal and angular, 5–10 µm wide ($\bar{x}$ = 6.9 µm, n = 9), dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.73 µm, n = 9), smooth. Conidiophores fasciculate, arising from stromata (5–32 per fascicle), geniculate, unbranched, 25–65 × 4–5 µm ($\bar{x}$ = 47.6 × 4.64 µm, n = 11), 1–5-septate, slightly constricted at the septa, distance between septa 5–28 µm long ($\bar{x}$ = 12.5 µm, n = 30), uniformly pale to medium brown, 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, 8–17 × 3–5 µm ($\bar{x}$ = 12.2 × 3.89 µm, n = 9), obtuse, conidiogenous loci inconspicuous, unthickened, not darkened. Conidia solitary, obclavate, straight to slightly curved, 23–72 × 2–5 µm ($\bar{x}$ = 49.3 × 3.0 µm, n = 11), 3–5-septate, pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.46 µm, n = 11), smooth, tip subacute, base truncate, hila 1.5–3 µm wide ($\bar{x}$ = 2.38 µm, n = 11).

Hosts – *Wendlandia thorelii* Pit. (Rubiaceae).

Distribution – **Asia:** Laos.

Material examined – Xiangkhouang Province, Paek District, Phonsavan Village, coniferous forest, on leaves of *Wendlandia thorelii*, 3 January 2010, P. Phengsintham (P512, MFLU 12-2205, **Holotype**).

Notes – *Pseudocercospora wendlandiphila* is morphologically comparable with *Cercospora wendlandiae* (Vasudeva 1963). The generic affinity of this species is still unclear (Crous & Braun 2003), but due to sparsely septate conidiophores and subhyaline, shorter and wider conidia, 28–46 × 4.5–6 µm (Vasudeva 1963) the latter species is in any case not conspecific. The Indian *Zasmidium wendlandiicola* (U. Braun & Crous) Kamal & U. Braun (≡ *Stenella wendlandiicola* U. Braun & Crous, ≡ *Cercospora wendlandiae* M. Mandal, nom. illeg., non *C. wendlandiae* T.S. Ramakr. & Sundaram) is a quite distinct cercosporoid fungus with verruculose superficial hyphae, solitary conidiophores (fascicles lacking), thickened and darkened conidiogenous loci and very long pluriseptate conidia formed singly (Mandal 1978). *Zasmidium rubiacearum* (S. Chaudhary, N. Sharma & Kamal) Kamal (Chaudhary et al. 2002, Kamal 2010) on *Wendlandia tinctoria* in India resembles *Z. tinctoriicola*, but the conidia

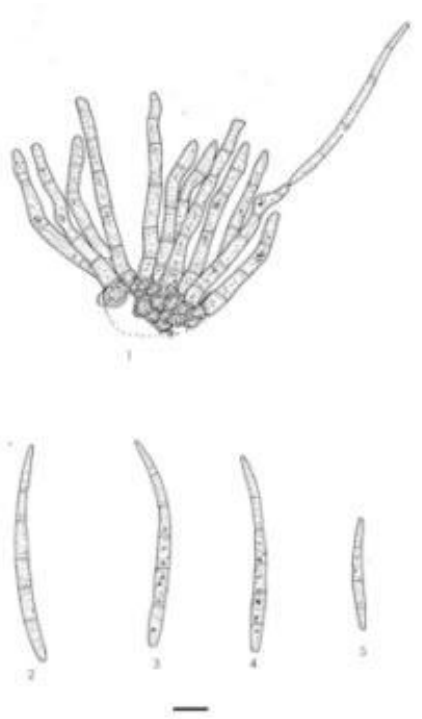

Fig. 146 – *Pseudocercospora wendlandiphila* on *Wendlandia thorelii*: 1. Stroma with attached conidiophores. 2–5. Conidia. Bar = 10 µm.

Fig. 147 – *Pseudocercospora wendlandiphila* on *Wendlandia thorelii* from leaf spots: 1–2. Lesions on host leaves (1. upper surface. 2. lower surface). 3. Caespituli. 4–5. Stromata with attached conidiophores. 6–10. Conidia. Bars 1–2 = 10 mm, 4–10 = 10 µm.

are formed in simple or branched chains.

Literature – Vasudeva (1963), Mandal (1978), Chaudhary et al. (2002), Crous & Braun (2003), Kamal (2010).

(74) *Pseudocercospora wrightiae* (Thirum. & Chupp) Deighton, Mycol. Pap. 140: 156, 1976. Figs 148–149.

≡ *Cercospora wrightiae* Thirum. & Chupp, Mycologia 40: 362, 1948.

Leaf spots circular, 2–10 mm in diam., with brown to dark brown and yellowish margin. Caespituli amphigenous, but chiefly hypophyllous. Mycelium internal; hyphae branched, 2–4 µm wide ($\bar{x}$ = 3.5 µm, n = 6), septate, constricted at the septa, distance between septa 5–17 µm ($\bar{x}$ = 9.13 µm, n = 8), subhyaline or hyaline, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.38 µm, n = 8), smooth. Stromata well-developed, substomatal, subglobular, 20–42 µm wide, brown to dark brown, stromatal cells oval, ellipsoidal to angular in outline, 4–8 µm wide ($\bar{x}$ = 6.59 µm, n = 17), dark brown, wall 0.8–1 µm wide ($\bar{x}$ = 0.87 µm, n = 17), smooth. Conidiophores fasciculate, arising from stromata (6-9 per fascicle), erect, straight or curved, unbranched, (10–)20–30 × 3–5 µm ($\bar{x}$ = 24.8 × 4.08 µm, n = 12), 0–1-septate, distance between septa 2–22 µm ($\bar{x}$ = 11.6 µm, n = 8), pale to moderately olivaceous-brown, paler and narrower towards the apex, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.55 µm, n = 12), smooth. Conidiogenous cells integrated, 13–26 × 3–5 µm, pale olivaceous-brown; conidiogenous loci inconspicuous. Conidia solitary, obclavate, straight to moderately curved, (28–)37–107 × (3–)4–6 µm ($\bar{x}$ = 64.5 × 4.57 µm, n = 30), 1–7-septate, slightly constricted at the septa, pale olivaceous, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.60 µm, n = 30), smooth, obtuse at the apex, with long obconically truncate base.

Colonies on PDA after 3 weeks at 25°C grey, spreading surface ridged and smooth, 6–10 mm diam, hyphae 1–6 µm wide ($\bar{x}$ = 3 µm, n = 30), septate, constricted at the septa, distance between septa 5–20 µm ($\bar{x}$ = 15.67 µm, n = 30), brown, wall 0.25–0.5 µm wide ($\bar{x}$ = 0.41 µm, n = 30), smooth. Conidia not formed in culture.

Hosts – *Plumeria obovata* Müll. Arg., *Wrightia pubescens* R. Br., *W. tintoria* R. Br. (Apocynaceae).

Distribution – **Asia:** China, India, Laos; **South America:** Brazil.

Material examined – Vientiane Capital, Xaythany District, Xay Village, on leaves of *Wrightia pubescens*, 11 May 2006, P. Phengsintham (P40), ibid., 12 August 2007, P. Phengsintham (P300).

Notes – The collections from Laos are similar to the original description of this species, based on materials from India, but there are slight differences in size of the conidiophores and conidia. The collection from India has conidiophores densely fasciculate, 15–45 × 3–6.5 µm, subhyaline to pale brown and conidia obclavate, straight to moderately curved, 25–105 × 4–6.5 µm, medium olivaceous.

Literature – Chupp (1954: 51), Guo & Hsieh (1995: 19), Crous & Braun (2003: 431).

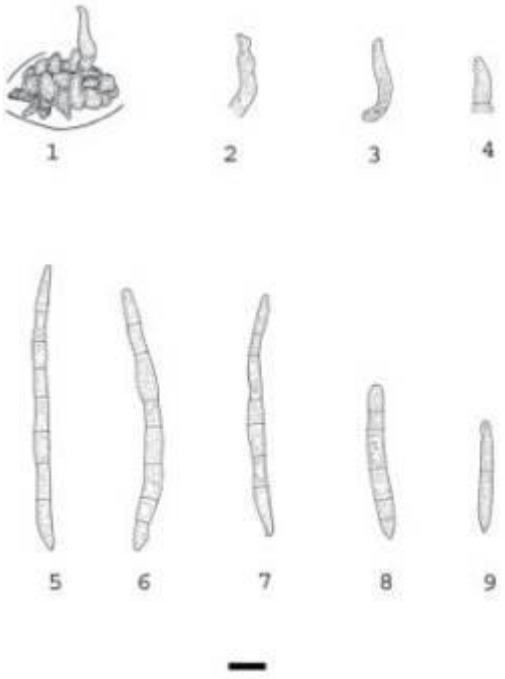

Fig. 148 – *Pseudocercospora wrightiae* on *Wrightia pubescens*: 1. Stroma with attached conidiophore. 2–4. Conidiophores. 5–9. Conidia. Bar = 10 µm.

(75) *Zasmidium aporosae* Phengsintham, K.D. Hyde & U. Braun, Cryptog. Mycol. 30(2): 246, 2009. Figs 150–151.

Leaf spots variable, typically deep brown to black, more or less irregularly orbicular, 1–15 mm in diam. Caespituli amphigenous, but chiefly hypophyllous.

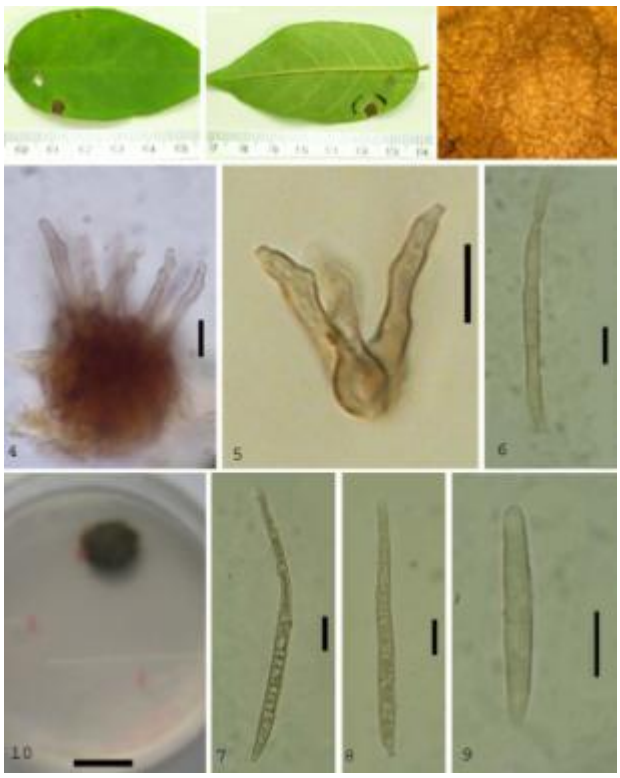

Fig. 149 – *Pseudocercospora wrightiae* on *Wrightia pubescens* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4–5. Stromata with attached conidiophores. 6–9. Conidia. 10. Culture. Bars 1–2, 10 = 10 mm, 4–9 = 10 µm.

Mycelium internal and external, internal hypha inconspicuous; external hyphae often constricted at the septa, pale olivaceous-brown, almost smooth to verruculose, 1–7 µm wide ($\bar{x}$ = 2.57 µm, n = 30), distance between septa 5–29 µm ($\bar{x}$ = 11.67 µm, n = 30), thick-walled 0.3–1 µm ($\bar{x}$ = 0.61 µm, n = 30). Stromata absent. Conidiophores borne on external mycelial hyphae, unbranched, septate, mid pale golden brown, smooth, 2–5-septate, thin-walled, 0.5–1 µm ($\bar{x}$ = 0.80 µm, n = 30), (6–)29–76(–83) × 3–4 µm ($\bar{x}$ = 43.1 × 3.2 µm, n = 30); conidiogenous cells intergrated, terminal or rarely intercalary, 7–15 × 1–3 µm ($\bar{x}$ = 10.3 × 2.8 µm, n = 30), conidiogenous loci forming minute, dark or refractive scars on lateral and terminal denticles, 1–2 µm wide ($\bar{x}$ = 1.72 µm, n = 30), planate, giving rise to branched conidial chains, occasionally terminally swollen. Conidia solitary or catenate, pale olivaceous, small conidia ellipsoid-ovoid to subcylindrical, but most conidia longer and slightly obclavate to obclavate-subcylindrical, straight or slightly curved or sinuous, smooth or

finely verruculose, thin-walled, rounded or subtruncate at the ends with thickened, planate hila, short obconically truncate at the base, variable in length and shape, occasionally with lateral branchlets (germ tubes), 0–3-septate, (5–)6–38(–39) × 2–3 µm ($\bar{x}$ = 17.47 × 2.3 µm, n = 30).

Colonies on PDA after 3 weeks at 25^{0}C with spreading mycelium, surface ridged, black and wavy in the centre and grey margin, reaching 10–27 mm diam.; hyphae often constricted at the septa, distance between septa 4–20 µm ($\bar{x}$ = 10.97 µm, n = 30), thin-walled 0.5–1 µm ($\bar{x}$ = 0.68 µm, n = 30), hyaline, smooth or verruculose, forming lateral and terminal minute, dark or refractive denticle-like scars, 1–2 µm diam., giving rise to branched conidial chains, width of mycelial hyphae gradually decreasing from primary to secondary and any later colonies. Conidia solitary or catenate, greenish, verruculose, more variable in length and shape than those from leaves, 17–66 × 3–4 µm ($\bar{x}$ = 41.94 × 3.3 µm, n = 18).

Hosts: *Aporosa villosa* (Lindl.) H. Baill. (Euphorbiaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Nonh Saengchanh Village, Dry dipterocarp forest, on leaves of *Aporosa villosa*, 19 April 2006, P. Phengsintham (P8, MFLU12-2206, **holotype**); ibid., 22 January 2007, P. Phengsintham (P201); ibid., 25 May 2007, P. Phengsintham (P171); ibid., Bolikhamxay Province, 5 May 2007, P. Phengsintham (P274). GenBank accession no (ITS, KC677912).

Notes – The young conidia of *Z. aporosae* can be minutely verruculose, more evident than in adult conidia. Several species of the genus *Zasmidium* are known from hosts belonging to the Euphorbiaceae, but all of them are distinct from *Z. aporosae*. *Zasmidium bischofiae-javanicae* (R.K. Chauhary, Tripathi, P.N. Singh & S. Chaudhary) Kamal (Chaudhary et al. 2001, Kamal 2010), described form India on *Bischofia javanica*, differs in having usually solitary conidia, up to 5 µm wide, with 2–6 septa and a surface with loosely scattered coarse warts. *S. brideliicola* (K. Srivast., A.K. Srivast. & Kamal) Kamal on *Bridelia stipularis* in India (Srivastava et al. 1994, Kamal 2010) has longer conidiophores, up to 310 × 5–7 µm, and broader conidia 4–7 µm, formed singly. *Zasmidium manihotis* (U. Braun & F.O. Freire) U. Braun, known on *Manihot* sp. in Brazil, is characterized by having solitary as well as fasciculate conidiophores and longer conidia, 25–160 × 3–4 µm, 2–16-septate, usually formed singly. *Z. gorakhpurensis* (Kamal & P. Kumar) Kamal (de Hoog et al. 1983, Kamal 2010) on *Glochidion multiloculare* in India is characterized by having colourless hyphae and smooth, very small, 1–3-septate conidia.

Literature – Crous & Braun (2003: key).

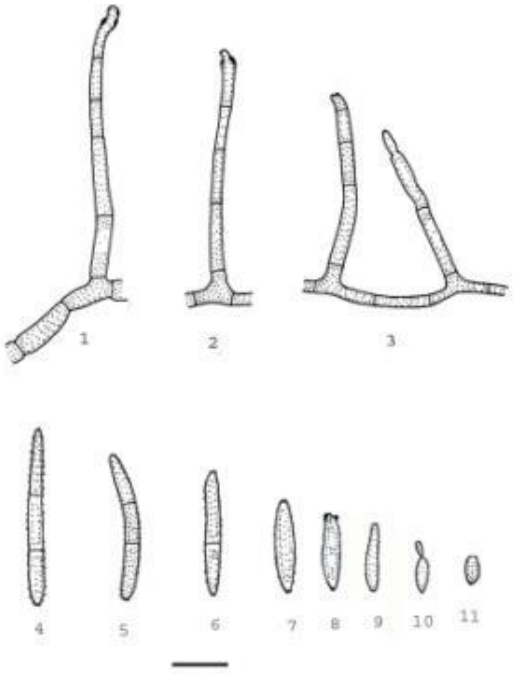

Fig. 150 – *Zasmidium aporosae* on *Aporosa villosa*: 1–3. External hyphae with attached conidiophores. 4–11. Conidia. Bar = 10 µm.

(76) ***Zasmidium dalbergiae*** sp. nov.

Figs 152–153.

Mycobank, MB 801731

Morphologically comparable with Zasmidium pterocarpi, but hyphae wider, 3–4 µm, conidiophores much longer and wider, 45–290 × 3–4 µm, and conidia longer, wider and pale olivaceous. Differs from all other species of Zasmidium on hosts of the Fabaceae s. str. (Faboideae) in having very narrow conidia, 48–105 × 2–3 µm.

Leaf spots variable, more or less irregularly orbicular, up to 10 mm diam., typically deep brown. Caespituli amphigenous, inconspicuous. Mycelium external; hyphae branched, 3–4 µm wide ($\bar{x}$ =3.2 µm n = 11), sep-

Fig. 151 – *Zasmidium aporosae* on *Aporosa villosa* from leaf spots/Lesions: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4–5. Conidiophores. 6–7. External hyphae. 8–10. Conidia. 11. Culture. Bars 1–2, 11 = 10 mm, 4–10 = 10 µm.

tate, constricted at the septa, distance between septa 15–35 µm ($\bar{x}$ = 25.4 µm, n = 11), pale olivaceous-brown, thin-walled 0.3–0.5 µm wide ($\bar{x}$ = 3.46 µm, n = 11), verruculose. Stromata lacking. Conidiophores borne on external mycelial hyphae, unbranched, cylindrical, 45–290 × 3–4 µm ($\bar{x}$ = 148 × 3.29 µm, n = 7), 3–11-septate, distance between septa 8–38 µm ($\bar{x}$ = 22.9 µm, n = 30), mid pale golden brown, wall 0.5–0.8 µm($\bar{x}$ = 0.54 µm, n = 30), smooth. Conidiogenous cells integrated, terminal or intercalary, 9–27 × 2–4 µm ($\bar{x}$ = 20.6 × 2.8 µm, n = 11), cylindrical with swollen and curved at the apex; conidiogenous loci forming minute, dark or refractive scars on lateral and terminal denticles, 1 × 1.5 µm diam. ($\bar{x}$ = 1.16 µm, n = 11), giving rise to branched conidial chains, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.43 µm, n = 11), thickened, darkened. Conidia solitary or catenate, sometimes ellipsoidal-ovoid or subcylindrical, but mostly slightly obclavate, straight or slightly curved or sinuous, 48–105 × 2–3 µm ($\bar{x}$ = 80.4× 2.6 µm, n = 13), 1–3-septate, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.35 µm, n = 13), smooth or finely verruculose; apex rounded or subtruncate at the ends with thickened hila, 1–1.5 µm wide ($\bar{x}$ = 1.25 µm, n = 5), wall 0.3–0.5 µm wide ($\bar{x}$ = 0.4 µm, n = 5), thickened and darkened, base shortly tapered at the base to the hilum, 1–1.5 µm wide ($\bar{x}$ = 1.25 µm, n = 6), wall 0.3–0.5 µm wide ($\bar{x}$ = 0.4 µm, n = 6), thickened and darkened.

Hosts – *Dalbergia cultrata* Graham (Fabaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Dongmakkai Village, mixed deciduous forest, on leaves of *Dalbergia cultrata*, 2 April 2010, P. Phengsintham (P550, MFLU12-2207, **holotype**). GenBank accession no (ITS, KC677913).

Notes – This is the first species of *Zasmidium* on *Dalbergia*. ***Zasmidium pterocarpi*** (Kranz) U. Braun comb. nov**.** (Bas.: *Stenella pterocarpi* Kranz, Sydowia 20(1/6): 214, "1966" 1968; MycoBank, MB 339665; holotype: on *Pterocarpus santalinoides* DC., Guinea, Kinida, 7 Dec. 1963, J. Kranz, IMI 105007) is a comparable species with narrow conidia, but differs from *Z. dalbergiae* in having very narrow hyphae, 1–2(–3) µm wide, much shorter and narrower conidiophores, 5–20 × 1.5–3 µm, and shorter, narrower, hyaline conidia, 8–60 × 1.5–2 µm (Braun 2001). Several additional species of *Zasmidium* have been described from other hosts belonging to the Fabaceae, but all of them [*Z. browneicola* (R.K. Chaudhary, Tripathi, P.N. Singh & Kamal) Kamal, *Z. buteae* (S. Misra, N. Srivast. & A.K. Srivast.) Kamal, *Z. canavaliae* (Deighton) Kamal, *Z. pterocarpigena* (U. Braun & Hosag.) U. Braun, *Z. crotalariicola* (R. Chaudhary, C. Gupta & Kamal) Kamal, *Z. fabacearum* (K. Srivast., A.K. Srivast. & Kamal) Kamal, *Z. millettiae* (R.K. Chaudhary, Tripathi, P.N. Singh & Kamal) Kamal, *Z. tephrosiae* (G.F. Atk.) Kamal & U. Braun] have wider conidia, up to 6 µm, and differ in various additional characters, e.g. length and septation of conidiophores and conidia (Chupp 1954, Chaudhary et al. 2001, Braun et al. 2003, Kamal 2010).

Literature – Chupp(1954), Chaudhary et al. (2001), Braun et al. (2001, 2003), Kamal (2010).

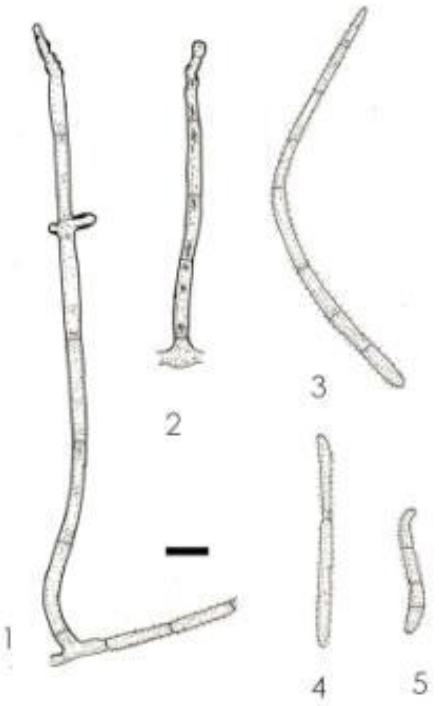

Fig. 152 – *Zasmidium dalbergiae* on *Dalbergia cultrata*: 1–2. External mycelium with attached conidiophores. 2–5. Conidia. Bar = 10 µm.

Fig. 153 – *Zasmidium dalbergiae* on *Dalbergia cultrata* from leaf spot: 1–2. Lesions on host leaves (1. upper surface and 2. lower surface). 3. External mycelium with attached with conidiophore. 4. Apex of conidiophores. 5. Conidium. Bar = 10 µm.

(77) ***Zasmidium jasminicola*** Phengsintham, K.D. Hyde & U. Braun**,** Cryptog. Mycol. 30(2): 249, 2009. Figs 174–175.

Leaf spots variable, typically deep brown, more or less irregularly orbicular, up to 10 mm. diam. Caespituli amphigenous. Mycelium: internal hyphae not observed; external hyphae verruculose, often constricted at the septa, pale olivaceous-brown, 1–2 µm wide, distance between septa 7–15 µm, thin-walled 0.5–0.8 µm. Stromata well-developed, brown, 6–40 µm diam. Conidiophores borne on external mycelial hyphae, unbranched, septate, mid pale golden brown, smooth, thinwalled 0.5–0.8 µm, up to 3-septate, 10–46 × 2–4 µm ($\bar{x}$ = 21.54 × 2.31 µm, n = 13), conidiogenous cells intergrated, terminal or rarely intercalary, 7–15 × 2–3 µm, conidiogenous loci forming minute, dark or refractive scars on lateral and terminal denticles, 2–3 µm diam., planate, giving rise to branched conidial chains, occasionally terminally swollen. Conidia solitary or catenate, pale olivaceous, ellipsoid-ovoid or subcylindrical but mostly slightly obclavate, straight or slightly curved or sinuous, smooth or finely verruculose, thin-walled, rounded or subtruncate at the ends, with thickened hila, 1–2 µm wide, planate, short obconically truncate at the base, about 0.5–1.5 µm wide, variable in length and shape, some conidia occasionally with a lateral branchlet (germ tube), 0–6-septate, (4–)5–42(–47) × (2–)3–5(–6) µm ($\bar{x}$ = 13.98 × 2.09 µm, n = 30).

Colonies on PDA after 3 weeks at 25 ^{0}C with spreading mycelium, surface ridged, black and wavy in the centre and grey margin, reaching 10–27 mm diam. Hyphae often constricted at the septa, distances between septa (2–)6–27 µm ($\bar{x}$ = 14.93 µm, n = 30), thin-walled, approximately 0.5 µm, hyaline, smooth or verruculose, forming minute, dark or refractive scars on lateral and terminal denticles, 1.5–2 µm diam., giving rise to branched conidial chains, width of mycelial hyphae gradually decreasing from primary to secondary and any later colonies, 1–5 µm wide ($\bar{x}$ = 2.8 µm, n = 30). Conidia solitary or catenate, greenish, verruculose, more variable in length and shape than those from leaves, 5–29 × 1.5–2.5 µm ($\bar{x}$ = 10.5 × 2.08 µm, n = 30).

Hosts – *Jasminum undulatum* Ker-Gawl. (Oleaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Xay Village, fallow forest, on leaves of *Jasminum undulatum*, 19 April 2006 (P10, MFLU12-2208, **holotype**).

Notes – *Zasmidium pseudoramularia* (U. Braun) U. Braun (≡ *Stenella pseudoramularia* U. Braun, the second species of *Zasmidium* on a host belonging to the Oleaceae, described from Indonesia on *Nyctanthes arbor-tristis* (Braun 2001), is distinguished from Z. *jasminicola* by forming solitary or loosely aggregated (subfasciculate) conidiophores arising from immersed hyphae and much narrower (6–35 × 1–3 µm in vivo), 0–1(–2)-septate conidia The young conidia of *Z. jasminicola* can be minutely verruculose, more evident than in adult conidia.

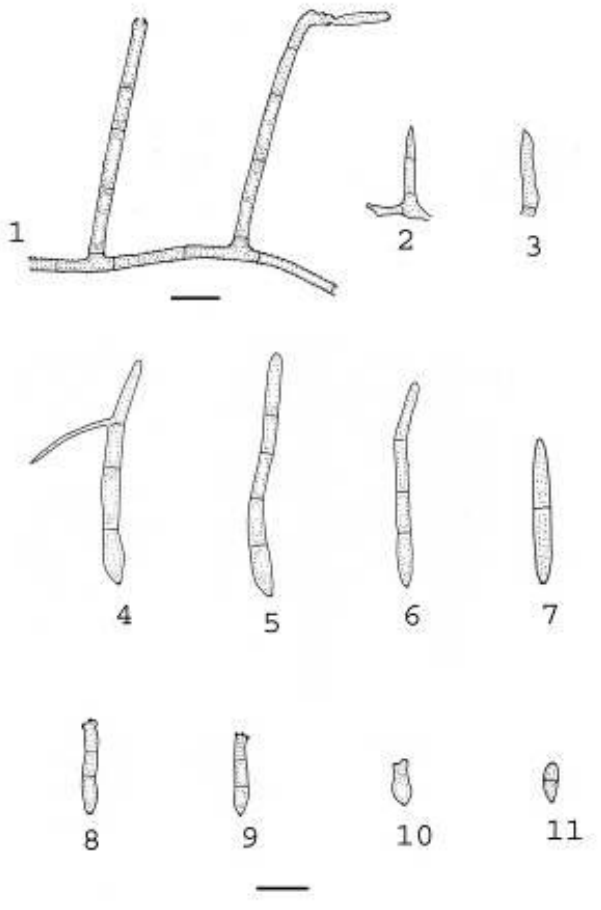

Fig. 174 – *Zasmidium jasminicola* on *Jasminum undulatum*: 1–4. Conidiophores. 5–11. Conidia. Bars = 10 µm.

Fig. 155 – *Zasmidium jasminicola* on *Jasminum undulatum* from leaf spot: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3–4. Stromata. 5–8. Conidiophores. 9–14. Conidia. 15. Culture. Bars: 1–2, 15 = 10 mm, 3–14 = 10 µm.

(78) ***Zasmidium meynae-laxiflorae*** **(**K. Srivast., A.K. Srivast. & Kamal) Phengsintham, K.D. Hyde & U. Braun, Cryptog. Mycol. 30(2): 255, 2009. Figs 156–157.

≡ *Stenella meynae-laxiflorae* K. Srivast., A.K. Srivast. & Kamal, in Srivastava et al., Mycol. Res. 99: 235, 1995.

Leaf spots circular to irregularly, angular, 1–12 mm in diam., brown to dark brown in the centre and with yellowish margin. Caespituli amphigenous, small, scattered, brown. Mycelium internal and external: internal hyphae inconspicuous; external hyphae branched, 2–3 µm wide ($\overline{x}$ = 2.5 µm, n = 12), septate, constricted at the septa, distance between septa 5–18 µm ($\overline{x}$ = 11.92 µm, n = 12), pale olivaceous-brown, wall 0.3–0.8 µm wide ($\overline{x}$ = 0.52 µm, n = 12), verruculose. Stromata well-developed, subglobose, 10–41 µm in diam., brown; stromatal cells oval, ellipsoidal to angular in outline, 3–9 µm wide

($\bar{x}$ = 5.67 µm, n = 30), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.74 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (9–20 per fascicle) and solitary, borne on external mycelial hyphae, unbranched, cylindrical, (14–)15–93(–98) × 3–4 µm ($\bar{x}$ = 51.8 × 3.37 µm, n = 30), 0–7-septate, distance between septa 4–23 µm ($\bar{x}$ = 11 µm, n = 30), brown to dark brown, wall 0.5–1 µm ($\bar{x}$ = 0.63 µm, n = 30), smooth, 0–2-geniculate; conidiogenous cells polyblastic, integrated, terminal or intercalary, 9–23 × 3–4 µm, cylindrical, pale at the apex; conidiogenous loci forming minute, dark or refractive scars on lateral and terminal denticle-like protuberances giving rise to branched conidial chains, 1–1.5 µm wide ($\bar{x}$ = 1.68 µm, n = 13), wall 0.5–1 µm wide ($\bar{x}$ = 0.81 µm, n = 13), thickened, darkened, with a minute central pore. Conidia solitary or catenate, sometimes subcylindrical but mostly slightly obclavate, straight or slightly curved or sinuous, (4–)16–87 × 2–4 µm ($\bar{x}$ = 30.57 × 3.4 µm, n = 14), 0–6-septate, pale olivaceous, wall 0.25–0.5 µm wide ($\bar{x}$ = 0.3 µm, n = 14), smooth or finely verruculose, apex rounded or subtruncate with a thickened hilum, base short obconically truncate, with a basal hilum 1–1.5 µm wide ($\bar{x}$ = 1.32 µm, n = 9), wall thickened 0.5–0.8 µm wide ($\bar{x}$ = 0.54 µm, n = 9).

Colonies on PDA after 3 weeks at 25^0C spreading surface ridged, black and brown in the centre, grey margin, reaching 25 mm in diam. 1–8 µm wide ($\bar{x}$ = 3.38 µm, n = 30), septate, constricted at the septa, distance between septa 4–20 µm ($\bar{x}$ = 14.2 µm, n = 30), brownish to subhyaline, wall 0.25–0.80 µm ($\bar{x}$ = 0.45 µm, n = 30), smooth or verruculose. Conidia not formed in the culture.

Hosts – *Meyna laxiflora* Robyns, *M. pubescens* (Kurz) Robyns (Rubiaceae).

Distribution – **Asia:** India, Laos.

Materials examined – Vientiane Capital, Xaythany District, Houay Den Meuang and Dong Mak Khai villages, dry dipterocarp forest, on leaves of *Meyna pubescens*, 26 April 2006, P. Phengsintham (P29, MFLU12-2210, **holotype**); ibid., 10 March 2007, P. Phengsintham (P295).

Notes – The collections from Laos are very similar to the type collection from India which is, according to the original description, characterized as follows: conidiophores superficial, 16–52 × 3–5.5 µm; conidia cylindrical, obclavate, 12–92 × 2.5–4 µm, olivaceous-brown, verruculose. *Meyna pubescens* is a new host species for this fungus. The relation of *Zasmidium meynae-laxiflorae* and *Z. vangueriae* (Thirum. & Mishra) Kamal (Kamal 2010), both species described from India on *Meyna laxiflora* (= *Vangueria spinosa*), is not clear. The two taxa are similar, but the latter species was described with much longer and somewhat wider conidia, 30–258 × 3–4.5 µm, formed singly, sometimes with lateral branchlets.

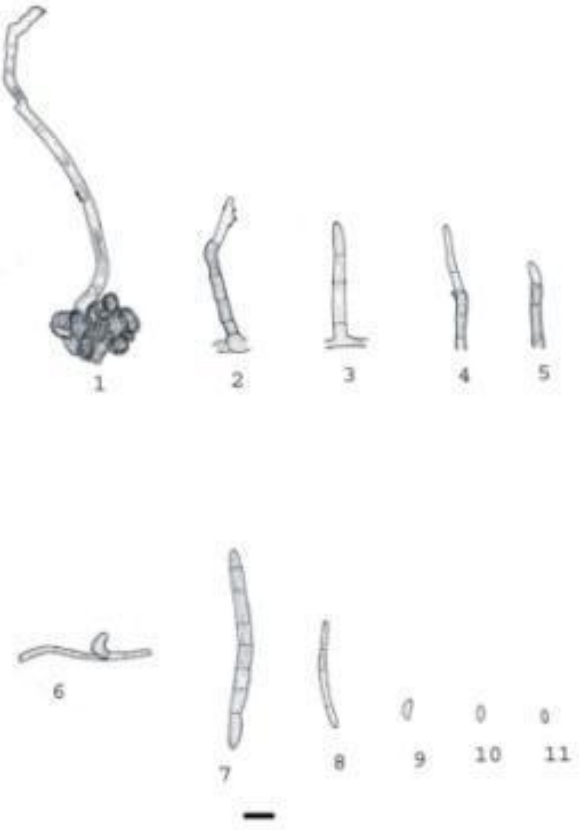

Fig. 156 – *Zasmidium meynae-laxiflorae* on *Meyna pubescens*: 1. Stroma with attached conidiophore. 2–3. External mycelia with attached conidiophores. 4–5. Conidiophores. 6. External mycelium with attached young conidiophore. 7–11. Conidia. Bar = 10 µm.

(79) ***Zasmidium micromeli*** Phengs., K.D. Hyde & U. Braun, Cryptog. Mycol. 31: 319, 2010. Figs 158–159.

Leaf spots variable, more or less irregularly orbicular, 2–30 mm diam., typically brown. Caespituli hypophyllous, conspicuous.

Mycelium external; hyphae branched, 2–4 µm wide ($\bar{x}$ = 3 µm, n = 10), septate, constricted at the septa, distance between septa 6–22 µm ($\bar{x}$ = 13.8 µm, n = 10), pale olivaceous-brown, thin-walled 0.5–1 µm wide ($\bar{x}$ = 0.63 µm, n = 10), verruculose. Stromata absent. Conidiophores borne on external hyphae, unbranched, cylindrical, 10–205 × 3–4 µm ($\bar{x}$ = 89.8 × 3.57 µm, n = 23), 5–20-septate, distance between septa 5–19 µm ($\bar{x}$ = 12 µm, n = 30), mid golden brown, wall 0.5–0.8 µm ($\bar{x}$ = 0.73 µm, n = 30), smooth. Conidiogenous cells integrated, terminal or intercalary, 8–19 × 3–3.5 µm ($\bar{x}$ = 12.3 × 3.07 µm, n = 7), cylindrical, somewhat swollen and curved at the apex; conidiogenous loci forming minute, dark or refractive scars on lateral and terminal denticles, 1–1.5 µm diam. ($\bar{x}$ = 1.2 µm, n = 8), giving rise to branched conidial chains, wall 0.5–0.8 µm wide ($\bar{x}$ =0.62 µm, n = 8), thickened, darkened. Conidia solitary or catenate, sometimes ellipsoidal-ovoid or subcylindrical, but mostly slightly obclavate, straight or slightly curved or sinuous, 16–145 × 2–4 µm ($\bar{x}$ = 55.2 × 3.01 µm, n = 30), 1–9-septate, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.42 µm, n = 30), smooth or finely verruculose, apex rounded or subtruncate; base short tapered, hila 1–2 µm wide ($\bar{x}$ = 1.33 µm, n = 30), wall 0.3–0.5 µm wide ($\bar{x}$ = 0.4 µm, n = 30), thickened and darkened.

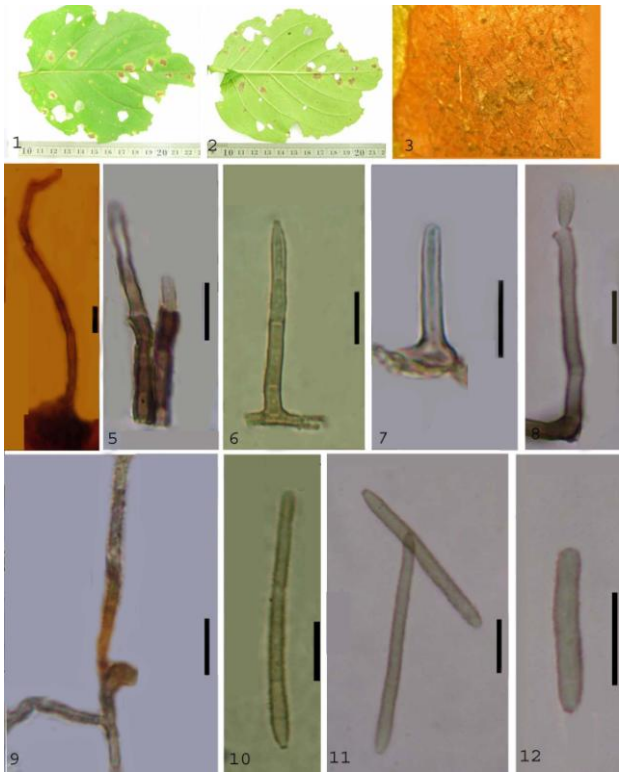

Fig. 157 – *Zasmidium meynae-laxiflorae* on *Meyna pubescens* from leaf spot: 1–2 Lesions on host leaves (1. upper surface and 2. lower surface). 3. Caespituli. 4. Stroma with attached conidiophores. 5. Conidiophores. 6–7. External mycelia with attached conidiophores. 8. Conidiophore with attached young conidia. 9. External with attached young conidiophores. 10–12. Conidia. Bars 1–2 = 10 mm, 4–12 = 10 µm.

Colonies on PDA after 3 weeks at 25°C with spreading mycelium, surface ridged, dark brown in the centre and grey margin, reaching 8–12 mm diam., hyphae often constricted at the septa, distance between septa 6–20 × 2–4 µm ($\bar{x}$ = 10.2 × 3.7 µm, n = 30), thin-walled 0.3–0.8 µm ($\bar{x}$ = 0.52 µm, n = 30), brownish to brown, smooth or verruculose. Conidiophores and conidia not formed in culture.

Hosts – *Micromelum hirsutum* Merr. (Rutaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Dongmakhai Village, Fallow forest, on leaves of *Micromelum hirsutum*, 4 February 2010, P. Phengsintham (P551, MFLU12-2209, **holotype**); ex-type living culture deposited in Systematic Mycology and Lichenology Laboratory, Institute of Microbiology, Chinese Academy of Sciences, Beijing, PR China.

Notes – *Stenellopsis nepalensis* R.K. Chaudhary & S.K. Singh on *Clausena platyphylla* in Nepal (Chaudhary et al. 1996) is the only additional zasmidium-like hyphomycete on a host of the Rutaceae. However, this species is quite distinct in having fasciculate conidiophores, lacking superficial hyphae and consistently singly formed, wider conidia (27–125 × 3–8 µm).

(80) ***Zasmidium pavettae*** Phengsintham, K.D. Hyde & U. Braun, Cryptog. Mycol. 30(2): 251, 2009. Figs 160–161**.**

Leaf spots circular to irregular, 3–8 mm in diam., grey-brown in the centre, and with greyish margin. Caespituli amphigenous, inconspicuous. Mycelium internal and external: internal hyphae inconspicuous; external hyphae branched, 2–3 µm wide ($\bar{x}$ = 2.8 µm, n= 17),

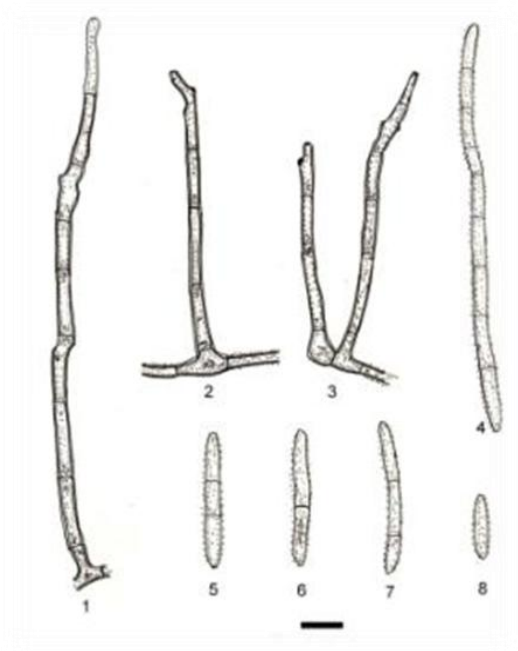

Fig. 158 – *Zasmidium micromeli* on *Micromelum hirsutum*: 1–3. External mycelium with attached conidiophores. 4–8. Conidia. Bar = 10 µm.

Fig. 159 – *Zasmidium micromeli* on *Micromelum hirsutum* from leaf spot: 1–2. Lesions on host leaves (1. upper surface and 2. lower surface). 3. Caespituli. 4. External mycelia with attached conidiophore. 5–7. Conidiophores. 8–12. Conidia. 13. Culture. 14. Colony in culture. Bars: 1–2, 13 = 10 mm, 8–12 = 10 µm.

septate, constricted at the septa, distance between septa 9–24 µm ($\bar{x}$ = 15.5 µm, n = 17), pale olivaceous-brown, wall 0.25–0.5 µm wide ($\bar{x}$ = 0.44 µm, n = 17), verruculose. Stromata not well-developed, subglobose, approximately 23 µm in diam., brown, stromatal cells oval, ellipsoidal to angular in outline, 3–5 µm wide ($\bar{x}$ = 3.75 µm, n = 8), brown to dark brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.54 µm, n = 8), smooth. Conidiophores fasciculate or solitary, arising from stromata and borne on external mycelia hyphae, unbranched, cylindrical, 12–34 × 3–4 µm ($\bar{x}$ = 16.8 × 3.5 µm, n = 5), 0–1-septate, brown, wall 0.8 µm, smooth; conidiogenous cells integrated, terminal or intercalary, 19–20 × 3–4 µm, cylindrical, paler at the apex; conidiogenous loci forming minute, dark or refractive scars on lateral and terminal denticle-like protuberances, giving rise to branched conidial chains, 1–2 µm wide, planate, wall 0.8–1 µm wide, thickened, darkened. Conidia solitary or catenate, sometimes subcylindrical but mostly slightly obclavate, straight or slightly curved or sinuous, (5–)6–59(–65) × 2–4 µm ($\bar{x}$ = 20 × 2.75 µm, n = 20), 0–5-septate, pale olivaceous, wall 0.25–0.5 µm wide ($\bar{x}$ = 0.36 µm, n = 20), smooth or finely verruculose, apex rounded or subtruncate, with a conspicuous hilum, base short obconically truncate, hila approximately 1 µm wide, wall 0.6–0.8 µm thick.

Colonies on PDA after 3 weeks at 25^{0}C spreading surface ridged, black and brown in the centre, grey margin, reaching 10 mm in diam., hyphae 1–4 µm wide ($\bar{x}$ = 2.6 µm, n = 30), septate, constricted at the septa, distance between septa 6–16 µm ($\bar{x}$ = 11 µm, n = 30), brownish to subhyaline, wall 0.25–0.5 µm ($\bar{x}$ = 0.44 µm, n = 30), smooth or verruculose. Conidia not formed in the culture.

Host – *Pavetta indica* L. (Rubiaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Houay Den Meuang and Dong Mak Khai villages, fallow forest, on leaves of *Pavetta indica*, 26 April 2006, P. Phengsintham (P24**,** MFLU12-2211, **holotype**); ibid., 10 March 2007, P. Phengsintham (P261, **paratype**).

Notes – Several *Zasmidium* species, all described from India, have been recorded on hosts belonging to the Rubiaceae. *Zasmidium*

canthii (J.M. Yen, A.K. Kar & B.K. Das) Kamal (Yen et al. 1982a, Kamal 2010), described from West Bengal on *Canthium dedymum*, is morphologically close to the fungus on *Pavetta indica*, but this species is distinguished by lacking stromata, consistently solitary conidiophores and somewhat longer, wider conidia, 18–112 × 3–4.5 µm. *Z. meynae-laxiflorae* (K. Srivast., A.K. Srivast. & Kamal) Phengsintham, K.D. Hyde & U. Braun (Srivastava et al. 1995, Phengsintham et al. 2009) is another similar species, but it is distinct by its much longer conidiophores, up to about 90 µm in length, often formed in well-developed fascicles of 9–20 stalks. Most of the other *Stenella* species on Rubiaceae are characterized by having much longer pluriseptate conidia, viz., *Z. coffeae* (J.M. Yen, A.K. Kar & B.K. Das) Kamal (conidia 33–200 × 3–5(–6) µm, see Yen et al. 1982a), *Stenella hyptiantherae* S.K. Singh, Arch. Singh & Kamal (conidia 18–177 × 3–5 µm, see Singh et al. 1997), *Z. plectroniae* (Ponnappa) Kamal (conidia 40–210 × 2–3.5 µm, see Ellis 1976), *Z. vangueriae* (Thirum. & Mishra) Kamal (conidia 30–258 × 3–4.5 µm, see Thirumalachar & Mishra 1963), and *Z. xeromphigena* (J.M. Yen, A.K. Kar & B.K. Das) Kamal (conidia 20–156 × 3–4 µm, see Yen et al. 1982b). *Zasmidium naucleae* (A.K. Das) Kamal (Das 1990, Kamal 2010) differs in having larger, well-developed stromata with large fascicles composed of 7–55 conidiophores, and much longer, pluriseptate conidiophores, 33–115 × 3–5 µm.

Literature – Yen et al. (1982: 35–57), Srivastava et al. (1995: 233–236), Thirumalachar & Mishra (1963: 29–83).

(81) ***Zasmidium* sp.** Figs 162–163.

Leaf spots variable, more or less irregularly orbicular, 2–4 mm diam., grey-brown in the center, dark brown at the margin. Caespituli hypophyllous, conspicuous. Mycelium external; hyphae branched, 4–6 µm wide ($\bar{x}$ = 5 µm, n = 7), septate, constricted at the septa, distance between septa 15–36 µm ($\bar{x}$ = 23.5 µm, n = 7), pale olivaceous-brown, thin-walled 0.5–1 µm wide ($\bar{x}$ = 0.63 µm, n = 10), verruculose. Stromata absent. Conidiophores borne on external hyphae, unbranched, cylindrical, 18–96 × 3–4 µm ($\bar{x}$ = 56.58 × 3.64 µm, n = 13), 1–5-septate, distance between sep-

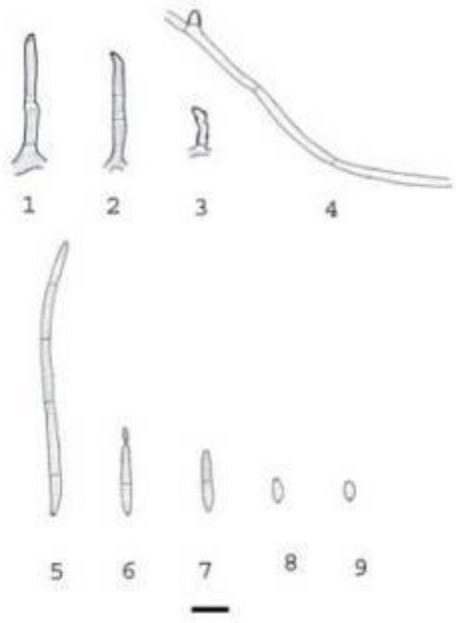

Fig. 160 – *Zasmidium pavettae* on *Pavetta indica*: 1–3. Conidiophores. 4. External mycelium with attached conidiophores. 6–9. Conidia. Bar = 10 µm.

Fig. 161 – *Zasmidium pavettae* on *Pavetta indica* from leaf spot: 1–2 Lesions on host leaves (1. upper surface and 2. lower surface). 3. Stroma. 4–5. Conidiophores. 6. External mycelium with attached young conidiophores. 7–10. Conidia. 11. Culture. Bars 1–2, 11 = 10 mm, 3–10 = 10 µm.

ta 11–38 µm ($\bar{x}$ = 19.76 µm, n = 30), mid golden brown, wall 0.5–0.8 µm ($\bar{x}$ = 0.6 µm, n = 30), smooth. Conidiogenous cells integrated, terminal or intercalary, 12–38 × 3–4 µm ($\bar{x}$ = 23.05 × 3.05 µm, n = 13), cylindrical, somewhat swollen and curved at the apex; conidiogenous loci forming minute, dark or refractive scars on lateral and terminal denticles, 1–1.5 µm diam. ($\bar{x}$ = 1.2 µm, n = 5), giving rise to branched conidial chains, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.6 µm, n = 5), thickened, darkened. Conidia solitary or catenate, sometimes ellipsoidal-ovoid or subcylindrical, but mostly slightly obclavate, straight or slightly curved or sinuous, 8–19 × 2–3 µm ($\bar{x}$ = 13.72 × 2.35 µm, n = 5), 0–1-septate, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.36 µm, n = 5), smooth or finely verruculose*;* apex rounded or subtruncate at the ends; base short tapered at the base to the hilum, 1–2 µm wide ($\bar{x}$ = 1.28 µm, n = 5), wall 0.3–0.5 µm wide ($\bar{x}$ = 0.36 µm, n = 5), thickened and darkened.

Colonies on PDA after 3 weeks at 25°C with spreading mycelium, surface ridged, grey brown in the centre and dark brown margin, reaching 15–22 mm diam.

Hosts: *Spondias pinnata* (L. f.) Kurz (Anacardiaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Houay Denmuang Village, fallow forest, on leaves of *Spondias pinnata*, 27 July 2010, P. Phengsintham (P605).

Notes – *Zasmidium* has not yet been recorded on this host, but the present material is not sufficient for a final conclusion and description as new species.

Literature – Crous & Brown (2003: 27, key).

(82) *Zasmidium suregadae* Phengsintham, K.D. Hyde & U. Braun, Cryptog. Mycol. 30(2): 258, 2009. Figs 164–165.

Leaf spots circular to irregular, 1–3 mm diam., grey to grey-brown in the centre, and with yellow-green margin. Caespituli amphigenous, small, scattered, brown. Mycelium internal and external; internal hyphae branched, 2–4 µm wide ($\bar{x}$ = 2.92 µm, n = 13), septate, constricted at the septa, distance between septa 4–19 µm ($\bar{x}$ = 10.08 µm, n =

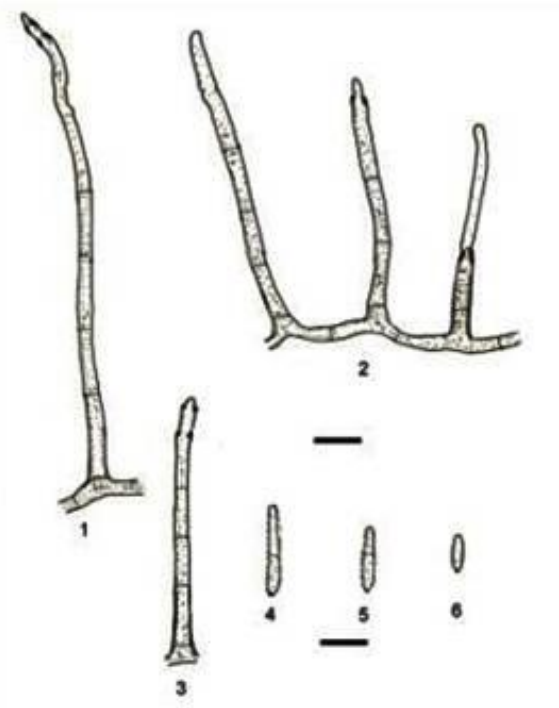

Fig. 162 – *Zasmidium* sp. on *Spondias pinnata*: 1–3. External mycelium with attached conidiophores. 4–6. Conidia. Bars = 10 µm.

Fig. 163 – *Zasmidium* sp. on *Spondias pinnata* from leaf spot: 1. Caespituli. 2–3. External mycelia with attached conidiophore. 4–6. Conidiophores. 7–9. Conidia. 10. Culture. Bars 2–9 = 10 µm, 10 = 10 mm.

13), pale olivaceousbrown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.39 µm, n = 13), smooth; external hyphae superficial, branched, 1–4 µm wide ($\bar{x}$ = 2.67 µm, n = 30), septate, constricted at the septa, distance between septa 6–22 µm ($\bar{x}$ = 11.78 µm, n = 30), pale olivaceous-brown, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.44 µm, n = 30), almost smooth to verruculose. Stromata well-developed, subglobose, 35–70 µm diam., brown, stroma cells oval, ellipsoidal to angular in outline, 3–10 µm wide ($\bar{x}$ = 6.37 µm, n = 30), brown to dark brown, wall 0.5–1 µm wide ($\bar{x}$ = 0.74 µm, n = 30), smooth. Conidiophores fasciculate, arising from stromata (9–34 per fascicle) and solitary, borne on external mycelial hyphae, unbranched, cylindrical, (34–)40–86(–110) × 3–4 µm ($\bar{x}$ = 65.8 × 3.3 µm, n = 30), 2–9-septate, distance between septa 7–20 µm ($\bar{x}$ = 13.3 µm, n = 30), brown to dark brown, wall 0.5–0.8 µm ($\bar{x}$ = 0.58 µm, n = 30), smooth, 0–2 times geniculate; conidiogenous cells polyblastic, integrated, terminal or intercalary, 8–20 × 2–3 µm ($\bar{x}$ = 15.8 × 3.14 µm, n = 30), cylindrical, pale at the apex; conidiogenous loci small, conspicuous, sub-planate to planate, 1–1.5 µm wide ($\bar{x}$ = 1.15 µm, n = 10), wall 0.5–1 µm wide ($\bar{x}$ = 0.76 µm, n = 10), thickened, darkened. Conidia solitary or catenate, sometimes subcylindrical, but mostly slightly obclavate, occasionally with lateral branches, straight or slightly curved to sinuous, (16–)17–128(–153) × 2–4 µm ($\bar{x}$ = 74.13 × 2.8 µm, n = 30), 1–10-septate, pale olivaceous, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.36 µm, n = 30), smooth or finely verruculose, apex rounded or subtruncate, at the end of some conidia with a thickened hilum, base truncate, hila slightly thickened and darkened, 1–1.5 µm wide ($\bar{x}$ = 1.04 µm, n = 13), wall 0.5–0.8 µm wide ($\bar{x}$ = 0.52 µm, n = 13).

Colonies on PDA after 3 weeks at 25°C spreading surface ridged, grey-brown in the centre, margin greenish black, reaching 11 mm diam., hyphae 1–4 µm wide ($\bar{x}$ = 2.8 µm, n = 30), septate, constricted at the septa, distance between septa 6–18 µm ($\bar{x}$ = 11.9 µm, n = 30), greenish to brownish, wall approximately 0.25–0.5 µm ($\bar{x}$ = 0.34 µm, n = 30), smooth or verruculose. Conidia not formed in the culture.

Hosts – *Suregada multiflora* (Juss.) H. Baill. (Euphorbiaceae).

Distribution – **Asia:** Laos.

Material examined – Vientiane Capital, Xaythany District, Houay Den Meuang Village, on leaves of *Suregada multiflora*, 8 May 2006, P. Phengsintham (P36, MFLU12-2212, **holotype**). GenBank accession no (ITS, KC677914; LSU, KC677939).

Notes – Five *Zasmidium* spp. have been recorded on other hosts of the family Euphorbiaceae, but there is no record from *Suregada* spp. *Zasmidium bischofiae-javanicae* (R.K. Chaudhary, M.S. Tripathi, P.N. Singh & S. Chaudhary) Kamal (Chaudhary et al. 2001), *Z. brideliicola* (K. Srivast., A.K. Srivast. & Kamal) Kamal (Srivastava et al. 1994), *Z. gorakhpurensis* (Kamal & P. Kumar) Kamal (Kamal & Kumar 1980, de Hoog et al. 1983) as well as *Z. aporosae*, described above, are distinct from *Z. suregadae* by having conidiophores that are consistently formed singly, i.e. stromata and fasciculate conidiophores are lacking. *Zasmidium manihotis* (≡ *Stenella manihotis*, Braun & Freire 2004), described from Brazil on *Manihot* sp., is a similar species with solitary as well as fasciculate conidiophores, but the stromata are much smaller, 10–25 µm diam., or even lacking, the conidiophores are formed in small fascicles, they are wider, 3–7 µm, and the conidia are also wider, 3–6 µm. *Stenella ateramnae* R.F. Castaneda & B. Kendr. (Castaneda & Kendrick 1991), described from Cuba on *Ateramnus lucidus*, is close to the new species by having large stromata, 50–80 × 25–45 µm, with numerous conidiophores in fascicles, but the brown conidia are much longer, up to 280 µm, with up to 20 septa. Furthermore, the latter species has been described from fallen leaves (lesions lacking) with usually internal mycelium (verruculose external hyphae not described).

Literature – Kamal & Kumar (1980: 265–269), Hoog et al. (1983: 485–490), Castañeda & Kendrick (1991: 1–132), Srivastava et al. (1994: 515–520), Chaudhary et al. (2001: 226–232), Crous & Braun (2003: Key).

1.3.3.2 Morphologically similar cercosporoid fungi

(83) ***Cladosporium colocasiae*** Sawada, Trans. Nat. Hist. Soc. Taiwan 25: 125, 1916. Figs 166–167.

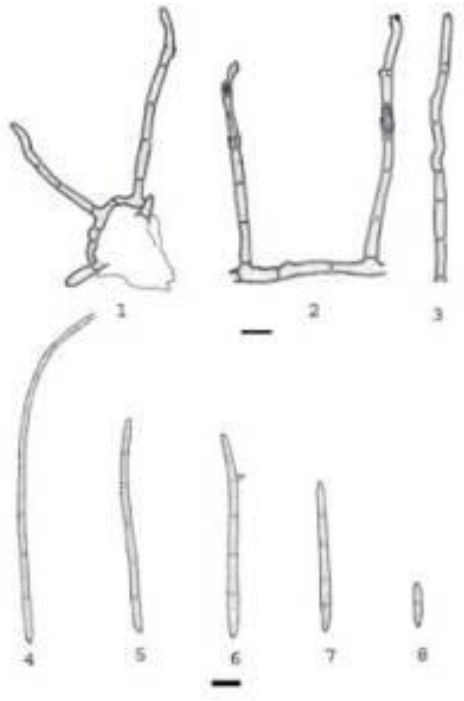

Fig. 164 – *Zasmidium suregadae* sp. nov on *Suregada multiflorae*: 1. Stroma with attached conidiophores. 2. External hypha with attached conidiophores. 3. Conidiophore. 4–8. Conidia. Bars = 10 µm.

Fig. 165 – *Zasmidium suregadae* sp. nov. on *Suregada multiflora* from leaf spots: 1–2 Lesions on host leaves (1. upper surface. 2. lower surface). 3. Caespituli. 4–5. Stromata with attached conidiophores. 6. Conidiophores. 7. External hypha with attached conidiophore. 8–12. Conidia. 13. Culture. 14. Mycelia. Bars 1–2, 13 = 10 mm, 4–12 = 10 µm.

Leaf spots orbicular or irregular, 2–25 mm in diameter, pale to greyish brown in the centre, grey-yellow margin. Caespituli amphigenous, effuse, velvety. Mycelium external; hyphae branched, 4–5.5 µm wide ($\bar{x}$ = 4.75 µm, n = 7), septate, constricted at the septa, distance between septa 10–12 µm long ($\bar{x}$ = 11 µm, n = 7), brownish, hyaline, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.65 µm, n = 7), smooth. Stromata absent. Conidiophores macronematous, solitary, arising from external hyphae, erect, straight or curved, geniculate, branched, small rounded to subconic tip, 28–165 × 3–9 µm ($\bar{x}$ = 58.9 × 4.79 µm, n = 20), 2–6-septate, distance between septa 8–35 µm ($\bar{x}$ = 19 µm, n = 30), pale to medium brown; wall 0.5–0.8 µm wide ($\bar{x}$ = 0.67 µm, n = 30), smooth, terminal and intercalary vesicular swelling (nodose) 4–5 µm wide ($\bar{x}$ = 4.5 µm, n = 30). Conidiogenous cells polyblastic, integrated, terminal and intercalary, 15–35 × 2–3.5 µm ($\bar{x}$ = 11 × 2.9 µm, n = 12), pale olivaceous or greenish; conidiogenous loci conspicuous, thickened and darkened towards the apex 1–1.5 µm wide ($\bar{x}$ = 1.67 µm, n = 15), wall 0.5–0.8 µm wide ($\bar{x}$ = 0.7 µm, n = 15), darkened. Conidia solitary, catenate, cylindrical rounded at the ends, ellipsoidal, limoniform or spherical, 4.5–30 × 2–6 µm ($\bar{x}$ = 11.25 × 3.37 µm, n = 30), 0–3-septate, slightly constricted at the septa; subhyaline to pale olivaceous; wall 0.3–0.5 µm wide ($\bar{x}$ = 0.35 µm, n = 30), smooth, apex the terminal conidia broadly rounded at the apex and some conidia with a small, distinctly protuberant scar 0.5–1.5 µm wide ($\bar{x}$ = 0.83 µm, n = 30), wall 0.3–0.5µm wide ($\bar{x}$ = 0.36 µm, n = 30), thickened and darkened; base with a prominent slightly thickened hilum, 0.5–2 µm wide ($\bar{x}$ = 1 µm, n = 30), wall thick 0.3–0.5µm wide ($\bar{x}$ = 0.35 µm, n = 30).

Hosts – *Colocasia esculenta* (L.) Schott (Araceae).

Distribution – **Africa:** Ethiopia, Guinea, Mauritius, Nigeria; **Asia:** Hong Kong, Laos, Nepal, Sabah, Sarawak, Pakistan, Taiwan, Thailand; **Oceania:** New Caledonia.

Material examined – Vientiane Capital, Xaythany District, Xay Village, on leaves of *Colocasia esculenta* 6 September 2006, P. Phengsintham (P185).

Notes – The collection from Laos agrees with the description of *Cladosporium colocasiae* given by Ellis (1971) [conidiophores

up to 180 µm long and 4–6 µm and conidia size 12–32 × 6–9 µm, 1–3-septate], but the conidia from Laos vary from 0–3-septate.

Literature – Ellis (1971: 312).

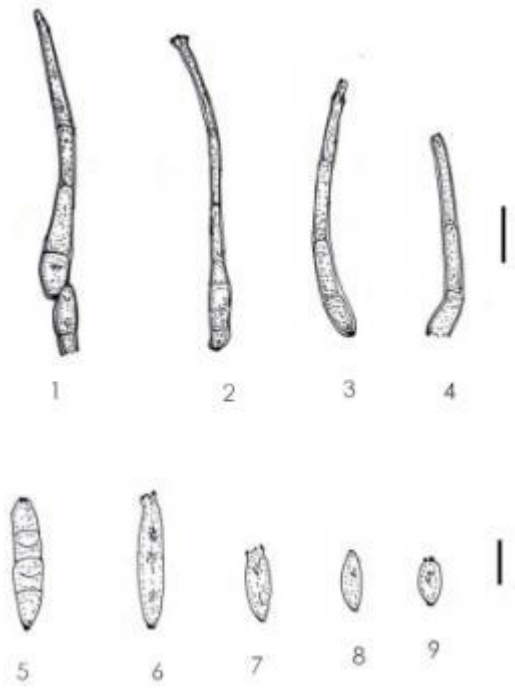

Fig. 166 – *Cladosporium colocasiae* on *Colocasia esculenta* from leaf spots: 1–4. Conidiophores. 5–9. Conidia. Bars = 10 µm.

(84) *Periconiella lygodii* Arch. Singh, Bhalla & S.K. Singh ex U. Braun, Feddes Repert. 115: 53, 2004. Figs 168–169.

Leaf spots black, striiform, restricted by lateral leaf veins and therefore appearing oblique, 1–5×1 mm, becoming confluent and eventually causing almost complete blackening of the leaflet. Caespituli amphigenous, conspicuous. Mycelium intercellar, inconspicuous. Stromata absent or small, intraepidermal, up to 15 µm diam, consisting of swollen, brown hyphal cells. Conidiophores single, arising through stomata, medium brown, smooth, 60–175 × 7–8 µm ($\bar{x}$ = 118 × 7.5 µm, n = 5), 5–11-septate, distance between septa 7–40 µm ($\bar{x}$ = 18.8 µm, n = 17), pale to medium brown, wall 0.5–0.8 µm wide ($\bar{x}$ = 0.66 µm, n = 17), smooth. Conidiogenous cells terminal, 17–22 × 5–6 µm ($\bar{x}$ = 20.5 × 4.5 µm, n = 7); conidiogenous loci usually restricted to the apex of the cell, slightly raised, slightly thickened and rather refractive than darkened,

Fig. 167 – *Cladosporium colocasiae* on *Colocasia esculenta* from leaf spots: 1. Lesions on host leaves (upper surface). 2–4. Conidiophores. 9–10. Conidia. Bars 1 = 10 mm, 2–10 = 10 µm.

1.5 µm diam. Conidia solitary, obclavate, tapering towards the apex, straight or slightly curved, pale brown, smooth, 17–58 × 4–5 µm($\bar{x}$ = 32.8 × 4.5 µm, n = 12), 0–7-septate, wall 0.3–0.5 µm wide ($\bar{x}$ = 0.47 µm, n = 12), smooth, basal hilum unthickened to thickened and not darkened to darkened, 1.5 µm wide.

Hosts – *Lygodium flexuosum* (L.) Sw., *L. japonicum* (Thunb.) Sw. (Schizaeaceae).

Distribution – **Asia:** India, Laos, Taiwan.

Material examined – Khammoune Province, Nakai District, Nahao Village, fallow forest, on leaves of *Lygodium flexuosum*, 3 June 2010, P. Phengsintham (P579).

Notes – The collection from Laos agrees with the description of *Periconiela lygodii* published by Singh et al. (1998) [conidiophores, 90–345 × 9–12 µm, with 3–6 septa, septa 8–75 µm apart; conidia solitary, obclavate, tapering towards the apex, straight or slightly curved, pale brown, smooth, 3–9-septate, 27–5 × 5–7 µm].

Literature – Braun (2004), Singh et al. (1998).

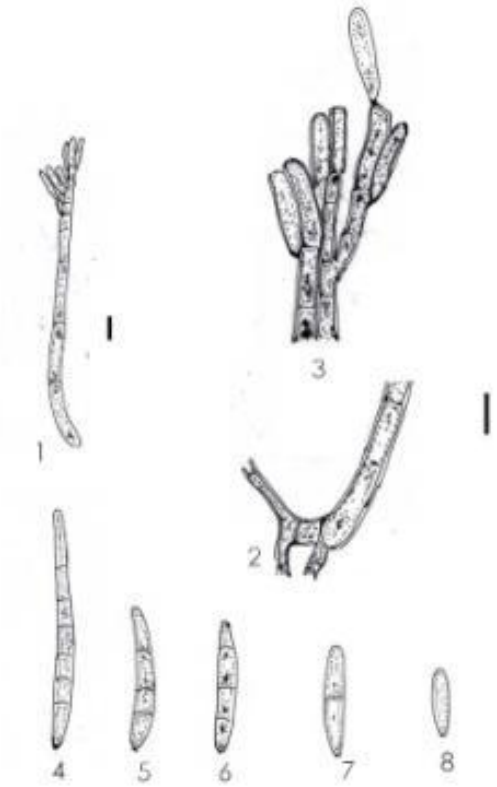

Fig. 168 – *Periconiela lygodii* on *Lygodium flexuosum* from leaf spots: 1. Stromata with attached conidiophores. 2. Base conidiophores. 3. Apex of conidiophores. 4–8. Conidia. Bar = 10 µm.

Fig. 169 – *Periconiela lygodii* on *Lygodium flexuosum* from leaf spots: 1. Lesions on host leaf. 2. Conidiophores. 3. Base of conidia. 4. Apices of conidiophores. 5–9. Conidia. Bars 3–9 = 10 µm.

(85) *Pseudocercosporella bakeri* (Syd. & P. Syd.) Deighton, Mycol. Pap. 133: 41, 1973. Figs 170–171.

≡ *Cylindrosporium bakeri* Syd. & P. Syd., Ann. Mycol. 14: 372, 1916.

= *Ramularia ipomoeae* F. Stevens, Bern. Bishop Mus. Bull. 19: 150, 1925.

= *Cercosporella ipomoeae* Sawada, Rep. Govt. Res. Inst. Dept. Agric. Formosa 86: 161, 1943.

= *Cercosporella ipomoeicola* Sawada, Spec. Publ. Coll. Agric. Natn. Taiwan Univ. 8: 192, 1959.

= *Pseudocercosporella ipomoeae* Deighton, Mycol. Pap. 133: 39, 1973.

Leaf spots subcircular, angular to irregular, 2–20 mm diam, pale greenish, becoming pale brown, finally greyish white; margin indefinite or with a narrow brown border. Caespituli amphigenous, punctiform to effuse, whitish.

Mycelium internal, consisting of hyaline, septate, sparingly branched, 1.5–3.5 µm wide hyphae; Stromata absent or small, intraepidermal, 10–40 µm diam, consisting of swollen, hyaline hyphal cells. Conidiophores usually aggregated, occasionally subfasciculate, up to about 20, arising from inner hyphae or hyphal aggregations, erumpent through the cuticle, short, erect, subcylindrical, conical, straight, curved to geniculate-sinuous, (2.5–)20–40 × (2–)2.5–4(–6) µm, 0–2-septate. Conidiogenous cells terminal, integrated, (2.5–)10–20 × 3.5–4 µm; conidial scars usually more or less truncate, 1.5–3 µm diam, unthickened, not darkened. Conidia solitary, subcylindrical, somewhat acicular to slightly obclavate, (35–)40–65 × (2.5–)3.5–4 µm, 1–3-septate in vivo, not constricted, hyaline, smooth, apex obtuse, base truncate or slightly obconically truncate, unthickened (adapted from Braun 1995). In vitro on OA, conidia (30–)46–60(–75) × (3.5–

)4(–4.5) µm, 1–7-septate, subcylindrical, guttulate, hyaline, smooth, at times narrowly obclavate, tapering in apical part to acutely rounded apex, and in basal part to long obconically subtruncate or subcylindrical base; base truncate, 2–3 µm wide, but with marginal thickening along the rim, which is also seen on scars on conidiogenous cells (but not observed in vivo).

Colonies on PDA after 3 weeks at 25°C black-grey mycelium, reaching 2–3 mm diam.

Hosts – *Ipomoea indica* (Burm.) Merr. (= *I. acuminata* (Vahl) Roem. & Schult., *I. aquatica* Forssk., *I. alba* L. (= *I. bona-nox* L.), *Ipomoea* sp. (Convolvulaceae).

Distribution – **Africa:** Sudan; **Asia:** Brunei, China (Hong Kong), Laos, Philippines, Sarawak and Sabah, Taiwan; **Oceania:** Hawaii.

Material examined – Vientiane Capital, Xaythany District, Xay Village, rice paddy, on leaves of *Ipomoea aquatica*, rice paddy, 14 May 2006, P. Phengsintham (P48), ibid., 12 August 2008, P. Phengsintham (P297), ibid., 8 September 2009, P. Phengsintham (P321).

Notes – *Pseudocercosporella ipomoeae* was described by Deighton (1973) based on its short, narrow conidia. However, an examination of type materials and additional collections of *P. bakeri* and *P. ipomoeae* led Braun (1995) to the conclusion that they represented a single taxon. As shown in the present study, conidial dimensions vary considerably from host material to culture, and hence we support the conclusion of Braun (1995) and treat this as a single species, *P. bakeri*, for which an epitype is designated. This species clusters as a close sister to the "*Dothistroma* clade" (Clade 7 in Crous et al. 2009c).

Literature – Chupp (1954: 171), Deighton (1973: 38–42), Hsieh & Goh (1990: 92), Braun (1995: 159–160).

(86) *Scolecostigmina mangiferae* **(**Koord.) U. Braun & Mouch., New Zealand J. Bot. 37: 323, 1999. Figs 172–173.

= *Cercospora mangiferae* Koord., Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Tweede Sect., 13: 236, 1907.

= *Stigmina mangiferae* (Koord.) M.B. Ellis, Mycolol. Pap. 72: 49, 1959.

= *Sciniatosporum mangiferae* (Koord.)

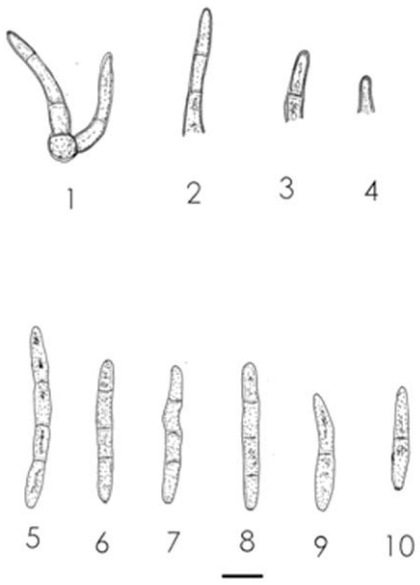

Fig. 170 – *Pseudocercosporella bakeri* from *Ipomoea aquatica*: 1. Stroma with attached conidiophores, 2–3. Conidiophores. 5–10. Conidia. Bar = 10 µm

Fig. 171 – *Pseudocercosporella bakeri* on *Ipomoea aquatica* from leaf spots: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3. Caespituli. 4. Stroma whith attached conidiophore. 5. Conidiophore. 6. Conidiophore with attached conidium. 7–10. Conidia. Bars 1–2 = 10 mm, 4–10 = 10 µm.

12 septete, distance between septa 7–60 µm ($\bar{x}$ = 37.03 µm, n = 26), Morgan-Jones, Canad. J. Bot. 49: 999, 1971.

Leaf spots round to angular black spots, 1–13 mm diam. ($\bar{x}$ = 4 mm, n = 13), pale grey or black in the centre, and with yellowish margin. Caespituli hypophyllous, minute, pucktiform, dark olivaceous-brown. Mycelium internal, inconspicuous. Stromata oval or ellipsoidal, 13–25 µm diam. ($\bar{x}$ = 18.44 µm, n = 9), dark brown, stromatal cells angular in outline, 3–7 µm wide ($\bar{x}$ = 3.84 µm, n = 20), wall 0.8–1 µm ($\bar{x}$ = 0.84 µm, n = 20), smooth. Conidiophores fasciculate, arising from stomata (1–4 per fascicle), unbranched, 0–1- geniculate, lageniform, straight or curved, 8–24 × 3–5 µm ($\bar{x}$ = 12 × 4.11 µm, n = 9), with up to 3 annellations, 0–2-septate, distance between septa 8–9 µm ($\bar{x}$ = 8.5 µm, n = 5), olivaceous-brown, paler and narrow at the apex, wall 0.5–1 µm wide ($\bar{x}$ = 0.9 µm, n = 9), smooth. Conidiogenous cells terminal, lageniform, 9 × 5 µm; conidiogenous loci small, at the apex, conspicuous, ovoid to oval, up to 2 µm, wall 0.8 µm thickened. Conidia solitary, cylindrical to obclavate, straight to curved, 21–77 × 3–5 µm ($\bar{x}$ = 50.53 × 3.84 µm, n = 13), 2–10-septate, reddish brown, pale near the apex, wall 0.3–0.8 µm wide ($\bar{x}$ = 0.53 µm, n = 13), smooth, tip subobtuse, base truncate, hila 2–3 µm wide ($\bar{x}$ = 2.85 µm, n = 9), wall 0.5–1 µm ($\bar{x}$ = 0.8 µm, n = 9), thickened and darkened.

Hosts – *Mangifera foetida* Lour., *M. indica* L. (Anacardiaceae).

Distribution – **Africa:** Angola, Congo, Gabon, Ghana, Malawi, Mozambique, Nigeria, São Tomé and Principe, Sierra Leone, Somalia, Sudan, Tanzania, Uganda; **Asia:** Brunei, China, Indonesia, Japan, Java, Laos, Malaysia, Nepal, Philippines, Sri Lanka, Taiwan, Thailand; **North America and West Indies:** Cuba, Dominican Republic, Haiti, Honduras, Jamaica, Mexico, Panama, Puerto Rico, Trinidan and Tobago, Virgin Islands; **Australia; Oceania:** Cook Islands, Fiji, New Caledonia, Papua New Guinea, Samoa, Solomon Islands, Vanuatu; **South America:** Colombia, Suriname, Venezuela.

Material examined – Vientiane Capital, Xaythany District, Dong Makkhai Village, Garden, on leaves of *Mangifera indica*, 18 December 2008, P. Phengsintham (P388).

Notes – The collection from Laos has conidiophores and conidia of a similar size to those described by Ellis (1971) and Hsieh & Goh (1990), but the conidiophores have only three annellations.

Literature – Saccardo (1910: 253), Ellis (1971: 146), Hsieh & Goh (1990: 21), Braun et al. (1999: 323), Crous & Braun (2003: 265).

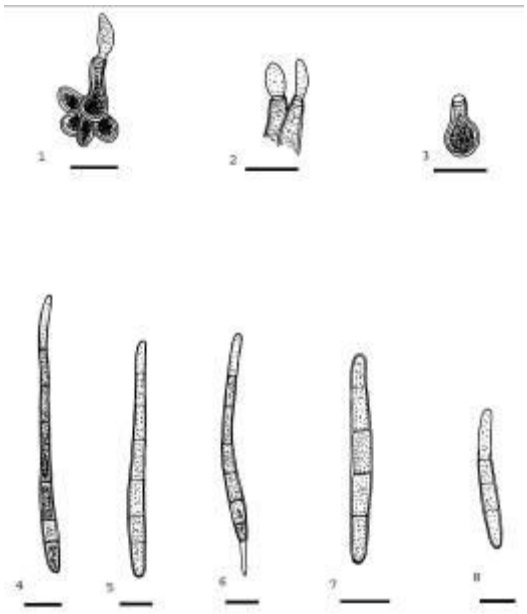

Fig. 172 – *Scolecostigmina mangiferae* from leaf spots of *Mangifera indica*: 1. Stroma with Conidiophore. 2–3. Conidiophores. 4–8. Conidia. Bars = 10 µm.

(87) ***Spiropes clavatus*** (Ellis & Martin) M.B. Ellis. Dematiaceous hyphomycetes: 256, 1971. Figs 174–175.

Leaf spots circular to irregular, 2–15 mm diam., black in the centre, and with dark brown or black margin. Caespituli effuse, epiphyllous, scattered, dark blackish brown, hairy. Mycelium external, hyperparasitic on *Meliora*; hyphae branched, 3–4 µm wide ($\bar{x}$ = 3.68 µm, n = 16), septate, constricted at the septa, distance between septa 5–25 µm ($\bar{x}$ = 11.68 µm, n = 16), brownish, wall 0.5–1 µm wide ($\bar{x}$ = 0.62 µm, n = 16). Stromata absent. Conidiophores arising from secondary mycelium, threads very tightly packed together to form erect, dark blackish brown to black synnemata, 410–609 × 18–35 µm ($\bar{x}$ = 536.53 × 29.28 µm, n = 5), spraying out at the apex and base, individually brown to dark brown, smooth, cylindrical, not branched, straight to curved, 410–609 × 3–6 µm ($\bar{x}$ = 525.43 × 4.2 µm, n = 19), 8–12-septate, distance between septa 7–60 µm ($\bar{x}$ = 37.03 µm, n = 26), medium brown, paler at the apex,

wall 0.5–1 µm wide ($\bar{x}$ = 0.71 µm, n = 26), smooth.

Fig. 173 – Scolecostigmina mangiferae from leaf spots of Mangifera indica: 1–2. Lesions on host leaves (1. upper surface, 2. lower surface). 3–4. Stroma with attached conidiophores. 5. Conidiophores. 6–12. Conidia (7 and10. Apex of conidia). Bars 1–2 = 10 mm, 3–12 = 10 µm.

Conidiogenous cells integrated, terminal, cylindrical, 25–60 × 4–7 µm ($\bar{x}$ = 45.5 × 5.57 µm, n = 14), pale brown; conidiogenous loci conspicuous, scattered, subcircular, 0.5–2 µm wide ($\bar{x}$ = 1.45 µm, n = 20), dark brown, wall 0.5–1.5 µm thick ($\bar{x}$ = 1.02 µm, n = 20). Conidia straight or slightly flexuous, obclavate or clavate, rostrate, dark brown in the broadest part, paler towards the ends, 26–55 × 8–11 µm ($\bar{x}$ = 36.43 × 9.63 µm, n = 30), 1–3(–4)-septate, subhyaline to olivaceous brown or dark brown, smooth, or verruculose, tip rounded, 2–6 µm wide ($\bar{x}$ = 2.68 µm, n = 25), wall of apex 0.8–1 µm ($\bar{x}$ = 0.88 µm, n = 25) thick., base truncate 3–4 µm wide ($\bar{x}$ = 3.43 µm, n = 30), wall of the hila 0.8–1 µm ($\bar{x}$ = 0.94 µm, n = 30) thick.

Hosts – *Mangifera indica* L. (Anacardiaceae).

Distribution – **Africa:** Ghana, Malawi, Sierra Leone, Uganda; **Asia:** Laos, Malaysia; **North America and West Indies:** Puerto Rica; **South America:** Argentina, Brazil.

Material examined – Vientiane Capital, Xaythani District, Phonsaath Village, on leaves of *Mangifera indica*, 19 December 2008, P. Phengsintham (P390).

Notes – This species is newly recorded in Laos, and it is morphological very similar to *Spiropes clavatus*, but the size of conidia of the collection from Laos is bigger and longer than described in Ellis (1971) [18–33 × 5–7 µm].

Literature – Ellis (1971: 256).

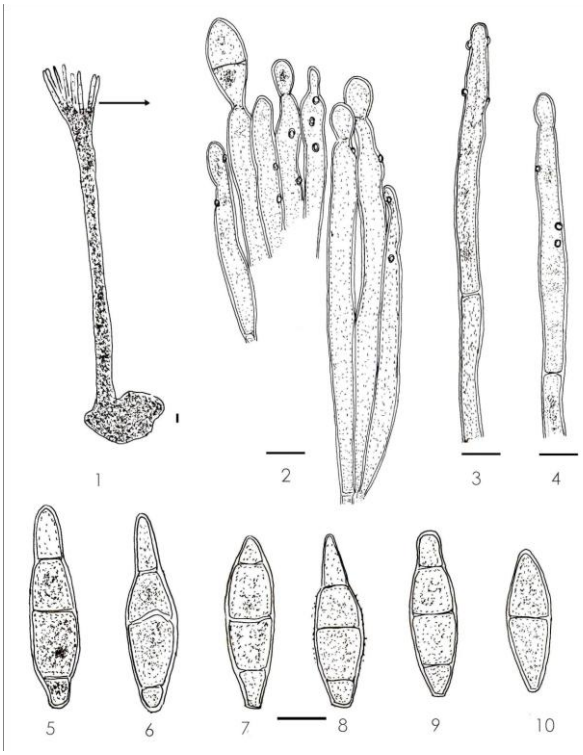

Fig. 174 – *Spiropes clavatus* on *Mangifera indica* from leaf spots. 1. Conidiophores, 2. Apical cells of conidiophores with attached young conidia; 3–4. Apical cells of Conidiophores, 5–19. Conidia. Bars = 10 µm.

Additonal cercosporoid fungi

(88) *Cercospora canescens* Ellis & G. Martin, Amer. Naturalist 16: 1003, 1882.

Material examined – Vientiane Capital, Xaythany District, Xay Village, on leaves of *Lablab purpureus* subsp. *bengalensis* (Jacq.) Verdc. (Fabaceae), 12 September 2006, P. Phengsintham (P172).

(89) ***Cercospora citrulina*** Cooke, Grevillea: 12: 31. 1883

Material examined – Vientiane Capital, Xaythany District, Xay Village, on leaves of *Luffa cylindrica* M. Roem. (Cucurbitaceae), 20 January 2006, P. Phengsintham (P199); Luangnamtha Province, Viengphoukha District, Mai Village, on leaves of *L. cylindrica* M. Roem., 3 May 2008, P. Phengsintham (P308).

Fig. 175 – *Spiropes clavatus* on *Mangifera indica* from leaf spots. 1–2. Lesions on host leaves (1. upper surface. 2. lower surface). 3. Conidiophores. 4. Base of conidiophores cells, 5–6. Apical cells of conidiophores with attached young conidia, 7–12. Conidia. Bars 1–2 = 10 mm, 3–12 = 10 µm.

(90) *Cercospora coffeicola* Berk. & Cooke, Grevillea 9: 99, 1881.

Material examined – Khammoune Province, Nakai District, Nahao Village, on leaves of *Coffea arabica* L. (Rubiaceae), 3 June 2010, P. Phengsintham (P577).

(91) *Cercospora crotalariae* Sacc., Syll. Fung. 22: 129, 1913.

Material examined – Luang Namtha Province, Namtha District, Chalensouk Village, on leaves of *Crotalaria uncinella* subsp. *elliptica* (Roxb.) Polhill (Fabaceae), 20 February 2010, P. Phengsintham (P574).

(92) *Cercospora diplaziicola* A.K. Das, Indian J. Mycol. Res. 27: 37, 1989.

Material examined – Vientiane Province, Xaysomboun District, Lak 33 Village, on fern leaves of *Diplazium esculentum* (Retz.) Sw. (Woodsiaceae), 28 May 2009, P. Phengsintham (P410).

(93) *Cercospora erytrinicola* Tharp, Mycologia 9: 109, 1917.

Material examined – Bolikhamsay Province, Lak 20 District, Nong Xong Village, on leaves of *Erythrina stricta* Roxb. (Fabaceae), 29 June 2008, P. Phengsintham (P333).

(94) *Cercospora nilghirensis* Govindu & Thirum. Sydowia 9: 224, 1955.

Material examined – Luang Prabang Province, Xiangngeun District, Lak 10 Village, Fallow forest, on leaves of *Conyza bonariensis* (L.) Cronquist (Asteraceae), 7 February 2007, P. Phengsintham (P240); Luang Namtha Province, Luang Namtha District, Chaleunsouk Village, on leaves of *C. bonariensis*, 19 February 2010, P. Phengsintham (P562).

(95) *Cercospora papayae* Hansf., Proc. Linn. Soc. London 155: 58, 1943.

(= *Cercospora apii*)

Material examined – Vientiane Capital, Xaythany District, Xay Village, Garden, on leaves of *Carica papaya* L. (Caricaceae), 3 August 2006, P. Phengsintham (P122); Houay Yang Village, on leaves of on *C. papaya*, 22 January 2007, P. Phengsintham (P197).

(96) *Cercospora petersii* (Berk. & M.A. Curtis) G.F. Atk., J. Elisha Mitchell Sci. Soc. 8: 57, 1892.

Material examined – Bolikhamxai Province, Thaphabath District, Hadkhai Village, mixed deciduous forest, on leaves of *Smilax chinensis* L. (Smilacaceae), 9 November 2009, P. Phengsintham (P460).

(97) *Cercospora sambuci* Y.L. Guo & Jiang, Mycotaxon 74: 262, 2000.

Material examined – Luangprabang Province, Xiangngeun District, Lak 10 Village, fallow forest, on leaves of *Sambucus* sp. (Adoxaceae), 7 February 2007, P. Phengsintham (P233).

(98) *Cercospora scrophulariae* (Moesz) Chupp, A monograph of the fungus genus *Cercospora*: 525, 1954.

Material examined – Luangnamtha Province, Namtha District, Chaleunsouk Village, fallow forest, on leaves of *Scrophularia* sp. (Scrophulariaceae), 20 February 2010, P. Phengsintham (P570).

(99) *Cercospora sonchi* Chupp., A Monograph of the fungus genus *Cercospora*: 154, 1954.

Material examined – Phongsaly Province, Phongsaly District, on leaves of *Taraxacum officinale* Wigg. (Asteraceae), 23 June 2010, P. Phengsintham (P591).

(100) *Cercospora tridacis-procumbentis* Govindu & Thirum., Sydowia 7: 49, 1953.

(= *Cercospora apii*)

Material examined – Vientiane Capital, Xaythany District, Xay Village, fallow forest, on leaves of *Tridax procumbens* L. (Asteraceae), 9 June 2007, P. Phengsintham (P282); Xaythany District, Xay Village, on leaves of *T. procubens*, 18 November 2011, P. Phengsintham (P649).

(101) *Pseudocercospora centromaticola* (J.M. Yen & Lim) J.M. Yen, in Yen & Lim, Gard. Bull. Singapore 33: 171, 1980.

Material examined – Vientiane Capital, Xaythany District, Xay Village, fallow forest, on leaves of *Centrosema pubescens* Benth. (Fabaceae), 11 May 2006, P. Phengsintham (P44).

(102) *Pseudocercospora cycleae* (Chidd.) Deighton, Mycol. Pap. 140: 143, 1976.

Material examined – Sayabouli Province, Paklay District, Sisa-art Somphou Village, fallow forest, on leaves of *Cyclea peltata* Hook. f. & Thomson (Menispermaceae), 19 August 2006, P. Phengsintham (P90).

(103) *Pseudocercospora ecdysantherae* (J.M. Yen) J.M. Yen, Bull. Trimestriel Soc. Mycol. France 97: 94, 1987.

Material examined – Vientiane Capital, Xaythany District, Nongviengkham Village, on leaves of *Ecdysanthera rosea* Hook. & Arn. (Apocynaceae), 9 August 2006, P. Phengsintham (P133).

(104) ***Pseudocercospora giranensis*** Sawada ex Goh & W.H. Hsieh, Trans. Mycol. Soc. Republ. China 2: 92, 1987.

Material examined – Vientiane Province, Toulakhom District, Phoukhaukhouay Protected Area, on leaves of *Glochidion eriocarpum* Champ. ex Benth. (Euphorbiaceae), 16 October 2006, P. Phengsintham (P181); Xiangkhouang Province, Paek District, Phonsavan Village, on leaves of *G. eriocarpum*, 1 March 2010, P. Phengsintham (P509).

(105) *Pseudocercospora ixorae* (Solheim) Deighton, Mycol. Pap. 140: 145, 1976.

Material examined – Vientiane Capital, Xaysetha District, Patouxay Garden, on leaves of *Ixora stricta* Roxb. (Rubiaceae), 15 May 2006, P. Phengsintham (P50).

(106) *Pseudocercospora malloticola* Goh & W.H. Hsieh., *Cercospora* and similar fungi from Taiwan: 124, 1990.

Material examined – Savannakhet Province, Vilaboury District, Naloumai Village, on leaves of *Mallotus thorelii* Gagnep. (Euphorbiaceae), 23 June 2010, P. Phengsintham (P588).

(107) *Pseudocercospora namae* (Dearn. & House) U. Braun & Crous. CBS Biodiversity Series 1: 288, 2003.

Material examined – Vientiane Capital, Xaythany district, Xay Village, rice paddy, on leaves of *Hydrolea zeylanica* (L.) Vahl (Hydroleaceae), 6 September 2006, P. Phengsintham (P159); Xaythany District, Xay Village, rice paddy, on leaves of *Hydrolea zeylanica*, 20 November 2009, P. Phengsintham (P466).

(108) *Pseudocercospora olacicola* (Muthappa) Kamal, M.K. Khan & R.K. Verma, Mycol. Res. 94: 241, 1990.

Material examined – Vientiane Capital, Xaythany District, Dongmakkhai Village, dipterocarp forest, on leaves of *Olax scandens* Roxb. (Olacaceae), 22 January 2007, P. Phengsintham (192).

(109) *Pseudocercospora puderi* Deighton, Mycol. Pap. 140: 90, 1976.

Material examined – Vientiane Capital, Xaythany District, Xay Village, on leaves of *Rosa chinensis* Jacq. (Rosaceae), 9 Septemebr 2006, P. Phengsintham (P164).

(110) *Pseudocercospora punicae* (Henn.) Deighton, Mycol. Pap. 140: 151, 1976.

Material examined – Xiangkhouang Province, Phonsavan Village, on leaves of *Punica granatum* L. (Lythraceae), 26 April 2011, P. Phengsintham (P623).

(111) *Pseudocercospora sarcocephali* (Vienn.-Bourg.) Deighton, Mycol. Pap. 140: 152, 1976. Figs 187-188

Material examined – Bolikhamsay Province, Lak 20 District, Nongxong Village, on leaves of *Sarcocephalus cordatus* (Roxb.) Miq. (Rubiaceae), 10 August 2008, P. Phengsintham (P358); Luangnamtha Province, Luangnamtha District, Chaleunsouk Village, on leaves of *S. cordatus*, 19 February 2010, P. Phengsintham (P557).

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

Material examined – Khammoune Province, Nakai District, Nahao Village, on leaves of *Scoparia dulcis* L. (Plantagiaceae), 20 July 2011, P. Phengsintham (P644).

(113) *Pseudocercospora tremicola* (J.M. Yen) Deighton [as '*trematicola*'], Mycol. Pap. 140: 154, 1976.

Material examined – Luangnamtha Province, Luangnamtha District, Chaleunsouk Village, on leaves of *Trema orientalis* (L.) Blume (Cannabaceae), 19 February 2010, P. Phengsintham (P563).

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