

CHAPTER 2

DIVERSITY AND TAXONOMY OF THE TRUE CERCOSPOROID FUNGI FROM THAILAND

2.1. Introduction

Cercospora sensu lato (*s. lat.*) or cercosporoid fungi are commonly associated with leaf spots, but can also cause necrotic lesions on flowers, fruits, bracts, seeds and pedicels of numerous hosts in most climatic regions (Agrios, 2005). *Cercospora s. lat.* is one of the largest group of hyphomycetes and the number of specific epithets once placed in the group exceeds 5,500 (Crous and Braun, 2003). This group of fungi was divided into several genera based on structure of conidiogenous loci (scars) and hila, and the presence or absence of pigmentation in conidiophores and conidia (Crous and Braun, 2003); the key of the true cercosporoid fungi and related genera are provided. Based on these morphological categories, Crous and Braun (2003) retreated and reexamined 5,720 names that related to *Cercospora s. lat.*, and proposed 455 taxonomic novelties within 10 genera including *Cercospora* Fresen., *Dactylaria* Sacc., *Fusicladium* Bonord., *Mycosphaerella* Johanson, *Passalora* Fr., *Scolecostigmina* U. Braun, *Semipseudocercospora* J. M. Yen, *Sirosporium* Bubák and Serebrian., *Sporidesmium* Link, and *Stenella* Syd. Crous and Braun (2003) also recognized only 659 *Cercospora s. str.* species from more than 3,000 *Cercospora* names that published by several earlier authors, and emphasized four genera, viz, *Cercospora*, *Passalora*, *Pseudocercospora*, and *Stenella*, as the true cercosporoid fungi.

Study on the true cercosporoid fungi based on the recent criteria that proposed by Crous and Braun (2003) in Thailand is needed as the previous reports and studies (Ellis, 1976; Giatgong, 1980; Sontirat *et al.*, 1980; Manoch *et al.*, 1986; Pons, 1988; Petcharat and Kanjanamaneesathian, 1989) were based on Chupp's criteria (Chupp, 1954). Further additions to the true cercosporoid fungi in Thailand based on the recent criteria proposed by Crous and Braun (2003) were published by Barreto and Evans, (1994), Crous (1998), Lumyong *et al.* (2003), Braun *et al.*, (2006), and Hunter *et al.* (2006), however, these information are fragmentary, and thus, need a revision. Survey on the diversity of this group of fungi and their distribution on the various host plants in Thailand are also necessary to carry out in order to provide a comprehensive database and a literature guide for the identification of this group of fungi which are beneficial to support the identification, detection, tracking, and risk assessment. Furthermore, academists can use the database as a source of information in education; mycologists can use as a tool for identification; plant pathologists and quarantine department can utilize the database to identify plant pathogens, analyses of diseases risk, protect native agricultural industries from disease incursions, and develop management of disease detection and treatments.

2.2. Materials and Methods

Collection and Observation

The specimens examined were generally collected from approximately seven provinces in northern Thailand from 2004 to 2008 as follows:

1. Chiang Mai
2. Uthradit
3. Phetchabun
4. Chiang Rai
5. Lamphun
6. Lampang
7. Payao

Specimen collection was carried out by observing cercospora leaf spot symptoms on the leaves surface. The symptoms are characterized by frog eye spots, stripes, shot-hole effect, discoloration, or necrosis. Leaf spots may be absent or presented in every degree of distinctness from a faint discoloration on the upper leaf surface to clearly defined and marked lesions. Specimens were collected after observing symptoms of *Cercospora* and allied genera on leaves using a 10× or 20 × magnifying glasses. The specimens that showed the cercosporoid fungi symptoms were stored in the plastic bags. Collecting bags are sealed and labeled some information including name of host plants, collecting site, collector and collection date.

Detailed observations of morphological characters were carried out by means of an Olympus CX31 light microscope using oil immersion (1000×). Specimens for microscopic observation were prepared by hand sectioning. Water and Shear's solution were used as mounting media. Thirty conidia, hila, conidiophores, conidiogenous loci, and 10 stromata were measured for each specimen. Line drawings were prepared at a magnification of 400×, and 1000× if necessary. Dried

herbarium specimens were deposited at CMU Herbarium (CMU), Biology Department, Faculty of Science, Chiang Mai University, Chiang Mai, Thailand, and BIOTEC Herbarium (BBH), Bangkok, Thailand. Living cultures were deposited at BIOTEC culture collection (BCC), Bangkok, Thailand, and Molecular of Plant Pathology Laboratory, Department of Plant Pathology, Chiang Mai University, Chiang Mai, Thailand.

Preservation of specimens

Once fully examined, each of specimens that positively contain caespituli of the cercosporoid fungi with all of its markers was pressed between clean paper sheets and dried for preservation. The papers were replaced by the new ones every day until specimen is completely dried. The specimen was then placed in a resealable envelope with the following details:

Herbarium code

Host name

Collection site

Collector

Date

The material was stored in labeled box in a dry environment and naphthalene balls were used to protect insect infestation at a minimum. Unused materials are destroyed.

Single Spore Isolation

Single spore isolation of each encountered new fungus was attempted referred to Choi *et al.* (1999) with a modification. A glass slide was sterilized with ethanol and wiped with a tissue paper on which ethanol (70%) has been sprayed. A sterilized pipette was then used to transfer 1-2 drops of sterilized water onto the glass slide. Flame sterilized fine forceps was used to take conidia from the specimen and suspend the conidia with sterilized water on the glass slide. Triangle line was marked on the bottom of the water agar plate. The prepared homogenous spore suspension was then transferred with a sterilized loop, onto the surface of the water agar plate, and smeared following the drawn lines. The unsealed plate was incubated at room temperature for approximately 24 hours. It was not sealed as this allows some of the surface water to dry out. If the plate is sealed with PARAFILM “M”[®] (Chicago, USA), water will accumulate on the surface of the agar and will increase the chance to contamination. The conidia were checked within 24 hours to establish germination. Once of the conidia had germinated, a sterilized glass needle was used to pick up a small piece of agar containing a conidium. In order to establish that the conidium was the one desired, and maintain quality control, a slide was prepared and examined under the compound microscope. If the conidia do not germinate after 24 hours, the plate was then sealed with PARAFILM “M”[®] (Chicago, USA) and examined periodically. Approximately 10-20 germinated conidia were transferred and distributed evenly onto two PDA plates and incubated at room temperature until their colony in diameter were about 1 to 2 cm. A small piece of mycelium with agar could then be cut and transferred to another PDA plate and the culture was checked after a few days, if there

was no contamination, a pure culture was obtained. Cultures could then be stored on the desired media.

Identification Procedures

Identification species is mainly based on the recent concepts of Deighton (1967, 1971, 1973, 1974, 1976, 1979, 1983, 1987), Pons and Sutton (1988), Braun (1988a, 1988b, 1989, 1990, 1993, 1994, 1995, 1996, 1998, 1999), and Crous and Braun (2003).

Key to the genera of the true cercosporoid fungi is a dichotomous key system adopted from Crous and Braun (2003) as follows:

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 and refractive (visible as minute rings) ***Pseudocercospora***
1. Conidiogenous 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 ***Stenella***
2. If superficial 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 non-scolecosporous, ellipsoid-ovoid, short cylindrical, fusoid and only few septa ***Passalora***

In most cases the specimen could not be identified to at least genus level with the above references, further identification required examination of the relevant literatures. Sources are often suggested in the above references and the Dictionary of Fungi (Kirk *et al.*, 2001), the ‘searchable’ Index Fungorum (<http://www.indexfungorum.org/Names/Names.asp>) and Systematic Mycology and Microbiology Laboratory (SMML) USDA Fungus-Host Database (<http://nt.ars-grin.gov/fungalatabases/fungushost/fungushost.cfm>) on the internet are also invaluable. If, after consulting all of the relevant literatures and seeking the advice of other mycologists, the fungi could not be identified, it was considered novel.

Presentation of Results

The cercosporoid fungi collected in this study are presented in alphabetical order and separated according to plant families. All species are also fully described and illustrated. The following data are provided: *names of species with references, synonymous, full description, specimen examined, habitat (host range), distribution with countries in alphabetical order, and notes* if necessary. For new species, a full description is presented (including Latin description for the published or submitted taxa), with the etymology of the specific epithet given and the holotype indicated in the “specimen examined”. Several unusual or rare species, or those which are poorly documented in the literature are illustrated and/ or a description given.

2.3. Results

In total, 166 species of the true cercosporoid fungi associated with 63 families of plants have been examined and identified, consist of 78 *Cercospora*, 21 *Passalora*, and 67 *Pseudocercospora* species. Twenty-one species are new to science in which nine species have been validly published or are in the process of publication. Sixty-two species are new records to Thailand, and 43 plants species are new host to this group of fungi. In addition, 30 species of genus *Cercospora* belong to *C. apii* s. lat. All of these taxa are listed in table 1. Reprints of the published taxa have been added in the publication section.

According to the International Code of Botanical Nomenclature, for a fungal species to be validly published, its description must include a Latin diagnosis, and the work in which it is published must be distributed to the public, or at least botanical institutions, through sale, exchange, or gift (Hawksworth *et al.*, 1995). Since there are only six or seven copies of this thesis, it will definitely not be widely distributed. Consequently, the new names within it will remain invalid until the author has published the descriptions with Latin diagnosis in recognized publications.

Table 1 List of the true cercosporoid fungi taxa recorded in this study.

Family	Fungus	Notes
<i>Acanthaceae</i>	<i>Cercospora andrographidicola</i>	
	<i>Cercospora barleriicola</i>	<i>C. apii</i> s. lat.
	<i>Passalora barleriigena</i>	New species
	<i>Pseudocercospora justiciae</i>	New record and new host
	<i>Pseudocercospora rhinacanthi</i>	
<i>Adiantaceae</i>	<i>Cercospora adiantigena</i>	New record and new host
<i>Alangiaceae</i>	<i>Pseudocercospora alangii</i>	New record
<i>Amaranthaceae</i>	<i>Cercospora canescens</i>	<i>C. apii</i> s. lat. and new host
	<i>Cercospora celosiae</i>	
	<i>Cercospora ricinella</i>	
<i>Apocynaceae</i>	<i>Cercospora peregrina</i>	<i>C. apii</i> s. lat., new record, and new host
	<i>Pseudocercospora kopsiae-fruticosae</i>	New species
	<i>Pseudocercospora repens</i>	New record
	<i>Pseudocercospora plumeriae</i>	New record and new host
<i>Araceae</i>	<i>Cercospora richardiicola</i>	<i>C. apii</i> s. lat.
<i>Araliaceae</i>	<i>Pseudocercospora panacis</i>	New record and new host
<i>Arecaceae</i>	<i>Cercospora arecacearum</i>	New species
<i>Aristolochiaceae</i>	<i>Cercospora apii</i>	New host
<i>Asclepiadaceae</i>	<i>Pseudocercospora marsdeniae</i>	New record and new host

Table 1 (continued)

Family	Fungus	Notes
Asteraceae	<i>Cercospora artemisiae</i>	New record and new host
	<i>Cercospora bidentis</i>	
	<i>Cercospora chrysanthemi</i>	<i>C. apii s. lat.</i> and new record
	<i>Cercospora cynarae</i>	New record
	<i>Cercospora dahliicola</i>	<i>C. apii s. lat.</i> and new record
	<i>Cercospora eupatorii</i>	
	<i>Cercospora gerberae</i>	<i>C. apii s. lat.</i>
	<i>Cercospora helianthicola</i>	<i>C. apii s. lat.</i>
	<i>Cercospora lactucae-sativae</i>	New host
	<i>Cercospora nilghirensis</i>	New record
	<i>Cercospora mikaniicola</i>	
	<i>Cercospora tagetis-erectae</i>	
	<i>Cercospora tridacis-procumbentis</i>	<i>C. apii s. lat.</i>
	<i>Cercospora zinniicola</i>	New record
	<i>Cercospora zinniae</i>	<i>C. apii s. lat.</i> , new record, and new host
		<i>Passalora assamensis</i>
	<i>Passalora tithonia</i>	
	<i>Pseudocercospora blumeae-</i> <i>balsamiferae</i>	New record
	<i>Pseudocercospora cosmicola</i>	New record and new host

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Table 1 (continued)

Family	Fungus	Notes
<i>Balsaminaceae</i>	<i>Cercospora balsaminiana</i>	New record and new host
	<i>Cercospora fukushiana</i>	<i>C. apii</i> s. lat.
<i>Basellaceae</i>	<i>Cercospora basellae-albae</i>	
<i>Bignoniaceae</i>	<i>Pseudocercospora jahnii</i>	New record
	<i>Pseudocercospora oroxyli</i>	
	<i>Pseudocercospora tecomae-heterophyllae</i>	
<i>Brassicaceae</i>	<i>Cercospora brassicicola</i>	New host
<i>Buddlejaceae</i>	<i>Pseudocercospora buddleiae</i>	
<i>Caricaceae</i>	<i>Cercospora papayae</i>	<i>C. apii</i> s. lat. and new record
	<i>Cercospora caricola</i>	New species
<i>Caprifoliaceae</i>	<i>Pseudocercospora sambucigena</i>	New species
<i>Chenopodiaceae</i>	<i>Cercospora beticola</i>	<i>C. apii</i> s. lat.
<i>Combretaceae</i>	<i>Pseudocercospora quisqualidis</i>	New record
<i>Convolvulaceae</i>	<i>Cercospora citrullina</i>	<i>C. apii</i> s. lat. and new host
	<i>Cercospora ipomoeae</i>	<i>C. apii</i> s. lat.
	<i>Cercospora operculinae</i>	<i>C. apii</i> s. lat. and new record

Table 1 (continued)

Family	Fungus	Notes
<i>Cucurbitaceae</i>	<i>Cercospora citrullina</i>	<i>C. apii</i> s. lat. and new host
	<i>Cercospora cocciniae</i>	New record and new host
	<i>Cercospora cucurbitacea</i>	
<i>Dioscoreaceae</i>	<i>Passalora dioscoreae</i>	New record and new host
<i>Dioscoreaceae</i>	<i>Pseudocercospora carbonacea</i>	
	<i>Pseudocercospora contraria</i>	
<i>Dracaenaceae</i>	<i>Pseudocercospora dracaenae</i>	New species
<i>Ebenaceae</i>	<i>Pseudocercospora diospyri-erianthae</i>	New record and new host
<i>Elaeagnaceae</i>	<i>Cercospora elaeagni</i>	
<i>Elaeocarpaceae</i>	<i>Pseudocercospora elaeocarpicola</i>	New species
<i>Euphorbiaceae</i>	<i>Cercospora acalyphae</i>	
	<i>Cercospora codiae</i>	<i>C. apii</i> s. lat., new record, and new host
	<i>Cercospora jatrophi</i>	
	<i>Cercospora phyllanthicola</i>	<i>C. apii</i> s. lat.

Table 1 (continued)

Family	Fungus	Notes	
<i>Euphorbiaceae</i>	<i>Cercospora ricinella</i>		
	<i>Passalora atrides</i>		
	<i>Passalora henningsii</i>		
	<i>Passalora manihotis</i>	New record	
	<i>Passalora codiaei</i>	New species	
	<i>Pseudocercospora eupatorii-</i> <i>formosani</i>	New record and new host	
	<i>Pseudocercospora glochidionis</i>		
	<i>Pseudocercospora jatrophae</i>	New record	
	<i>Pseudocercospora melanolepidis</i>		
	<i>Pseudocercospora euphorbiae-</i> <i>pubescentis</i>	New record and new host	
	<i>Fabaceae</i>	<i>Cercospora canescens</i>	<i>C. apii</i> s. lat.
		<i>Cercospora crotalariae</i>	<i>C. apii</i> s. lat., new record, and new host
		<i>Cercospora erythrinicola</i>	<i>C. apii</i> s. lat.
<i>Cercospora kikuchii</i>		<i>C. apii</i> s. lat.	
<i>Cercospora leucaenae</i>			
<i>Passalora aenea</i>			
<i>Passalora arachidicola</i>			
<i>Passalora buteae</i>	New record and new host		

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Table 1 (continued)

Family	Fungus	Notes
<i>Fabaceae</i>	<i>Passalora centrosematis</i>	
	<i>Passalora mucunicola</i>	
	<i>Pseudocercospora bauhiniae</i>	
	<i>Pseudocercospora centrosematicola</i>	New record
	<i>Pseudocercospora clitoriae</i>	New record
	<i>Pseudocercospora cruenta</i>	New record
	<i>Pseudocercospora dalbergiae</i>	
	<i>Pseudocercospora puerariae</i>	New record
	<i>Pseudocercospora stizolobii</i>	
<i>Flacourtiaceae</i>	<i>Pseudocercospora dovyalidis</i>	New record and new host
<i>Hamamelidaceae</i>	<i>Pseudocercospora liquadambaricola</i>	New record
<i>Hydrangeaceae</i>	<i>Cercospora hydrangeae</i>	<i>C. apii</i> s. lat.
<i>Lamiaceae</i>	<i>Cercospora kabatiana</i>	New record and new host
	<i>Cercospora physostegiae</i>	New record and new host
	<i>Cercospora volkameriae</i>	<i>C. apii</i> s. lat.
	<i>Passalora gmeliniicola</i>	New species
<i>Lomariopsidaceae</i>	<i>Pseudocercospora phyllitidis</i>	
<i>Lythraceae</i>	<i>Cercospora apii</i>	New host
	<i>Pseudocercospora cupheae</i>	
	<i>Pseudocercospora lythracearum</i>	New record
<i>Malvaceae</i>	<i>Cercospora althaeina</i>	New record

Table 1 (continued)

Family	Fungus	Notes
Malvaceae	<i>Cercospora malayensis</i>	<i>C. apii</i> s. lat.
	<i>Passalora sidae-mysorensis</i>	New species
	<i>Pseudocercospora abelmoschi</i>	
Meliaceae	<i>Pseudocercospora subsessilis</i>	
Menispermaceae	<i>Pseudocercospora pericampyli</i>	New species
Moraceae	<i>Cercospora broussonetiicola</i>	
Moraceae	<i>Cercospora ficina</i>	New record
	<i>Cercospora elasticae</i>	<i>C. apii</i> s. lat. and new record
	<i>Cercospora morina</i>	<i>C. apii</i> s. lat.
	<i>Pseudocercospora fici</i>	
	<i>Pseudocercospora fici-religiosae</i>	New record
	<i>Pseudocercospora mori</i>	
	<i>Pseudocercospora fici-caricae</i>	New record
Musaceae	<i>Pseudocercospora musae</i>	
Myricaceae	<i>Passalora myricae</i>	New species
Myrtaceae	<i>Pseudocercospora paraguayensis</i>	
Nelumbonaceae	<i>Pseudocercospora nymphaeacea</i>	New record
Nyctaginaceae	<i>Cercospora neobougainvilleae</i>	New species
	<i>Passalora bougainvilleae</i>	
	<i>Pseudocercospora bougainvilleae</i>	New record
Nymphaeaceae	<i>Pseudocercospora nymphaeacea</i>	

Table 1 (continued)

Family	Fungus	Notes
<i>Oleaceae</i>	<i>Pseudocercospora butleri</i>	New record and new host
<i>Onagraceae</i>	<i>Cercospora fuchsiae</i>	<i>C. apii</i> s. lat.
<i>Orchidaceae</i>	<i>Cercospora habenariicola</i>	New species
<i>Oxalidaceae</i>	<i>Cercospora oxalidis</i>	New record and new host
	<i>Pseudocercospora biophyti</i>	New record and new host
<i>Polypodiaceae</i>	<i>Cercospora platycerii</i>	
<i>Polypodiaceae</i>	<i>Pseudocercospora platycerii</i>	New species
<i>Polygonaceae</i>	<i>Pseudocercospora polygonigena</i>	New record and new host
<i>Portulacaceae</i>	<i>Cercospora talini</i>	<i>C. apii</i> s. lat.
<i>Pteridaceae</i>	<i>Cercospora cyclosori</i>	<i>C. apii</i> s. lat., new record, and new host
<i>Rosaceae</i>	<i>Cercospora scharifii</i>	New record and new host
	<i>Pseudocercospora puderi</i>	New record and new host
	<i>Pseudocercospora prunicola</i>	New record
<i>Rubiaceae</i>	<i>Cercospora coffeicola</i>	
	<i>Passalora haldinae</i>	New species
	<i>Pseudocercospora gardeniae</i>	New record
	<i>Pseudocercospora mitracarpigena</i>	New species
<i>Rutaceae</i>	<i>Pseudocercospora angolensis</i>	New record and new host
<i>Saururaceae</i>	<i>Cercospora houttuyniicola</i>	<i>C. apii</i> s. lat.
	<i>Pseudocercospora houttuyniae</i>	

Table 1 (continued)

Family	Fungus	Notes
<i>Solanaceae</i>	<i>Cercospora capsicigena</i>	<i>C. apii</i> s. lat.
	<i>Passalora natrassii</i>	
	<i>Passalora tarrii</i>	New record
	<i>Pseudocercospora daturina</i>	New record
	<i>Pseudocercospora egenula</i>	New record and new host
	<i>Pseudocercospora fuligena</i>	
	<i>Pseudocercospora solani-melongenicola</i>	
<i>Theaceae</i>	<i>Pseudocercospora ocellata</i>	New record
<i>Thelypteridaceae</i>	<i>Cercospora christellae</i>	New species
<i>Tiliaceae</i>	<i>Cercospora apii</i>	New host
<i>Verbenaceae</i>	<i>Cercospora apii</i>	New host
	<i>Cercospora durantae-erectae</i>	New species
	<i>Cercospora lantanae-indicae</i>	
	<i>Cercospora tectonae</i>	<i>C. apii</i> s. lat.
	<i>Pseudocercospora holmskioldiae</i>	New species
	<i>Pseudocercospora viticicola</i>	
<i>Zingiberaceae</i>	<i>Cercospora alpiniicola</i>	New record and new host

Taxonomy

Family *Acanthaceae*

Cercospora andrographidicola S. Q. Chen and P. K. Chi, *J. South China Agric. Univ.* 11: 61 (1990a).

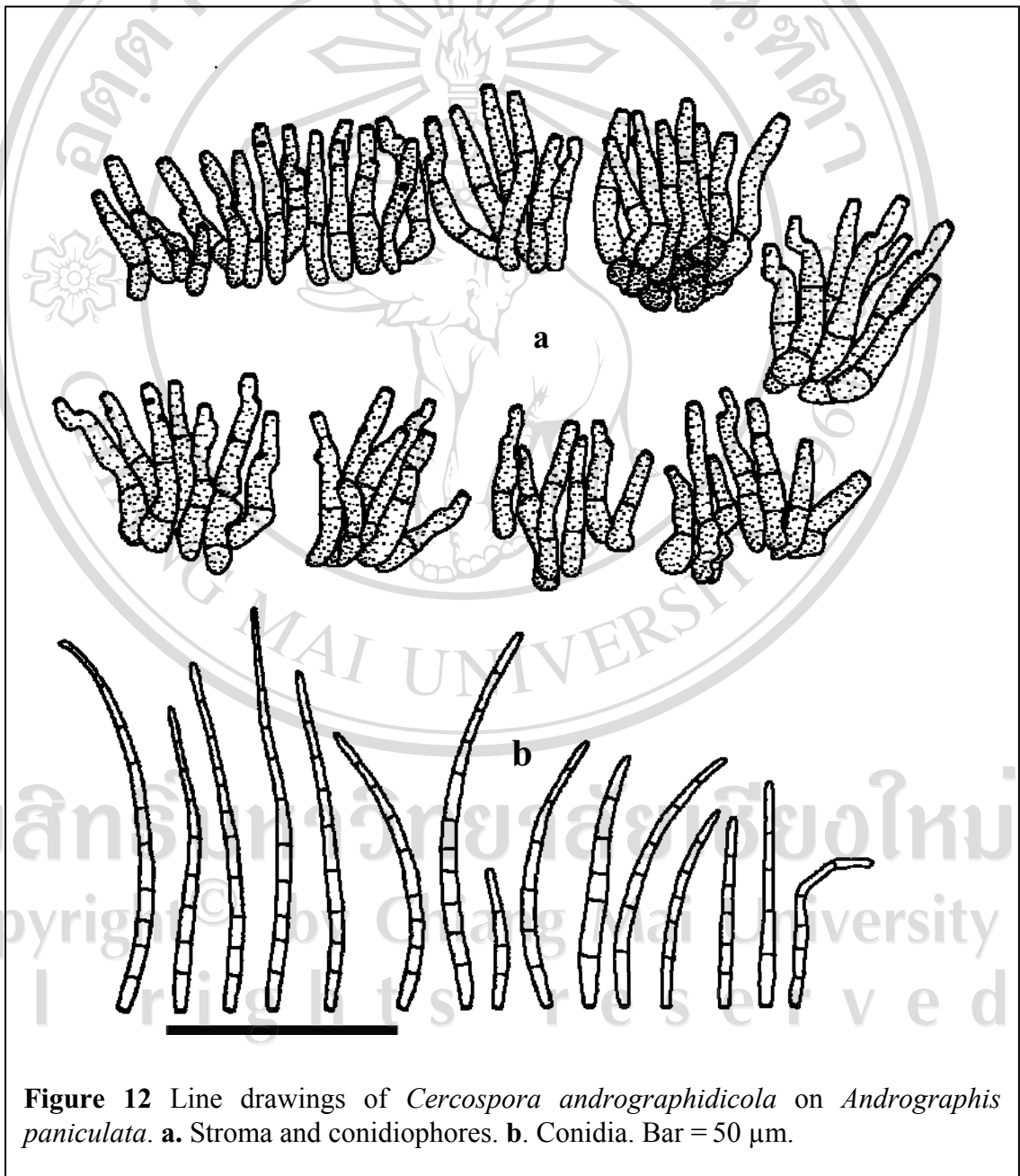
(Figure 12)

Leaf spots 2-5 mm in diameter, amphigenous, subcircular to irregular, distinct on the upper surface, brown with dark margin, without definite margins on the lower surface. *Caespituli* amphigenous. *Stromata* often lacking, rudimentary to poorly developed, if present small, up to 29.5 μm in diameter, composed of a few subglobose and dark brown cells. *Conidiophores* (16) 23-60 (74) \times 3-5 (6.5) μm , arranged in a loose fascicles, 1-9-septate, arising from stromata, straight or flexuous, simple, thick wall, brown to dark brown or paler towards the apex, geniculate near the apex.

Conidiogenous cells integrated, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* 1.5-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (30.5) 49-86 (91) \times (2) 2.5-3 (4) μm , obclavate to acicular, 3-15-septate, hyaline, straight to curved, truncate at the base with subacute apex, smooth, hila 1.5-2.5 μm diameter, with thickened.

Specimen examined: THAILAND, Uthairat Province, Sak Yai National Park, on leaves of *Andrographis paniculata* Nees (*Acanthaceae*), 25 November 2004, Jamjan Meeboon (CMU 27924).

Habitat: *Andrographis paniculata* (*Acanthaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).



Distribution: China and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first report of this species from Thailand was made by Meeboon *et al.* (2007c).

Cercospora barleriicola Payak and Thirum., *Indian Phytopath.* **2**: 191 (1949).

= *Cercospora barleriae-cristatae* Govindu and Thirum., *Sydowia* **10**: 273 (1957).

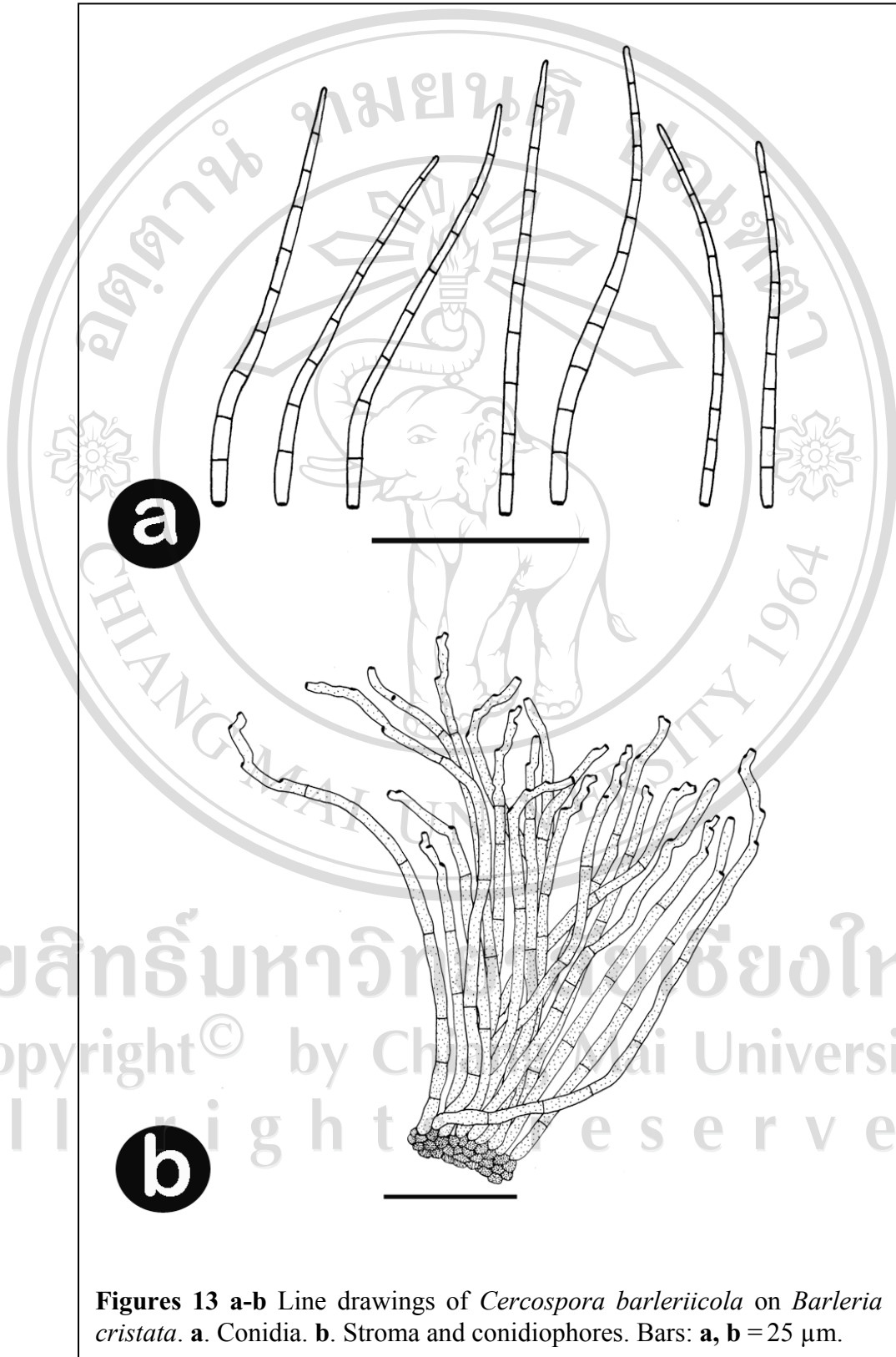
(= *C. apii* s. lat.)

(Figure 13a-b)

Leaf spots 5-8 mm diameter, amphigenous, dark to yellowish, only leaf decoloration on the host. *Caespituli* amphigenous. *Stromata* 20-24 μm diameter, small, substomatal, composed from few brown cells. *Conidiophores* 85-209 \times 3-4 μm , 5-7 in a loose fascicles, 5-8-septate, arising from stromata, straight, unbranched, cylindrical, not geniculate, smooth, brown at the base, and paler toward the apex. *Conidiogenous cells* integrated, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* 61-91 \times 2-3 μm , solitary, acicular, straight, hyaline, 6-13-septate, smooth, truncate at the base, tapering toward a subacute apex, hila 1.5-2 μm diameter, conspicuous, thickened, and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Dao District, Huay Luek Royal Project, on leaves of *Barleria cristata* L. (*Acanthaceae*), 6 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23592); Utradit Province,

Amphur Nam Pad, Sak Yai National Park, the same host, 25 November 2004,
Chiharu Nakashima and Jamjan Meeboon (CMU 27885).



Habitat: *Barleria cristata*, *B. prionitis*, *Barleria* sp. (*Acanthaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007b).

Distribution: India, Jamaica and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007b).

Notes: This species belongs to *C. apii* s. lat. fide Crous and Braun (2003). The first report of this species from Thailand was carried out by Meeboon *et al.* (2007b).

Literature: Chupp (1954, p. 22).

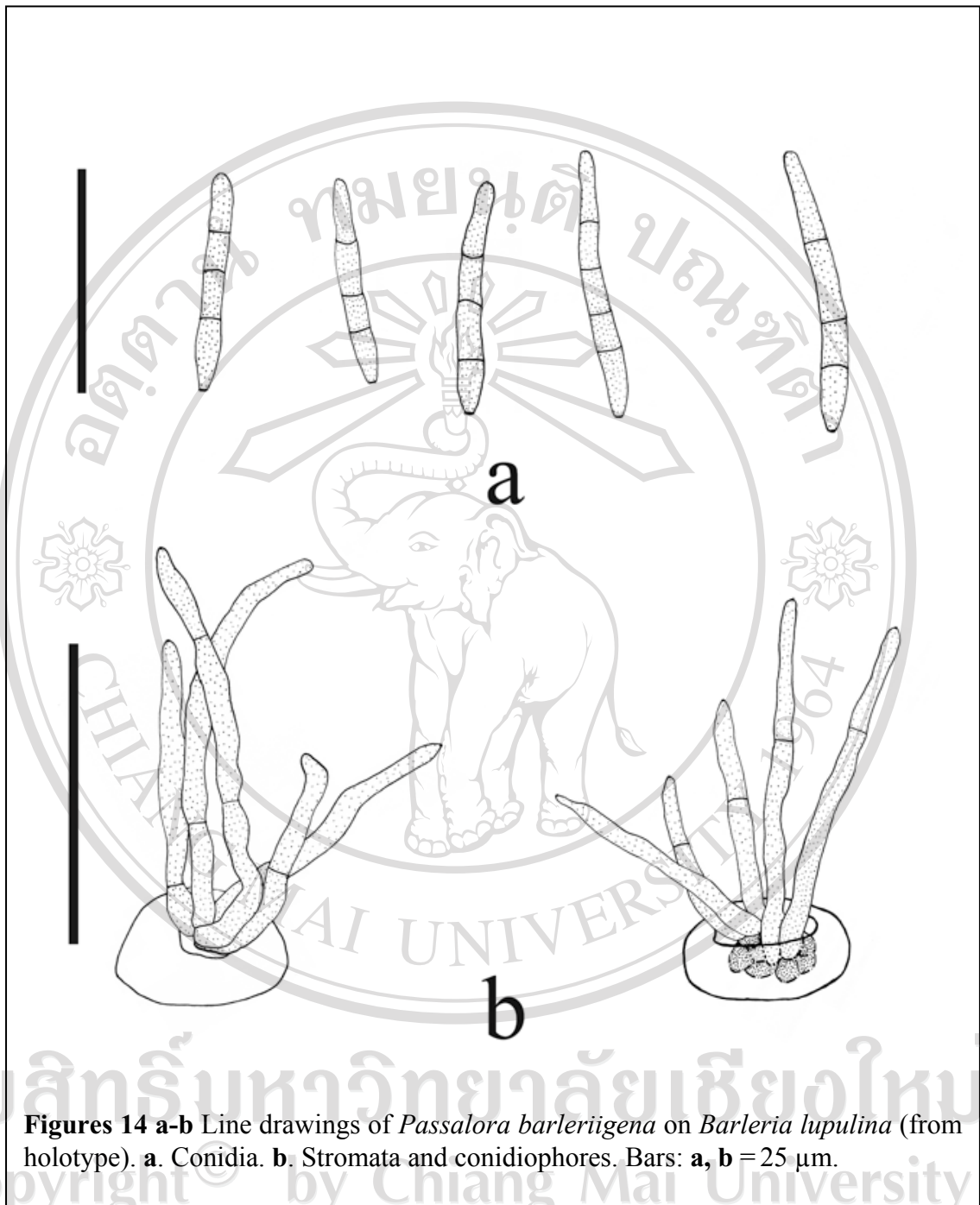
Passalora barleriigena Meeboon and Hidayat, *Mycotaxon* **102**: 140-141 (2007d)

Mycobank MB 510839

(Figures 14a-b)

Maculae 1-14 mm diameter, amphigenae, subcirculares vel irregulares, pallidae vel pallide brunneae, margine primo indistincto, deinde fusco. Caespituli amphigeni. Stromata 7.5-20 µm diameter, parva, ex cellulis, globosis vel subglobosis, brunneis, 3-7, composita. Conidiophora 22-66 × 3.5-5 µm, brevia, 4-7, dense fasciculata, per stoma emergentia, 1-3-septata, nonramosa, 1-2-geniculata, tenuitunicata, levia, basi atro-brunnea, apicem versus pallidiora. Cellulae conidiogenae integratae, terminales. Loci conidiogeni conspicui, incrassati, fuscati, 1-2 µm diameter Conidia 25-50 × 3.5-5 µm, solitaria, obclavata, rarissime oblonge cylindrici, recta (interdum curvata), basi leviter obconice truncata, apice rotundato, 1-3(-4)-septata, subhyalina vel pallide brunnea, hila incrassata et fuscata, 1-2 µm diameter

Etymology: the epithet refers to the genus name of the host.



Leaf spots 1-14 mm in diameter, amphigenous, subcircular to irregular, pale to pale brown, margin at first indefinite in young spots, later conspicuous, dark.

Caespituli amphigenous. *Stromata* 7.5-20 μm in diameter, small, composed of 3-7

globose to subglobose, brown cells. *Conidiophores* 22-66 \times 3.5-5 μm , mostly short, 4-

7 in a densely fasciculate, 1-3-septate, emerging through the stomata, thin-walled, smooth, dark brown at the base, paler toward the apex, unbranched, 1-2-geniculate. *Conidiogenous cells* integrated, terminal. *Conidiogenous loci* 1-2 μm in diameter, conspicuous, thickened and darkened. *Conidia* 25-50 \times 3.5-5 μm , solitary, mostly obclavate, occasionally oblong-cylindrical, straight (occasionally curved), slightly obconically truncated at the base, mostly tapering toward a blunt, rounded apex, 1-4-septate, subhyaline to pale brown, hila 1-2 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui National Park, on leaves of *Barleria lupulina* Lindl. (*Acanthaceae*), 30 December 2005, Jamjan Meeboon (CMU 28212: **holotype**); **Paratype:** the same locality and host, 10 December 2006, Jamjan Meeboon and Ikumitsu Araki (CMU 28213); *ibid*, 19 September 2007, Jamjan Meeboon (BBH 23757).

Habitat: *Barleria lupulina* (*Acanthaceae*).

Distribution: Thailand (type locality).

Notes: Only one other species of *Passalora*, *P. acanthicola* (Hansf.) U. Braun and Crous has been recorded from *Acanthaceae* (on *Acanthus* spp.) (Crous and Braun, 2003). *Passalora barleriigena* is distinct from *P. acanthicola* in having unbranched and shorter conidiophores (22-66 \times 3.5-5 μm vs 150-250 \times 4-6 μm in *P. acanthicola*). The solitary conidia of *P. barleriigena* are also distinct from those of *P. acanthicola*, which are reported as sometimes being in branched chains (Chupp, 1954; Deighton, 1987). The conidia of *P. acanthicola* are cylindrical, rounded at both ends and measure 20-95 \times 4-6 μm .

Pseudocercospora justiciae (F. L. Tai) Y. L. Guo and X. J. Liu, *Mycosystema* 4: 103 (1991).

≡ *Cercospora justiciae* F. L. Tai, *Lloydia* 11: 47 (1948).

(Figure 15)

Leaf spots 2-13 mm diameter, distinct, amphigenous, irregular, scattered, brown, with blackish-brown margins. *Caespituli* amphigenous. *Stromata* (17) 31 ± 11.6 (41) μm diameter, intraepidermal, well-developed, composed of a few globose to subglobose, brown to dark brown cells. *Conidiophores* (23) 37.5 ± 9.4 (58) \times (2) 3 ± 0.5 (4) μm , numerous in a dense fascicles, 1-3-septate, arising from the stromata, smooth, brown, simple, straight, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (19) 62 ± 27.8 (107) \times (2) 2.5 ± 0.5 (3.5) μm , solitary, acicular to obclavate, 3-10-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the base, with subacute apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Mae Fag, Sansai, Farming area, on leaves of *Justicia betonica* L. (*Acanthaceae*), 9 August 2008, Jamjan Meeboon (BBH 23710).

Host: *Justicia procumbens*, *Justicia* sp. (*Acanthaceae*) (Crous and Braun, 2003).

Distribution: China, and USA (Crous and Braun, 2003).

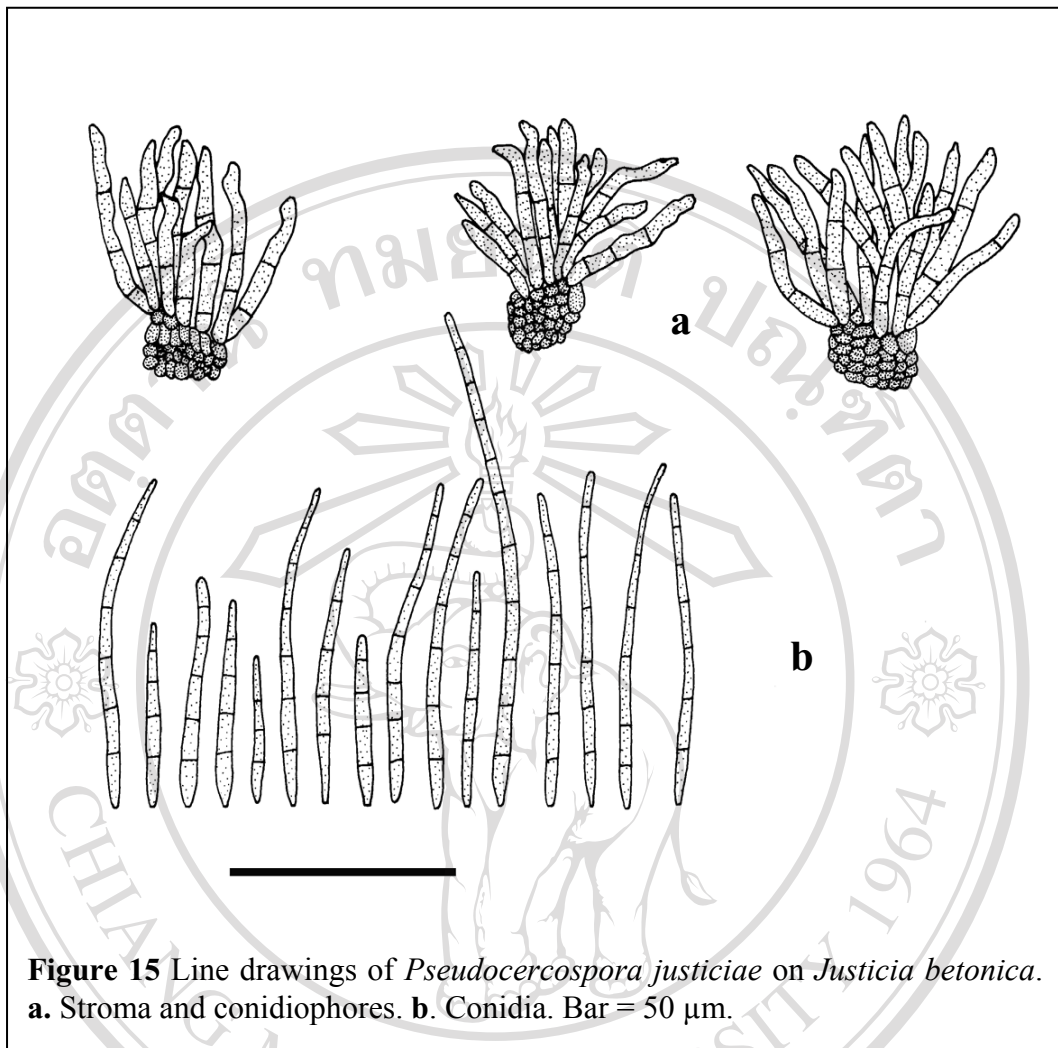


Figure 15 Line drawings of *Pseudocercospora justiciae* on *Justicia betonica*.
a. Stroma and conidiophores. **b.** Conidia. Bar = 50 μm .

Notes: This specimen is a new record of *P. justiciae* from Thailand, and *Justicia betonica* is reported here as a new host of this pathogen.

Pseudocercospora rhinacanthi (Höhn.) Deighton, *Mycol. Pap.* **140**: 152 (1976).

≡ *Cercospora rhinacanthi* Höhn. (*rhynacanthi*). *Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Wien.* **121**: 414 (1912).

≡ *Cercosporina rhinacanthi* (Höhn.) Sacc., *Syll. Fung.* **25**: 917 (1931).

(Figure 16)

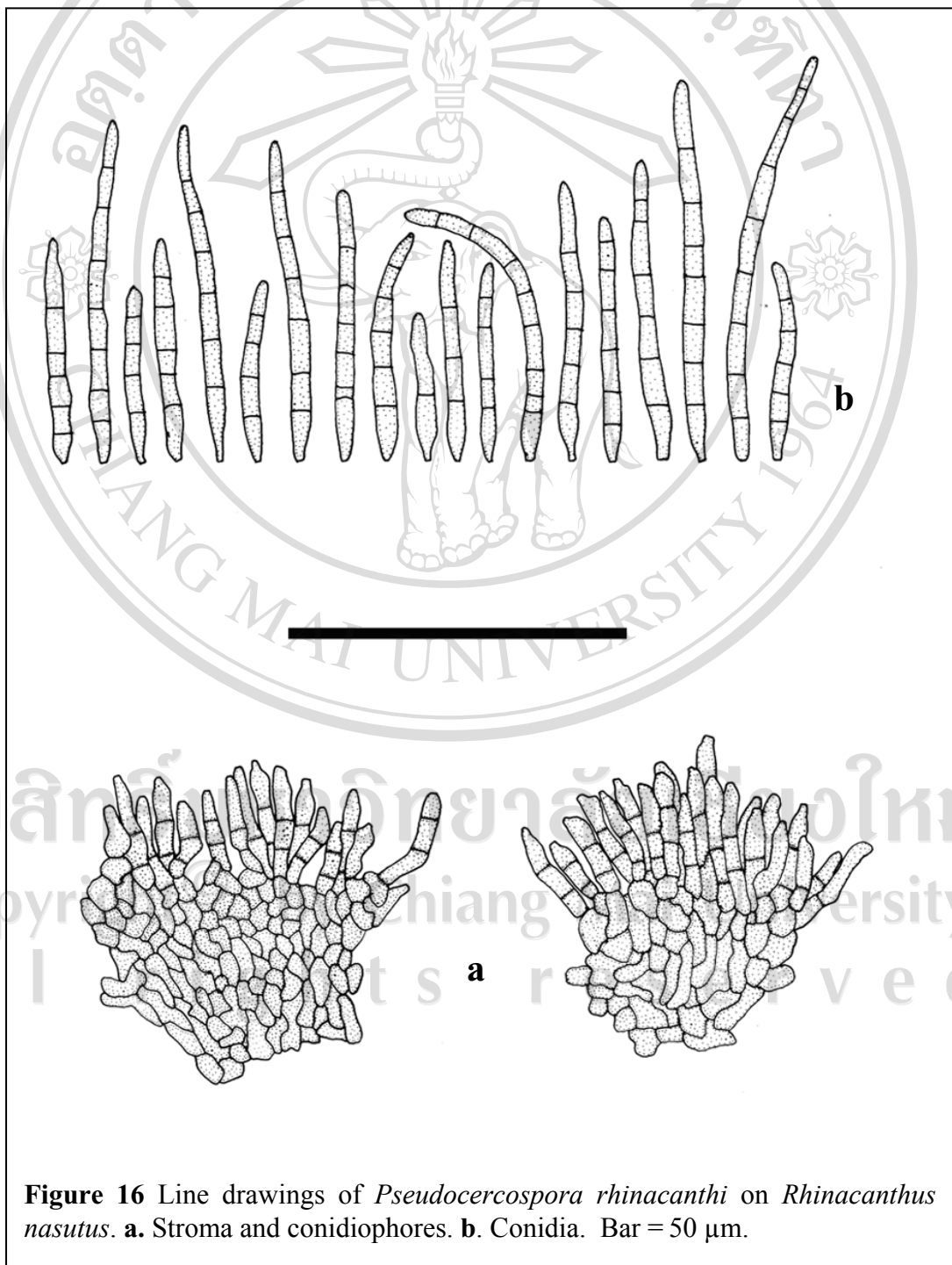
Leaf spots 5-25 mm diameter, amphigenous, solitary, distinct, visible on both upper and lower surfaces, circular-subcircular in shape, dark brown with whitish gray center surrounded by a raised yellowish brown border line on the upper part, on the lower surface brown to yellowish with brown margin. *Caespituli* amphigenous, abundantly hypophyllous. *Stromata* 27-57 μm diameter, well-developed, substomatal, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (16.5) 23-34.5 (40) \times 2.5-3.5 (4) μm , densely fasciculate, 1-2-septate, arising from stromata, straight to decumbent, smooth, brown, and paler towards the apex, unbranched, non-geniculate or slightly geniculate near the apex. *Conidiogenous cells* integrated, terminal, holoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (27) 42.5-64 (76.5) \times 2.5-3.5 (4) μm , solitary, obclavate to cylindrical, 1-7-septate, straight to mildly curved, subhyaline, smooth, obtuse to subobtuse at the apex, obconically truncate at the base, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Rhinacanthus nasutus* Kuntze (*Acanthaceae*), 25 November 2005, Jamjan Meeboon (CMU 27892); Samoeng, Pang Da Royal Project, on the same host, 7 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23742).

Habitat: *Justicia procumbens*, *R. nasutus*, *Rhinacanthus* sp. (*Acanthaceae*) (Crous and Braun, 2003).

Distribution: China, Indonesia, Java, Philippines, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007b).

Notes: The first record of this species from Thailand was made by Chandrasrikul (1962) as "*Cercospora rhinacanthi*" on *Rhinacanthus nasutus* in a preliminary host list of plant diseases in Thailand. Meeboon *et al.* (2007b) re-collected and reported the specimen as *P. rhinacanthi* because of inconspicuous conidial scars and unthickened hila.



Family *Adiantaceae*

Cercospora adiantigena U. Braun and Crous, *CBC Biodiversity Series* 1: 44-45 (2003).

(Figure 17)

Leaf spots 5-15 mm diameter, amphigenous, solitary, circular, brown to dark brown, with dark margin and grey at the center. *Caespituli* amphigenous. *Stromata* 9-43 μm diameter, substomatal to intraepidermal, small, composed of few subglobose, brown to blackish brown cells. *Conidiophores* 74-106 \times 3-4 μm , 6-11 in a loose fascicles, 1-3-septate, arising from stromata, straight to decumbent, smooth, brown at the base, and paler toward the apex, cylindrical, unbranched, geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, mostly polyblastic, sympodially proliferating. *Conidiogenous loci* 1.5-2.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* 53-60 \times 2-3 μm , solitary, obclavate, straight, slightly curved, hyaline, 7-16-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 1.5-2 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Mae Rim, Nong Hoi Royal Project Foundation, on leaves of *Doryopteris ludens* J. Sm. (*Adiantaceae*),

12 September 2007, Parin Noiruang (BBH 23634).

Host: *Adiantum philippense* (*Adiantaceae*) (Crous and Braun, 2003).

Distribution: Tanzania (Crous and Braun, 2003).

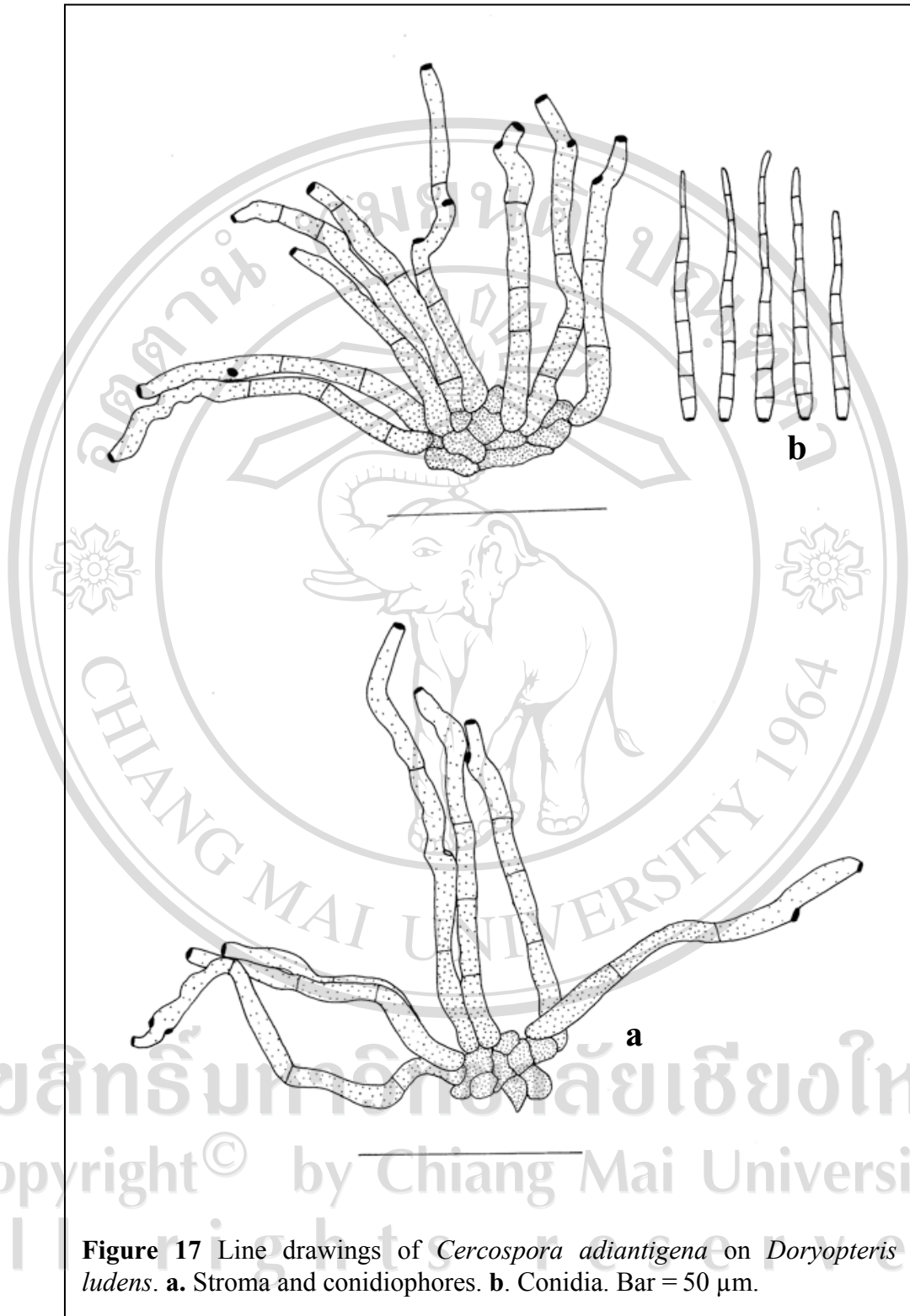


Figure 17 Line drawings of *Cercospora adiantigena* on *Doryopteris ludens*. **a.** Stroma and conidiophores. **b.** Conidia. Bar = 50 μ m.

Notes: *Doryopteris ludens* is a fern belong to family *Adiantaceae*. About three species of *Cercospora s. str.* have been reported from *Adiantum* spp., viz,

C. adianticola R. K. Srivast., A. K. Srivast., and Kamal (*C. apii* s. lat.), *C. adiantigena* U. Braun and Crous, and *C. pteridigena* M. K. Khan, R. K. Verm, and Kamal. *Cercospora pteridigena* is distinct from this specimen by having very long conidiophores, and large conidiogenous loci (4-5 μm diameter). This specimen is identified as *C. adiantigena* due to short and obclavate conidia (53-60 \times 2-3 μm vs 40-90 \times (4) 5-8 μm of *C. adiantigena*). This specimen is the new record of *C. adiantigena* from Thailand, and *D. ludens* is reported here as a new host of this fungus.

Family Alangiaceae

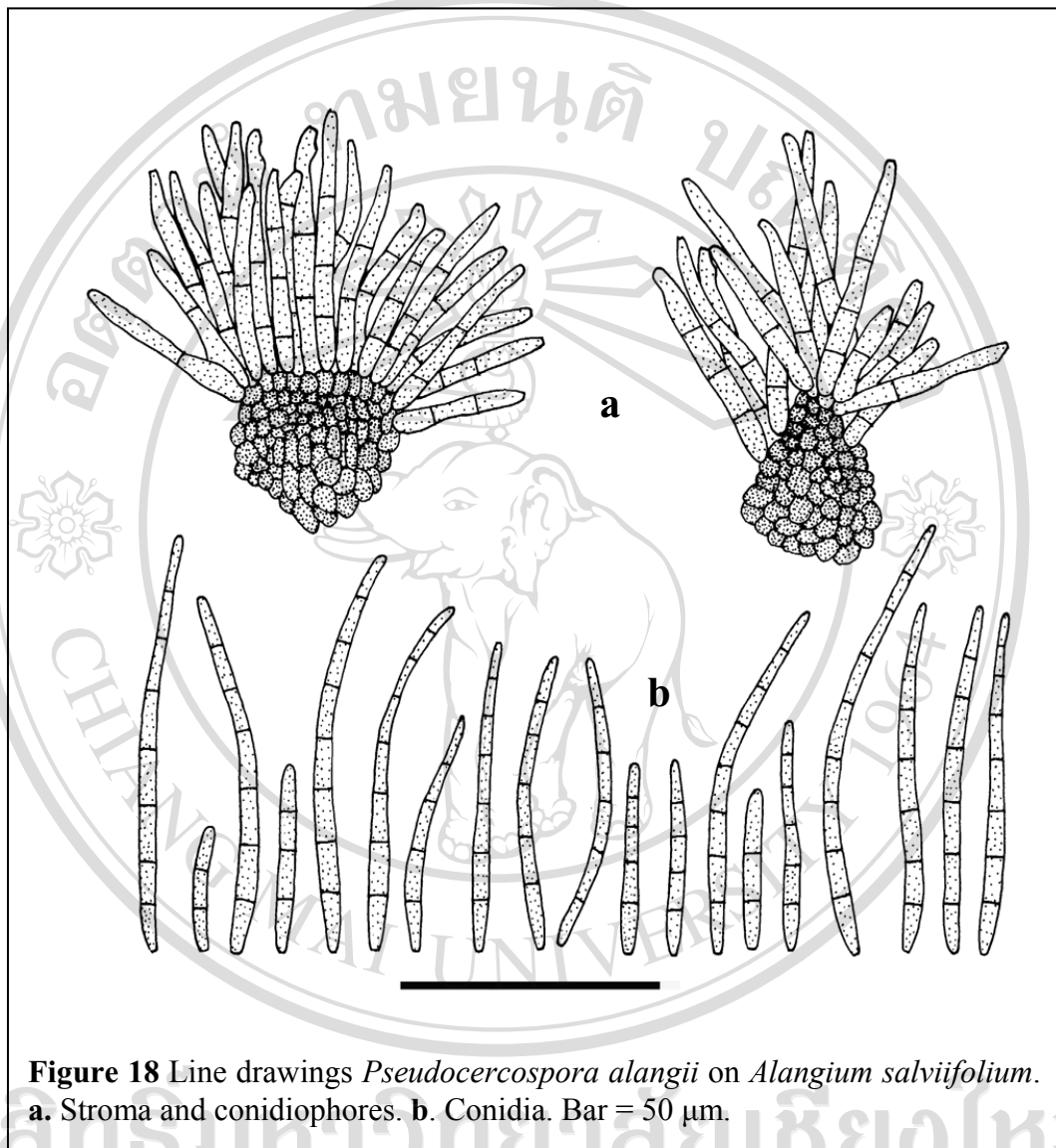
Pseudocercospora alangii Y. L. Guo and X. J. Liu, *Mycosystema* 2: 226 (1989).

= *Cercospora alangii* M. Mandal, *Indian J. Mycol. Res.* 16: 311 (1978).

(Figure 18)

Leaf spots 5-19 mm diameter, distinct, amphigenous, circular to irregular, scattered, grayish-brown, with dark margins. *Caespituli* hypophyllous. *Stromata* (23) 27.5 \pm 6.8 (40) μm , intraepidermal, well-developed, composed of brown to dark brown cells. *Conidiophores* (18) 38.5 \pm 10.8 (67.5) \times (2) 3 \pm 0.7 (4.5) μm , numerous in a densely fasciculate, divergent, 1-3-septate, arising from the stromata, brown, smooth, simple, straight, not geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (14.5) 55.5 \pm 21.9 (89) \times (2) 3 \pm 0.7 (4.5) μm , solitary, obclavate

to long filiform, 2-8-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the base with obtuse apex, hila unthickened and not darkened.



Specimen examined: THAILAND, Chiang Mai Province, Mae Fag, Sansai, Farming area, on leaves of *Alangium salviifolium* Wang. (*Alangiaceae*), 3 August 2008, Jamjan Meeboon (BBH 23752).

Host: *Alangium kurzii*, *A. salviifolium* (*Alangiaceae*) (Crous and Braun, 2003).

Distribution: China and India (Crous and Braun, 2003).

Notes: This specimen is the first record of *P. alangii* from Thailand.

Family *Amaranthaceae*

Cercospora canescens Ellis and G. Martin, *Amer. Naturalist* **16**: 1003 (1882).

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

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

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

(Figures 19a-b; 20a-b)

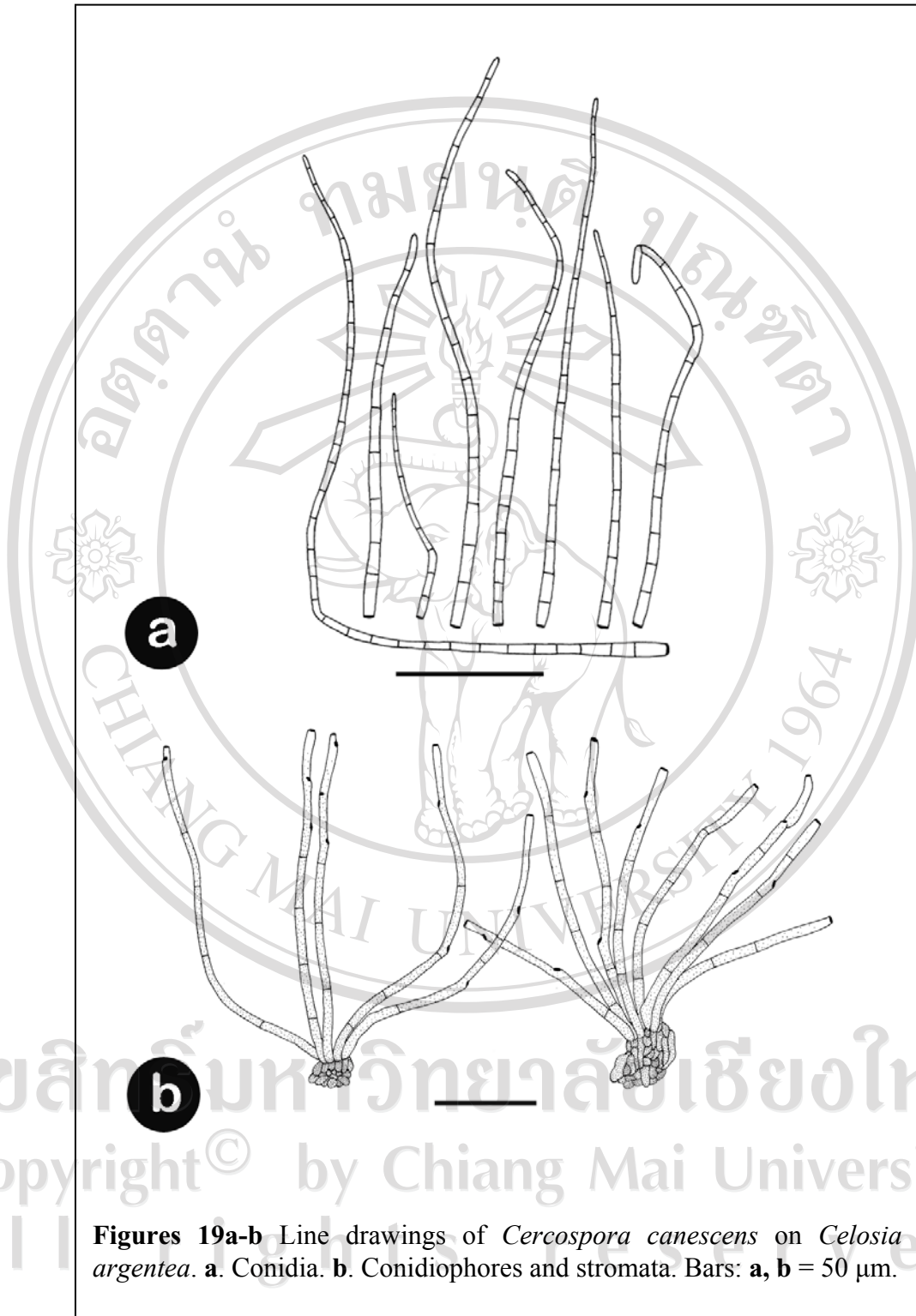
Leaf spots 3-6 mm diameter, amphigenous, dark to yellowish, only leaf decoloration on the host. *Caespituli* hypophyllous. *Stromata* mostly lacking, if present small, up to 8 µm diameter, composed of 4-5 globose to subglobose, brown to dark brown cells. *Conidiophores* (90.5) 154 ± 29.5 (192) × (3) 3.5 ± 0.5 (4) µm, up to 5 in a loose fascicles, 3-7-septate, arising from stromata, straight, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, geniculate. *Conidiogenous cells* integrated, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3.5 µm diameter, conspicuous, thickened, and darkened. *Conidia* (82) 192 ± 57.4 (316) × (3) 3 ± 0.2 (4) µm, solitary, acicular, straight, hyaline, 10-22-septate, smooth, truncate at the base, tapering toward a subacute apex, hila 2.5-3 µm diameter, conspicuous, thickened, and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, Multiple Cropping Centre, on leaves of *Celosia argentea* L. (*Amaranthaceae*), 14 August 2008, Jamjan Meeboon (BBH 23725); Chiang Rai Province, Mae Fah Luang, Mae Jan, Doi Tung Development, on leaves of *Iresine herbstii* Hook. (*Amaranthaceae*), 16 August 2008, Jamjan Meeboon (BBH 23586).

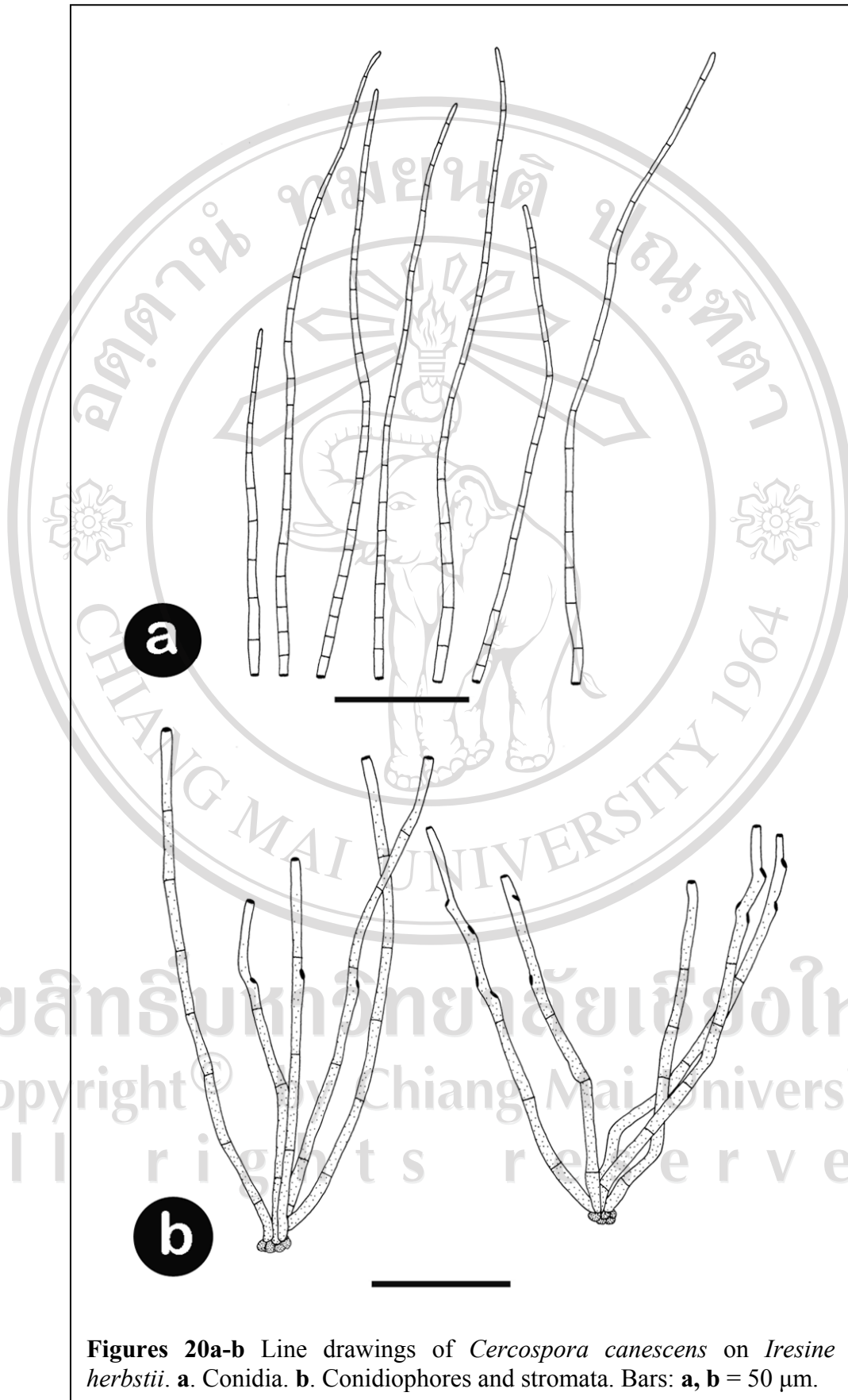
Host: *Amaranthus* sp., *Celosia argentea* (*Amaranthaceae*), *Annona odorata*, *A. squarrosa* (*Annonaceae*), *Rauvolfia serpentina* (*Apocynaceae*), *Verschaffeltia splendida* (*Arecaceae*), *Aster novibelgii* (*Asteraceae*), *Bixa orellana* (*Bixaceae*), *Raphanus sativus* (*Brassicaceae*), *Rhynchosia aurea*, *R. minima*, *Ricinus communis* (*Euphorbiaceae*), *Arachis hagenbeckii*, *A. hypogaea*, *Alysicarpus* sp., *Bauhinia alba*, *B. variegata*, *Cajanus cajan*, *Calopogonium mucunoides*, *Canavalia ensiformis*, *C. gladiata*, *C. maritima*, *Cassia alata*, *C. lathyroides*, *Cassia* sp., *Centrosema acutifolium*, *C. arenarium*, *C. brasilianum*, *C. macrocarpum*, *C. plumieri*, *C. pubescens*, *C. virginianum*, *Clitoria ternatea*, *Codariocalyx gyroides*, *Crotalaria juncea*, *C. mucronata*, *C. mysorensis*, *C. retusa*, *C. spectabilis*, *C. usaramoensis*, *C. verrucosa*, *C. zanzibarica*, *Crotalaria* spp., *Cyamopsis psoralioides*, *Desmodium canum*, *D. gyrans*, *D. gyroides*, *D. incanum*, *D. intortum*, *D. lycioides* subspecies *guerkei*, *D. repandum*, *D. turtuosum*, *D. uncinatum*, *Dolichos biflorus*, *D. daltonii*, *D. lablab*, *D. lignosus*, *D. trilobus*, *D. turtuosum*, *D. uniflorus*, *Erythrina addisoniae*, *E. suberosa*, *E. subumbrans*, *E. variegata*, *Flemingia macrophylla*, *Gliricidia sepium*, *Glycine max*, *G. soja*, *G. ussuriensis*, *G. wightii*, *Heylandia latebrosa*, *Indigofera astragalina*, *Kotschya* sp., *Lablab niger*, *L. purpureus*, *Lespedeza* sp., *Lathyrus odoratus*, *Leucaena leucocephala*, *Lotononis bainesii*, *Lupinus* sp., *Macroptilium atropurpureum*, *M. lathyroides*, *M. daltonii*, *M. uniflorum*, *Medicago sativa*, *Mimosa*

invisa, *Mucuna pruriens*, *Neonotonia wightii*, *Phaseolus aconitifolius*, *P. angularis*,
P. atropurpureus, *P. aureus*, *P. calcaratus*, *P. lathyroides*, *P. limensis*, *P. lunatus*,
P. minimus, *P. panduratus*, *P. radiatus*, *P. trilobus*, *P. vulgaris*, *Pistia stratiotes*,
Pisum sativum, *Psophocarpus tetragonolobus*, *Psoralea bituminosa*, *P. drupacea*,
Pterocarpus marsupia, *Pueraria hirsuta*, *P. lobata*, *P. phaseoloides*, *P. trilobam*,
Quercus sp., *Senna alata*, *S. tora*, *Shutteria involucrata*, *Stylosanthes guianensis*,
S. humilis, *Vicia unguiculata*, *Vigna angularis*, *V. catjang*, *V. luteola*, *V. marina*,
V. mungo, *V. parkeri*, *V. radiata*, *V. repens*, *V. reticulata*, *V. sesquipedalis*,
V. sinensis, *V. umbellata*, *V. vexillata*, *Vitis vinivera*, *Voandzeia subterranea*
(Fabaceae), *Coleus* sp., *Ocimum basilicum*, *Plectranthus* sp. (Lamiaceae), *Tetramnus*
labialis, *T. uncinatus* (Malphigiaceae), *Artocarpus integrifolia* (Moraceae),
Boerhavia erecta, *Commicarpus* sp. (Nyctaginaceae), *Lycopersicon esculentum*,
Solanum laciniatum (Solanaceae) (Crous and Braun, 2003).

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
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Figures 19a-b Line drawings of *Cercospora canescens* on *Celosia argentea*. **a.** Conidia. **b.** Conidiophores and stromata. Bars: **a, b** = 50 µm.



Figures 20a-b Line drawings of *Cercospora canescens* on *Iresine herbstii*. **a.** Conidia. **b.** Conidiophores and stromata. Bars: **a, b** = 50 µm.

Distribution: Worldwide, wherever the crop is cultivated, including Australia, Bangladesh, Barbados, Brazil, Bolivia, Brunei, Cambodia, China, Colombia, Costa Rica, Cuba, Dominican Republ., Ecuador, Fiji, Georgia, Ghana, Guyana, Haiti, Hong Kong, India, Indonesia, Iran, Japan, Kenya, Korea, Malawi, Malaysia, Malawi, Mauritius, Myanmar, Nepal, New Caledonia, New Zealand, Nigeria, Pakistan, Panama, Papua New Guinea, Peru, Philippines, Puerto Rico, Russia, Senegal, Sierra Leone, Solomon Islands, Somalia, South Africa, Saint Vincent and the Grenadines, Sudan, Tadjikistan, Taiwan, Tanzania, Trinidad and Tobago, Togo, Uganda, USA, Uzbekistan, Vanuatu, Venezuela, Virgin Islands, Zambia, and Zimbabwe (Crous and Braun, 2003).

Notes: This species was first reported from Thailand by Sontirat *et al.* (1980) who found *C. canescens* on *Vigna radiata*. Crous and Braun (2003) assigned this species to *C. apii* s. lat. In this study, *Iresine herbstii* is reported as a new host of *C. canescens*.

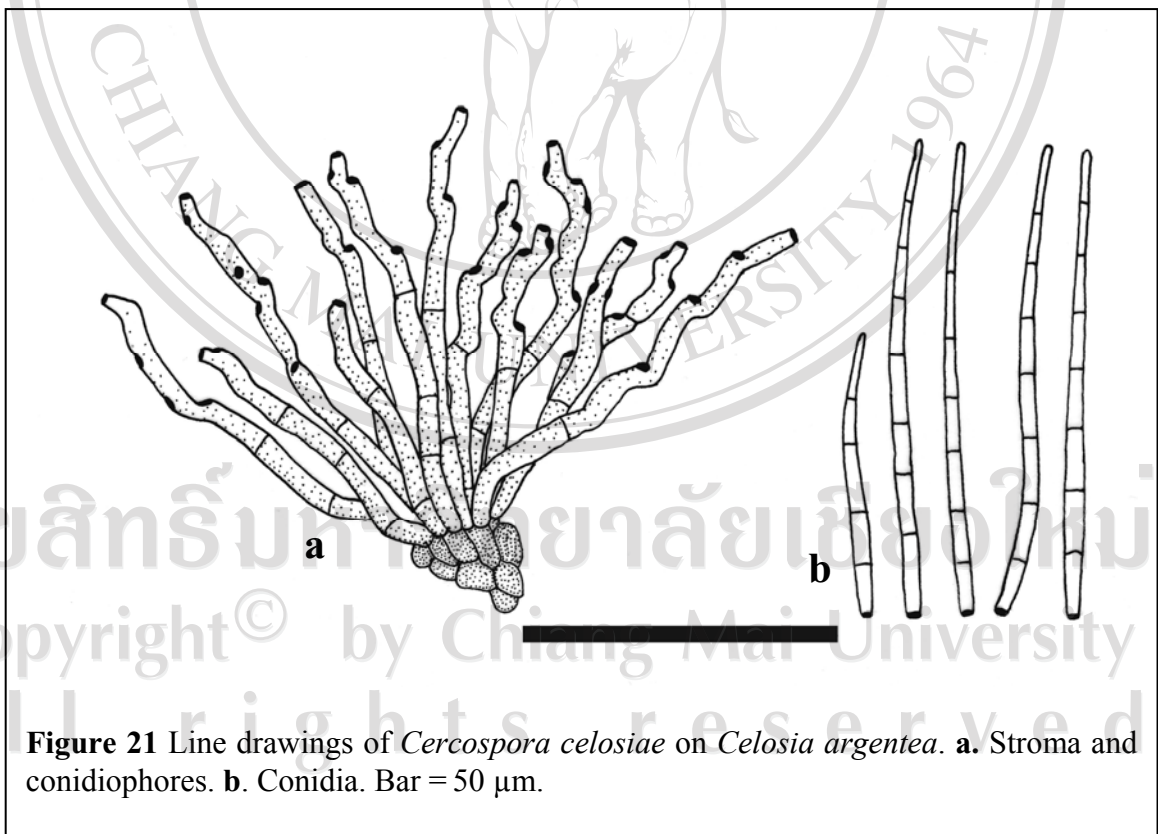
Cercospora celosiae Syd., *Ann. Mycol.* 27: 430 (1929).

(Figure 21)

Leaf spots up to 3 mm in diameter, amphigenous, circular to subcircular, brown at central area (somewhat grey-brown in the centre of larger spots), with dark brown margin. *Caespituli* amphigenous, mostly hypophyllous. *Stromata* 19-29 μm in diameter, small, composed of a few globose to subglobose, dark brown cells. *Conidiophores* (34) 50-70 (85) \times (2.5) 3-4 (5) μm , up to 13 in a moderately dense fascicles, 1-3 septate, straight to decumbent, light brown to brown, paler and narrower

toward the apex, 1-5 geniculation near the apex. *Conidiogenous cells* integrated, terminal, holoblastic, polyblastic, sympodial proliferating. *Conidiogenous loci* 2-3 μm in diameter, conspicuous, thickened and darkened. *Conidia* (12) 27-47.5 (67) \times 2.5-3.5 μm , 4-7-septate, hyaline, acicular, hyaline, obconically truncate at the base, with acute apex, hila 2-3 μm in diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Rai Province, Amphur Wiang Pa Pao, on leaves of *Celosia argentea* L., 25 November 2005, Jamjan Meeboon (CMU 27902); the same locality, on *Celosia argentea* var. *crispata* (L.) Kuntze (*Amaranthaceae*), 25 November 2005, Jamjan Meeboon (CMU 27893).



Habitat: *Celosia argentea*, *C. argentea* var. *crinata*, *C. aristata*, *C. laxa*, *C. plumosa*, *C. trigyna*, *Celosia* spp. (*Amaranthaceae*) (Crous and Braun, 2003).

Distribution: Bangladesh, Brazil, Brunei, Cambodia, China, Cuba, India, Indonesia, Japan, Malaysia, Myanmar, Nigeria, Pakistan, Papua New Guinea, Sabah, Sri Lanka, Sudan, Taiwan, Thailand, Uganda, USA, and Venezuela (Crous and Braun, 2003).

Notes: *Cercospora celosiae* on *C. argentea* and *C. argentea* var. *crinata* was previously reported from Thailand by Petcharat and Kanjanamaneesathian (1989) and Sontirat *et al.* (1980), respectively.

Cercospora ricinella Sacc. and Berl., *Atti Reale 1st. Ven. Sci. Lett.* **Art. 6, Ser. 3:** 721 (1885).

≡ *Cercosporina ricinella* (Sacc. and 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).

(Figure 22)

Leaf spots 2-9 mm diameter, distinct, amphigenous, circular or subcircular, grayish brown, with reddish brown margins. *Caespituli* amphigenous. *Stromata* (12) 19 ± 6.1 (26) μm diameter, intraepidermal, small, composed of globular to angular, brown to blackish brown cells. *Conidiophores* (47) 74 ± 16.8 (125) \times (3) 4 ± 0.6 (5) μm , 5-9 in a loosely and divergent fasciculate, 1-4-septate, arising from stromata, erect to decumbent, smooth, pale yellow to pale brown, not branched, subcylindrical,

strongly geniculate. *Conidiogenous cells* integrated, terminal to intercalary, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (29) 53.5 ± 32.6 (168.5) \times (2.5) 2.5 ± 0.4 (3.5) μm , solitary, narrowly obclavate to subacicular, 2-12-septate, straight to curve, hyaline, smooth, base obconically truncate, with subacute apex, hila 2-2.5 μm diameter, thickened and darkened.

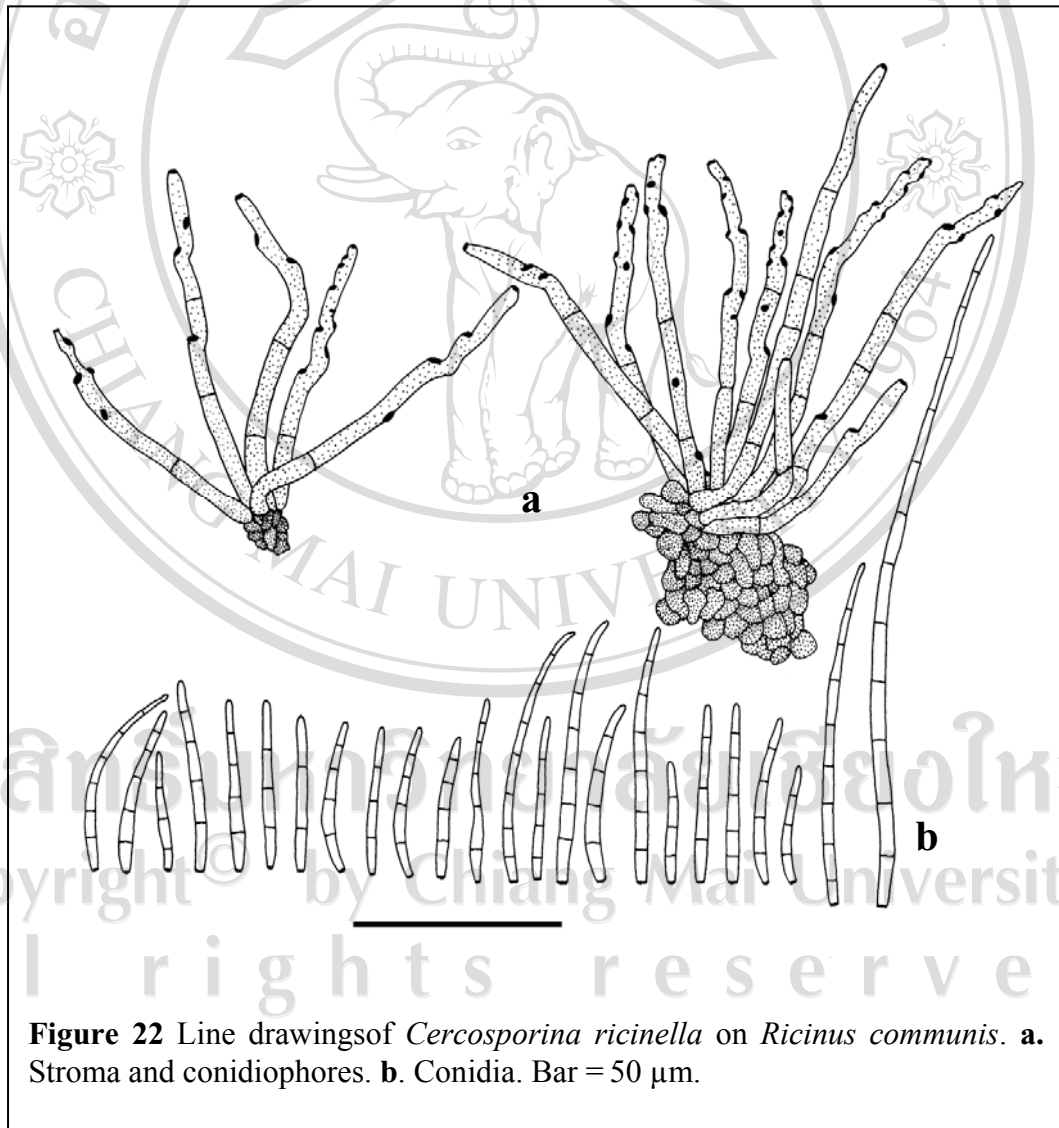


Figure 22 Line drawings of *Cercosporina ricinella* on *Ricinus communis*. **a.** Stroma and conidiophores. **b.** Conidia. Bar = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Mae Fag, Amphur San Sai, on leaves of *Ricinus communis* L. (*Euphorbiaceae*), 3 August 2008, Jamjan Meeboon (BBH 23755).

Host: *Ricinus communis* (*Euphorbiaceae*) (Crous and Braun, 2003).

Distribution: Worldwide, including Angola, Argentina, Australia, Bangladesh, Barbados, Brazil, Bulgaria, Cambodia, China, Colombia, Cuba, Dominican Republic, Egypt, El Salvador, Ethiopia, French Polynesia, Georgia, Ghana, Guatemala, Haiti, India, Indonesia, Iran, Jamaica, Japan, Kazakhstan, Kenya, Korea, Malawi, Malaysia, Mauritius, Morocco, Mozambique, Myanmar, Nepal, New Caledonia, Nigeria, Pakistan, Panama, Philippines, Puerto Rico, Russia (European part), Sierra Leone, Somalia, South Africa, Sri Lanka, Sudan, Tahiti, Taiwan, Tanzania, Thailand, Togo, Trinidad and Tobago, Uganda, Ukraine, USA, Vanuatu, Venezuela, and Zimbabwe (Crous and Braun, 2003).

Notes: This species was firstly reported from Thailand by Sontirat *et al.* (1980).

Literature: Chupp (1954, p. 229), Sontirat *et al.* (1980).

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Family *Apocynaceae*

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Cercospora peregrina Chupp, *A monograph of the fungus genus Cercospora*: 49 (1954).

(= *C. apii* s. lat)

(Figures 23a-b)

Leaf spots 2-5 mm diameter, distinct, amphigenous, circular to subcircular, scattered, dull brown, often paler at the centre, with dark brown margins. *Caespituli* epiphyllous. *Stromata* (25) 29 ± 4.9 (37) μm diameter, intraepidermal, well-developed, composed of globular to angular, brown to blackish brown cells. *Conidiophores* (38) 102 ± 23.7 (139) \times (3) 4 ± 0.4 (4.5) μm , 7-12 in a loosely to densely fasciculate, 2-4-septate, often divergent, arising from stromata, simple, erect to decumbent, smooth, pale brown to brown, not branched, subcylindrical, slightly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic to polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (25) 98 ± 53.7 (170) \times (3) 3 ± 0.3 (3.5) μm , solitary, narrowly obclavate to subacicular, 3-12-septate, straight, hyaline, smooth, base obconically truncate, with acute apex, hila 2-3 μm diameter, thickened and darkened.

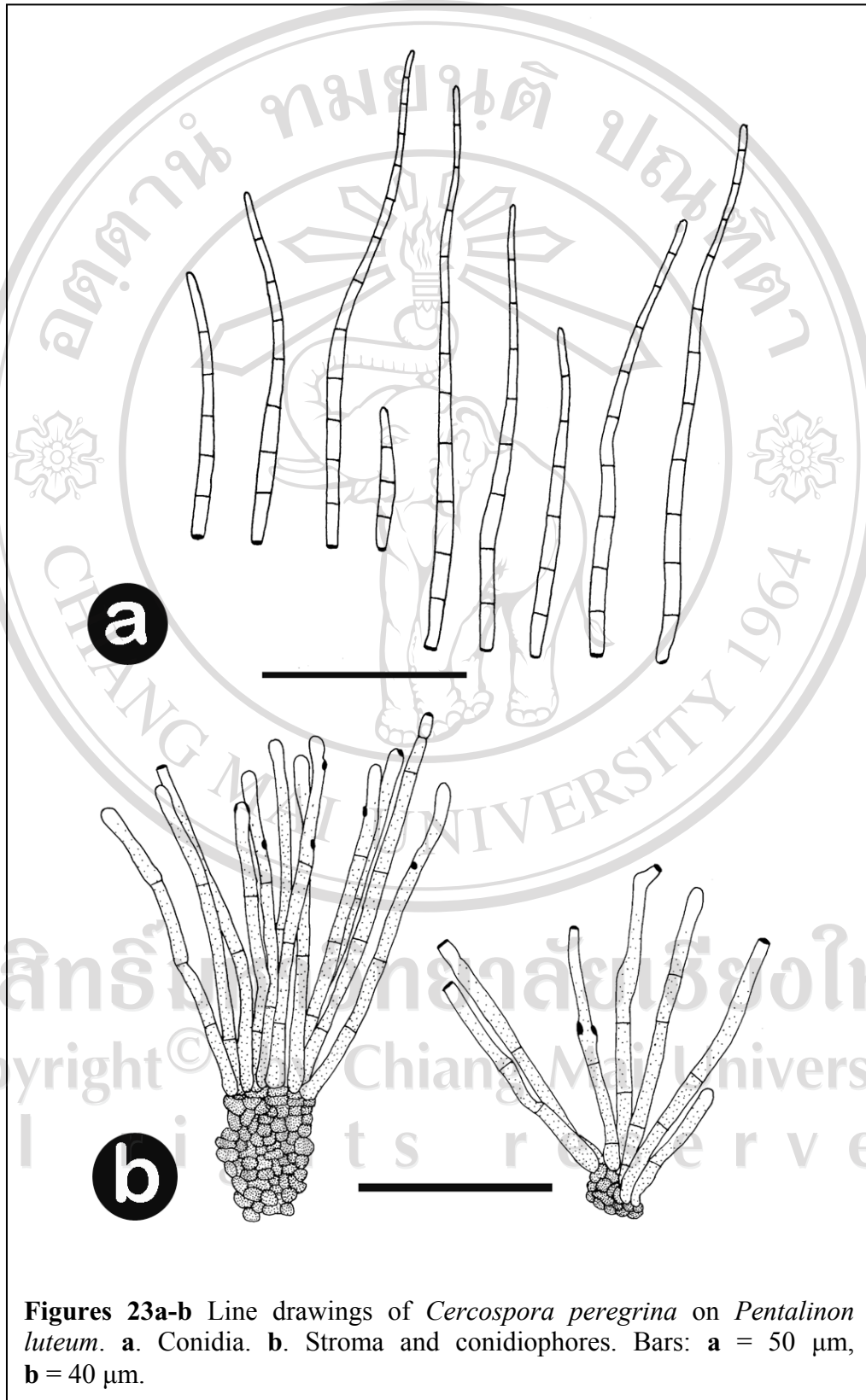
Specimen examined: THAILAND, Chiang Mai Province, Royal Flora, on leaves of *Pentalinon luteum* (L.) B. F. Hansen and Wunderlin (*Apocynaceae*), 27 July 2008, Jamjan Meeboon (BBH 23762).

Host: *Tabernamontana coronaria*, *T. divaricata* (*Apocynaceae*) (Crous and Braun, 2003).

Distribution: India, Mexico, Pakistan, and USA (Crous and Braun, 2003).

Notes: This specimen is a typical of *C. apii* s. lat fide Crous and Braun (2003) due to long and slightly geniculate of conidiophores, and long acicular conidia with truncate base and acute apex. *Cercospora peregrina* is the only one *C. apii* s. lat. reported from plants family *Apocynaceae*. This specimen is the first record of

C. peregrina from Thailand, and *Pentalinon luteum* is reported here as a new host of this fungus.



Pseudocercospora kopsiae-fruticosae Meeboon, Hidayat, and To-anun, **sp. nov.**

(Figures 24a-b)

Leaf spots 7-18 mm diameter, amphigenous, solitary, circular to subcircular, scattered, brown, with indistinct border. *Caespituli* amphigenous. *Stromata* (18) 22.5 ± 4.8 (30) μm diameter, intraepidermal, well-developed, composed of brown to dark brown cells. *Conidiophores* (11) 21 ± 5.9 (30.5) \times (2) 3 ± 0.3 (3) μm , numerous in a dense fascicles, 0-3-septate, arising from stromata, smooth, light brown to brown, simple, straight, not branched, geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (15) 29.5 ± 9.8 (57) \times (1.5) 2 ± 0.2 (2.5) μm , solitary, subcylindric to obclavate, 4-9-septate, straight or slightly curved, smooth, hyaline to pale olivaceous, truncate at the base, with obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Kopsia fruticosa* (Roxb.) A. DC. (*Apocynaceae*), 12 August 2008, Jamjan Meeboon (BBH 23584: **holotype**).

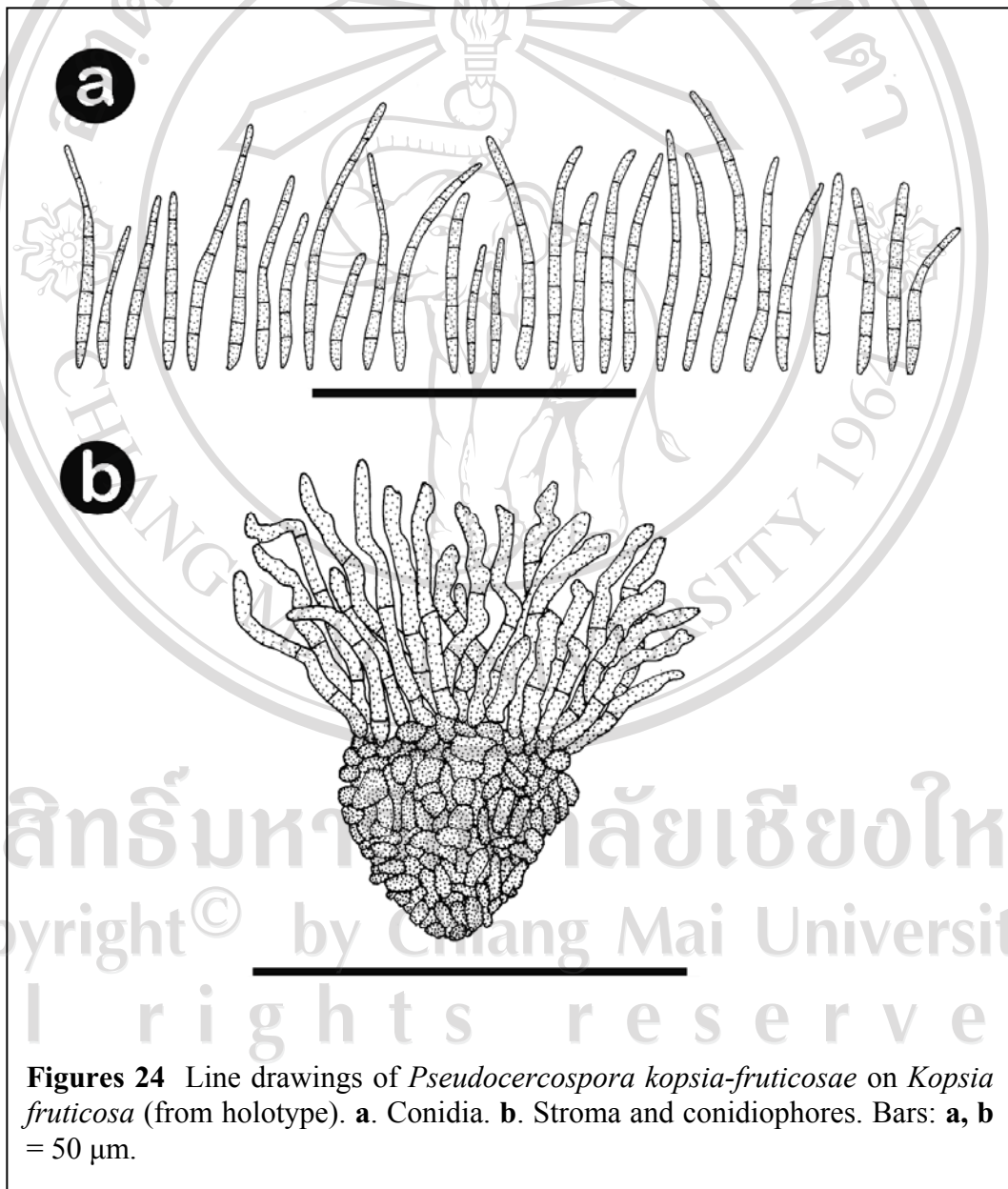
Host: *Kopsia fruticosa* (*Apocynaceae*).

Distribution: Thailand (type locality).

Notes: Four *Pseudocercospora* species, viz, *P. byliana* (Syd.) J. M. Yen, *P. liebenbergii* (Syd.) Deighton, *P. tabernaemontanae* (Syd. and P. Syd.) Deighton, and *P. wrightiae* (Thirum. and Chupp) Deighton, have been recorded as the species with amphigenous caespituli. This specimen is distinct from the four similar

Pseudocercospora species in having geniculate conidiophores, and obclavate-filiform conidia with truncate base and conspicuous septation. Due to distinct morphological characteristics of this specimen to similar species; therefore, this specimen was proposed as a new species.

Literature: Chupp (1954, p.47-51).



Figures 24 Line drawings of *Pseudocercospora kopsia-fruticosae* on *Kopsia fruticosa* (from holotype). **a.** Conidia. **b.** Stroma and conidiophores. Bars: **a, b** = 50 μm .

Pseudocercospora repens (Ellis and Everh.) U. Braun, Trudy Bot. Inst. im. V. L. Komarova **20**: 88 (1997).

≡ *Cercospora repens* Ellis and Everh., *J. Mycol.* **3**: 14 (1887).

(Figure 25)

Leaf spots 3-6 mm diameter, amphigenous, circular to subcircular, darkened at the upper and lower surfaces, with indistinct margin, limited by the vein. *Caespituli* hypophyllous. *Stromata* lacking. *Conidiophores* 23-33 × 2.5-3 μm, non-fasciculate, 0-2-septate, arising from secondary mycelium, smooth, pale brown, paler toward the apex, straight to decumbent, branched, slightly geniculate near the apex. *Conidiogenous cells* integrated, terminal, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (27) 37-76 (92) × (1.8) 2-3 (3.4) μm, solitary, subcylindrico-obclavate, straight to mildly curved, subhyaline, 3-8-septate, smooth, truncate at the base, with subacute apex, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Tumbol Mae Hea, Amphur Muang, on leaves of *Nerium oleander* L. (*Apocynaceae*), 13 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23739).

Habitat: *Nerium oleander*, *Trachelospermum difforme*, *T. jasminoides* (*Apocynaceae*) (Crous and Braun, 2003).

Distribution: China, Hong Kong, India, Japan, Korea, Mauritius, New Caledonia, New Zealand, Pakistan, Philippines, Taiwan, and USA (Crous and Braun, 2003).

Notes: Three species of *Pseudocercospora*, viz, *P. kurimensis* (Fukui) U. Braun, *P. neriella* (Sacc.) Deighton, and *P. repens* (Ellis and Everh.) U. Braun, have been reported associated with plant genus *Nerium*. This specimen is very close to *P. repens* in having hypophyllous caespituli, conidiophores arising from secondary mycelium, lacking of stromata, and conidia subcylindric-obclavate; and distinct from another two *Pseudocercospora* species due to amphigeous caespituli (mostly epiphyllous) and divergent conidiophores of *P. kurimensis*, and epiphyllous caespituli and well-developed stromata of *P. neriella*. This is the first report of *P. repens* on *Nerium oleander* from Thailand.

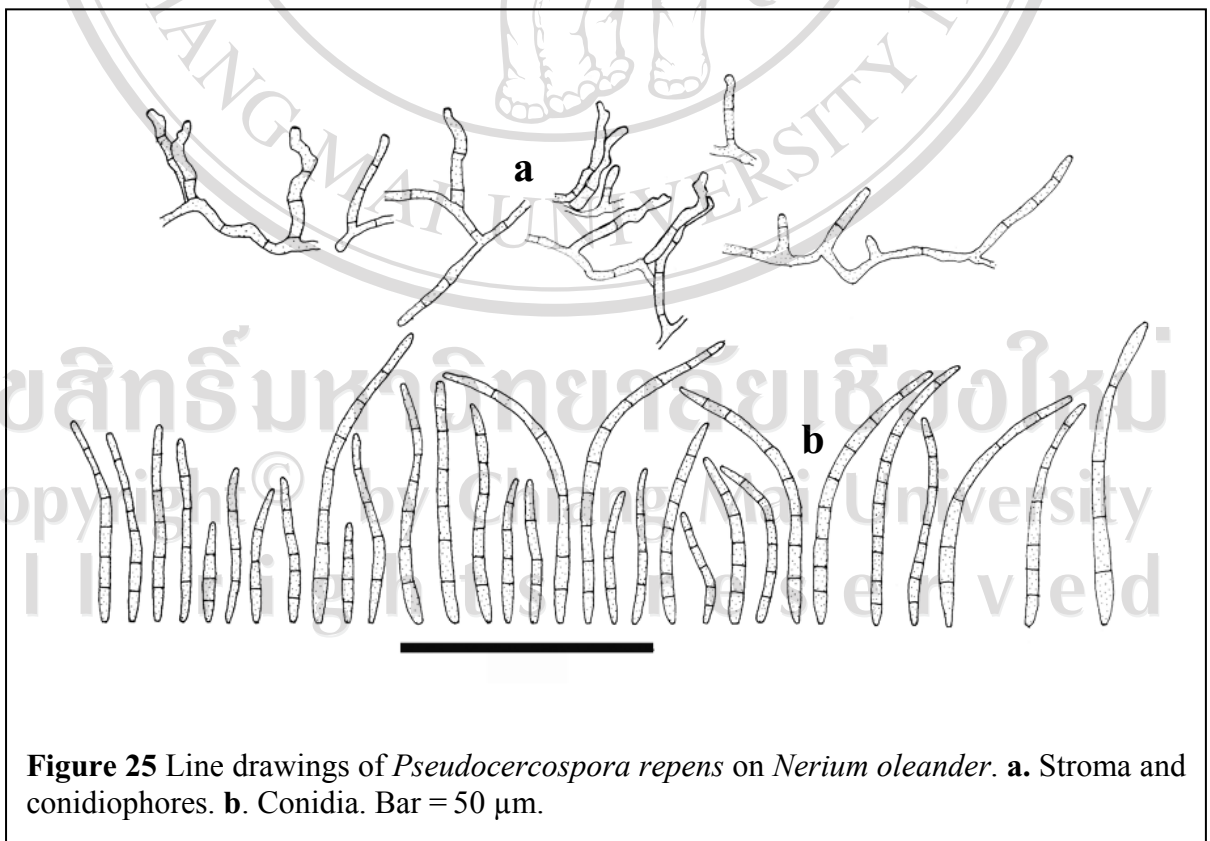


Table 2 Morphological comparison of *Pseudocercospora repens* recorded from Thailand with the type specimens of *P. kurimensis*, *P. neriella*, and *P. repens* on plant genus *Nerium* (*Apocynaceae*) (data from Braun, 1996; Deighton, 1976; Braun and Melnik, 1997).

Characters	<i>P. repens</i> from Thailand	<i>P. kurimensis</i> (type)	<i>P. neriella</i> (type)	<i>P. repens</i> (type)
Leaf spot	Amphigenous, indefinite, limited by the vein	Indefinite, yellowing at the upper surface and slightly darkened at the lower surface	Amphigenous	Amphigenous, brownish or reddish-brown
Caespituli	Hypophyllous	Amphigenous, mostly epiphyllous, few hypophyllous	Epiphyllous	Hypophyllous
Stromata	Lacking	Lacking or small	Well-developed, 25-100 μ m	Lacking
Conidiophores	Non-fasciculate, arising from secondary mycelium, branched, slightly geniculate near the apex, 23-33 \times 2.5-3 μ m	Non-fasciculate or fasciculate, branched, with minute scars at the tip, 5-25 \times 3-4.5 μ m	slightly densely fasciculate, not branched, rarely geniculate, with minute scars at the tip, 5-35 \times 3-5 μ m	Non-fasciculate, branched, arising from secondary mycelium, branched, slightly geniculate near the apex, 3-25 \times 2-4 μ m
Conidia	Obelavato-subcylindric, solitary, subhyaline, plainly curved near the apex, with truncate base, (27) 37-76 (92) \times (1.8) 2-3 (3.4) μ m	Cylindric to cylindrico-obelavate, subhyaline, the longest one usually curved, tip blunt with obconically truncate at the base, 20-100 \times 3-4.5 μ m	Cylindric, hyaline, nearly straight, tip blunt with subtruncate base to fairly sharp obconic, 15-50 \times 3-5 μ m	Obelavato-subcylindric, solitary, pale olivaceous, base obconically truncate, with obtuse to subacute apex, 30-110 \times 2-3.5 μ m

Pseudocercospora plumeriae (Chupp.) Tak. Kobayashi., Nishijima, and C. Nakash.,
Mycoscience **39**: 188 (1998).

≡ *Cercospora plumeriae* Chupp, *A monograph of the fungus genus Cercospora*:
 49 (1954).

(Figure 26)

Leaf spots 2-6 mm diameter, distinct, amphigenous, circular to subcircular, scattered, yellowish to brown, often paler at the centre, with dark brown margins. *Caespituli* epiphyllous. *Stromata* (21) 23.5 ± 1.8 (25) μm diameter, intraepidermal, small, composed of globular to angular, brown to dark brown cells. *Conidiophores* (24) 30 ± 8.6 (52) \times (2.5) 3 ± 0.2 (3) μm , arising from the stromata, pale to medium brown, numerous in a densely fasciculate, 1-3-septate, mostly not divergent, rarely divergent, simple, smooth, straight, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic to polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (38) 64 ± 11.5 (83) \times (1.5) 1.9 ± 0.3 (2.5) μm , solitary, filiform to long obclavate, 5-10-septate, straight or slightly curved, smooth, pale olivaceous, base truncate, with obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Muang, Tumbol Mae Hea, Royal Flora, on leaves of *Pentalinon luteum* (L.) B. F. Hansen and Wunderlin (*Apocynaceae*), 27 July 2008, Jamjan Meeboon (JM 103).

Host: *Plumeria acuminata*, *P. acutifolia*, *P. alba*, *P. rubra*, *P. tomentosa* (*Apocynaceae*) (Crous and Braun, 2003).

Distribution: Bangladesh, India, Indonesia, Japan, Malaysia, Myanmar, Philippines, and Trinidad and Tobago (Crous and Braun, 2003).

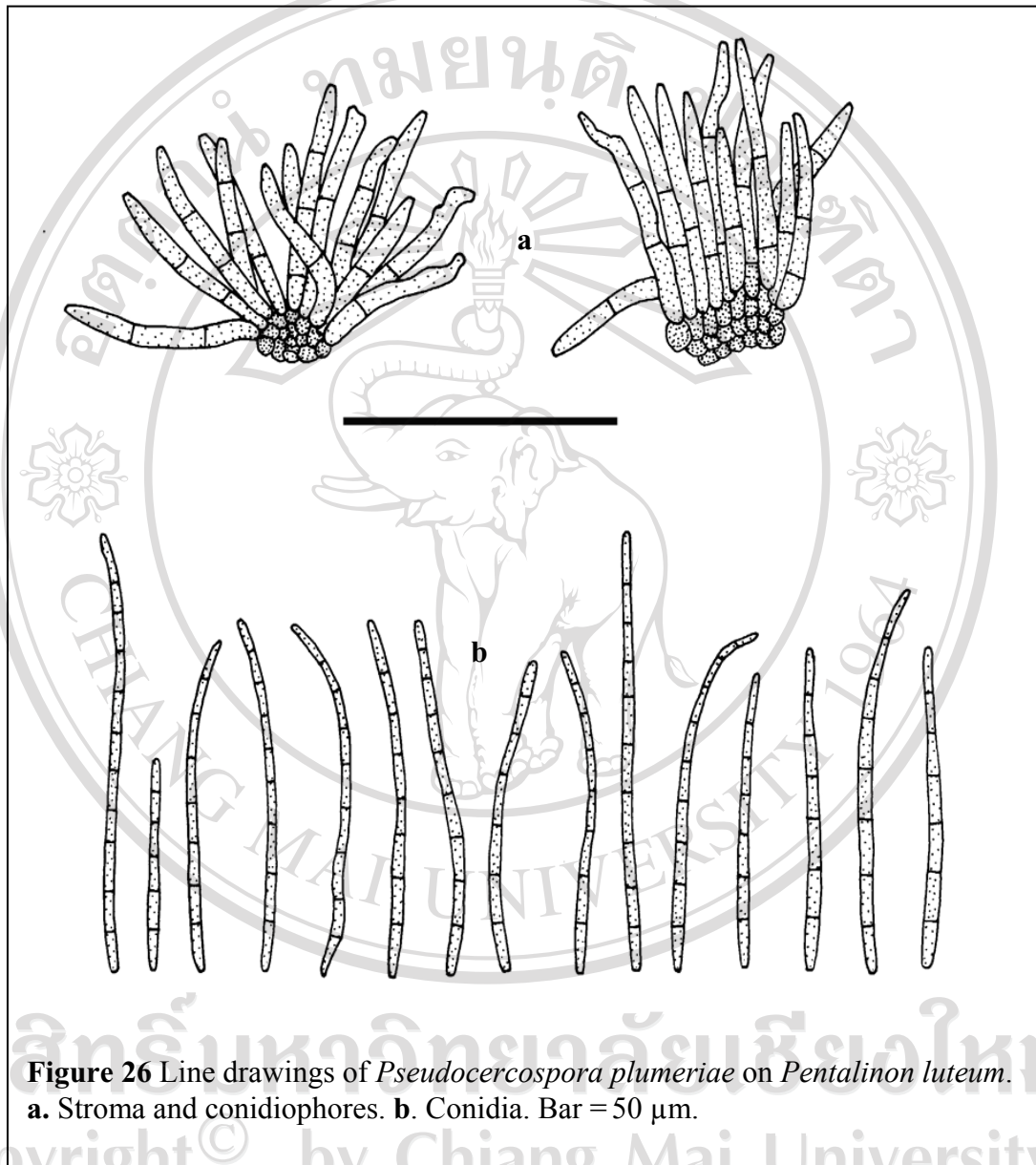


Figure 26 Line drawings of *Pseudocercospora plumeriae* on *Pentalinon luteum*.
a. Stroma and conidiophores. **b.** Conidia. Bar = 50 μm .

Notes: Three species of *Pseudocercospora* from plant family *Apocynaceae*, viz, *P. holarrhenae* (Thirum. and Chupp) Deighton, *P. neriella* (Sacc.) Deighton, *P. plumeriae* (Chupp) Tak. Kobay., Nishij., and C. Nakash., have been reported as species with epiphyllous caespituli. *Pseudocercospora holarrhenae* is distinct from

this specimen due to pale conidiophores and obclavate conidia. On the other hand, *P. neriella* differs also from this specimen in having pale conidiophores with almost hyaline at the tip, with hyaline conidia. This specimen is much closed to *P. plumeriae* in having circular to subcircular symptoms, pale to medium brown conidiophores in fairly compact fascicles, and pale olivaceous conidia. This specimen is the first record of *P. plumeriae* from Thailand, and *Pentalinon luteum* is reported here as a new host of this fungus.

Family Araceae

Cercospora richardiicola G. F. Atk. (*richardiaecola*), *J. Elisha Mitchell Sci. Soc.* **8**: 19 (1892).
(= *C. apii* s. lat.)

Specimen examined: THAILAND, Phetchabun Province, Amphur Lom Sak, Num Nao National Park, on leaves of *Zantedeschia* sp. (*Araceae*), 24 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27966).

Habitat: *Anthurium* sp., *Epipremnum aureum*, *Zantedeschia aethiopica*, *Z. angustiloba*, *Z. elliotiana*, *Z. melanoleuca*, *Z. rehmannii*, *Zantedeschia* sp. (*Araceae*).

Distribution: Ethiopia, Guatemala, Hong Kong, Indonesia, Japan, Malaysia, Puerto Rico, Sierra Leone, South Africa, Thailand, U.S.A, Virgin Islands, and Zimbabwe.

Notes: Nakashima *et al.* (2007) were the first of reporting this species from Thailand.

Literature: Saccardo (1892, p. 653), Chupp (1954, p. 60).

Family Araliaceae

Pseudocercospora panacis (Thirum. and Chupp) Y. L. Guo and X. J. Liu, *Acta Mycol. Sin.* **11**: 297 (1992).

≡ *Cercospora panacis* Thirum. and Chupp, *Mycologia* **40**: 358 (1948).

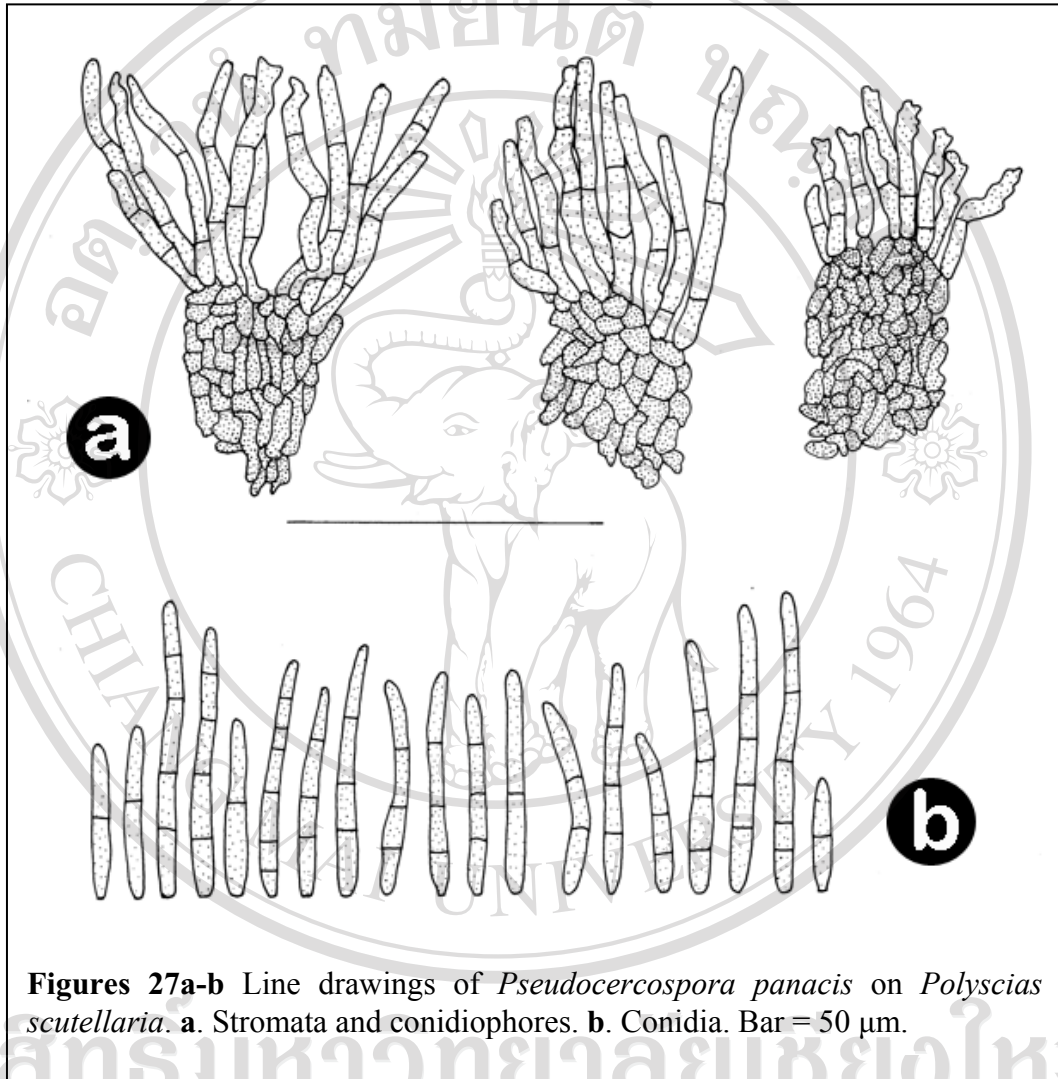
≡ *Passalora panacis* (Thirum. and Chupp) Crous and U. Braun, *Mycotaxon* **78**: 336 (2001).

= *Pseudocercospora polysciatis-pinnatae* U. Braun and Mouch., *N. Z. Jl. Bot.* **37**: 319 (1999).

(Figures 27a-b)

Leaf spots 10-20 mm diameter, amphigenous, solitary, circular to subcircular, brown, with dark brown margin. *Caespituli* amphigenous. *Stromata* 20-50 μm diameter, well-developed, intraepidermal, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* 27-43 \times 2.5-5 μm , 8-12 in a densely fascicles, arising from stromata, straight to decumbent, 0-3-septate, smooth, brown and paler towards the apex, unbranched, slightly geniculate near the apex. *Conidiogenous cells* integrated, terminal, holoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 21.5-42 \times 2-3 μm , solitary,

obclavate, straight to mildly curved, hyaline to subhyaline, 2-3-septate, smooth, obconically truncate at the base, with obtuse to subobtuse apex, hila inconspicuous, unthickened, and not darkened.



Figures 27a-b Line drawings of *Pseudocercospora panacis* on *Polyscias scutellaria*. **a.** Stromata and conidiophores. **b.** Conidia. Bar = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Amphur Sarapee, Tumbol Khua Mung, Deu Ngok, on leaves of *Polyscias scutellaria* (Burm. f.) Fosberg (*Araliaceae*), 29 February 2008, Jamjan Meeboon (BBH 23589); Chiang Mai Province, Chiang Mai University, on leaves of *Polyscias scutellaria* (Burm. f.) Fosberg (*Araliaceae*), 12 June 2008, Jamjan Meeboon (BBH 23643).

Habitat: *Kalopanax septemlobus*, *Polyscias fruticosa*, *P. fulva*, *P. pinnata*, *Polyscias* sp. (*Araliaceae*) (Crous and Braun, 2003).

Distribution: Australia, Brunei, Cambodia, India, Indonesia, Mauritius, New Caledonia, Papua New Guinea, and Sierra Leone (Crous and Braun, 2003).

Notes: This specimen is the first record of *Pseudocercospora panacis* from Thailand, and *Polyscias scutellaria* is reported here as a new host of this fungus.

Family Arecaceae

Cercospora arecacearum Hidayat and Meeboon, *Mycol. Prog.* xx: xx-xx. (2009).

Mycobank No. MB 510616

(Figures 28a-c)

Leaf spots 1-10 cm diameter, amphigenous, irregular, brownish, dull grayish brown, finally pale grayish with a white center and dark margins, spots usually overlapping. *Caespituli* amphigenous, scattered, and dark-yellowish. *Stromata* (30) 64 ± 26 (100) μm diameter ($n = 10$), substomatal to intraepidermal, well-developed, subglobular, brown to blackish brown. *Conidiophores* (68.5) 165 ± 91 (310) \times (4) 4.5 ± 0.5 (5) μm ($n = 30$), variable in length, in rich fascicles, 2-8-septate, dense, arising from stromata, smooth, pale yellowish to brownish throughout, sometimes paler at the apex, cylindrical, but narrowed towards the apex, straight, branched, strongly geniculate. *Conidiogenous cells* (24.5) 37 ± 13 (67) \times (4) 4 ± 0.4 (5) μm ($n = 30$), integrated, terminal, sympodially proliferating. *Conidiogenous loci* (2.5) 3 ± 0.3 (3)

μm diameter ($n = 30$), conspicuous, thickened and darkened. *Conidia* (140) 229 ± 56 (320) \times (4) 5 ± 0.5 (5) μm ($n = 30$), formed singly, acicular, straight, often curved at the apex, hyaline, 9-25-septate, thin-walled, smooth, tapered towards a subacute apex, base truncate, hila (2.5) 3 ± 0.3 (3) μm diam ($n = 30$), thickened and darkened.

On potato dextrose agar medium: colony slowly growing, velvety, 3-4 cm after 30 days, tight to the agar, dark, covered by a grayish white aerial mycelium, reddish near the margin, with white margin, producing red pigmentation in the agar, no sporulation.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Taeng, Tumbol Pa Pae, Mushroom Research Centre, on leaf spots of *Areca catechu* L. (*Areaceae*), 17 November 2006, Iman Hidayat (CMU 27946: **holotype**).

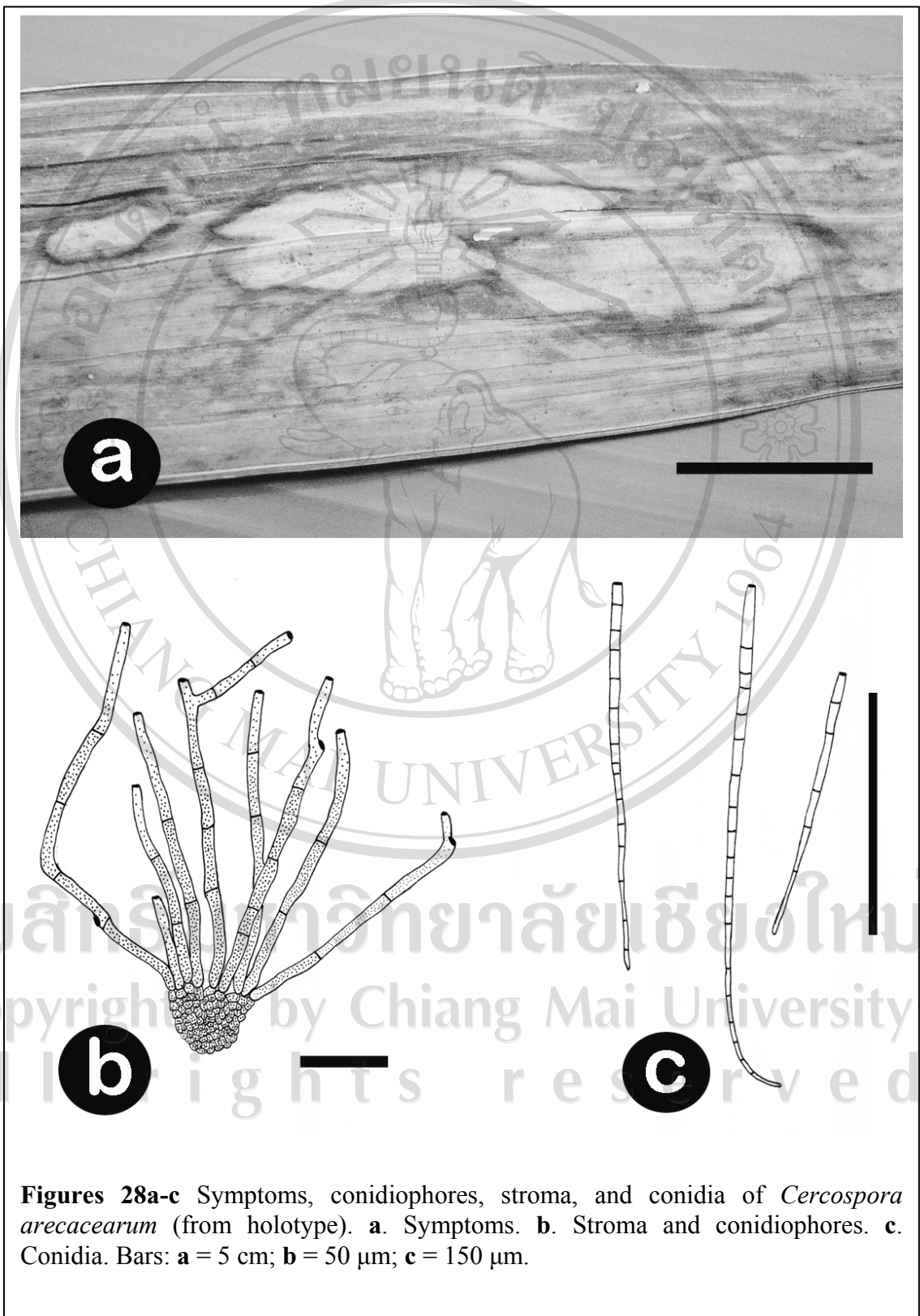
Habitat: *Areca catechu* (*Areaceae*).

Distribution: Thailand (type locality).

Notes: According to Crous and Braun (2003), this species belongs to *Cercospora* Fresen. *s. str.*, which is characterized by having pigmented conidiophores, thickened and darkened conidiogenous loci, and hyaline scoleoid conidia. Furthermore, this fungus is distinct from the plurivorous *C. apii* *s. lat.* by having well-developed, large stromata, and strongly geniculate, branched conidiophores in rich fascicles (Crous and Braun 2003).

Currently, only three species on *Areaceae*, *viz* *Cercospora areacearum* Hidayat and Meeboon, *C. palmae-amazonensis* Bat. and Cavalc. (Batista and Cavalcanti 1964) and *C. raphiae* Deighton (1985), have been maintained in *Cercospora* *sensu str.* (Crous and Braun 2003). Another species of *Cercospora sensu*

str., *C. nucifera* R. K. Srivast., S. Narayan and A. K. Srivast. (1995), is now classified as *C. apii sensu lat.* (Crous and Braun 2003).



Cercospora areacearum is distinct from *C. raphiae* by having amphigenous caespituli, branched and strongly geniculate conidiophores as well as much narrower acicular conidia. Deighton (1985) characterized *C. raphiae* by having hypophyllous caespituli, unbranched, non-geniculate conidiophores and obclavate-cylindrical conidia with slightly thickened hila. *Cercospora areacearum* is also easily distinguishable from *C. palmae-amazonensis* by its large stromata, branched, and strongly geniculate conidiophores with hyaline acicular conidia.

Family Aristolochiaceae

Cercospora apii Fresen., *Beitr. Mykol.* **3**: 91 (1863).

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

= *Cercospora apii* f. *dauci-carotae* Ellis and Everh., *N. Amer. Fungi*: 2482 (1890) (*nom. nud.*).

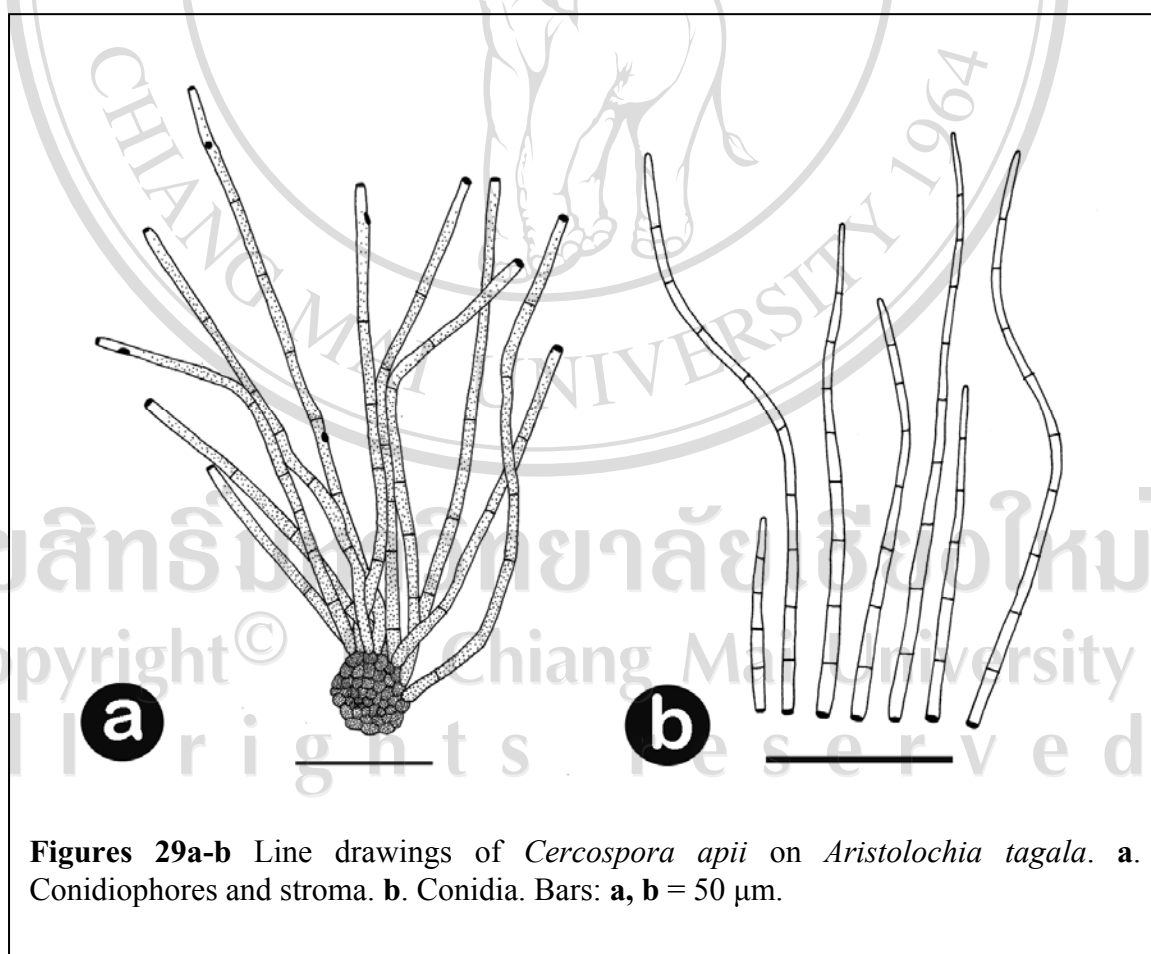
= *Cercospora levistici* Kvashnina, *Izv. Severo-Kavkazsk. Kraev. Stantsii Zashch. rast.* **4**: 38 (1928).

= *Cercospora apii* f. *Clerodendri* Sobers and Martinez, *Proc. Florida State Hort. Soc.* **79**: 433 (1966) [1967] (*nom. inval.*).

(Figures 29a-b)

Leaf spots 7-13 mm diameter, amphigenous, circular or irregular, brown to dark brown, with grayish brown centre, surrounded by a dark margins. *Colonies* amphigenous. *Stromata* (12) 22.5 ± 6.9 (33) μm diameter, intraepidermal, small to

well-developed, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (25) 141.5 ± 77.7 (329) \times (2.5) 4 ± 0.8 (6) μm , 10 to numerous in a loosely fasciculate, 1-2-septate, arising from stromata, erect to decumbent, simple, straight, smooth, pale yellow to pale brown, rarely branched, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal, holoblastic, ostly monoblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (83) 143.5 ± 46.3 (216) \times (2.5) 2.5 ± 0.5 (4) μm , solitary, narrowly obclavate to subacicular, 4-9-septate, straight, hyaline, smooth, base obconically truncate, with subacute apex, hila 2-2.5 μm diameter, thickened and darkened.



Figures 29a-b Line drawings of *Cercospora apii* on *Aristolochia tagala*. **a.** Conidiophores and stroma. **b.** Conidia. Bars: **a, b** = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Pang Da Royal Project, on leaves of *Aristolochia tagala* Cham. (*Aristolochiaceae*), 5 August 2008, Jamjan Meeboon (BBH 23729).

Host: *Abelmoschus esculenta*, *Aloysia virgata*, *Amaranthus* sp., *Anethum graveolens*, *Angelica dahurica*, *A. dawsonii*, *Annona odorata*, *Anthurium* sp., *Anthurus* sp., *Apium graveolens*, *A. sativum*, *Arracacia xanthorrhiza*, *Astilbe chinensis*, *Atkinsia cubensis*, *Bixa orellata*, *Cajanus cajan*, *Careya arborea*, *Carica papaya*, *Cedrela toona*, *Centella asiatica*, *Chamaechrista aeschynomenes*, *Chenopodium ambrosioides*, *Chondrilla juncea*, *Citrullus vulgaris*, *Clerodendrum fragrans*, *C. thomsoniae*, *Coleus hybridus*, *Coleus* sp., *Conioselinum benthamii*, *C. chinense*, *C. pacificum*, *C. tataricum*, *Coriandrum sativum*, *Crepis capillaris*, *Cucumis melo*, *Cucurbita pepo*, *Cyamopsis psoraloides*, *Daucus carota*, *Dichondra repens*, *Drejerella guttata*, *Droguetia debilis*, *Emilia sonchifolia*, *Emilia* sp., *Erucastrum arabicum*, *Eryngium foetidum*, *Euphorbia heterophylla*, *Foeniculum dulce*, *F. vulgare*, *Galinsoga parviflora*, *Gloriosa virescens*, *Hedychium coronarium*, *Heliotropium europaeum*, *Heliotropium* sp., *Hemigraphis* sp., *Hydrocotyle* sp., *Indigofera suffruticosa*, *Lablab purpureus*, *Lactuca canadensis*, *Laportea crenulata*, *Leonotis* sp., *Leonurus sibiricus*, *Levisticum* sp., *Limonium sinuatum*, *Limonium* spp., *Marlea begoniifolia*, *Modiola caroliniana*, *Momordica charantia*, *Myrrhis* sp., *Nicotiana tabacum*, *Oenanthe javanica*, *Papaver rhoeas*, *Pastinaca sativa*, *Petrea volubilis*, *Petroselinum crispum*, *P. hortense*, *Physalis* sp., *Plumbago capensis*, *P. rosea*, *Pegostemon benghalensis*, *Premna mucronata*, *Pseucedanum graveolens*, *Rauwolfia serpentina*, *Rinorea microdon*, *Ruellia* sp., *Schwenkia americana*, *Selinum gmelini*, *Senna alata*, *Seseli indicum*, *Smyrniolus atrum*, *Spigelia anthelmia*,

Stellaria media, *Stigmaphyllon sagraeanum*, *Tabebuia serratifolia*, *Tagetes* sp.,
Wdelia paludosa, *Zinnia elegans* (Crous and Braun, 2003).

Distribution: Worldwide, including Australia, Austria, Azerbaijan, Bangladesh, Barbados, Brazil, Brunei, Bulgaria, Cambodia, Canada, Canary Islands, China, Colombia, Congo, Cuba, Czech Republ., Denmark, Dominican Republ., Egypt, El Salvador, France, Germany, Greece, Guatemala, Hong Kong, India, Indonesia, Iraq, Italy, Jamaica, Jordan, Kenya, Korea, Latvia, Lebanon, Libya, Lithuania, Mexico, Malaysia, Mauritius, Morocco, Myanmar, Nepal, Netherlands, New Caledonia, New Zealand, Morocco, Nepal, Nigeria, New Zealand, Panama, Papua New Guinea, Peru, Philippines, Poland, Puerto Rico, Romania, Russia, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Sudan, Suriname, Switzerland, Taiwan, Tanzania, Thailand, Togo, Trinidad, Tobago, Uruguay, U.S.A, Vanuatu, Venezuela, and Zimbabwe (Crous and Braun, 2003).

Notes: This specimen is the first report of *Cercospora* s. str. (including *C. apii*) occurs on *Aristolochia tagala* and on the host plant family *Aristolochiaceae*.

Family Asclepiadaceae

Pseudocercospora marsdeniae (Hansf.) Deighton, *Mycol. Pap.* **140**: 147 (1976).

= *Cercospora marsdeniae* Hansf., *Proc. Linn. Soc. London* **158**: 50 (1947).

(Figure 30)

Leaf spots 1-2 mm diameter, amphigenous, circular, angular to irregular, scattered, later coalescing to large spots, forming a 5-28 mm diameter size, grayish-brown with blackish-brown border on the upper leaf surface, and pale greenish, indistinct border on the lower leaf surface. *Caespituli* amphigenous. *Stromata* (27.5) 40 ± 15.4 (62) μm diameter, substomatal to intraepidermal, small to well-developed, composed of globose to subglobose, sometime angular, brown to dark brown cells. *Conidiophores* (9.5) 18 ± 3.9 (29) \times (2) 3 ± 0.3 (3) μm , numerous in a densely fasciculate, 1-2-septate, arising from the upper part of stromata, pale olivaceous-brown, smooth, simple, straight or geniculate. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (26) 47 ± 12 (78) \times (2.5) 3 ± 0.4 (4.5) μm , solitary, acicular to obclavate, 2-5-septate, straight or slightly curved, smooth, pale olivaceous, truncate basal end, with acute apex, hila unthickened and not darkened.

Specimen examined THAILAND, Chiang Mai Province, Chiang Mai University, Multiple Cropping Centre, on leaves of *Dregea volubilis* Benth. ex Hook. f. (*Asclepiadaceae*), 1 August 2008, Jamjan Meeboon (BBH 23720).

Host: *Cionura erecta*, *Dregea sinensis*, *Marsdenia angolensis*, *M. latifolia*, *M. roylei* (*Asclepiadaceae*) (Crous and Braun, 2003).

Distribution: Bulgaria, China, Ghana, Pakistan, and Uganda (Crous and Braun, 2003).

Notes: This specimen is the first record of *P. marsdeniae* from Thailand, and *Dregea volubilis* is reported here as a new host of this fungus.

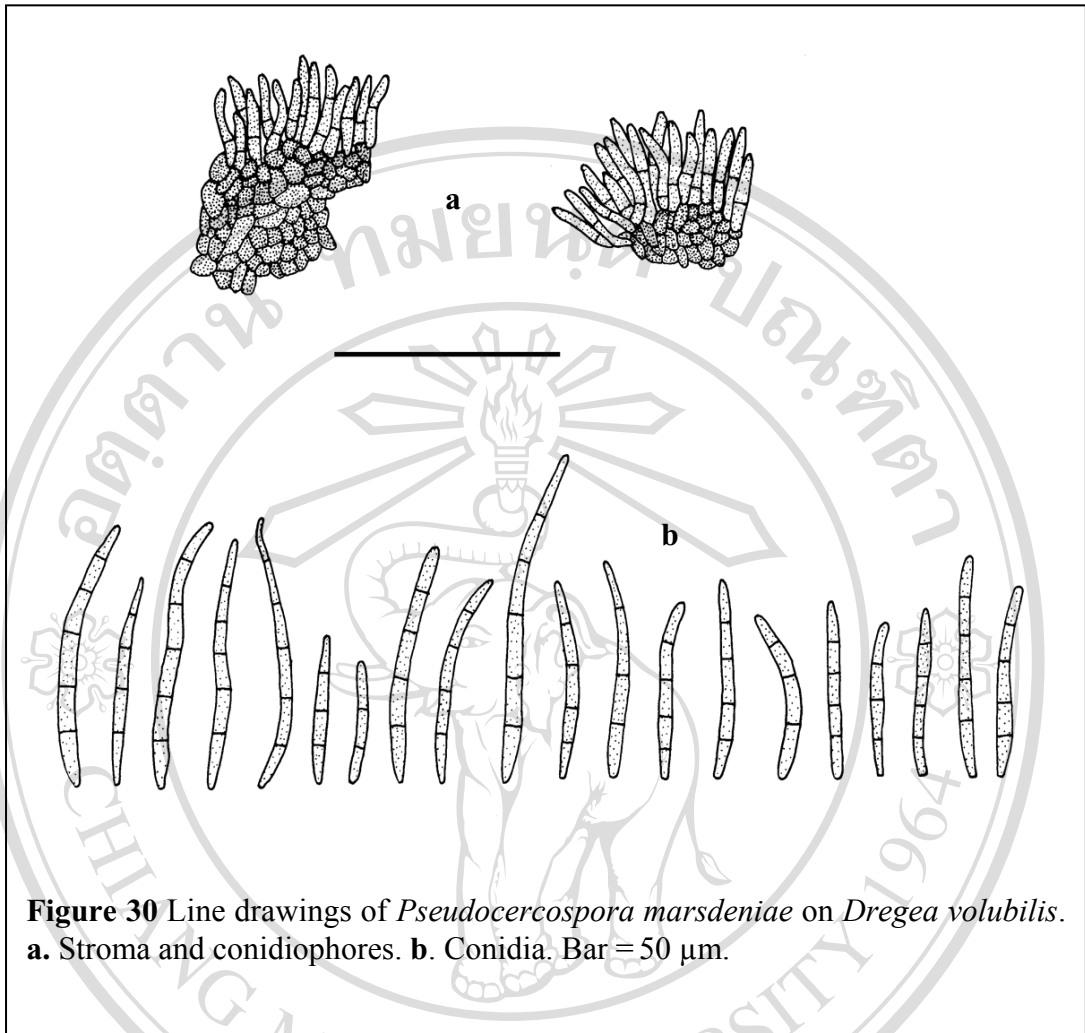
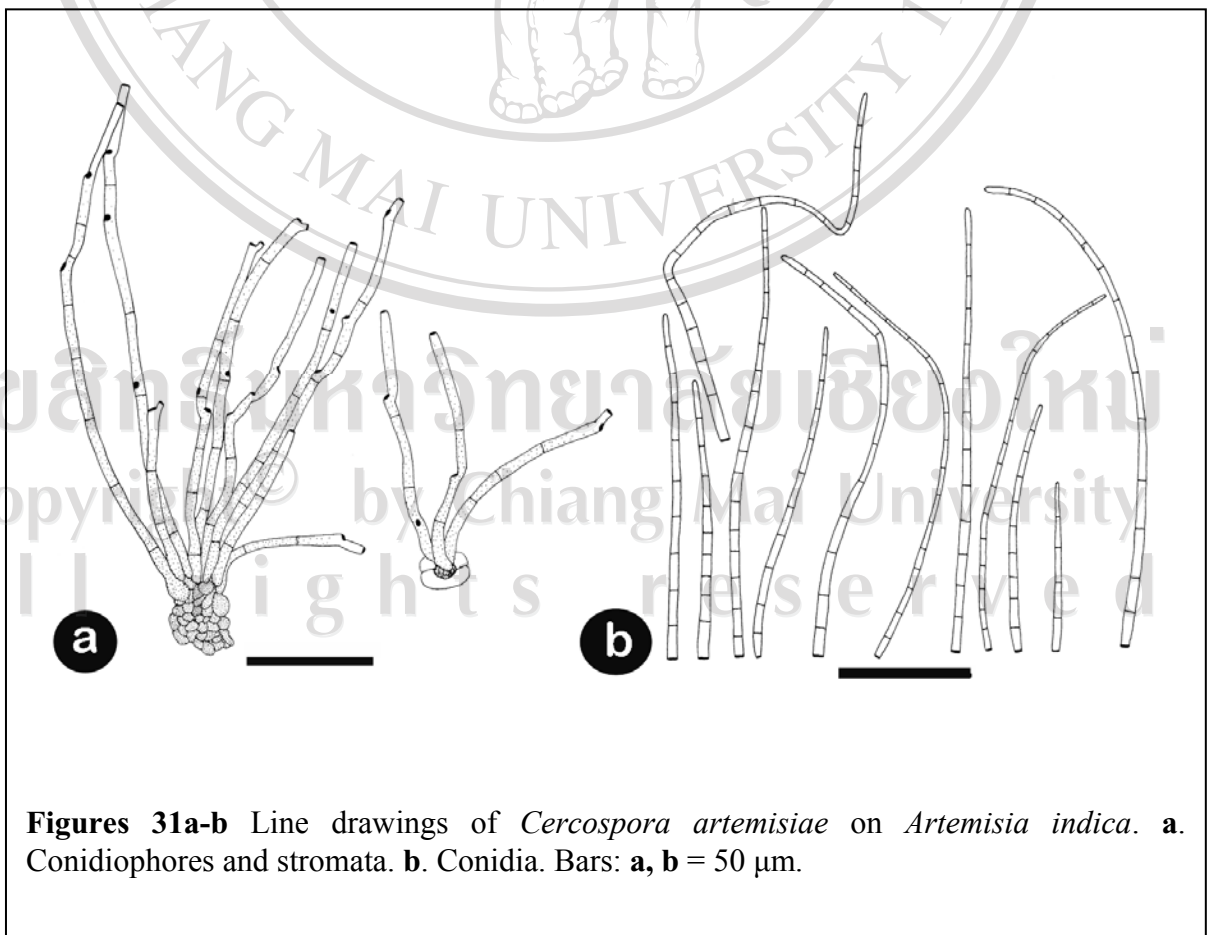


Figure 30 Line drawings of *Pseudocercospora marsdeniae* on *Dregea volubilis*.
a. Stroma and conidiophores. **b.** Conidia. Bar = 50 μ m.

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
 Family Asteraceae
 Copyright © by Chiang Mai University
Cercospora artemisiae Y. L. Guo and Y. Jiang, *Mycosystema* **19**: 445 (2000).
 All rights reserved (Figures 31a-b)

Leaf spots 15-30 mm diameter, amphigenous, circular to subcircular, at first pale greenish to ochraceous when the symptoms young, later become brown to dark

brown, finally with grayish brown at the centre, surrounded by a dark margin or brown halo. *Caespituli* hypophyllous, ochre yellow, velvety. *Stromata* (18) 21 ± 3.6 (25) μm diameter, substomatal, well-developed, composed of a few globose to subglobose, brown to blackish brown cells. *Conidiophores* (55) 120.5 ± 34.8 (181) \times (4) 4.5 ± 0.4 (5.5) μm , 3-10 in a loosely fasciculate, 2-7-septate, arising from stromata, erect to decumbent, smooth, pale yellow to pale brown, simple, straight, rarely branched, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3 μm diameter, conspicuous, thickened, darkened. *Conidia* (43.5) 117.5 ± 48.6 (207.5) \times (2) 2.5 ± 0.8 (4) μm , solitary, narrowly obclavate to subacicular, straight, hyaline, 4-17-septate, smooth, base obconically truncate, with subacute apex, hila 2-2.5 μm diameter, thickened and darkened.



Figures 31a-b Line drawings of *Cercospora artemisiae* on *Artemisia indica*. **a.** Conidiophores and stromata. **b.** Conidia. Bars: **a, b** = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, Multiple Cropping Centre, on leaves of *Artemisia indica* Willd. (*Asteraceae*), 14 August 2008, Jamjan Meeboon (BBH 23726).

Host: *Artemisia lactiflora* (*Asteraceae*) (Guo and Jiang, 2000).

Distribution: China (Guo and Jiang, 2000).

Notes: Crous and Braun (2003) noted this species is probably a synonym of *C. apii* s. lat., but further investigation is needed to justify this preliminary comment. This specimen is the first record of *C. artemisiae* from Thailand, and *Artemisia indica* is reported here as a new host of this fungus.

Cercospora bidentis Tharp, *Mycologia* **9**: 108 (1917).

Specimen examined: THAILAND, Phetchabun Province, Amphur Lom Sak, Num Nao National Park, on leaves of *Bidens pilosa* L. (*Asteraceae*), 24 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27963).

Host: *Bidens bipinnata*, *B. biternata*, *B. cernua*, *B. coronata*, *B. laevis*, *B. nashii*, *B. pilosa*, *Bidens* spp., *Centaurea americana*, *Chrysanthemum hortorum*, *Coreopsis drummondii*, *C. lanceolata*, *Coreopsis* spp., *Conyza* sp., *Cosmos bipinnatus*, *Erigeron floribundus*, *Helianthus annuus*, *H. tuberosus*, *Helichrysum brassii*, *Pseudoelephantopus spicatus*, *Rudbeckia laciniata*, *Senecio cruentus*, *Solidago* sp., *Tithonia speciosa*, *Tridax procumbens*, *Vernonia glabra* (*Asteraceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Widespread in the tropics and subtropics, American Samoa, Brazil, China, Congo, Cuba, Ghana, India, Indonesia, Japan, Kenya, Malaysia,

Malawi, Mauritius, Myanmar, Nepal, Nigeria, Panama, Papua New Guinea, Solomon Islands, South Africa, Sudan, Taiwan, Tanzania, Tonga, Trinidad and Tobago, Venezuela, U.S.A, Zimbabwe, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: This species was firstly reported from Thailand by Meeboon *et al.* (2007c).

Cercospora chrysanthemi Heald and F. A. Wolf, *Mycologia* **3**: 15 (1911).

= *Cercospora chrysanthemi* Puttemans, *Bull. Soc. Roy. Bot. Belgique* **48**: 244 (1912) (*nom. illeg.*), homonym *C. chrysanthemi* Heald and F. A. Wolf (1911).

≡ *Cercosporina chrysanthemi* Sacc., *Syll. Fung.* **25**: 898 (1931) (*nom. nov.*), as '(Puttemans) Sacc.'

= *Cercospora chrysanthemi-coronarii* Sawada, *Rep. Dept. Agric. Gov. Res. Inst. Formosa* **2**: 147 (1922).

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

(Figure 32)

Leaf spots 5-25 mm diameter, amphigenous, irregular, greyish brown, with dark brown margin. *Caespituli* amphigenous. *Stromata* 34-40.5 µm diameter, well-developed, substomatal, small, composed of few subglobose, brown cells. *Conidiophores* (35-) 46-187 (-212) × 3-4 (-4.5) µm, 3-11 in fascicles, 1-10-septate, arising from stromata, straight, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, strongly geniculate. *Conidiogenous cells* integrated, holoblastic, polyblastic, sometimes monoblastic and terminal, sympodially proliferating. *Conidiogenous loci* 2-3.5 µm diameter, conspicuous, thickened, and

darkened. *Conidia* (23-) 40-107 (-190) \times 2-3.5 (-4) μm , solitary, acicular, straight, hyaline, 3-10-septate, smooth, truncate at the base, tapering toward a subacute apex, hila 1.5-2 μm diameter, conspicuous, thickened, and darkened.

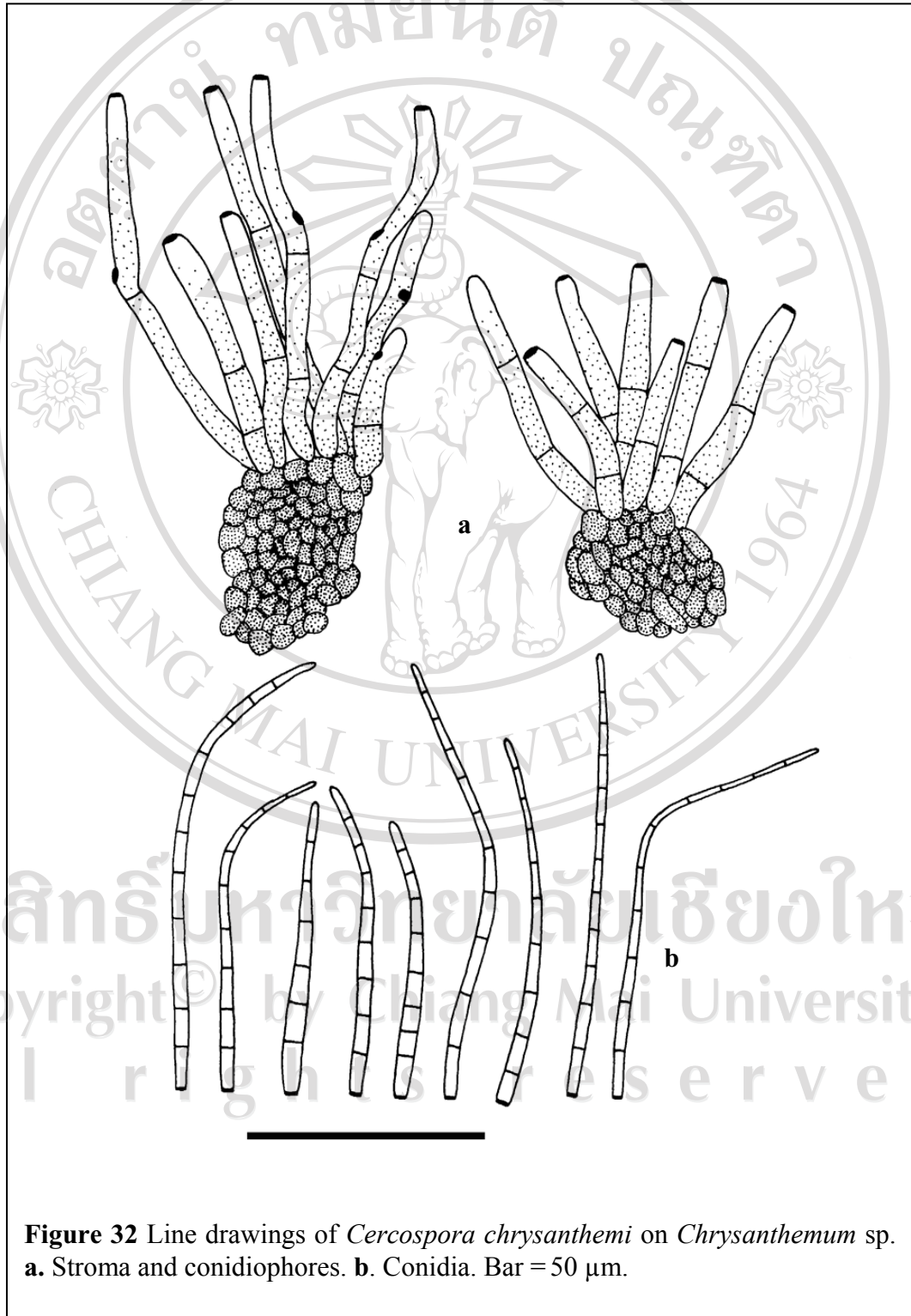


Figure 32 Line drawings of *Cercospora chrysanthemi* on *Chrysanthemum* sp.
a. Stroma and conidiophores. **b.** Conidia. Bar = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Amphur Chiang Dao, Tumbol Huay Luek, Huay Luek Royal Project, on leaves of *Chrysanthemum* sp. (*Asteraceae*), 6 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23577).

Host: *Callistephus chinensis*, *Centratherum anthelminticum*, *Chrysanthemum balsamita*, *C. coronarium*, *C. hortorum*, *C. indicum*, *C. maximum*, *C. morifolium* hybrid, *C. segetum*, *C. sinense*, *Chrysanthemum* sp. (*Asteraceae*) (Crous and Braun, 2003).

Distribution: Bermuda, Brazil, China, Georgia, Hong Kong, India, Jamaica, Japan, Korea, Mauritius, Myanmar, New Zealand, Panama, Philippines, Taiwan, and U.S.A (Crous and Braun, 2003).

Notes: This specimen is the first record of *C. chrysanthemi* from Thailand.

Cercospora cynarae Y. L. Guo and Y. Jiang, *Mycosystema* **20**: 26 (2001).

(Figures 33a-b)

Leaf spots 2-10 mm in diameter, amphigenous, distinct, circular to subcircular, pale brown to tan, centre greyish brown to greyish white, with dark brown margins.

Caespituli amphigenous. *Stromata* up to 28 µm in diameter, small sometimes lacking, if present composed of a few of globose, brown to dark brown cells. *Conidiophores* (32.5-) 55-187 (-220) × 3-5 (-8) µm, very variable in length, loosely fasciculate, 3-12-septate, emerging from stromata through the cuticle or secondary mycelium, straight to slightly curved, pale brown or sometimes paler towards the apex, rarely geniculate.

Conidiogenous cells integrated, terminal, often monoblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3 µm diameter, conspicuous, thickened, and

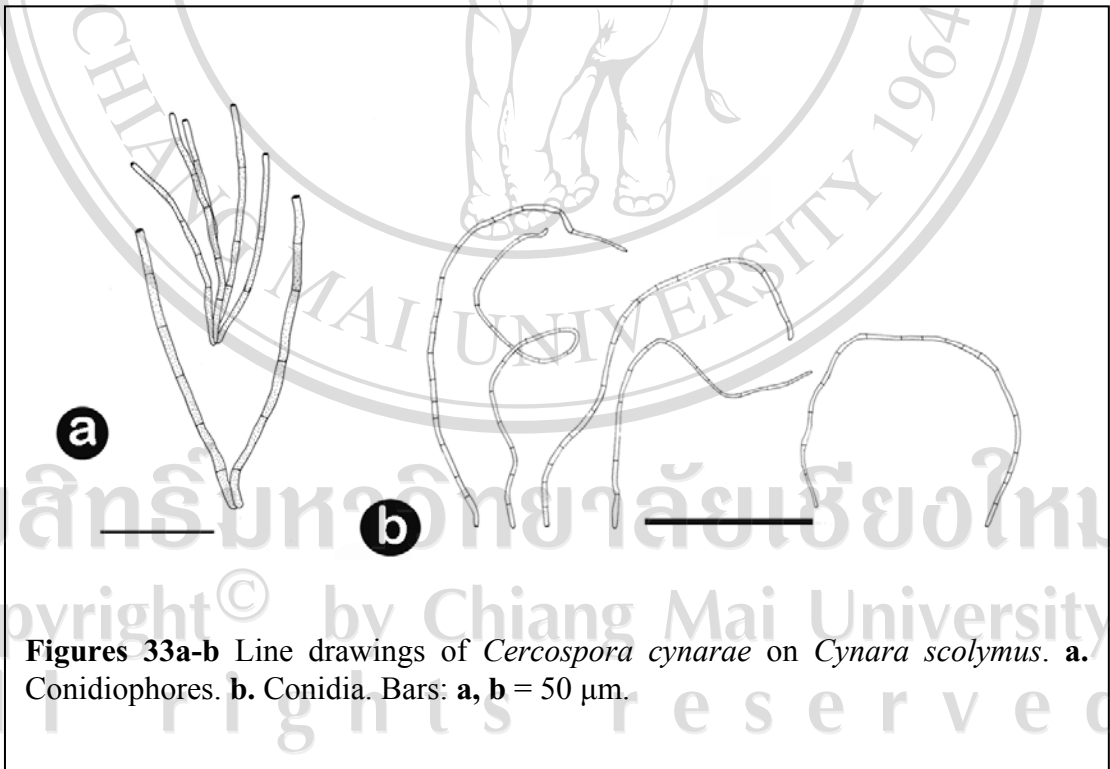
darkened. *Conidia* 45-150 (-196) \times 1.5-3 μm , solitary, acicular, curved, hyaline, 13-19-septate, smooth, truncate at the base, apex acute, with thickened, and darkened hila, \pm 1 μm diameter

Specimen examined: THAILAND, Chiang Mai Province, Mae-jam Distric, Mae-hae Royal Project Area, on leaves of *Cynara scolymus* L. (*Asteraceae*), 12 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23674).

Host: *Cynara scolymus* (*Asteraceae*) (Jiang and Guo, 2001).

Distribution: China (Jiang and Guo, 2001).

Notes: This specimen is the first record of *Cercospora cynarae* from Thailand.



Figures 33a-b Line drawings of *Cercospora cynarae* on *Cynara scolymus*. **a.** Conidiophores. **b.** Conidia. Bars: **a, b** = 50 μm .

Cercospora dahliicola M. A. Salam and P. N. Rao, *J. Indian Bot. Soc.* **36**: 424 (1957).

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

(Figure 34)

Leaf spots 3-5 mm diameter, amphigenous, dark to yellowish, only leaf decoloration on the host. *Caespituli* hypophyllous. *Stromata* (19) 20 ± 1 (21) μ diameter, small, composed of a few globose to subglobose, brown to blackish brown cells. *Conidiophores* (25) 65 ± 28.5 (102) \times (25) 3.5 ± 0.6 (4) μ m, 3-5 in a loosely and divergent fasciculate, 1-3-septate, arising from stromata, straight, smooth, brown at the base, and paler toward the apex, cylindrical, unbranched, not geniculate. *Conidiogenous cells* integrated, holoblastic, monoblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3 μ m diameter, conspicuous, thickened, and darkened. *Conidia* (46) 67.5 ± 16.2 (87) \times (2.5) 3 ± 0.2 (3) μ m, solitary, acicular, straight, hyaline, 7-10-septate, smooth, truncate at the base, tapering toward a subacute apex, hila 2-2.5 μ m diameter, conspicuous, thickened, and darkened.

Specimen examined: THAILAND, Chiang Rai Province, Mae Fah Luang, Mae Jan, Doi Tung Development, on leaves of *Dahlia* sp. (*Asteraceae*), 16 August 2008, Jamjan Meeboon (BBH 23587).

Host: *Dahlia variabilis*, *Dahlia* sp. (*Asteraceae*) (Salam and Rao, 1957).

Distribution: India (Salam and Rao, 1957).

Notes: This specimen is the first record of *C. dahliicola* from Thailand.

Crous and Braun (2003) assigned this species as *C. apii* s. lat.

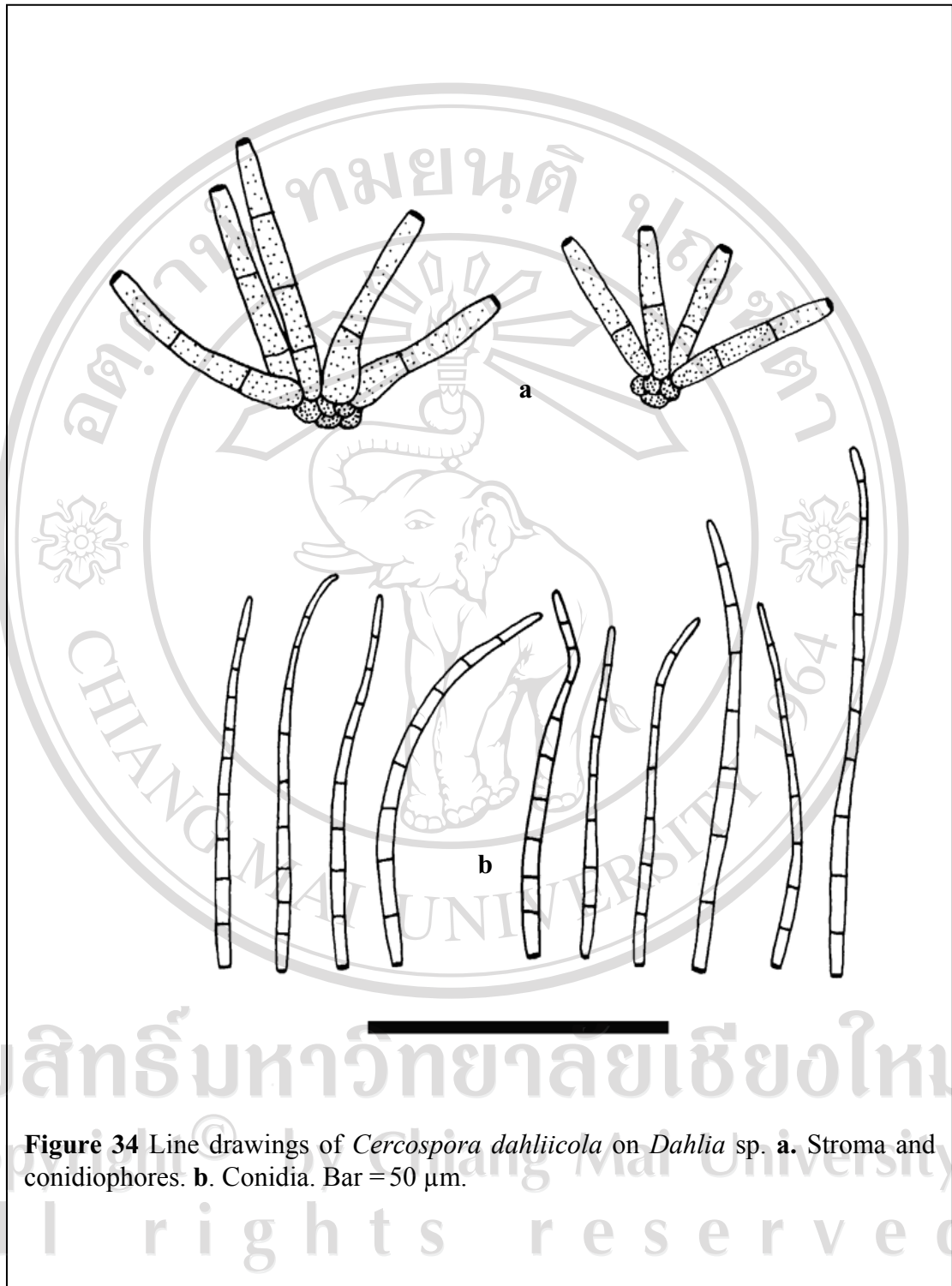


Figure 34 Line drawings of *Cercospora dahliicola* on *Dahlia* sp. **a.** Stroma and conidiophores. **b.** Conidia. Bar = 50 μ m.

Cercospora eupatorii Sacc., *Syll. Fung.* **4**: 449 (1886).

Specimen examined: THAILAND, Phetchabun Province, Amphur Lom sak, Nam Nao National Park, on leaves of *Eupatorium odoratum* L. (*Asteraceae*), 24 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27925); Chiang Mai Province, Queen Sirikit Botanical Garden, on leaves of *Eupatorium adenophorum* Spreng. (*Asteraceae*), 20 November 2004, Jamjan Meeboon (CMU 27880).

Host: *Eupatorium adenophorum*, *E. odoratum*, *Eupatorium* sp. (*Asteraceae*) (Crous and Braun, 2003).

Distribution: Nepal, U.S.A, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first report of this species occurs in Thailand was made by Meeboon *et al.* (2007c). The conidiophores of the specimen on *E. adenophorum* are straight, 2-8-septate, (117) 139-295 (332) × (2) 3.5-7 μm, with thickened conidiogenous loci. The conidia are pale olivaceous, obclavate, (14.5-) 22-39 (-51) × (2.5-) 4-5 (-7) μm, 2-12-septate, and have conspicuously thickened, darkened and non-protuberant of hila. On the other hand, the specimen on *E. odoratum* is characterized by having 1-9-septate conidiophores, 15-118 × 3.5-5 μm, and 3-12-septate conidia, 29-102.5 × 1.5-4 μm.

Cercospora gerberae Chupp and Viégas, *Bol. Soc. Brasil. Agron.* **8**: 27 (1945).

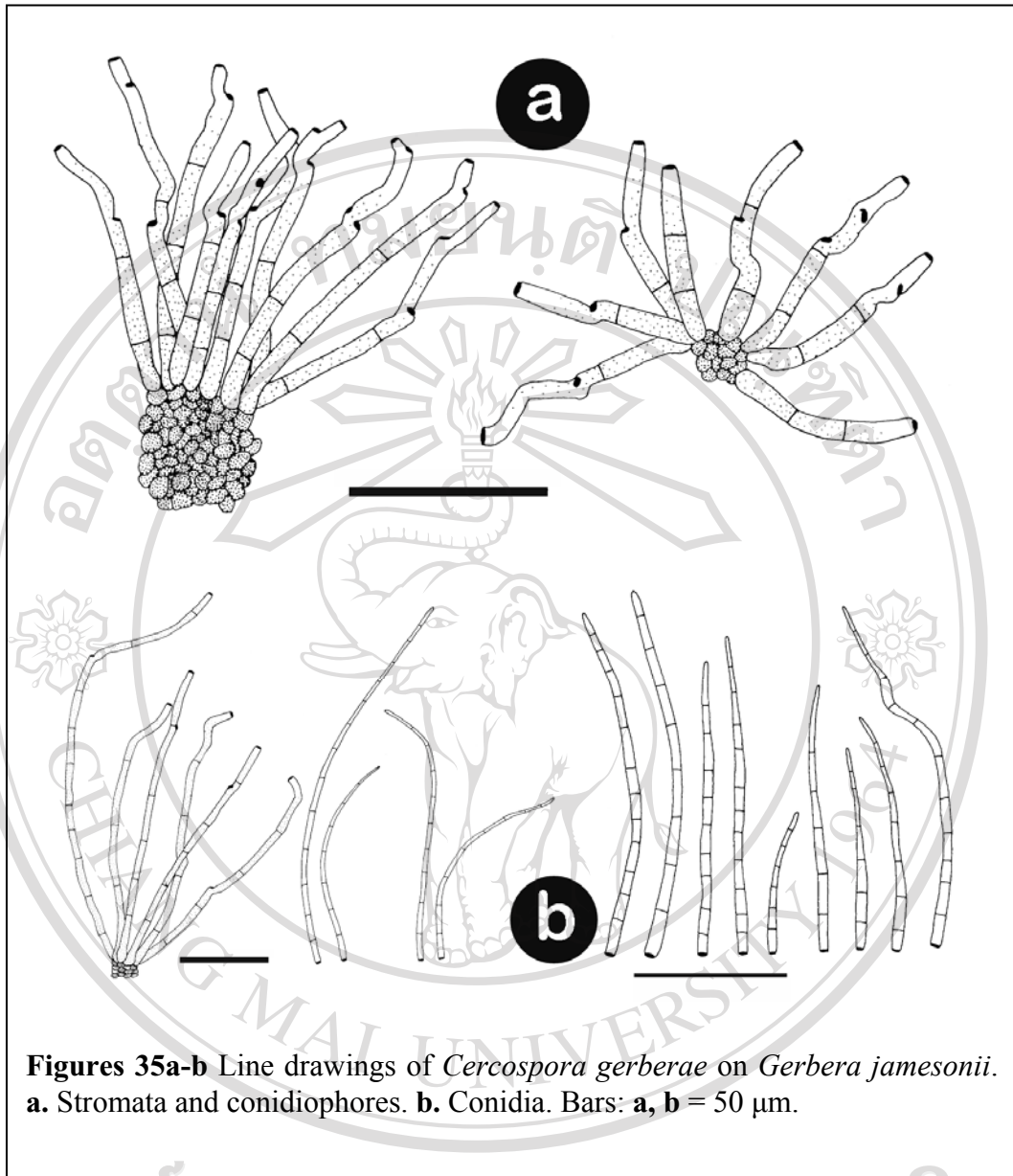
(= *C. apii* s. lat.)

(Figures 35-a-b)

Leaf spots 15-30 mm diameter, amphigenous, circular or subcircular, pale greenish to ochraceous at young symptoms, becoming brown to dark brown, with finally grayish brown at the centre, surrounded by a dark margin. *Caespituli* amphigenous. *Stromata* (20.5)33.5 ± 7.51(39) µm diameter, well-developed, intraepidermal, composed of a few subglobose, brown to blackish brown cells. *Conidiophores* (36) 88.5 ± 30(163) × (3) 4.5 ± 0.6 (6) µm, loosely to densely fasciculate, 1-3-septate, numerous, arising from stromata, simple, straight, erect to decumbent, smooth, pale yellow to pale brown, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal, polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 µm, conspicuous, thickened, darkened. *Conidia* (60)113.38 ± 39.14(198) × (2)2.92 ± 0.78(4) µm, solitary, narrowly obclavate to subacicular, straight, hyaline, 5-12-septate, smooth, base obconically truncate, with subacute apex, hila 2-2.5 µm, thickened and darkened.

Specimen examined: THAILAND, Chiang Rai Province, Amphur Wiang Pa Pao, on leaves of *Gerbera jamesonii* Adlam cultivar (*Asteraceae*), 9 March 2005, Jamjan Meeboon (CMU 28219); Chiang Mai Province, Amphur Muang, Suthep, Chang Khian, the same host, 2 August 2008, Jamjan Meeboon (BBH 23690); Chiang Mai Province, Amphur Mae Jo, Tumbol San Sai, Farming area, the same host, 9 August 2008, Jamjan Meeboon (BBH 23702).

Host: *Gerbera jamesonii*, *Gerbera* sp. (*Asteraceae*) (Crous and Braun, 2003).



Figures 35a-b Line drawings of *Cercospora gerberae* on *Gerbera jamesonii*.
a. Stromata and conidiophores. **b.** Conidia. Bars: **a, b** = 50 μ m.

Distribution: Australia, Bangladesh, Bermuda, Brazil, British Solomon Islands, Brunei, Cuba, Cambodia, Ghana, Hong Kong, India, Indonesia, Iran, Jamaica, Kenya, Malawi, Malaysia, Pakistan, Philippines, Puerto Rico, Sierra Leone, Singapore, Taiwan, Tanzania, Thailand, Uganda, U.S.A and Virgin Islands (Crous and Braun, 2003).

Notes: The first report of this species in Thailand was carried out by Sontirat *et al.* (1980).

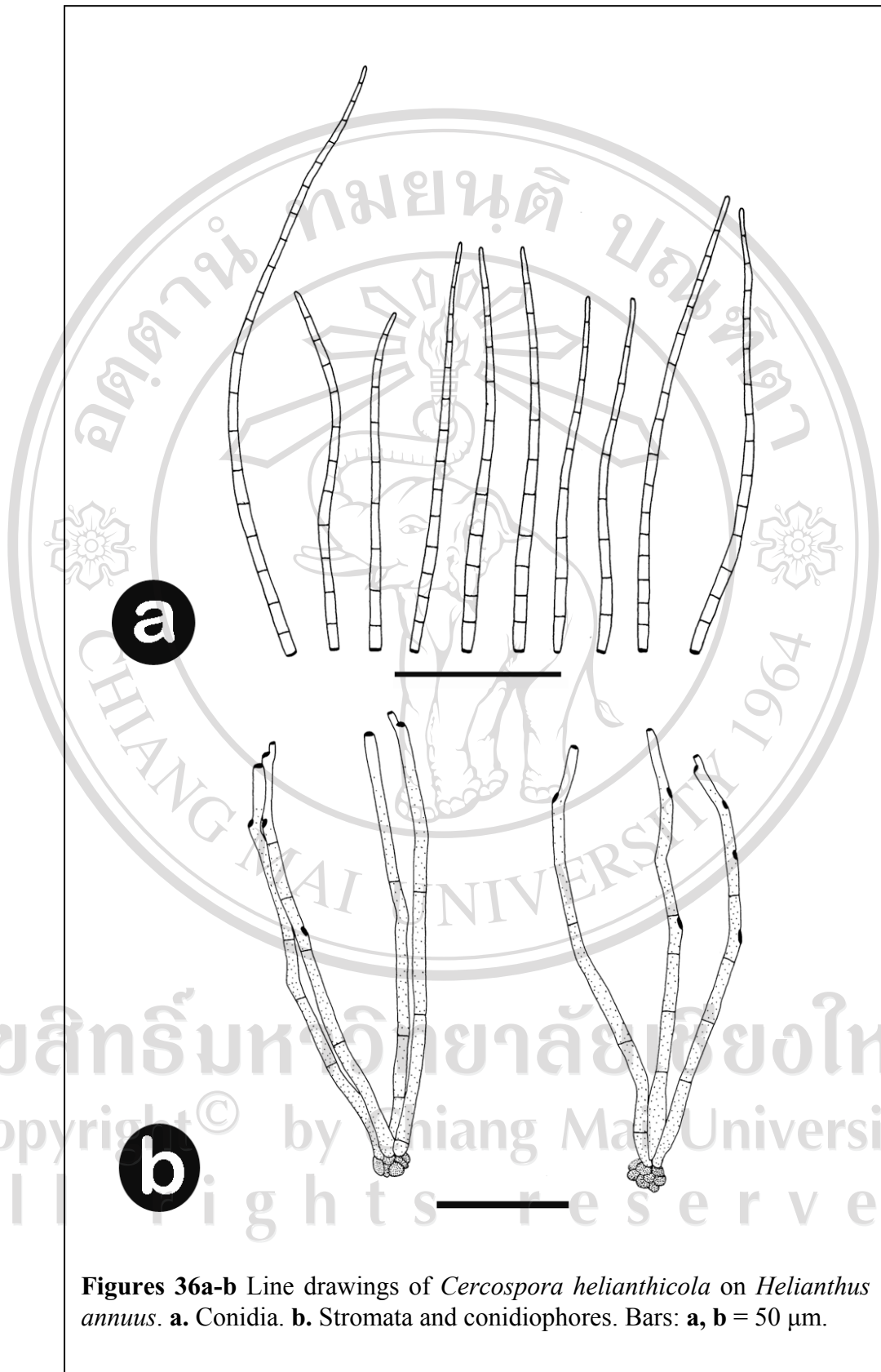
Literature: Chupp (1954, p. 138).

Cercospora helianthicola Chupp and Viégas, *Bol. Soc. Brasil. Agron.* **8**: 29 (1945).

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

(Figures 36a-b)

Leaf spots 2-26 mm diameter, distinct, amphogenous, variable, from minute spot until large necrosis on the leaves, dark brown with indistinct margins. *Caespituli* hypophyllous. *Stromata* (12) 13.5 ± 1.3 (15) μm diameter, intraepidermal, small, composed of a few globose to subglobose, brown to blackish brown cells. *Conidiophores* (79) 147.5 ± 35.7 (184) \times (3) 4 ± 0.5 (5) μm , 3-6 in a loosely and divergent fasciculate, 2-4-septate, arising from stromata, straight to decumbent, erect to decumbent, smooth, pale yellow to pale brown, not branched, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal to intercalary, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* 1.5-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (120) 145.5 ± 39.9 (215) \times (3) 3.5 ± 0.4 (4) μm , solitary, narrowly obclavate to acicular, 8-20-septate, straight to curve, hyaline, smooth, base obconically truncate, with subacute apex, hilum 1.5-2.5 μm diameter, thickened and darkened.



Figures 36a-b Line drawings of *Cercospora helianthicola* on *Helianthus annuus*. **a.** Conidia. **b.** Stromata and conidiophores. Bars: **a, b** = 50 µm.

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Helianthus annuus* L. (*Asteraceae*), 30 November 2004, Jamjan Meeboon (CMU 27879); Chiang Mai Province, Chiang Mai University, Faculty of Agriculture, on the same host, 14 August 2008, Jamjan Meeboon (BBH 23610).

Host: *Helianthus annuus*, *H. doronicoides*, *H. hirsutus*, *H. maximiliani*, *H. occidentalis*, *H. rigidus*, *H. strumosus*, *H. tuberosus* (*Asteraceae*) (Crous and Braun, 2003).

Distribution: Brazil, Cambodia, China, India, Mauritius, Pakistan, Panama, and Thailand (Crous and Braun, 2003).

Notes: In Thailand, this fungus was firstly reported by Petcharat and Kanjanamaneesathian (1989). Crous and Braun (2003) noted *C. helianthicola* as *C. apii* s. lat.

Literature: Chupp (1954, p. 141).

Cercospora lactucae-sativae Sawada, *Report of the Department of Indutry, Government Research Institute, Formosa* **85**: 111 (1943).

= *Cercospora longispora* (Cugini) Trav., *Malpighia* **17**: 217 (1902) (*nom. illeg.*), homonym of *C. longispora* Peck (1884).

≡ *Cercospora longissima* Trav., *Malpighia* **17**: correzione (correction slip) to p. 217 (1903) (*nom. illeg.*), homonym of *C. longissima* Cooke and Ellis (1889).

≡ *Cercospora longissima* (Cugini) Sacc., *Syll. Fung.* **18**: 607 (1906) (*nom. illeg.*), homonym of *C. longissima* Cooke and Ellis (1889).

- = *Cercospora lactucae* J. A. Stev., *J. Dept. Agric. Puerto Rico* **1**: 105 (1917) (*nom. illeg.*), homonym of *C. lactucae* Henn. (1902).
- = *Cercospora lactucae* Welles, *Phytopathology* **13**: 289 (1923) (*nom. illeg.*), homonym of *C. lactucae* Henn. (1902).
- = *Cercospora ixeridis-chinensis* Sawada, *Rep. Gov. Agric. Res. Inst. Taiwan* **86**: 171 (1943) (*nom. inval.*).
- = *Cercospora lactucae-indicae* Sawada, *Rep. Gov. Agric. Res. Inst. Taiwan* **86**: 172 (1943) (*nom. inval.*).

(Figures 37a-b)

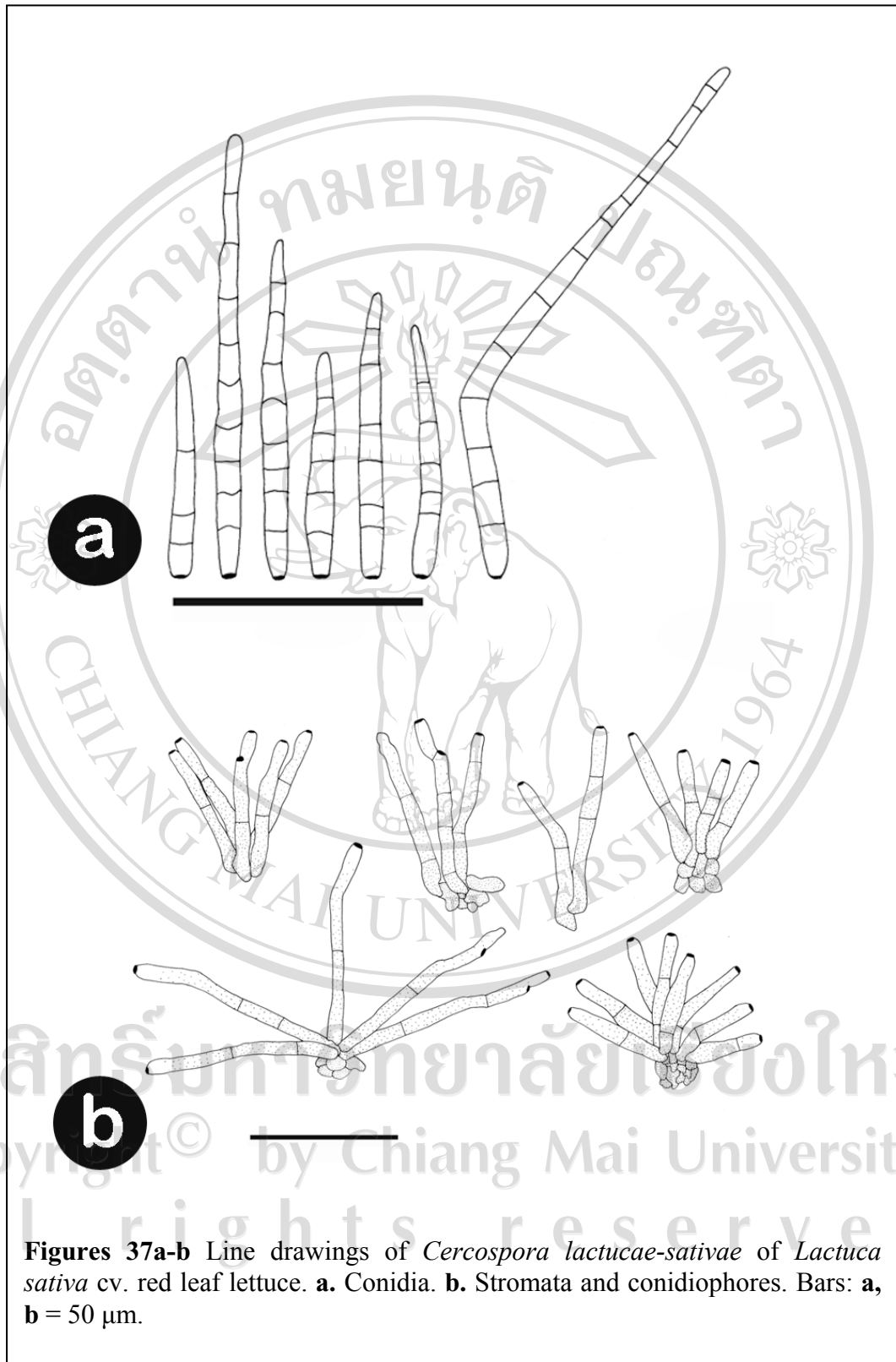
Leaf spots 2-10 mm diameter, amphigenous, circular or subcircular, brown to dark brown, with grayish brown at the centre, surrounded by a dark margin. *Caespituli* amphigenous. *Stromata* 17-36 μm diameter, intraepidermal, moderately small, composed of subglobular, and brown to dark brown cells. *Conidiophores* 47-128 \times 3-6.5 μm , 3-8 in a loose fascicles, 1-4-septate, arising through stomata, straight to decumbent, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, strongly geniculate near the apex. *Conidiogenous cells* 19-40 \times 2-3.5 μm , integrated, terminal, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* 36-182 \times 3-6.5 μm , solitary, acicular to narrowly obclavate, straight (occasionally curved), hyaline, 7-13-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 1.5-3 μm diameter, thickened, and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Lactuca sativa* L. (*Asteraceae*), 31 October 2004, Jamjan Meeboon (CMU 27900); the same province, Amphur Samoeng, Pang Da Royal Project, on leaves of *Lactuca sativa* cv. *butter head lettuce*, 7 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23572); cv. *red leaf lettuce*, Jamjan Meeboon and Iman Hidayat (BBH 23573); and cv. *green corol*, Jamjan Meeboon and Iman Hidayat (BBH 23572); the same province Amphur Sanpatong, Tambol Mae Win, Ban Mae Sapok, Mae Sapok Royal Project, 8 February 2008, cv. *red corol*, Jamjan Meeboon and Iman Hidayat (BBH 23569) and cv. *red oak leaf*, Jamjan Meeboon and Iman Hidayat (BBH 23570); cv. *ice berg*, Jamjan Meeboon and Iman Hidayat (BBH 23633); cv. *lettuce green oak leaf*, Jamjan Meeboon and Iman Hidayat (BBH 23597); and cv. *lettuce sweet chart*, Jamjan Meeboon and Iman Hidayat (BBH 23631).

Host: *Cichorium endivia*, *C. intybus* L., *Lactuca chinensis*, *L. denticulata*, *L. indica*, *L. paradoxa*, *L. saligna*, *L. scariola*, and *L. sativa* (*Asteraceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Worldwide, wherever the host plant is growing or cultivated, including China, Japan, Korea, Taiwan, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first report of this species from Thailand was made by Meeboon *et al.* (2007c). This report is the first report of *C. lactucae-sativae* infected *Cichorium endivia*, and various cultivars of *L. sativa*, viz, cv. *butter head lettuce*, cv. *red leaf lettuce*, cv. *green corol*, cv. *red corol*, cv. *red oak leaf*, cv. *ice berg*, cv. *lettuce green oak leaf*, and cv. *lettuce sweet chart*, in Thailand.



Cercospora nilghirensis Govindu and Thirum., *Sydowia* 9: 224 (1955).

(Figure 38)

Leaf spots 2-5 mm diameter, amphigenous, distinct, circular to subcircular, pale to whitish at the center with dark margin. *Caespituli* amphigenous. *Stromata* up to 12 µm diameter, small, often lacking, intraepidermal, composed of a few globose to subglobose, brown cells. *Conidiophores* (88-) 99-111 (-118) × (4-) 4.5-5 (-6) µm, 4-9 in a loose to dense fascicles, 2-5-septate, arising from stromata, straight to decumbent, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, geniculate, mostly near the apex. *Conidiogenous cells* integrated, terminal or intercalary, frequently monoblastic, sometimes polyblastic, sympodially proliferating. *Conidiogenous loci* 2-2.5 µm diameter, conspicuous, thickened, and darkened. *Conidia* 80-96 × 3.5-4 µm, solitary, obclavate, straight, slightly curved, hyaline, 6-12-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 2-2.3 µm diameter, conspicuous, thickened, and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Jam, Mae Hae Royal Project, on leaves of *Conyza sumatrensis* (Retz.) E. Walker (*Asteraceae*), 12 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23775).

Host: *Conyza ambigua*, *C. stricta*, *C. sumatrensis* (*Asteraceae*) (Crous and Braun, 2003).

Distribution: India (Crous and Braun, 2003).

Notes: This specimen is quite closed to *C. nilghirensis* Govindu and Thirum. due to distinct and amphigenous leaf spot, amphigenous caespituli, stromata small to

lacking, unbranched and geniculation of conidiophores near the apex, and conidia frequently obclavate. In *C. bidentis* Tharp, the leaf spot is indefinite at the lower surfaces and caespituli epiphyllous. This is the first record of *C. nilghirensis* from Thailand.

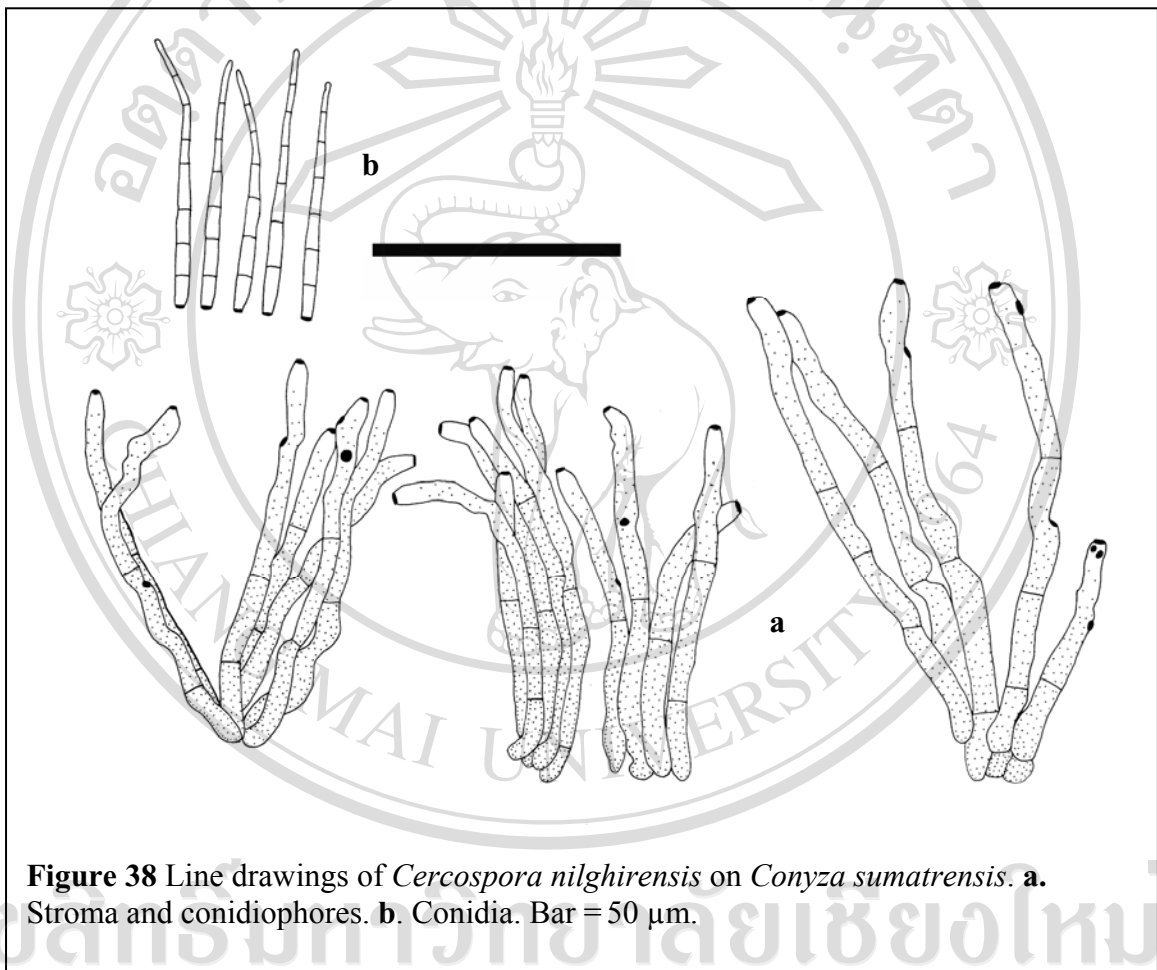


Figure 38 Line drawings of *Cercospora nilghirensis* on *Conyza sumatrensis*. **a.** Stroma and conidiophores. **b.** Conidia. Bar = 50 μ m.

Cercospora mikaniicola F. Stevens, *Trans. Illinois Acad. Sci.* **10**: 213 (1917).

= *Cercospora mikaniae-cordatae* J. M. Yen, *Rev. Mycol.* **30**: 183 (1965).

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Mikania cordata* B. L. Rob. (*Asteraceae*), 31 October 2004, Jamjan Meeboon (CMU 27934).

Host: *Mikania cordata*, *M. cordifolia*, *M. micrantha*, *M. scandens* (*Asteraceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Distribution: American Samoa, Argentina, Bangladesh, Brazil, Cuba, Colombia, Fiji, Guadalcanal, Hong Kong, India, Jamaica, Malaysia, Niue, Pakistan, Papua New Guinea, Puerto Rico, Samoa, Sierra Leone, Singapore, Solomon Islands, Thailand, Tuvalu, U.S.A, Vanuatu (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Notes: The first report of this species from Thailand was conducted by Meeboon *et al.* (2008).

Literature: Chupp (1954, p. 146).

Cercospora tagetis-erectae Thirum. and Govindu (*tagetes-erectae*), *Sydowia* **10**: 262 (1956) [1957].

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Tagetes erecta* L. (*Asteraceae*), 31 October 2004, Jamjan Meeboon (CMU 27939).

Host: *Tagetes erecta*, *T. patula* (*Asteraceae*) (Thirumalachar and Govindu, 1956; Meeboon *et al.*, 2008).

Distribution: India and Thailand (Thirumalachar and Govindu, 1956; Meeboon *et al.*, 2008).

Notes: The first report of this species from Thailand was carried out by Meeboon *et al.* (2008).

Cercospora tridacis-procumbentis Govindu and Thirum., *Sydowia* 7: 49 (1953).

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

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Tridax procumbens* L. (*Asteraceae*), 31 October 2004, Jamjan Meeboon (CMU 27918).

Host: *Tridax procumbens* (*Asteraceae*) (Crous and Braun, 2003).

Distribution: Australia, Cuba, Ghana, Guinea, India, Kenya, Kiribati, Myanmar, Nauru, Nigeria, Papua New Guinea, Sierra Leone, Solomon Islands, South Africa, Tanzania, Thailand, Togo, and Tuvalu (Crous and Braun, 2003).

Notes: In Thailand, *C. tridacis-procumbentis* was reported by Sontirat *et al.* (1980). Crous and Braun (2003) noted *C. tridacis-procumbentis* as *C. apii* s. lat.

Cercospora zinniicola A. Pande, *Kavaka* 3: 55 (1975).

(Figures 39; 40)

Leaf spots 1-10 mm diameter, amphigenous, irregular, pale, with dark red margin, numerous and scattered through the leaf surface. *Caespituli* amphigenous. *Stromata* 32.5-46 µm diameter, intraepidermal, well-developed, composed of globose

to subglobose, brown to blackish brown cells. *Conidiophores* 54-100 × 2.5-5 µm, 9-16 in a densely fasciculate, not divergent, 3-6-septate, arising from stromata, smooth, brown at the base, and paler toward the apex, straight to decumbent, unbranched, cylindrical, geniculate to sinuous, mostly near the apex. *Conidiogenous cells* 7.5-20 × 2.5-5 µm, integrated, terminal, holoblastic, mostly polyblastic, sympodially proliferating. *Conidiogenous loci* 2-2.5 µm diameter, conspicuous, thickened, and darkened. *Conidia* 24.5-93.5 × 2.5-3.5 µm, solitary, filiform to narrowly obclavate, straight, hyaline, 7-18-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 2-2.5 µm diameter, thickened, and darkened.

Specimen examined: THAILAND, Chiang Rai Province, Amphur Wiang Pa Pao, Tumbol Wiang Ga Long, on leaves of *Zinnia elegans* Jacq (*Asteraceae*), 31 July 2007, Jamjan Meeboon (BBH 23563); Chiang Mai Province, Mae Rim, Queen Sirikit Botanical Garden, on leaves of *Zinnia elegans* Jacq. (*Asteraceae*), 5 August 2008, Jamjan Meeboon, (BBH 23731).

Host: *Zinnia elegans* (*Asteraceae*) (Crous and Braun, 2003).

Distribution: India (Crous and Braun, 2003).

Notes: Both of these specimens definitely distinct from *C. apii* s. lat. due to well developed stromata, very densely fasciculate conidiophores, and obclavate conidia with obconically truncate base. Both of them are characterized by having amphigenous caespituli. The conidiophores of the first specimen are not divergent, but the second one are divergent. Both of the specimens having relatively short conidiophores (up to 100 µm long) as well as conidia, but the conidia septation of the second specimen is a few (only up to 4 septate). Since these collections are not *C. apii*

s. lat.; therefore, we assigned them to *C. zinnicola* due to the similarity of morphological characteristics, and being recorded from *Zinnia elegans*. These specimens are the first record of *C. zinnicola* from Thailand.

Literature: Crous and Braun (2003, p. 434).

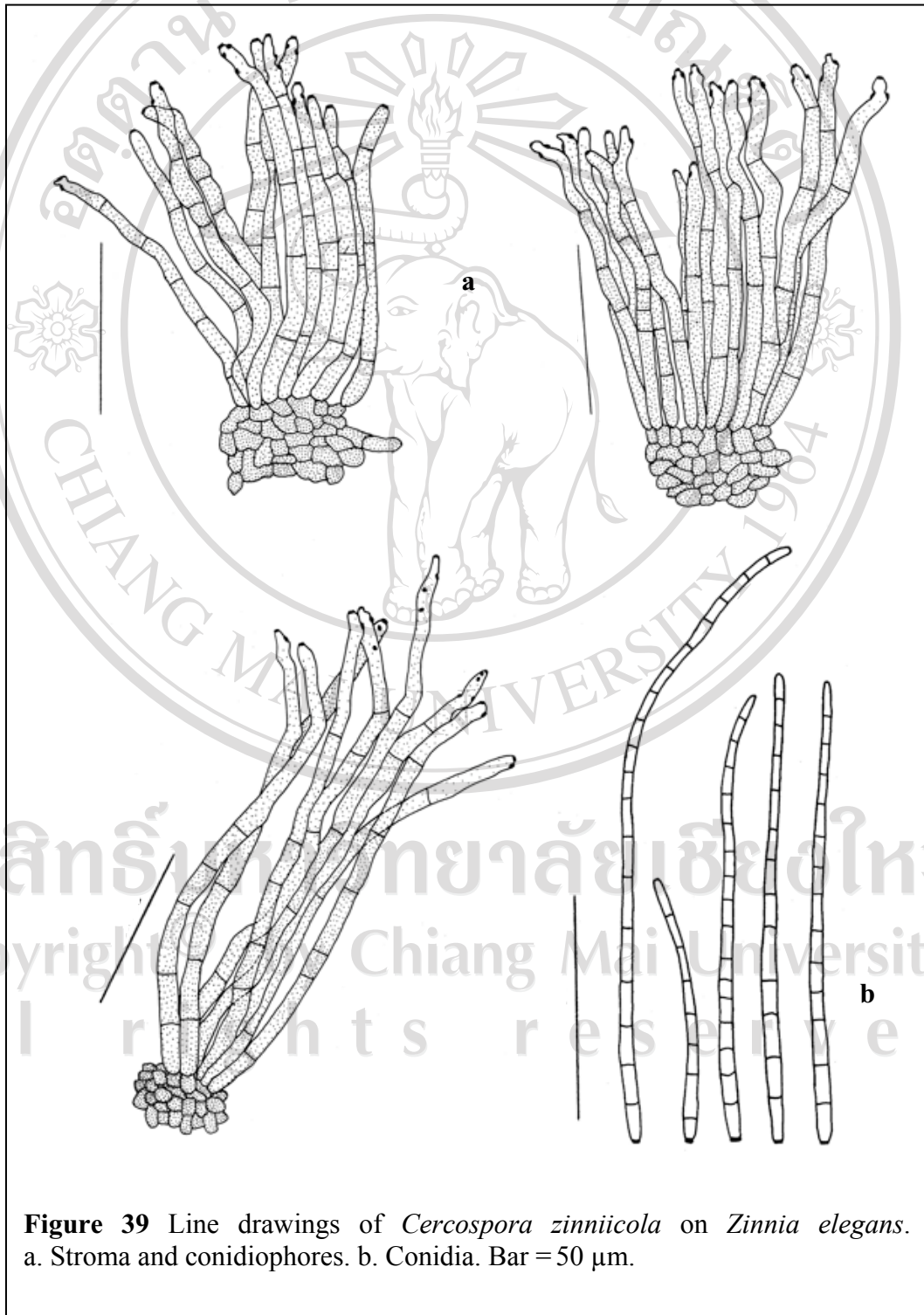


Figure 39 Line drawings of *Cercospora zinnicola* on *Zinnia elegans*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

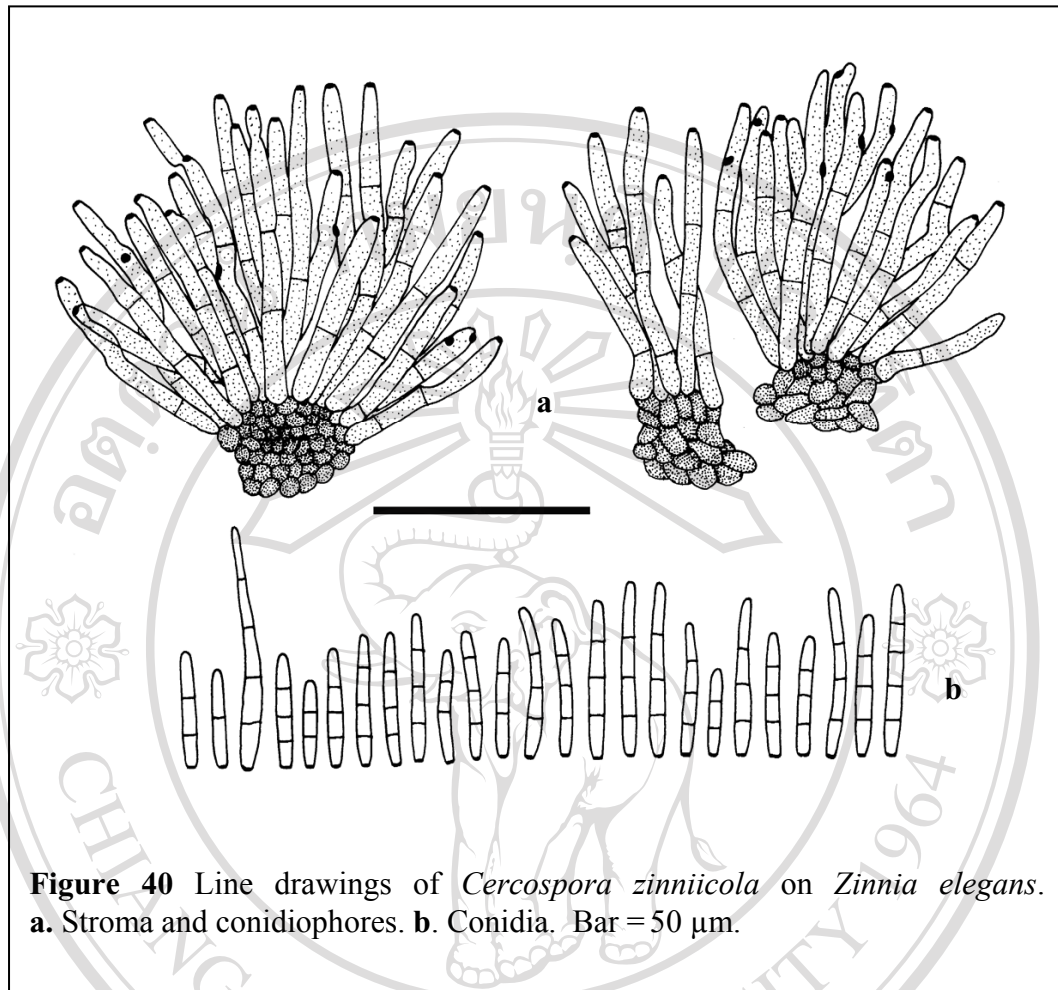


Figure 40 Line drawings of *Cercospora zinnicola* on *Zinnia elegans*. **a.** Stroma and conidiophores. **b.** Conidia. Bar = 50 μm .

Cercospora zinniae Ellis and G. Martin, *J. Mycol.* 1: 20 (1885).

= *Cercospora atricineta* Heald and F. A. Wolf, *Mycologia* 3: 14 (1911).

= *Cercospora zinniae* Takah. and Yosh., *Pl. Protect. Tokyo* 7: 17 (1953).

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

(Figures 41a-b)

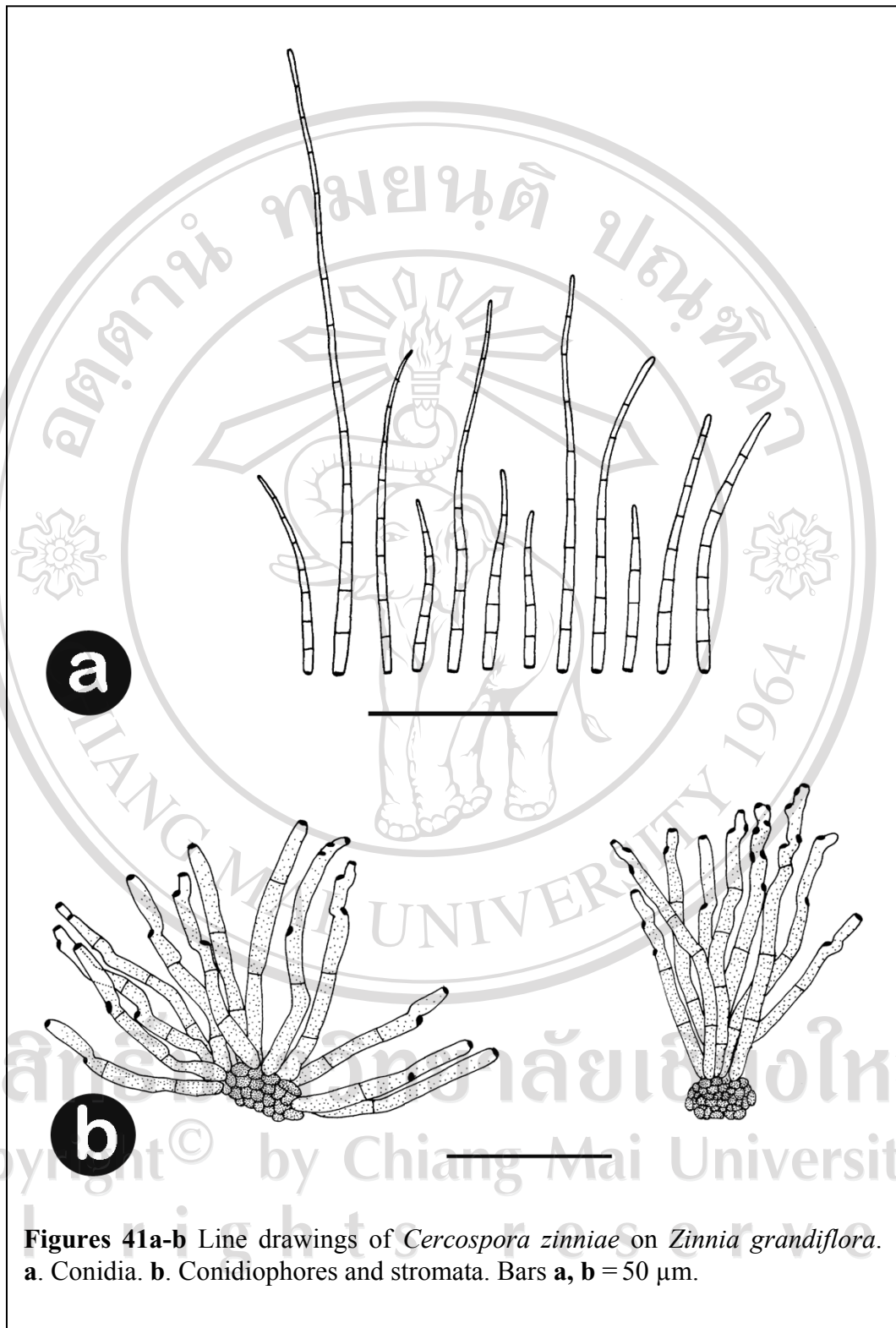
Leaf spots 15-30 mm diameter, amphigenous, circular or subcircular, at first pale greenish to ochraceous, later brown to dark brown, finally with grayish brown centre, surrounded by a dark margins. *Caespituli* amphigenous, effuse. *Stromata* (17) 24.5 ± 5.9 (25) μm diameter, intraepidermal, well-developed, composed of globose to

subglobose, brown to blackish brown cells. *Conidiophores* (40) 82 ± 22.2 (152) \times (3) 4 ± 0.6 (5.5) μm , 9-13 in a densely fasciculate, often divergent, 1-4-septate, arising from stromata, simple, straight, erect to decumbent, smooth, pale yellow to pale brown, rarely branched, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 1.5-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (24) 74 ± 37.7 (175) \times (2) 3 ± 0.4 (3.5) μm , solitary, narrowly obclavate to subacicular, straight, hyaline, 4-13-septate, smooth, obconically truncate at the base, with subacute apex, hila 1.5-2.5 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Rim, Queen Sirikit Botanical Garden, on leaves of *Zinnia grandiflora* Nutt. (*Asteraceae*), 5 August 2008, Jamjan Meeboon (BBH 23730).

Host: *Cosmos* sp., *Zinnia elegans*, *Z. multiflora*, *Z. pauciflora*, *Z. peruviana*, *Z. violacea*, *Zinnia* sp. (*Asteraceae*) (Crous and Braun, 2003).

Distribution: American Samoa, Bangladesh, Bhutan Brazil, Brunei, China, Colombia, Cook Islands, Cuba, Dominican Republic, El Salvador, Fiji, Ghana, Guam, Guatemala, Haiti, Hong Kong, India, Indonesia, Jamaica, Japan, Korea, Lithuania, Malawi, Malaysia, Mauritius, Mexico, Micronesia, Myanmar, Nepal, New Caledonia, Nigeria, Pakistan, Panama, Papua New Guinea, Philippines, Puerto Rico, Samoa, Singapore, Solomon Islands, South Africa, Sudan, Taiwan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tuvalu, Uganda, U.S.A, Vanuatu, Venezuela, Virgin Islands, Zambia, and Zimbabwe (Crous and Braun, 2003).



Figures 41a-b Line drawings of *Cercospora zinniae* on *Zinnia grandiflora*.
a. Conidia. **b.** Conidiophores and stromata. Bars **a, b** = 50 µm.

Notes: This specimen is the first record of *C. zinniae* from Thailand, and *Z. grandiflora* is reported here as a new host of this fungus.

Literature: Chupp (1954, p. 168).

Passalora assamensis (S. Chowdhury) U. Braun and Crous, *CBS Biodiversity Series* 1: 69 (2003).

≡ *Cercospora assamensis* S. Chowdhury, *Lloydia* 20: 134 (1957).

= *Cercospora eupatorii-odorati* J. M. Yen, *Bull. Trimest. Soc. Mycol. Fr.* 84: 11 (1968).

≡ *Mycovellosiella eupatorii-odorati* (J. M. Yen) J. M. Yen, *Bull. Trimest. Soc. Mycol. Fr.* 97: 131 (1981).

≡ *Phaeoramularia eupatorii-odorati* (J. M. Yen) X. J. Liu and Y. L. Guo, *Acta Phytopath. Sinica* 12: 7 (1982).

= *Mycovellosiella eupatorii-odorati* var. *asteracearum* Bhalla, S. K. Singh, and A. K. Srivast., *Aust. Syst. Bot.* 12: 368 (1999).

(Figures 42a-b)

Leaf spots 4-15 mm in diameter, amphigenous, subcircular, brown to grayish brown at the center, with dark and narrow margins. *Caespituli* amphigenous. *Stromata* 24-44 μ m diameter, intraepidermal, well-developed, and composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* 28-53 \times 3-5 μ m, 7-13 in a loose to moderately dense fascicles, arising from stromata, 1-4-septate, erect, straight,

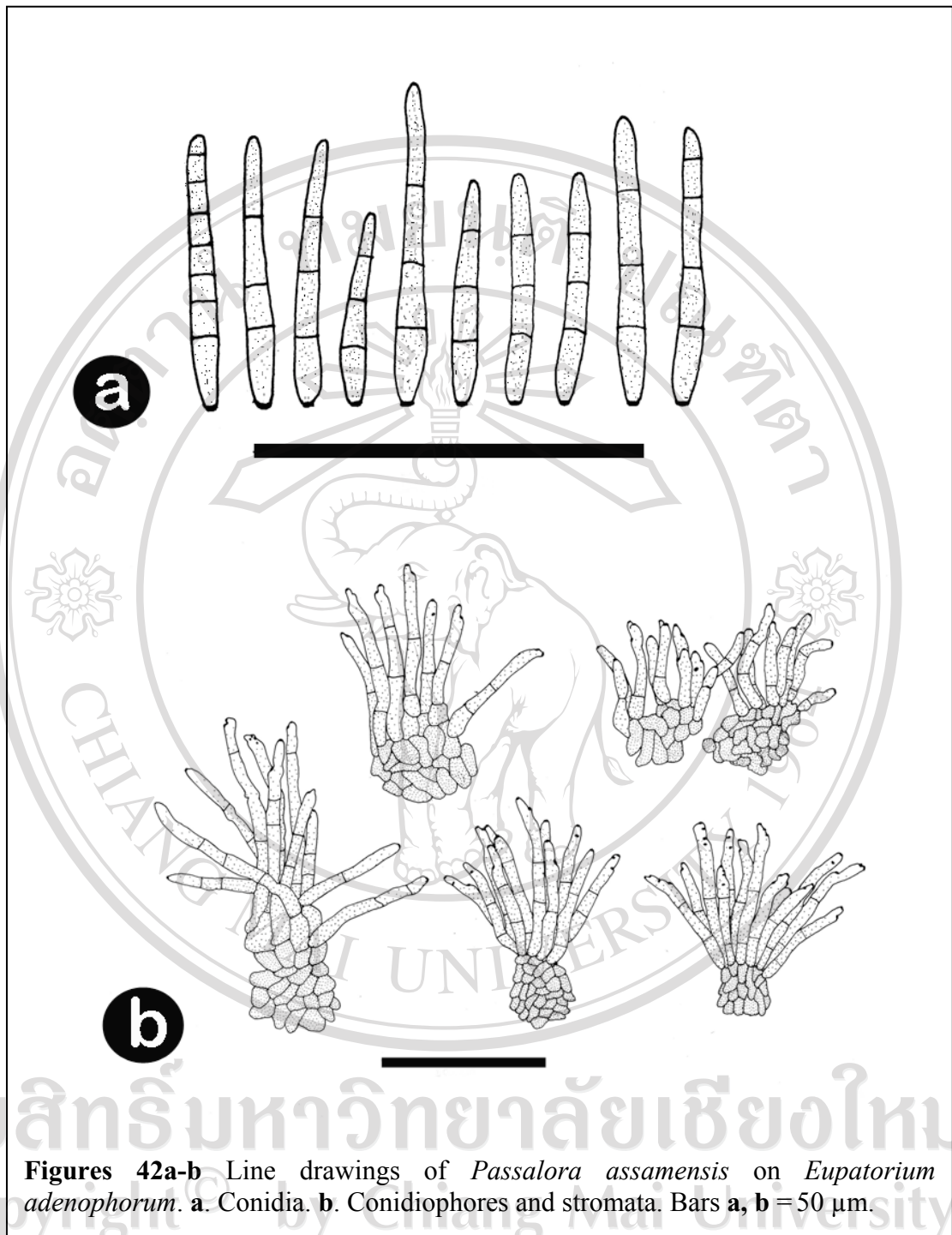
smooth, pale brown to brown with lightly paler at the apex, unbranched, subcylindrical to moderately geniculate-sinuuous. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* 1-1.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* 13-54 \times 2.5-5 μm , solitary, obclavate to subcylindrical, straight, subhyaline to light brown, 3-7-septate, smooth, obconically truncate at the base, with obtuse apex, hila 1-1.5 μm diameter, conspicuous, slightly thickened, and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Aumphur Mae Taeng, Tumbol Pa Pae, Bahn Phadeng, Mushroom Research Centre, on leaves of *Eupatorium adenophorum* Spreng. (*Asteraceae*), 12 October 2006, Ikumitsu Araki (CMU 27916); Chiang Mai Province, Nong Hoy Royal Project, on the same host, 27 July 2007, Jamjan Meeboon and Iman Hidayat (BBH 23647).

Host: *Eupatorium adenophorum*, *E. odoratum* (*Asteraceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007b).

Distribution: China, India, Malaysia, Nepal, New Zealand, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007b).

Notes: The first report of this species from Thailand was made by Meeboon *et al.* (2007b).



Passalora tithonia (R. E. D. Baker and W. T. Dale) U. Braun and Crous, *CBS Biodiversity Series* **1**: 404-405 (2003).

≡ *Cercospora tithoniae* R. E. D. Baker and Dale, *Mycol. Pap.* **33**: 106 (1951).

- ≡ *Phaeoramularia tithoniae* (R. E. D. Baker and W. T. Dale) Deighton, in Ellis, *More Dematiaceous Hyphomycetes*: 319 (1976).
- = *Cercospora tithoniae* Chidd., *Mycopathol. Mycol. Appl.* **17**: 80 (1962).
(*nom. illeg.*) homonym of *C. tithoniae* R. E. D. Baker and W. T. Dale (1951).
- ≡ *Cercospora tithoncola* J. M. Yen (*tithoncola*) *Rev. Mycol.* **31**: 144 (1966)
(*nom. nov.*).

(Figure 43)

Leaf spots 1-6 mm diameter, amphigenous, indistinct, subcircular to irregular, black, only leaf discoloration. *Caespituli* amphigenous. *Stromata* 20-67.5 μ m diameter, substomatal, small, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* (52-) 73-97 (-110) \times (2.5-) 3-3.5 (-4.5) μ m, in a dense fascicles, 2-6-septate, arising from stromata, straight to often incurved, smooth, pale brown, unbranched, slightly geniculate. *Conidiogenous cells* integrated, holoblastic, monoblastic, sometimes polyblastic, terminal or intercalary, sympodial proliferating. *Conidiogenous loci* thickened and darkened. *Conidia* (20-) 22.5-56 (-89) \times (2.5-) 3-4 (-4.5) μ m, catenate, obclavate to cylindrical, straight, brown, 1-5-septate, smooth, obconically truncate at the base, with obtuse apex, hila 1-2 μ m diameter, slightly thickened and darkened.

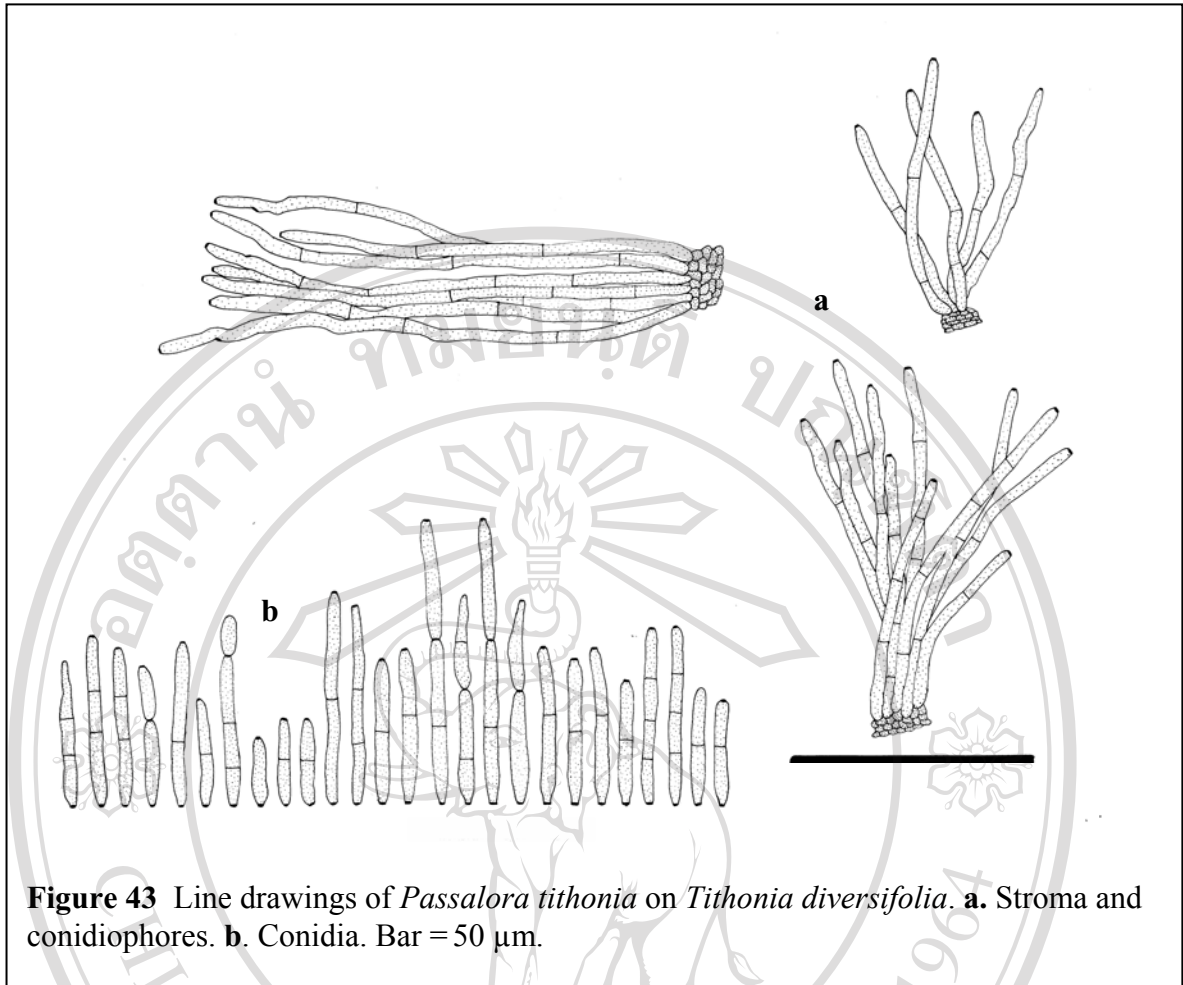


Figure 43 Line drawings of *Passalora tithonia* on *Tithonia diversifolia*. **a.** Stroma and conidiophores. **b.** Conidia. Bar = 50 μ m.

Specimen examined: THAILAND, Chiang Mai Province, Queen Sirikit Botanical Garden, Chiang Mai Province, on leaves of *Tithonia diversifolia* (Hemsl.) A. Gray (*Asteraceae*), 20 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27957); 9 October 2005, Jamjan Meeboon (CMU 28052); the same host, Chiang Mai Province, Amphur Mae Jam, Mae-Hae Royal Project Area, 12 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23601).

Host: *Tithonia diversifolia*, *T. speciosa*, *T. tagetiflora*, *Viguiera dentata* (*Asteraceae*) (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Distribution: Barbados, Cuba, Hong Kong, India, Ivory Coast, Mauritius, Singapore, Taiwan, Thailand, and Trinidad and Tobago (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Notes: This species was identified as *P. tithoniae* due to small stromata, straight conidiophores, and obclavate and catenate conidia. The first record of this species from Thailand was made by Nakashima *et al.* (2007).

Pseudocercospora blumeae-balsamiferae Goh and W. H. Hsieh, *Trans. Mycol. Soc. R. O. C.* **2**: 128 (1987c).

≡ *Cercospora blumeae-balsamiferae* Sawada, *Taiwan Agric. Res. Inst. Rept.* **86**: 166 (1943) (*nom. inval.*).

≡ *Pseudocercospora blumeae-balsamiferae* (Sawada) Y. L. Guo and X. J. Liu, *Mycosystema* **2**: 229 (1989) (*nom. inval.*), homonym of *P. blumeae-balsamiferae* Goh and W. H. Hsieh (1987).

(Figure 44)

Leaf spots 10-20 mm diameter, amphigenous, solitary, scattered on the host surface, circular to subcircular, brown, with dark brown margin. *Caespituli* amphigenous. *Stromata* 17-42 µm diameter, intraepidermal, well-developed, and composed of globose to subglobose, brown to dark brown cells. *Conidiophores* 35-116 × 2.5-4 µm, 13-27, in a very densely fasciculate, 0-3-septate, arising from stromata, straight to decumbent, smooth, brown at the base, and paler towards the apex, unbranched, slightly geniculate near the apex. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 78-102 × 3-4.5 µm, solitary, obclavate, straight to mildly curved, hyaline to subhyaline, 7-9-septate, smooth,

obconically truncate at the base, with obtuse to subobtuse apex, hila inconspicuous, unthickened, and not darkened.



Figure 44 Line drawings of *Pseudocercospora blumeae-balsamiferae* on *Blumea balsamifera*. **a.** Stroma and conidiophores. **b.** Conidia. Bar = 50 μ m.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, Medicinal Plant Garden, on leaves of *Blumea balsamifera* DC. (*Asteraceae*), 15 September 2007, Jamjan Meeboon and Iman Hidayat (BBH 23688).

Host: *Blumea balsamifera*, *B. oxydonta* (*Asteraceae*) (Crous and Braun, 2003).

Distribution: Argentina, Brunei, China, India, yanmar, Philippines, and Taiwan (Crous and Braun, 2003).

Notes: This specimen is the first record of *P. blumeae-balsamiferae* from Thailand.

Pseudocercospora cosmicola (A. K. Kar and M. Mandal) Deighton, *Trans. Brit. Mycol. Soc.* **88**: 388 (1987)

≡ *Cercospora cosmicola* A. K. Kar and M. Mandal, *Trans. Brit. Mycol. Soc.* **53**: 345 (1969).

(Figure 45)

Leaf spots 2-10 mm diameter, distinct, amphigenous, circular to irregular, scattered, brown, with dark brown margins. *Caespituli* hypophyllous. *Stromata* (30) 34 ± 3.7 (40) μm diameter, intraepidermal, well-developed, composed of globular to angular, brown to dark brown cells. *Conidiophores* (13) 15.5 ± 1.6 (18) \times (2) 2.5 ± 0.3 (2.5) μm , numerous in a densely fasciculate, 1-2-septate, not divergent, arising from stromata, brown, smooth, straight, simple, not geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (26) 65.5 ± 16.5 (93) \times (1.5) 2 ± 0.3 (2.5) μm ,

solitary, long filiform to slightly obclavate, 4-8-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the base, obtuse apex, hila unthickened and not darkened.

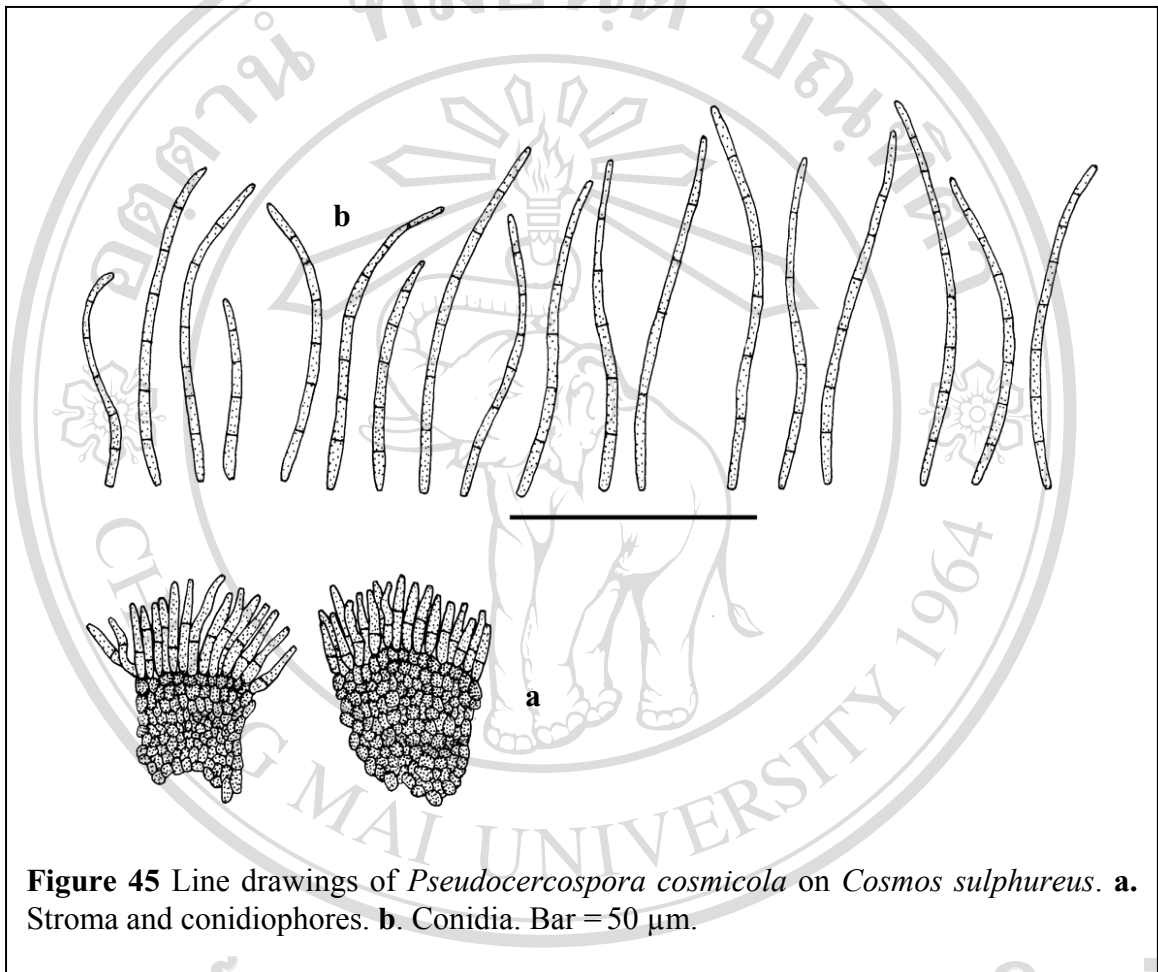


Figure 45 Line drawings of *Pseudocercospora cosmicola* on *Cosmos sulphureus*. **a.** Stroma and conidiophores. **b.** Conidia. Bar = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Royal Flora, on leaves of *Cosmos sulphureus* Cav. (*Asteraceae*), 27 July 2008, Jamjan Meeboon (BBH 23766).

Host: *Cosmos caudatus* (*Asteraceae*) (Deighton, 1987).

Distribution: India (Deighton, 1987).

Notes: This specimen is the first record of *P. cosmicola* from Thailand, and *C. sulphureus* is reported here as a new host of this fungus.

Family Balsaminaceae

Cercospora balsaminiana J. M. Yen and Lim, *Cah. Pacifique* **14**: 91 (1970).

(Figure 46)

Leaf spots 3-10 mm diameter, amphigenous, circular to subcircular, brown to dark brown, with dark margin and pale at the center. *Caespituli* amphigenous. *Stromata* 10-15 μm diameter, substomatal to intraepidermal, small, composed of a few globose to subglobose, brown cells. *Conidiophores* 52-129 \times 2-3.5 μm , 6-8 in a loose fascicles, 2-4-septate, arising from stromata, straight to decumbent, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, geniculate, mostly near the apex. *Conidiogenous cells* integrated, holoblastic, polyblastic, sometimes monoblastic, sympodially proliferating. *Conidiogenous loci* 1-2 μm , conspicuous, thickened, and darkened. *Conidia* 35-73 \times 4-5 μm , solitary, obclavate to subacicular, straight, slightly curved, hyaline, 3-11-septate, smooth, obconically truncate at the base, with tapering toward a subacute apex, hila, 1-2.3 μm diameter, thickened, and darkened.

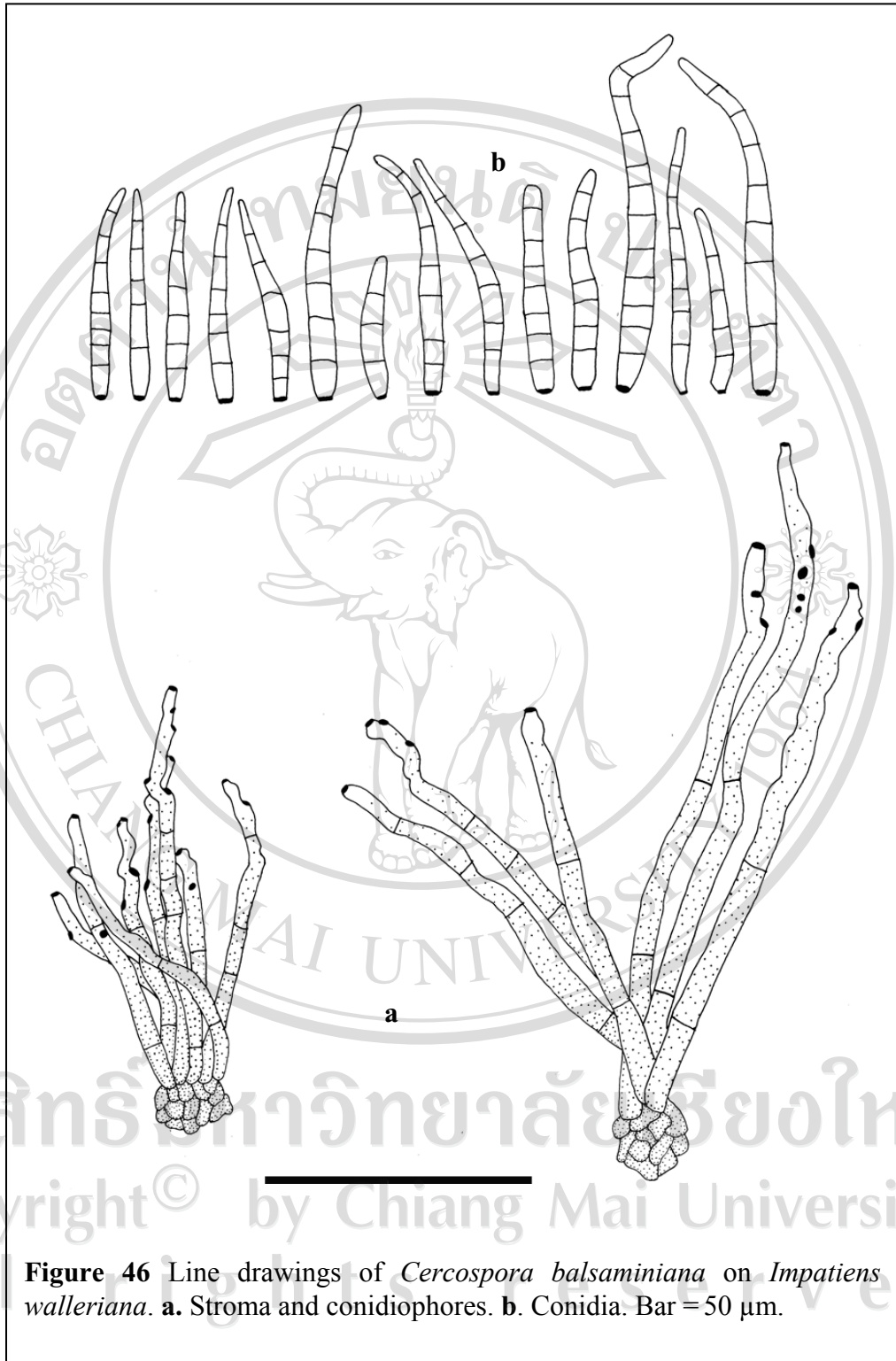


Figure 46 Line drawings of *Cercospora balsaminiana* on *Impatiens walleriana*. **a.** Stroma and conidiophores. **b.** Conidia. Bar = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Amphur Mueang, Tumbol Sri Pum, Chiang Mai Public Garden, on leaves of *Impatiens walleriana* Hook. f. (*Balsaminaceae*), 15 August 2008, Jamjan Meeboon (BBH 23582).

Host: *Impatiens balsamina* (*Balsaminaceae*) (Yen and Lim, 1980).

Distribution: Singapore (Yen and Lim, 1980).

Notes: The symptoms, stromata, and conidiophores of this specimen are much closed to *C. apii* s. lat. fide Crous and Braun (2003), but the conidia are obclavate with obconically truncate at the base. We decide to assign this specimen to *C. balsaminiana*. This specimen is the first record of *C. balsaminiana* from Thailand. *Impatiens walleriana* is also reported in this study as a new host of this fungus.

Literature: Yen and Lim (1980, p. 155).

Table 3 Morphological comparison of *Cercospora balsaminiana* from Thailand with closely related species from the same family (Chupp, 1954; Yen and Lim, 1980).

Characters	<i>Cercospora balsaminiana</i> (from Thailand)	<i>C. balsaminiana</i> (type)	<i>C. fukushiana</i> (type)
Leaf spot	Distinct	None or indistinct	Distinct
Caespituli	Amphigenous	Epigenous invisible	Amphigenous
Stromata	Small, 10-15 μm diameter	Absent or very rudimentary	Small
Conidiophores	Loosely fasciculate, 6-8- fasciculate, geniculate, 52-129 \times 2-3.5 μm	Very poor (2-7 stalks), straight, not geniculate, 15-40 \times 4.5-6 μm	Densely fasciculate, 10-120 \times 4-6 μm
Conidia	Obclavate, hyaline, straight, 35-73 \times 4-5 μm	Acicular, hyaline, curve, 66-307 \times 2.5-4.5 μm	Acicular, 30-140 \times 3-4.5 μm
Notes	This specimen is close to plurivorous <i>C. apii</i> s. lat.	Crous and Braun (2003) noted that this specimen probably a young <i>C. apii sensu lato</i>	This species is <i>C. apii</i> s. lat.

Cercospora fukushiana (Matsuura) W. Yamam., *J. Soc. Trop. Agric.* **6**: 601 (1934).

≡ *Cercospora fukushiana* Matsuura, *J. Pl. Prot.* **14**: 699 (1927).

= *Cercospora balsaminae* Mend. *Philipp. J. Sci.* **75**: 166 (1941).

= *Cercospora balsaminae* Kellerm. and Swingle, unknown fide Chupp (1954).

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

(Figure 47)

Leaf spots 15-30 mm diameter, amphigenous, circular or subcircular, at first pale greenish to ochraceous, later brown to dark brown, finally with grayish brown centre, surrounded by a dark margin. *Caespituli* amphigenous, velvety. *Stromata* (25) 28.5 ± 2.5 (32) μm diameter, small, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* (49) 83 ± 16.5 (112) \times (4) 4.5 ± 0.9 (6.5) μm , 6-8 in a loosely to densely fasciculate, arising from stromata, simple, straight, 1-4-septate, erect to decumbent, smooth, subcylindrical, pale yellow to pale brown, rarely branched, geniculate to sinuous. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* conspicuous, thickened, darkened. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, darkened. *Conidia* (60) 86.5 ± 18 (120) \times (2.5) 3.5 ± 1 (5) μm , solitary, narrowly obclavate to subacicular, 5-18-septate, straight, hyaline, smooth, base truncate to obconically truncate, with subacute apex, hila 1.5-2.5 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Phetchabun Province, Nam Nao National Park, on leaves of *Impatiens balsamina* L. (*Balsaminaceae*), 24 November 2004, Jamjan Meeboon (CMU 27917); Chiang Mai Province, Amphur Samoeng, Pang Da

Royal Project, on leaves of *Impatiens balsamina* L. (*Balsaminaceae*), 7 February 2008, Jamjan Meeboon (BBH 23616).

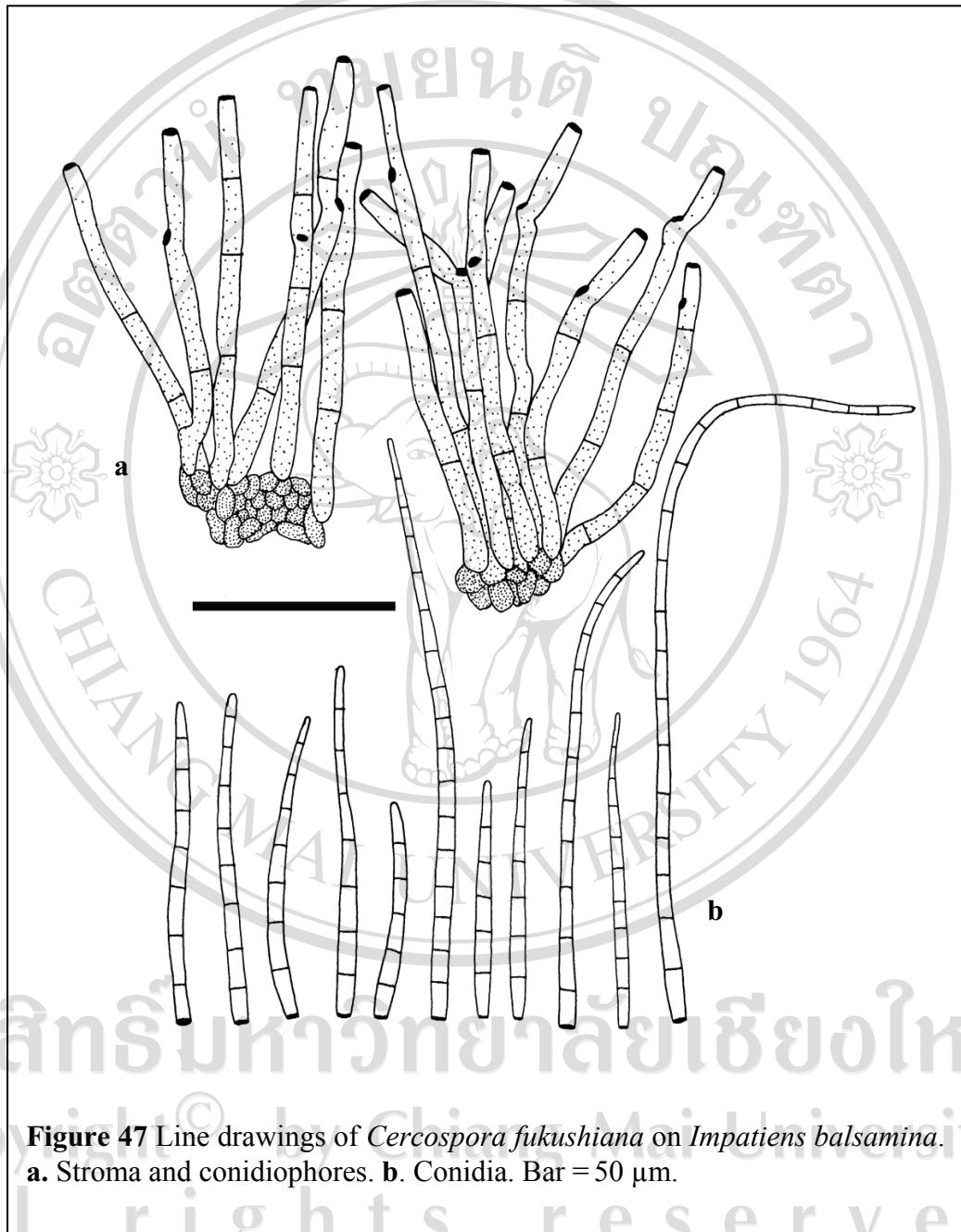


Figure 47 Line drawings of *Cercospora fukushiana* on *Impatiens balsamina*.
a. Stroma and conidiophores. **b.** Conidia. Bar = 50 μm .

Host: *Impatiens acaulis*, *I. balsamina*, *I. biflora*, *I. chinensis*, *I. gigantea*,
I. hawkeri, hybrid, *I. noli-tangere*, *Impatiens* sp. (*Balsaminaceae*) (Crous and Braun,
2003; Meeboon, 2006).

Distribution: Bangladesh, Bhutan Brazil, Brunei, China, Cuba, Estonia, Hong Kong, India, Indonesia, Iran, Japan, Korea, Lithuania, Korea, India, Indonesia, Malaysia, Mauritius, Myanmar, Nepal, New Caledonia, Papua New Guinea, Philippines, Sierra Leone, South Africa, Sudan, Taiwan, Tanzania, Thailand, and U.S.A (Crous and Braun, 2003; Meeboon, 2006).

Notes: In Thailand, *C. fukushiana* on *I. balsamina* was first reported by Meeboon (2006).

Literature: Chupp (1954, p. 78).

Family Basellaceae

Cercospora basellae-albae R. K. Srivast., S. Narayan and A. K. Srivast., *Indian Phytopathol.* 47: 229 (1994).

(Figure 48)

Leaf spots 2-8 mm in diameter, amphigenous, subcircular to irregular, pale brown to dingy grey in the center with reddish brown to purplish brown margin on the upper surface, pale brown to olivaceous brown on the lower surface. *Caespituli* amphigenous. *Stromata* 13-53 µm in diameter, small, sometimes lacking, irregular, composed of a few globose to subglobose, dark brown cells. *Conidiophores* (25-) 31.5-60 (-70) × (3-) 4-5 (-6) µm, 10-15 in a divergent fascicles, 1-4-septate, emerging through stomata openings and the cuticle, light brown, paler towards the apex, straight to slightly curved, not branched, plainly geniculate near the apex. *Conidiogenous cells*

integrated, terminal or intercalary, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm , conspicuous, thickened, and darkened. *Conidia* (17-) 26-52.5 (-93) \times 3-4 (-5) μm , solitary, acicular to obclavate, hyaline, 6-12-septate, non-constricted at the septa, acute to obtuse at the apex, truncate at the base, hila 1-3 μm in diameter, conspicuous, thickened, and darkened.

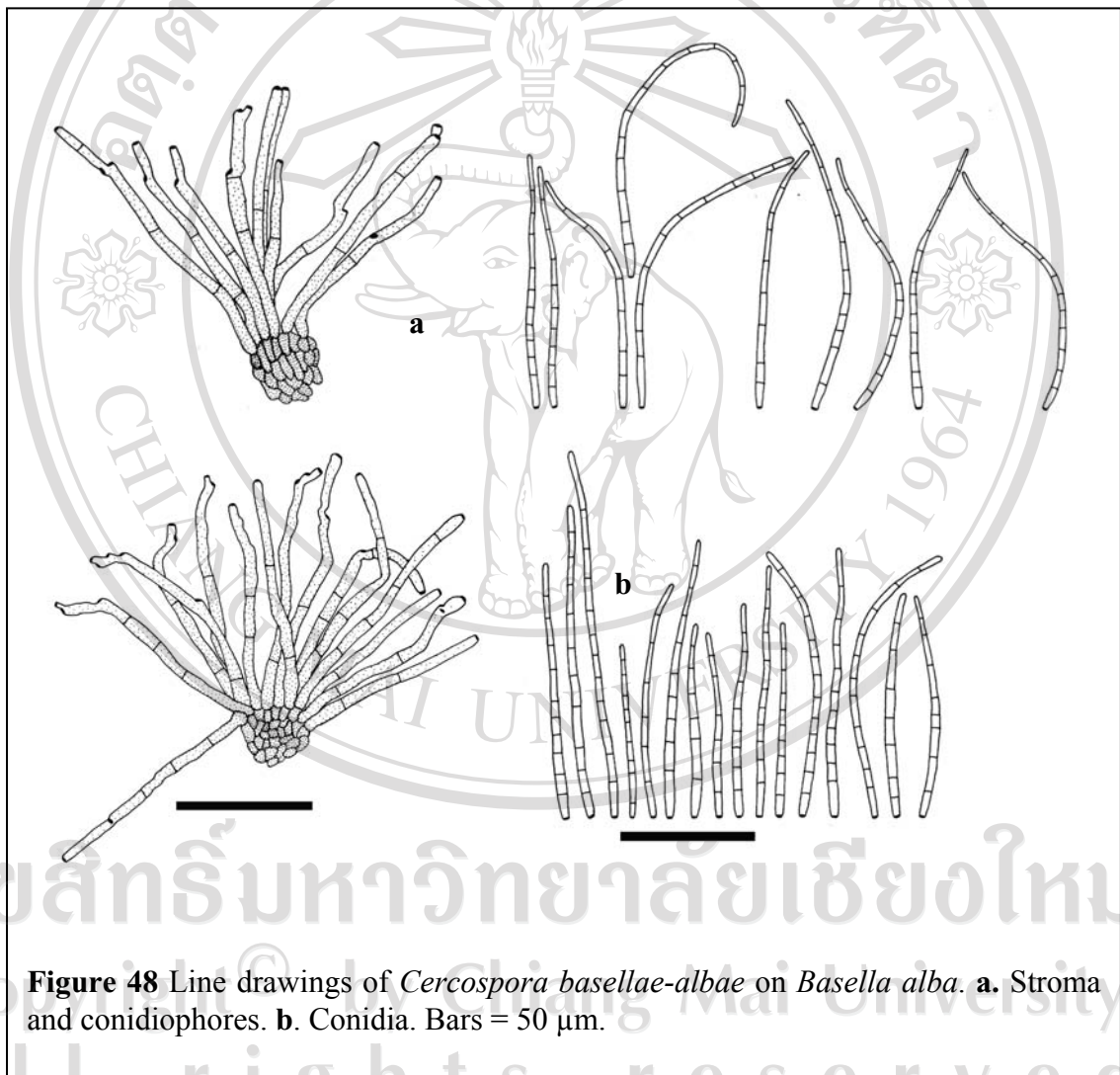


Figure 48 Line drawings of *Cercospora basellae-albae* on *Basella alba*. **a.** Stroma and conidiophores. **b.** Conidia. Bars = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Basella alba* L. (*Basellaceae*), 27 November 2005, Jamjan Meeboon (CMU 28214).

Host: *Basella alba* (*Basellaceae*) (Srivastava *et al.*, 1994; Meeboon *et al.*, 2007d).

Distribution: India and Thailand (Srivastava *et al.*, 1994; Meeboon *et al.*, 2007d).

Notes: *Cercospora basellae-albae* on *Basella alba* has been previously recorded in India. The first report of this species from Thailand was made by Meeboon *et al.* (2007d). Crous and Braun (2003) noted that this species is a true *Cercospora s. str.*, but close to or identical with *C. apii s. lat.*

Family *Bignoniaceae*

Pseudocercospora jahnii (Syd.) U. Braun and Crous, *CBS Biodiversity Series* 1: 230-231 (2003).

≡ *Cercospora jahnii* Syd., *Ann. Mycol.* 28: 214 (1930).

(Figure 49)

Leaf spots 3-23 mm diameter, distinct, subcircular to circular, scattered, pale to grayish-brown at the centre, with blackish-brown margins. *Caespituli* hypophyllous. *Stromata* (28) 45 ± 9.4 (58.5) μm diameter, intraepidermal, well-developed, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (22) 46.5 ± 11.4 (71) \times (2) 3 ± 0.4 (4) μm , 1-3-septate, numerous in a densely fasciculate, arising from stromata, light brown to brown, simple, smooth, straight to decumbent, geniculate at the apex, branched. *Conidiogenous cells*

integrated, terminal, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* $(8.5) 30 \pm 24 (91) \times (2) 2 \pm 0.1 (2.5) \mu\text{m}$, solitary, acicular to obclavate, 5-10-septate, straight or slightly curved, smooth, pale olivaceous, catenate, truncate at the base, with subacute apex, hila unthickened and not darkened.

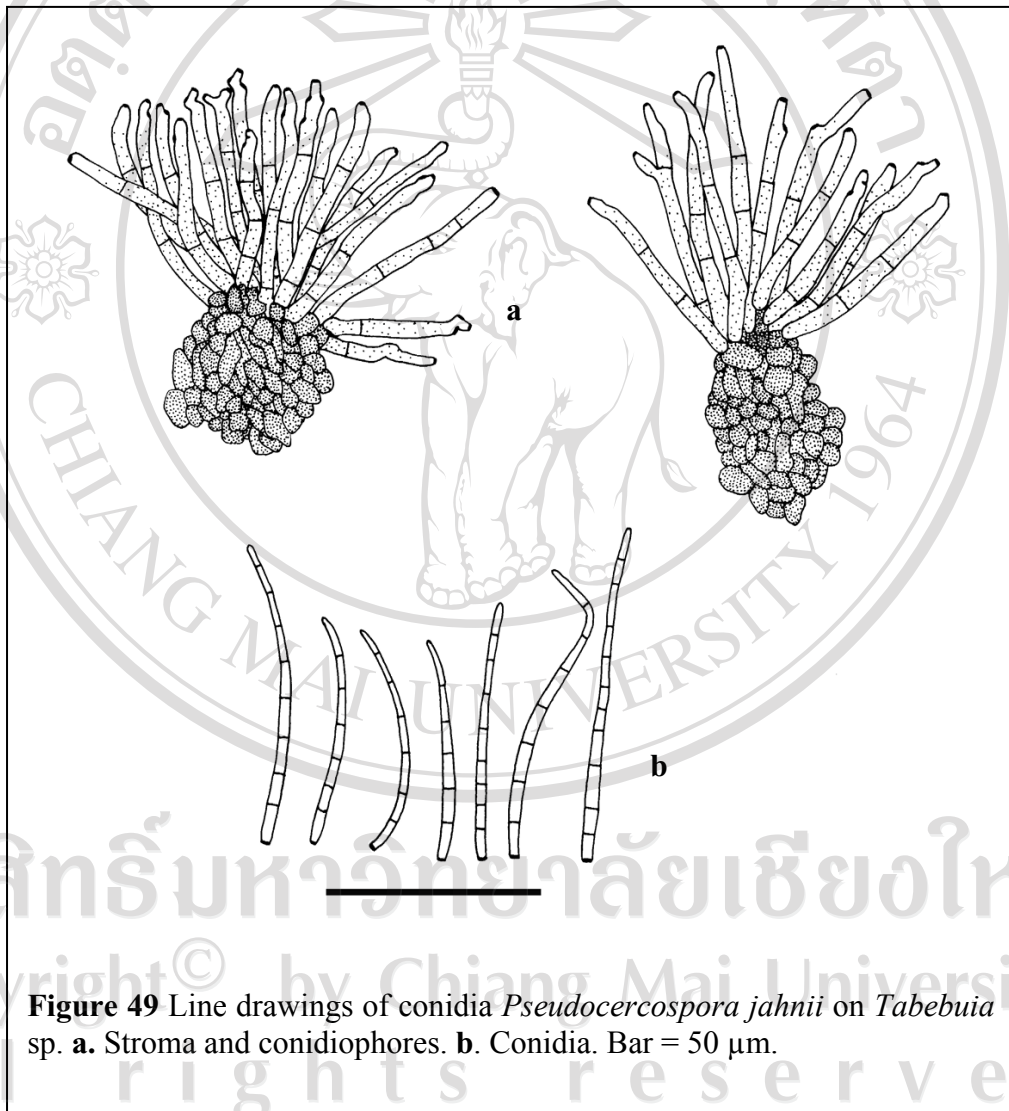


Figure 49 Line drawings of conidia *Pseudocercospora jahnii* on *Tabebuia*
 sp. **a.** Stroma and conidiophores. **b.** Conidia. Bar = 50 μm .

Specimen examined: THAILAND, Lamphun Province, Amphur Ban Hong, Tumbol Ban Hong, Farming area, on leaves of *Tabebuia* sp. (*Bignoniaceae*), 24 August 2008, Jamjan Meeboon (BBH 23695).

Host: *Tabebuia argentea*, *T. heterophylla*, *T. pentaphylla*, *T. rosea*, *T. serratifolia*, *T. shaferi* (*Bignoniaceae*) (Crous and Braun, 2003).

Distribution: Cuba, India, Panama, Puerto Rico, Senegal, Trinidad and Tobago, U.S.A, Venezuela, and Virgin Islands (Crous and Braun, 2003).

Notes: This specimen is the first record of *P. jahnii* from Thailand.

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

≡ *Cercospora oroxyli* A. K. Kar and Mandal, *Trans. Brit. Mycol. Soc.* **53**: 344 (1969).

(Figure 50)

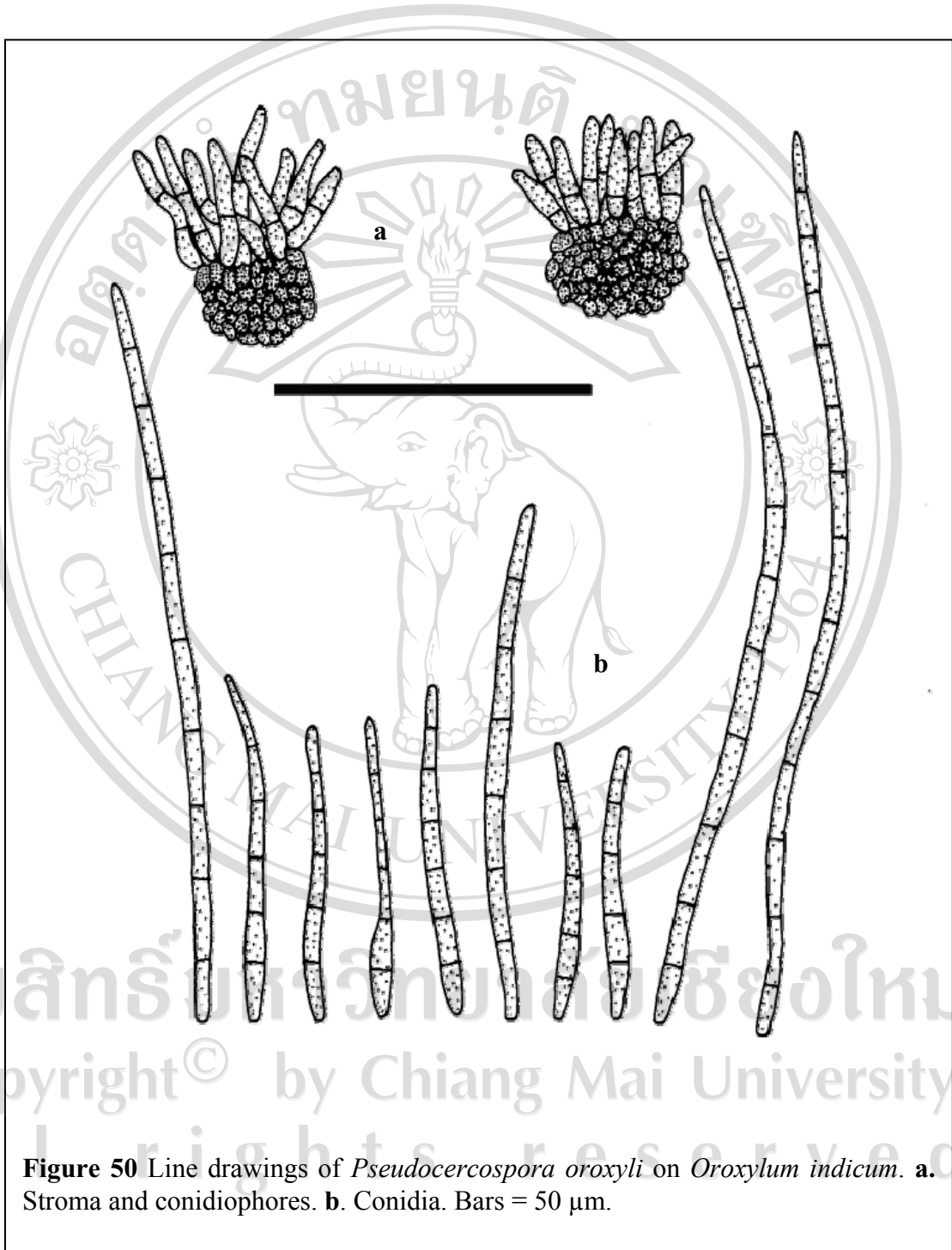
Leaf spots 5-13 mm diameter, amphigenous, brown, with indistinct margin, often appears as a necrosis on the edge of the leaves. *Caespituli* hypophyllous.

Stromata (19.5) 31 ± 5.6 (39) µm diameter, intraepidermal, well-developed, composed globose to subglobose, brown to dark brown cells. *Conidiophores* (8) 14 ± 4.6 (22.5) × (2) 3 ± 0.7 (4) µm, 9-10 to numerous in a dense fascicles, not divergent,

1-2-septate, arising from the stromata, brown, smooth, simple, straight, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic. *Conidiogenous loci* inconspicuous, unthickened, and not darkened.

Conidia (23) 79 ± 42.2 (149) × (2) 2.5 ± 0.5 (3.5) µm, solitary, acicular to obclavate,

4-13-septate, straight or slightly curved, smooth, subhyaline to pale olivaceous, hila unthickened and not darkened.



Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Rim, Tumbol Pa Pae, Mushroom Research Centre, on leaves of *Oroxylum indicum* (L.) Benth. ex Kurz (*Bignoniaceae*), 8 November 2006, Ikumitsu Araki (CMU 27908); Chiang Mai Province, Amphur Hang Dong, Tumbol Num Phrae, Farming area, on leaves of *Oroxylum indicum* (L.) Benth. ex Kurz (*Bignoniaceae*), 7 August 2008, Jamjan Meeboon (BBH 23590).

Host: *Oroxylum indicum* (*Bignoniaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007b).

Distribution: India, Myanmar, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007b).

Notes: The first record of *P. oroxyli* on *O. indicum* from Thailand was reported by Meeboon *et al.* (2007b).

Pseudocercospora tecomae-heterophyllae (J. M. Yen) Y. L. Guo and X. J. Liu, *Acta Mycol. Sinica* **12**: 30 (1993).

≡ *Cercospora tecomae-heterophyllae* J. M. Yen, *Rev. Mycol.* **31**: 143 (1996).

≡ *Cercoseptoria tecomae-heterophyllae* (J. M. Yen) J. M. Yen, *Gard. Bull., Singapore* **33**: 153 (1980).

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Tecoma stans* (L.) Kunth (*Bignoniaceae*), 21 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27961).

Host: *Tecoma heterophylla*, *T. undulata*, *Tecomaria capensis* (*Bignoniaceae*) (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Distribution: China, India, Singapore, and Thailand (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Notes: Nakashima *et al.* (2007) was the first of reporting this species from Thailand.

Family Brassicaceae

Cercospora brassicola Henn., *Bot. Jahrb. Syst.* **37**: 166 (1906).

= *Cercospora brassicae-campestris* Rangel, *Arq. Mus. Nac., Rio de Janeiro* **18**: 163 (1917).

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

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

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

(Figures 51; 52)

Leaf spots 2-15 mm diameter, amphigenous, irregular, brown to dark brown, pale at the center, with dark margin, and limited by vein of the leaf. *Caespituli* amphigenous. Stromata 12.5-19.5 µm diameter, substomatal to intraepidermal, small, composed of a few globose to subglobose, brown cells. *Conidiophores* 24.5-64 × 3.5-5 µm, 6-11 in a loose to dense fascicules, 1-3-septate, arising from stromata, straight to decumbent, smooth, unbranched, cylindrical, geniculate near the apex, brown at the

base, and paler toward the apex. *Conidiogenous cells* integrated, terminal or intercalary, polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-5 µm diameter, conspicuous, thickened, and darkened. *Conidia* 54-103.5 × 2.5-5 µm, solitary, obclavate to subacicular, straight, slightly curved, hyaline, 7-16-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 2.5-4.5 µm diameter, thickened and darkened.

Specimen examined: THAILAND, Faculty of Agriculture, Chiang Mai University, Chiang Mai Province, on leaves of *Brassica pekinensis* Skeels (*Brassicaceae*), 31 October 2004, Jamjan Meeboon (CMU 27891); on leaves of *B. campestris* L. (*Brassicaceae*), 15 October 2004, Jamjan Meeboon (CMU 27887); on leaves of *B. rapa* L. (*Brassicaceae*), 9 November 2005, Jamjan Meeboon (CMU 27905); Suthep-Pui National Park, Chiang Mai Province, on leaves of *B. juncea* (L.) Czern. (*Brassicaceae*), 21 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27901); Chiang Rai Province, Amphur Wiang Pa Pao, on leaves of *B. oleracea* L. (*Brassicaceae*), 19 October 2005, Jamjan Meeboon (CMU 28218); Chiang Mai Province, Amphur Mae Rim, Nong Hoi Royal Project, on leaves of *Raphanus sativus* L. (*Brassicaceae*), 12 September 2007, Jamjan Meeboon and Iman Hidayat (BBH 23639); the same locality, on leaves of *Cichorium endivia* L. (*Asteraceae*), 6 June 2007, Jamjan Meeboon and Iman Hidayat (JMC 29).

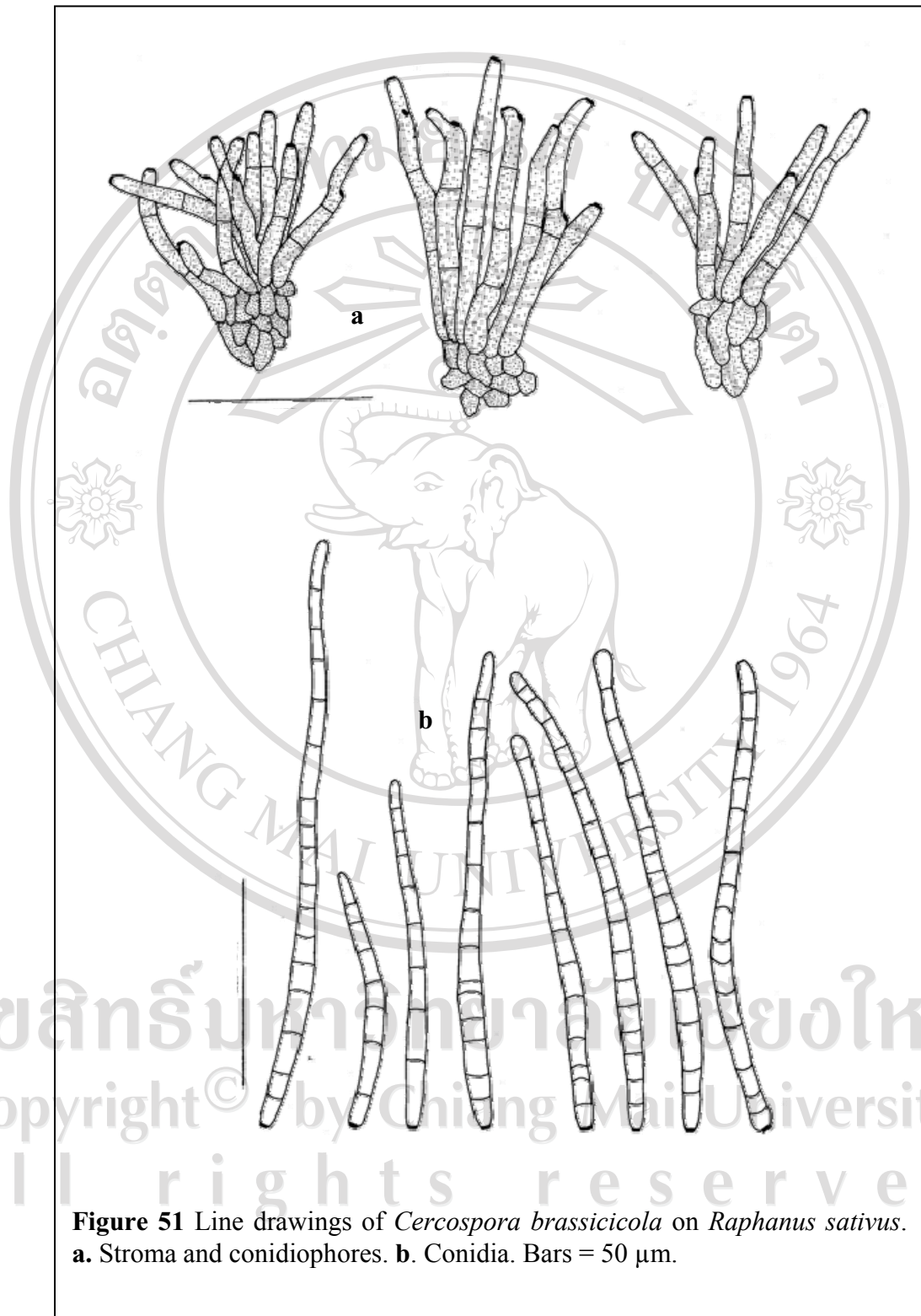


Figure 51 Line drawings of *Cercospora brassicicola* on *Raphanus sativus*.
a. Stroma and conidiophores. **b.** Conidia. Bars = 50 μm .

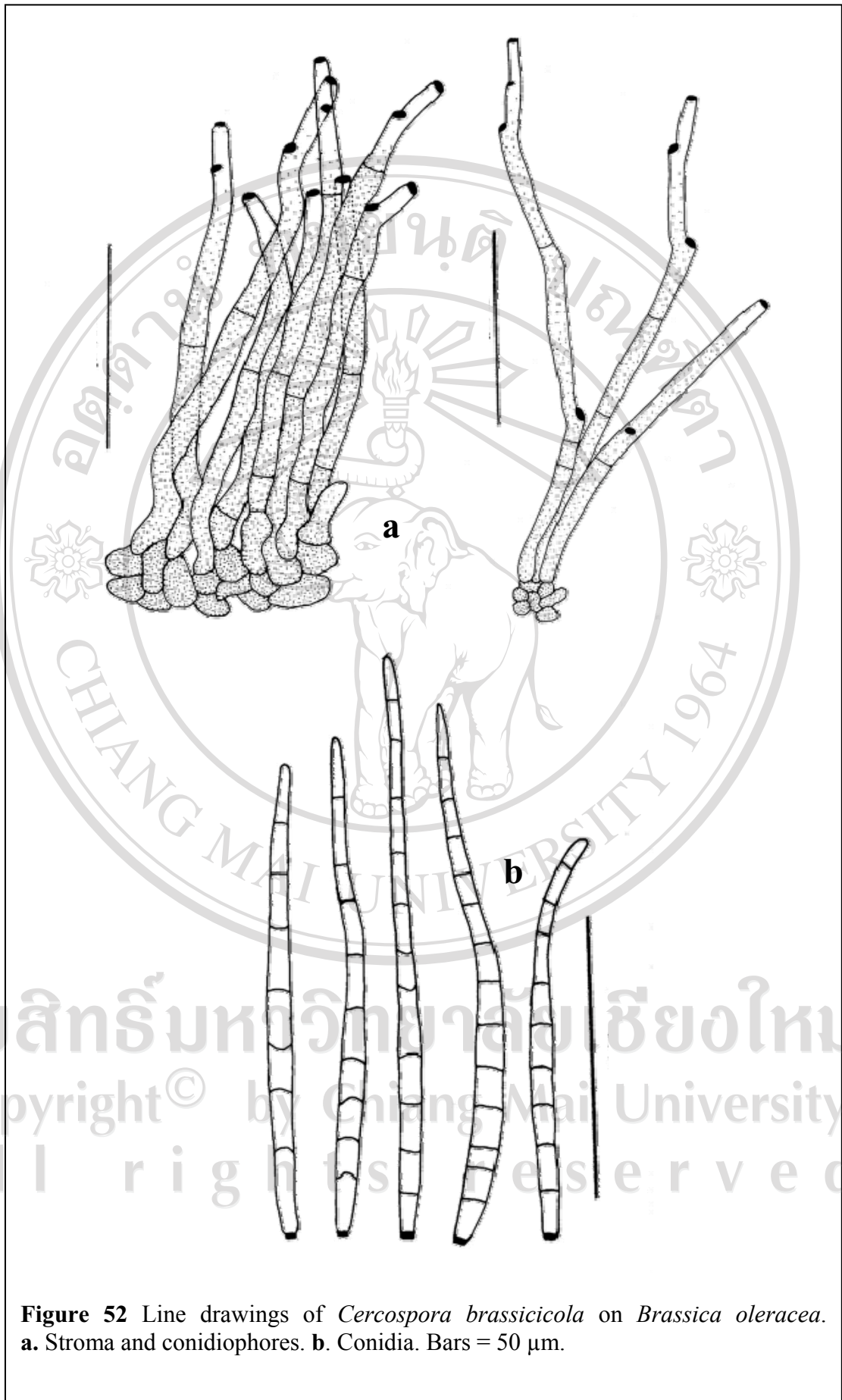


Figure 52 Line drawings of *Cercospora brassicicola* on *Brassica oleracea*.
a. Stroma and conidiophores. **b.** Conidia. Bars = 50 μm .

Host: *Brassica alba*, *B. alboglabra*, *B. campestris*, *B. chinensis*, *B. integrifolia*, *B. juncea*, *B. kaber*, *B. napus*, *B. nigra*, *B. oleracea*, *B. pekinensis*, *B. pe-tsai*, *B. rapa*, *Brassica* spp., *Matthiola incana*, *Raphanus sativus* (*Brassicaceae*) (Crous and Braun, 2003).

Distribution: Worldwide, including Angola, Armenia, Australia, Belarus, Brazil, China, Colombia, Cuba, Dominican Republic, Estonia, Great Britain, India, Indonesia, Jamaica, Japan, Kazakhstan, Kenya, Korea, Latvia, Lithuania, Malaysia, Malawi, Mauritius, Myanmar, Nigeria, Niue, Papua, New Guinea, Peru, Philippines, Puerto Rico, Russia, Sierra Leone, South Africa, Solomon Islands, Somalia, Sri Lanka, Sudan, Taiwan, Tanzania, Thailand, Togo, Trinidad and Tobago, Togo, Uganda, U.Kraine and U.S.A (Crous and Braun, 2003).

Notes: Reports of *C. brassicicola* on plant genus *Brassica* from Thailand were published by Puckdeedindan (1966), and Petcharat and Kanjanamaneesathian (1989). In this study, *Raphanus sativus* is reported as a new host of *C. brassicicola*.

Literature: Chupp (1954, p. 180).

Family *Buddlejaceae*

Pseudocercospora buddleiae (W. Yamam.) Goh and W. H. Hsieh, *Trans. Mycol. Soc.*

R. O. C. **2**: 114 (1987b).

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

- ≡ *Pseudocercospora buddleiae* (Yamam.) X. J. Liu and Y. L. Guo, *Mycosystema* **2**: 230 (1989) (*comb. superfl.*).

Specimen examined: THAILAND, Phetchabun Province, Amphur Lo Sak, Num Nao National Park, on leaves of *Buddleja asiatica* Lour. (*Buddlejaceae*), 24 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27951).

Host: *Buddleja asiatica*, *B. curviflora*, *B. davidii*, *B. insignis*, *B. madagascariensis*, *Buddleja* sp. (*Buddlejaceae*) (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Distribution: China, India, Japan, Philippines, Taiwan, and Thailand (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Notes: The first report of this species in Thailand was made by Nakashima *et al.* (2007).

Family *Caricaceae*

Cercospora papayae Hansf., *Proc. Linn. Soc. London* **155**: 58 (1943).

= *Cercospora papayae* Chupp and Viégas, *Arq. Mus. Nac. Rio de Janeiro* **8**: 42 (1945).

≡ *Cercospora mamaonis* Viégas and Chupp, *Monograph of Cercospora*: 107 (1954).

≡ *Pseudocercospora mamaonis* (Viégas and Chupp) Tak. Kobay. and Tokash., *Ann. Phytopath. Soc. Japan* **61**: 51 (1995).

(= *C. apii* s. lat)

(Figure 53)

Leaf spots 2-5 mm in diameter, amphigenous, scattered to confluent, distinct, circular to subcircular, pale brown, centre greyish, with dark brown margins. *Caespituli* amphigenous. *Stromata* 12-34 μm in diameter, small, often rudimentary to poorly developed, intraepidermal, composed of a few sub-globular to irregular, brown cells. *Conidiophores* 46-202 \times 3-5.5 μm , very variable in length, 4-13 in a divergent fascicles, 1-9-septate, emerging from stromata through the cuticle, pale olivaceous brown or sometimes paler towards the apex, smooth, straight to slightly curved, mostly strong geniculate. *Conidiogenous cells* integrated, terminal, sympodially proliferating. *Conidiogenous loci* 2.5-3.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* 81-201 \times 3-4 μm , solitary, acicular, straight to mildly curved, hyaline, 14-36-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila, 1-2.5 μm diameter, thickened and darkened

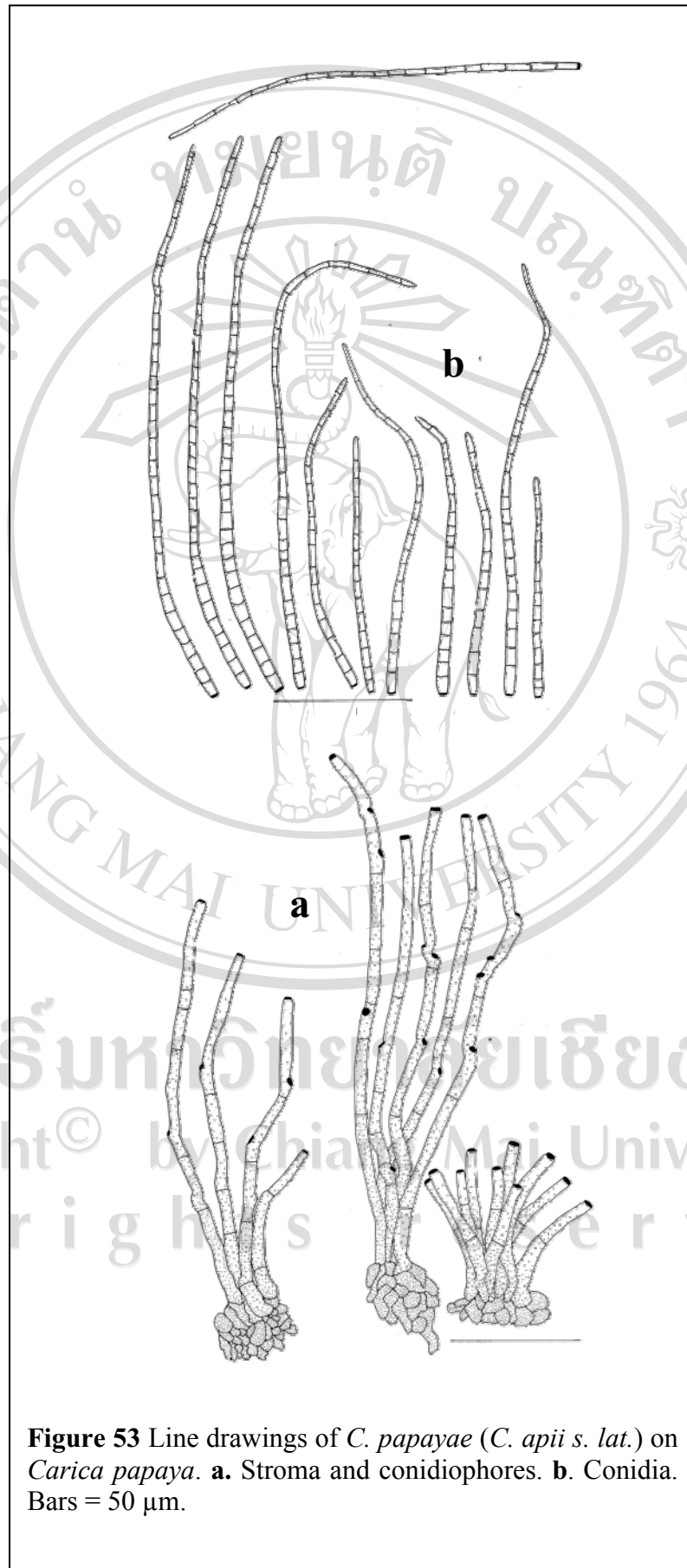
Specimen examined: THAILAND, Chiang Mai Province, Amphur Sarapee, on leaves of *Carica papaya* L. (*Caricaceae*), 12 September 2007, Jamjan Meeboon and Iman Hidayat (BBH 23650).

Host: *Carica monoica*, *C. papaya* (*Caricaceae*) (Crous and Braun, 2003).

Distribution: Barbados, Brazil, Cambodia, China, Cuba, Guatemala, India, Indonesia, Malawi, Mauritius, Myanmar, Nepal, Pakistan, Panama, Papua New Guinea, Philippines, Seychelles, Somalia, Sudan, Togo, Tonga, Uganda, U.S.A, Venezuela, and Zimbabwe (Crous and Braun, 2003).

Notes: This specimen is the first report of *C. papayae* from Thailand.

Literatures: Chupp (1954, p. 107), Ellis (1976, p. 247).



Cercospora caricola Meeboon, Hidayat, and To-anun, **sp. nov.**

(Figure 54)

Leaf spots 2-5 mm in diameter, amphigenous, scattered to confluent, distinct, circular to subcircular, pale brown to tan, centre greyish brown to greyish white, with dark brown margins. *Caespituli* amphigenous. *Stromata* 15-40 μm in diameter, small, composed of globose to subglobose, brown cells. *Conidiophores* 38-165 \times 3-5 μm , very variable in length, 5-25 in a dense and sometimes divergent fascicles, 1-5-septate, emerging from stromata, straight to slightly curved, subcylindrical, pale olivaceous brown or sometimes paler towards the apex, thick walled, sometimes branched, strong geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2-2.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* 31-74 \times 2-3.5 μm , solitary, obclavate, straight to mildly curved, hyaline, 3-6-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 1-2.5 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Samoeng,

Pang Da Royal Project, on leaves of *Carica papaya* L. (*Caricaceae*), 7 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23732: **holotype**).

Host: *Carica papaya* (*Caricaceae*).

Distribution: Thailand (type locality).

Notes: This specimen distinct from the plurivorous *C. apii* s. lat. in having branching conidiophores, and obclavate conidia with obconically truncate at the base

(hila 1-2.5 μm diameter). This species differs from *Cercospora caricae-papayae* P. K. Rajak and S. P. Gautam in having conidiophores branched, shorter conidia ($31-74 \times 2-3.5 \mu\text{m}$ vs $80-330 \times 3.5-6 \mu\text{m}$ of *C. caricae-papayae*), and being found on leaf spots (*C. caricae-papayae* found on petioles).

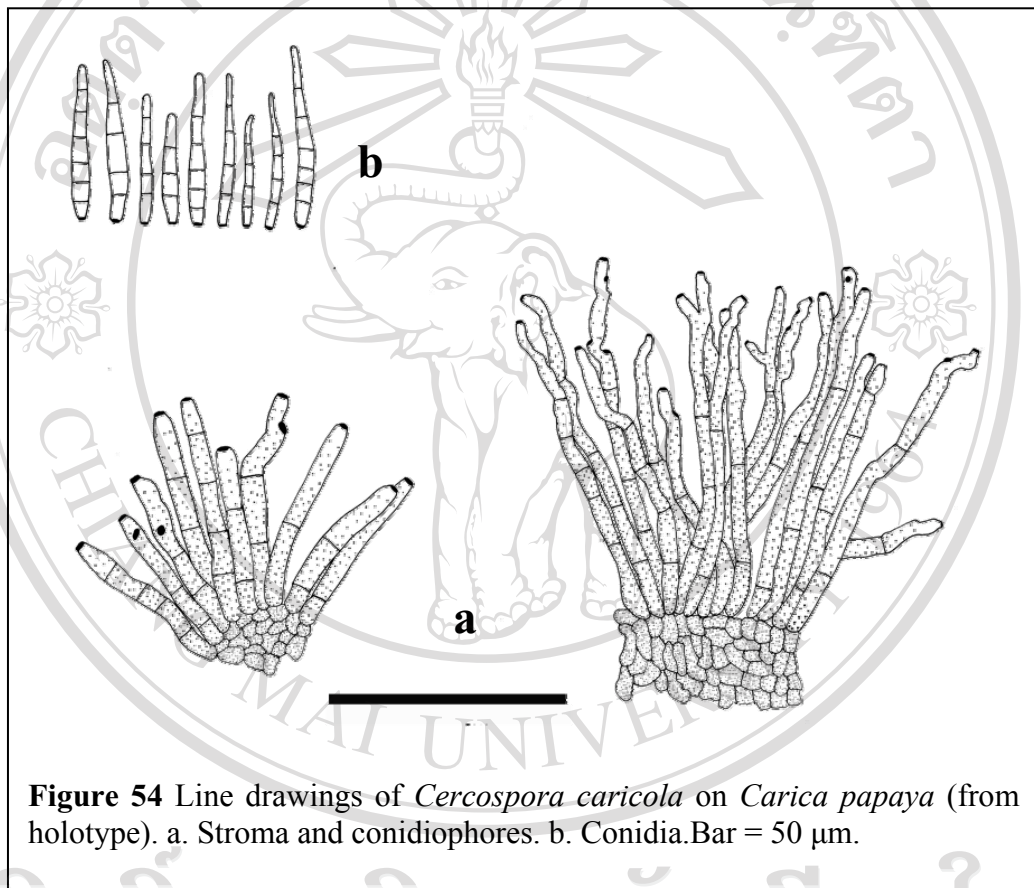


Figure 54 Line drawings of *Cercospora caricola* on *Carica papaya* (from holotype). a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Family *Caprifoliaceae*

Pseudocercospora sambucigena Meeboon, Hidayat, and To-anun, **sp. nov.**

(Figure 55)

Leaf spots 3-7 mm diameter, distinct, amphigenous, circular to irregular, pale to whitish, with dark margins, scattered, sometimes forming necrosis at the edge of the leaves, 8-18 mm diameter, brown, with indistinct margins. *Caespituli* amphigenous. *Stromata* (17) 19.5 ± 1.8 (22) μm diameter, intraepidermal, small to well-developed, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (10) 13 ± 1.8 (16) \times (2.5) 3 ± 3 (3.5) μm , numerous in a dense fascicles, 1-2-septate, arising from the stromata, straight to decumbent, smooth, brown, simple, not branched, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (24) 43 ± 9.9 (61) \times (3) 3 ± 0.2 (3.5) μm , solitary, filiform-acicular to obclavate, 5-10-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the base, with subacute to obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Muang, Chiang Mai Main Stadium, on leaves of *Sambucus simpsonii* Rehder (*Caprifoliaceae*), 24 August 2008, Jamjan Meeboon (BBH 23717: **holotype**).

Host: *Sambucus simpsonii* Rehder (*Caprifoliaceae*).

Distribution: Thailand (type locality).

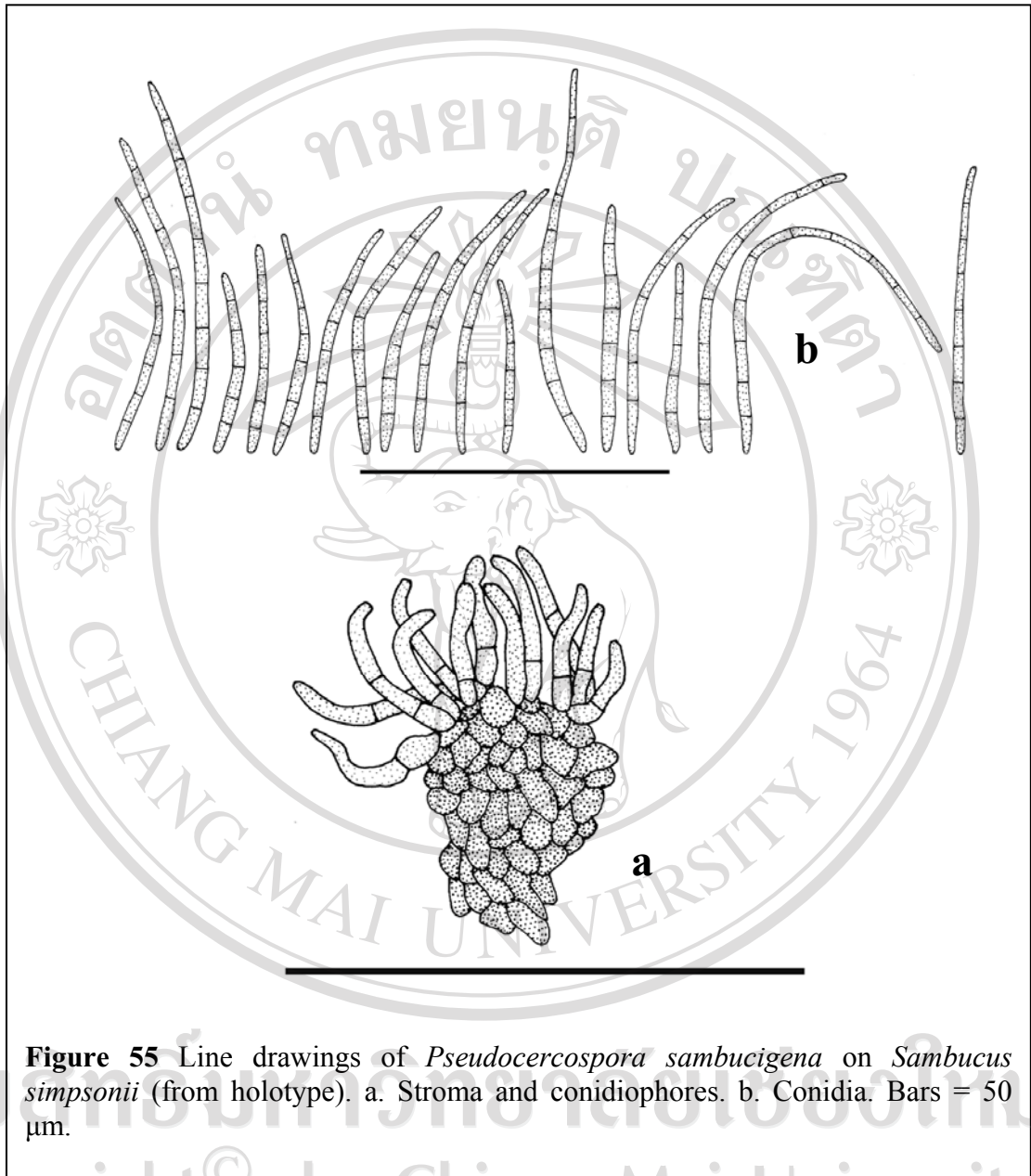


Figure 55 Line drawings of *Pseudocercospora sambucigena* on *Sambucus simpsonii* (from holotype). a. Stroma and conidiophores. b. Conidia. Bars = 50 μm .

Notes: On plant genus *Sambucus* (*Caprifoliaceae*), *Pseudocercospora ebulicola* (M. Yamam.) Deighton has been recorded from Taiwan. However, this specimen is distinct from *P. ebulicola* in having distinct symptoms, amphigenous caespituli, small to well-developed stromata, shorter and not branched conidiophores

(10-16 × 2.5-3.5 µm vs 40-150 × 4-5.5 µm of *P. ebulicola*), and shorter (24-61 × 3-3.5 µm vs 50-125 × 4-5.5 µm of *P. ebulicola*) and solitary conidia with truncate base. Five other *Pseudocercospora* from family *Caprifoliaceae*, viz, *P. diervillae* (Ellis and Everh.) U. Braun, *P. varia* (Peck) J. K. Bai and Y. Cheng, *P. viburni-cylindrici* (F. L. Tai) U. Braun, *P. viburnigena* U. Braun and Crous, and *P. weigeliae* (Ellis. and Everh.) Deighton, have been reported in having amphigenous caespituli. However, this specimen differs with *P. diervillae* and *P. weigeliae* in having shorter conidiophores and conidia. This specimen is also distinct from *P. viburni-cylindrici* and *P. viburnigena* by having not branched conidiophores and shorter conidia. *Pseudocecospora varia* is the most closely related species due to the similarity in the sizes of conidiophores and conidia, but this specimen differs with *P. varia* in having very short conidiophores, and solitary and pale olivaceous conidia with truncate base. Therefore, this specimen is proposed as a new *Pseudocercospora* species from family *Caprifoliaceae*.

Family *Chenopodiaceae*

Cercospora beticola Sacc., *Nuovo Giorn. Bot. Ital.* **8**: 189 (1876).

≡ *Cercosporina beticola* (Sacc.) K. Nakata, T. Nakajima and K. Katimoto, *Rep.*

Agric. Korea **6** (1915).

= *Fusisporium betae* Desm., *Ann. Sci. Net., Bot.*, **2 Ser.**, **19**: 434 (1843).

= *FU.S.Arium betae* (Desm.) Sacc., *Michelia* **2**: 132 (1880).

= *PionNotes betae* (Desm.) Sacc., *Syll. Fung.* **4**: 726 (1886).

- = *Cercospora betae* (A. B. Frank) Sacc., *Syll. Fung.* **10**: 637 (1892).
- = *Cercospora longissima* Cooke and Ellis, *Grevillea* **17**: 65 (1889).
- = *Cercospora flagelliformis* Ellis and Halst., *New Jersey Agric. Coll. Exp. Sta., Annual Rep.* **11**: 355 (1890).
- = *Cercospora anthelmintica* G. F. Atk., *J. Elisha Mitchell Sci. Soc.* **8**: 48 (1892).
- = *Cercospora spinaciae* Oudem., *Ned. Kruidk. Arch.* **III**, **2**: 324 (1900).
- = *Cercospora chenopodiicola* Bres., *Hedwigia* **39**: 328 (1900).
- = *Cercosporina spinaciicola* Sacc., *Nuovo Giorn. Bot. Ital., N. S.*, **22**: 73 (1915).
- = *Cercospora beticola* var. *poonensis* Chidd., *Sydowia* **13**: 153 (1959)
(*nom. inval.*)
(= *C. apii* s. *lat.*)

Specimen examined: THAILAND, Chiang Mai Province, Amphur Sansai, Mae Jo University, on leaves of *Beta vulgaris* L. (*Chenopodiaceae*), 19 August 2005, Jamjan Meeboon (CMU 28208); Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Spinacia oleracea* L. (*Chenopodiaceae*), 10 Oct 2005, Jamjan Meeboon and Iman Hidayat (CMU 27931).

Host: *Beta cicla*, *B. maritima*, *B. patellaris*, *B. rapa*, *B. trigyna*, *B. vulgaris*, *Beta* spp., *Atriplex argentea*, *A. canescens*, *Chenopodium album*, *C. ambrosioides*, *C. bonus-henricus*, *C. botrys*, *C. capitatus*, *C. hybridum*, *C. murale*, *C. polyspermum*, *Chenopodium* spp., (*Chenopodiaceae*), *Cycloloma atriplicifolium*, *Kochia scoparia*, *Spinacia oleracea*, *Spinacia* spp., (*Amaranthaceae*), *Malva* sp. (*Malvaceae*), *Polygonum convolvulus* (*Polygonaceae*), *Proboscidea jussieui*, *P. lousiana*, *P. louisianica* (*Martyniaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007d, 2008).

Distribution: Worldwide where sugar beet and chard are cultivated, including China, Japan Korea, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007d, 2008).

Notes: The first report of *Cercospora beticola* from Thailand was made by Meeboon *et al.* (2007d) on *Beta vulgaris*, and on *Spinacea oleracea* (2008).

Family *Combretaceae*

Pseudocercospora quisqualidis (Narain and B. S. Mehrotra) Z. D. Jing and P. K. Chi, *J. S. China Agr. Univ.* **15**: 19 (1994), and *Fungal diseases of cultivated medicinal plants in Guangdong Province*: 100 (1994).

≡ *Cercospora quisqualidis* Narain and B. S. Mehrotra, *Sydowia* **24**: 327 (1971).

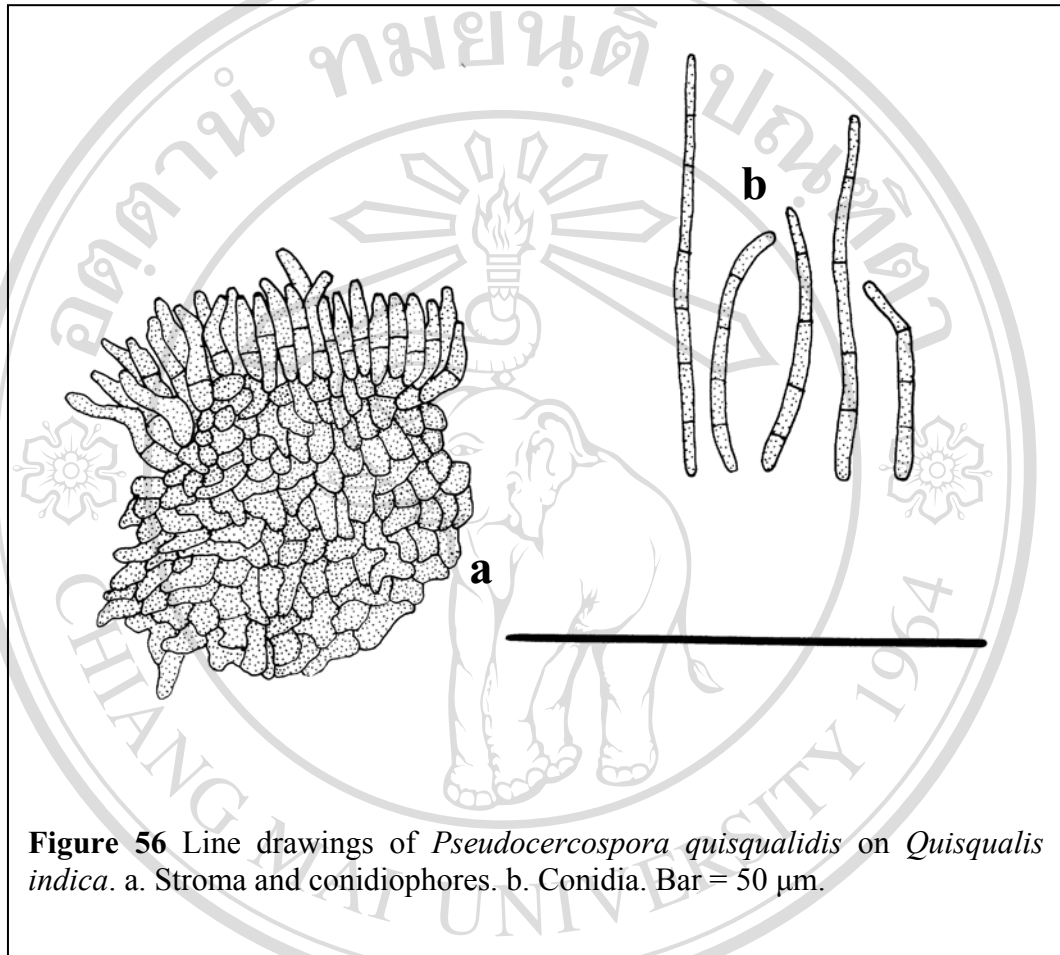
(Figure 56)

Leaf spots 8-20 mm diameter, amphigenous, distinct, appear as necrosis at the edge and tip of the leaves, pale, and blackish to dark brown, with brown margin.

Caespituli amphigenous. *Stromata* 18-81 μm diameter, intraepidermal, well-developed, and composed of globose to subglobose, brown to blackish brown cells.

Conidiophores 11-23.5 \times 1.5-2 μm , densely fasciculate, 0-1-septate, arising from stromata, straight to decumbent, smooth, pale brown, paler toward the apex, unbranched, slightly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 31-62.5 \times 1.5-2 μm ., obclavate, tapering to

the apex, base truncate, straight, subhyaline, 3-7-septate, hila indistinct, unthickened, and not darkened.



Specimen examined: THAILAND, Chiang Mai Province, Amphur Muang,

Tumbol Mae Hea, Royal Flora, on leaves of *Quisqualis indica* L. (*Combretaceae*), 13 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23743).

Host: *Quisqualis indica* (*Combretaceae*) (Crous and Braun, 2003).

Distribution: China, and India (Crous and Braun, 2003).

Notes: This specimen is the first report of *P. quisqualidis* from Thailand.

Literature: Guo *et al.* (1998, p. 379).

Family Convolvulaceae

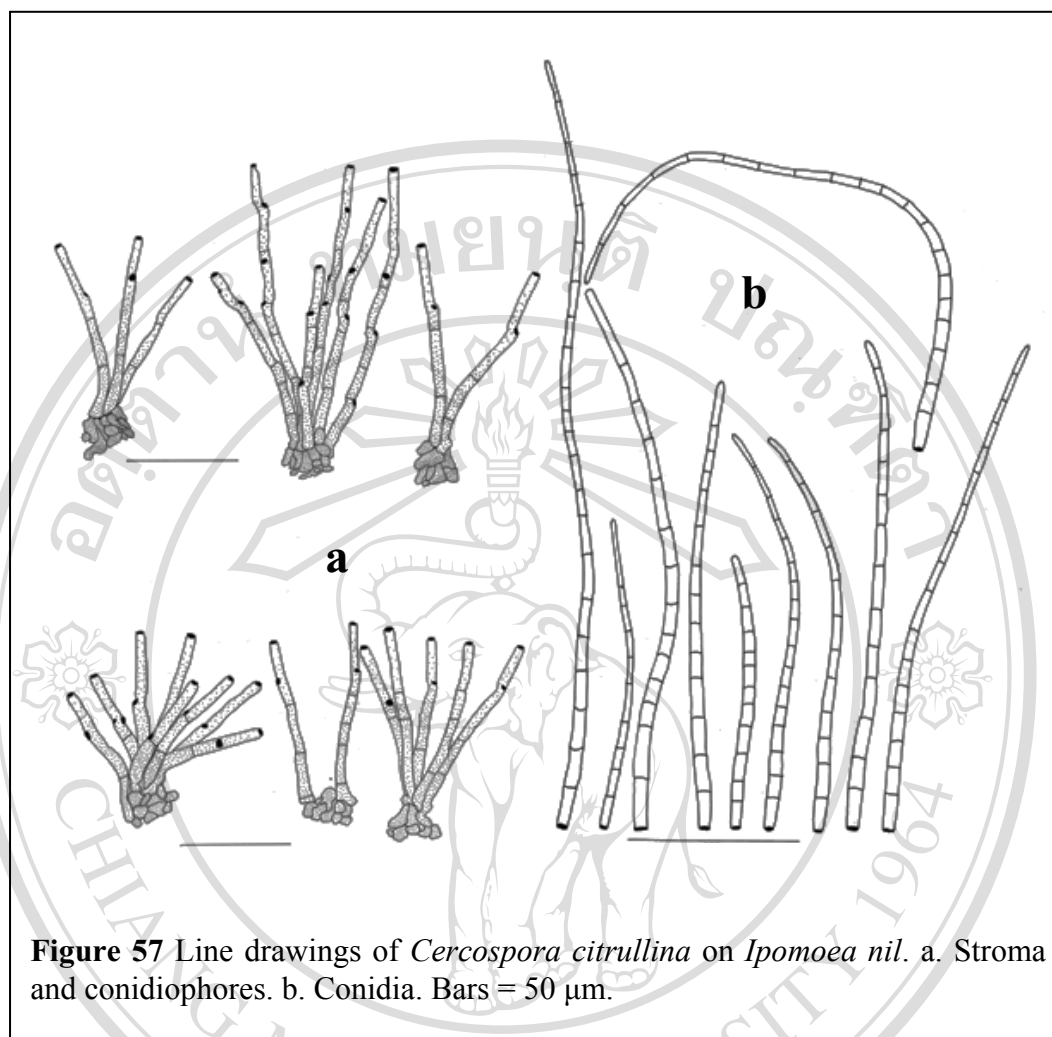
- Cercospora citrullina* Cooke *Grevillea* **12**: 31 (1883).
- = *Cercospora cucurbitae* Ellis and Everh., *J. Mycol.* **4**: 3 (1883).
- = *Cercospora sechii* J. A. Stev., *Puerto Rico Agric. exp. Sta. Rep.* **1917-1918**: 137 (1919).
- = *Cercospora momordicae* McRae, *Ann. Cryptog. Exot.* **2**: 267 (1929).
- = *Cercospora trichosanthi* McRae, *Ann. Cryptog. Exot.* **2**: 270 (1929).
- = *Cercospora luffae* Hara, *Diseases of cultivated plants*: 228 (1928).
- = *Cercospora chardoniana* Chupp, *Monogr. Univ. Puerto Rico, B*, **2**: 245 (1934).
- = *Cercospora momordicae* Mend., *Philipp. J. Sci.* **75**: 173 (1941). (*nom. illeg.*), homonym of *C. momordicae* McRae (1929).
- = *Cercospora momordicae* Sawada, *Rep. Gov. Agric. Res. Inst. Taiwan* **86**: 173 (1943), (*nom. inval.*), homonym of *C. momordicae* McRae, 1929.
- (= *C. apii* s. lat.) (Figure 57)

Leaf spots 1-5 mm in diameter, amphigenous, scattered to confluent, distinct, circular to subcircular, pale brown, greyish brown to greyish white at the center, with dark brown margins. *Caespituli* amphigenous. *Stromata* 7-41.5 µm in diameter, small, sometimes lacking to poorly developed, irregular, composed of a few globose to subglobose, brown to dark brown cells. *Conidiophores* 62-148×3-5 µm, 4-12 in a divergent fascicles, 2-3-septate, emerging from stromata through the plant cuticle, pale olivaceous brown or sometimes paler towards the apex, straight to slightly

curved, geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3.5 μm diameter, conspicuous, thickened, and darkened. Conidia very variable in length, 80-240 \times 3-4 μm , solitary, acicular to long obclavate, straight to mildly curved, hyaline, 9-14-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 2.5-3.5 μm diameter, hila thickened and darkened.

Specimen examined: THAILAND, Chiang Rai Province, Amphur. Wiang Pa Pao, Tumbol Wiang Ga Long, on leaves of *Ipomoea nil* (L.) Roth (*Convolvulaceae*), 8 September 2007, Jamjan Meeboon (BBH 23594); Chiang Mai Province, Mae Jo, Sansai, Farming area, on leaves of *Ipomoea aquatica* Forssk. (*Convolvulaceae*), 31 July 2008, Jamjan Meeboon (BBH 23716).

Host: *Apadantha sagittifolia*, *Benincasa cerifera*, *B. hispida*, *Bryoania* sp., *Bryonopsis laciniata*, *Citrullus lanatus*, *C. vulgaris*, *Citrullus* sp., *Coccinia cordifolia*, *C. indica*, *Ctenolepsis cerasiformis*, *Ctenolepsis* sp., *Cucumis anguria*, *C. callosus*, *C. maxima*, *C. melo*, *C. sativa*, *Cucurbita foetidissima*, *C. maxima*, *C. moschata*, *C. pepo*, *C. perennis*, *C. sativus*, *Lagenaria leucantha*, *L. siceraria*, *L. vulgaris*, *Luffa acutangula*, *L. aegyptiaca*, *L. amara*, *L. cylindrica*, *L. vulgaris*, *Melothria pendula*, *Momordica charantia*, *M. cochinchinensis*, *M. cordifolia*, *M. dioica*, *M. foetida*, *M. schimperiana*, *Sechium edule*, *Sicana odorifera*, *Telfaria pedata*, *Trichosamthes anguina*, *T. japonica* (*Cucurbitaceae*) (Crous and Braun, 2003).



Distribution: Worldwide, where the host plants are cultivated or growing, including American Samoa, Argentina, Austria, Bangladesh, Barbados, Belize, Bolivia, Brazil, Brunei, Bulgaria, Cambodia, Canada, Chile, China, Cook Island, Costa Rica, Cuba, Czech Republ., Denmark, Dominican Republic, El Salvador, Ethiopia, Fiji, French Polynesia, Gabon, Georgia, Germany, Ghana, Great Britain, Greece, Guam, Hong Kong, India, Indonesia, Iran, Iraq, Ireland, Israel, Israel, Italy, Jamaica, Japan, Kenya, Korea, Laos, Malawi, Malaysia, Mauritius, Mexico, Morocco, Myanmar, Nepal, Netherlands, New Caledonia, New Zealand, Nicaragua, Nigeria, Norway, Pakistan, Panama, Papua New Guinea, Peru, Philippines, Pitcairn Island,

Poland, Puerto Rico, Romania, Russia, Samoa, Saudi Arabia, Solomon Islands, Somalia, South Africa, Sri Lanka, Sweden, Switzerland, Sudan, Taiwan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Uganda, U.Kraine, U.K, U.S.A, Vanuatu, Venezuela, Virgin Islands, Zambia and Zimbabwe (Crous and Braun, 2003).

Notes: *Ipomoea nil* is reported here as a new host of *C. citrullina*. Crous and Braun (2003) assigned this species to *C. apii s. lat.*

Literatures: Chupp (1954, p. 185), Ellis (1976, p. 255).

Cercospora ipomoeae G. Winter, *Hedwigia* **26**: 34 (1887).

= *Cercospora dichondrae* KatsU.Ki, *Ann. Phytopathol. Soc. Japan* **20**: 72 (1955).

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

(Figure 58)

Leaf spots 15-30 mm diameter, amphigenous, circular or subcircular, at first pale greenish to ochraceous, later brown to dark brown, finally with grayish brown centre, surrounded by a dark margin. *Colonies* amphigenous, ochre yellow, velvety.

Stromata (24) 31 ± 5.3 (40) μm diameter, intraepidermal, well-developed, subglobose,

brown to blackish brown. *Conidiophores* (13.5) 59 ± 29.1 (134) \times (3) 3.95 ± 0.75 (5)

μm , in a loosely to densely fasciculate, 2-3-septate, numerous, arising from stromata,

simple, straight, erect to decumbent, smooth, pale yellow to pale brown, rarely

branched, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated,

terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating.

Conidiogenous loci 2-3 μm diameter, conspicuous, thickened, darkened. *Conidia*

(44.5) 78.5 ± 31.8 (143) \times (3) 3.1 ± 0.2 (3.5) μm , solitary, narrowly obclavate to

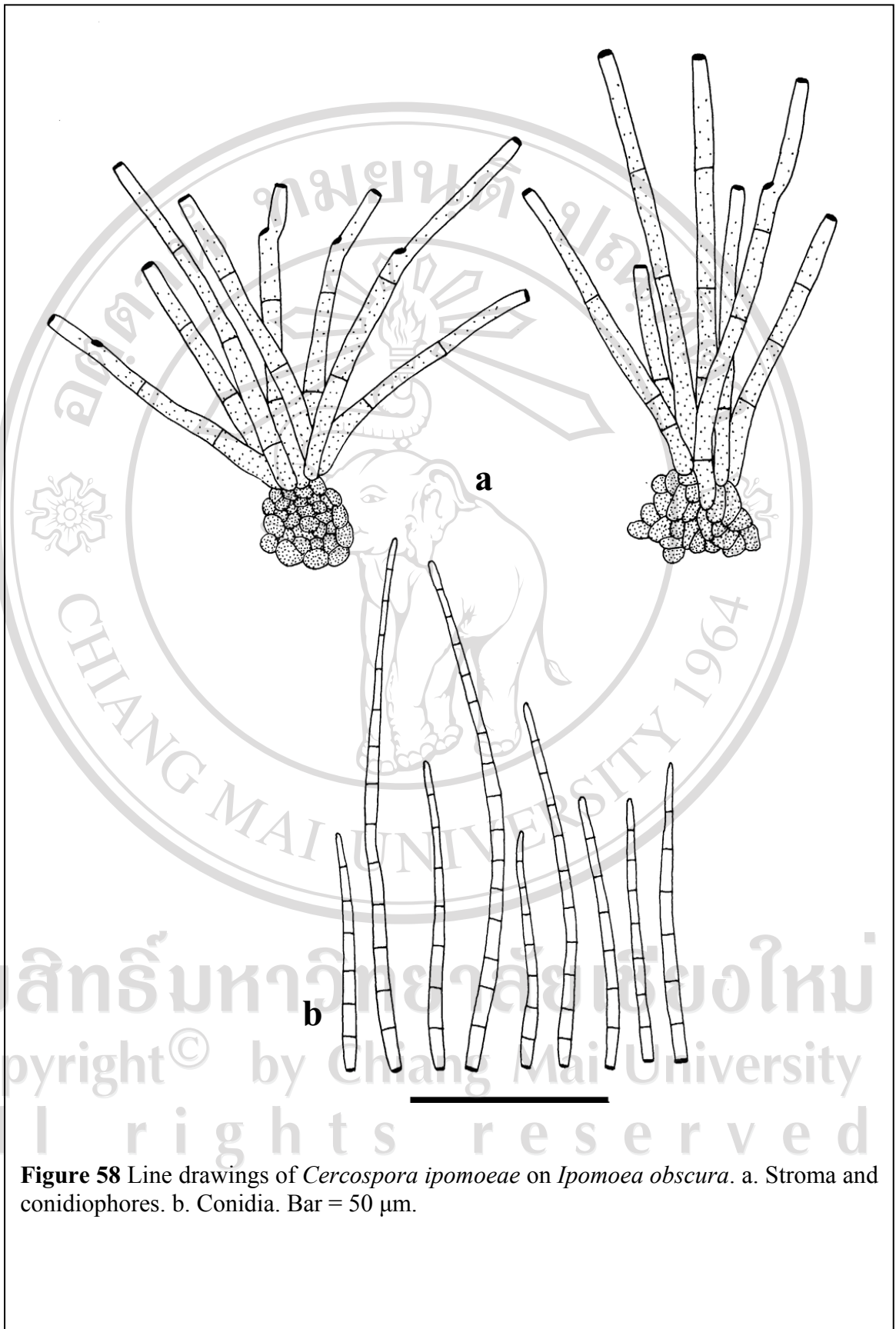


Figure 58 Line drawings of *Cercospora ipomoeae* on *Ipomoea obscura*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Specimen examined: THAILAND, Chiang Rai Province, Amphur Wiang Pa Pao, on leaves of *Ipomoea aquatica* Forssk. and *Ipomoea nil* (L.) Roth (*Convolvulaceae*), 9 March 2005, Jamjan Meeboon (CMU 28220 and CMU 28221); Chiang Mai Province, Amphur Pa Pae, Bahn Phadeng, Mushroom Research Centre, on leaves of *Argyreia henryi* Craib (*Convolvulaceae*), 10 November 2006, Ikumitsu Araki (CMU 27911); Chiang Mai Province, Chiang Mai University, Faculty of Agriculture, on leaves of *Ipomoea obscura* (L.) Ker Gawl. (*Convolvulaceae*), 21 August 2008, Jamjan Meeboon (BBH 23558).

Host: *Argyreia tiliaefolia*, *Convolvulus arvensis*, *Dichondra repens*, *Hewittia bicolor*, *Hewittia* sp., *Ipomoea acuminata*, *I. alba*, *I. aquatica*, *I. armata*, *I. asarifolia*, *I. batatas*, *I. biloba*, *I. bonanox*, *I. cairica*, *I. carnea*, *I. clarensis*, *I. coccinea*, *I. cordofana*, *I. cymosa*, *I. eriocarpa*, *I. fistulosa*, *I. forsteri*, *I. hederacea*, *I. hildebrantii*, *I. indica*, *I. kentrocarpa*, *I. lacumosa*, *I. leari*, *I. longicuspis*, *I. nil*, *I. pandurata*, *I. pes-caprae*, *pestigridis*, *I. purpurea*, *I. quamoclit*, *I. ramonii*, *I. reptans*, *I. septaria*, *I. triloba*, *I. turpethum*, *I. villosa*, *Jacquemontia tammifolia*, *Merremia chrysoides*, *M. Emarginata*, *M. Umbellata*, *Operculina* sp. (*Convolvulaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Worldwide, including American Samoa, Antigua and Barbuda, Argentina, Australia, Barbados, Brazil, Brunei, China, Cook Islands, Costa Rica, Cuba, Fiji, Guam, Hong Kong, India, Indonesia, Italy, Ivory Coast, Jamaica, Japan, Kenya, Kiribati, Korea, Malaysia, Marshall Islands, Mauritius, Myanmar, New Caledonia, New Zealand, Pakistan, Panama, Papua New Guinea, Puerto Rico, Samoa, Sierra Leone, Solomon Island, Sudan, Venezuela, Taiwan, Tanzania, Thailand, U.S.A, and Vanuatu (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first report of *C. ipomoeae* on *Argyreia henryi* from Thailand was made by Meeboon *et al.* (2007c). Crous and Braun (2003) assigned this species to *C. apii s.lat.*

Literature: Chupp (1954, p. 171).

Cercospora operculinae Mendoza, *Phiipp. J. Sci.* **75**: 174 (1941).

= *Cercospora operculinicola* Kamal, *in herb.* (IMI 367133).

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

(Figure 59)

Leaf spots 1-6 mm diameter, amphigenous, distinct, circular to subcircular, brown, with black margin. *Caespituli* amphigenous. *Stromata* 7-55 µm diameter, substomatal, small, composed of a few globose to subglobose, brown cells. *Conidiophores* (64-) 78-102 (-127.5) × 3-4 (-5) µm, 2-7 in a loose fascicles, 2-8-septate, arising from stromata, straight, unbranched, cylindrical, smooth, brown at the base, and paler toward the apex, plainly geniculate. *Conidiogenous cells* integrated, holoblastic, polyblastic, rarely monoblastic, terminal, sympodially proliferating. *Conidiogenous loci* 1-2 µm diameter, conspicuous, thickened, and darkened. *Conidia* (22.5-) 51-57 (-96) × (3-) 2.5-3 (-3.5) µm, solitary, acicular, sometimes obclavate, straight, hyaline, 6-9-septate, smooth, truncate at the base, tapering toward a subacute apex, hila 1-2.3 µm diameter, conspicuous, thickened, and darkened.

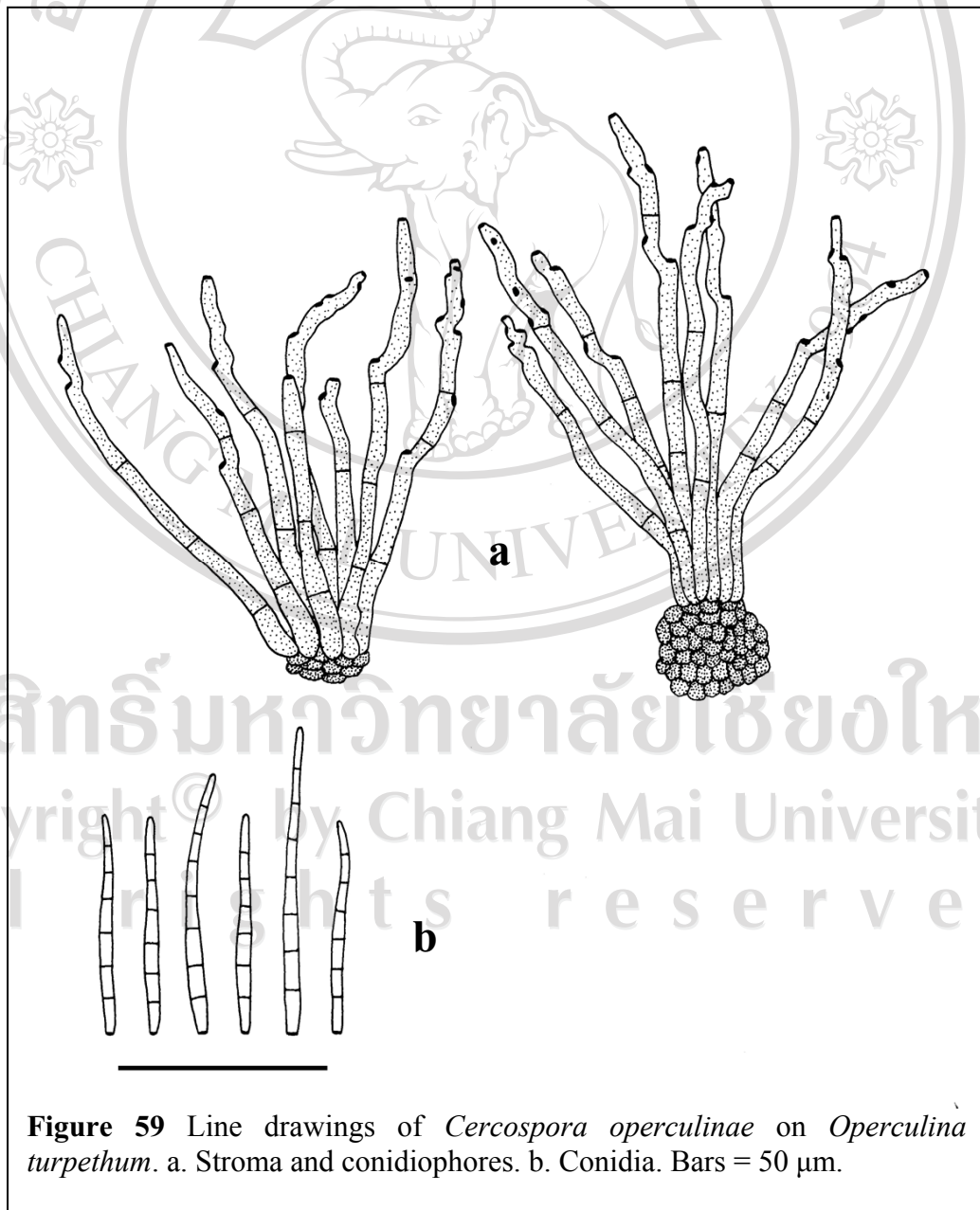
Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Taeng, on leaves of *Operculina turpethum* (L.) Silva Manso (*Convolvulaceae*), 6 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23768).

Host: *Operculina bufalina*, *O. riedeliana*, *O. turpethum* (*Convolvulaceae*)
(Crous and Braun, 2003).

Distribution: India, Papua New Guinea, and Philippines (Crous and Braun, 2003).

Notes: This specimen is the first report of *C. operculinae* from Thailand. Crous and Braun (2003) assigned this species to *C. apii* s.lat.

Literature: Chupp (1954, p. 172).



Family Cucurbitaceae

- Cercospora citrullina* Cooke *Grevillea* **12**: 31 (1883).
- = *Cercospora cucurbitae* Ellis and Everh., *J. Mycol.* **4**: 3 (1883).
- = *Cercospora sechii* J. A. Stev., *Puerto Rico Agric. exp. Sta. Rep.* **1917-1918**: 137 (1919).
- = *Cercospora momordicae* McRae, *Ann. Cryptog. Exot.* **2**: 267 (1929).
- = *Cercospora trichosanthi* McRae, *Ann. Cryptog. Exot.* **2**: 270 (1929).
- = *Cercospora luffae* Hara, *Diseases of cultivated plants*: 228 (1928).
- = *Cercospora chardoniana* Chupp, *Monogr. Univ. Puerto Rico, B*, **2**: 245 (1934).
- = *Cercospora momordicae* Mend., *Philipp. J. Sci.* **75**: 173 (1941). (*nom. illeg.*), homonym of *C. momordicae* McRae (1929).
- = *Cercospora momordicae* Sawada, *Rep. Gov. Agric. Res. Inst. Taiwan* **86**: 173 (1943), (*nom. inval.*), homonym of *C. momordicae* McRae, 1929.
- (= *C. apii* s. lat.) **(Figures 60; 61a-b; 62; 63)**

Leaf spots 5-25 mm diameter, amphigenous, irregular, greyish brown, with dark brown margin. *Caespituli* amphigenous. *Stromata* 14-30 µm diameter, substomatal, small, composed of a few globose to subglobose, brown to dark brown cells. *Conidiophores* 52-106.5 × 2.5-5 µm, 6-11 in a loosely fasciculate, 2-5-septate, arising from stromata, straight, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, not geniculate. *Conidiogenous cells* integrated, holoblastic, monoblastic, terminal, sympodially proliferating. *Conidiogenous loci* 1.5-2.5 µm

diameter, refractive, conspicuous, thickened, and darkened. *Conidia* 63-296.5 × 2.5-4.5 µm, solitary, acicular, straight, hyaline, 8-26-septate, smooth, truncate at the base, tapering toward a subacute apex, hila 1.5-2 µm diameter, conspicuous, thickened, and darkened.

Specimen examined: THAILAND, Chiang Rai Province, Amphur Wiang Pa Pao, on leaves of *Sechium edule* (Jacq.) Sw. (*Cucurbitaceae*), 19 December 2005, Jamjan Meeboon (CMU 28215); the same host, Chiang Mai Province, Faculty of Chiang Mai University, Multiple Cropping Centre, 1 August 2008, Jamjan Meeboon (BBH 23721); the same locality, Faculty of Agriculture, on leaves of *Coccinia grandis* (L.) Voigt (*Cucurbitaceae*), 19 January 2005, Jamjan Meeboon (CMU 27903); *ibid*, 12 June 2007, Jamjan Meeboon (BBH 23652); Chiang Rai Province, A.Wiang Pa Pao, T. Wiang Ga Long, Moo11, Bahn Tung Ruang Tong, on leaves of *Cucumis sativus* L. (*Cucurbitaceae*), 30 July 2007, Jamjan Meeboon (BBH 23623); Chiang Mai Province, Amphur Hang Dong, Tumbol Num Phrae, Farming area, on leaves of *Lagenaria siceraria* (Molina) Standl. (*Cucurbitaceae*), 7 August 2008, Jamjan Meeboon (BBH 23591); Chiang Mai Province, Sansai, Mae Fag, on leaves of *Momordica charantia* L. (*Cucurbitaceae*), 3 August 2008, Jamjan Meeboon (BBH 23754).; Chiang Mai Province, Mae Jo University, Farming area, on leaves of *Citrullus vulgaris* Schrad. (*Cucurbitaceae*), 9 August 2008, Jamjan Meeboon (BBH 23703).

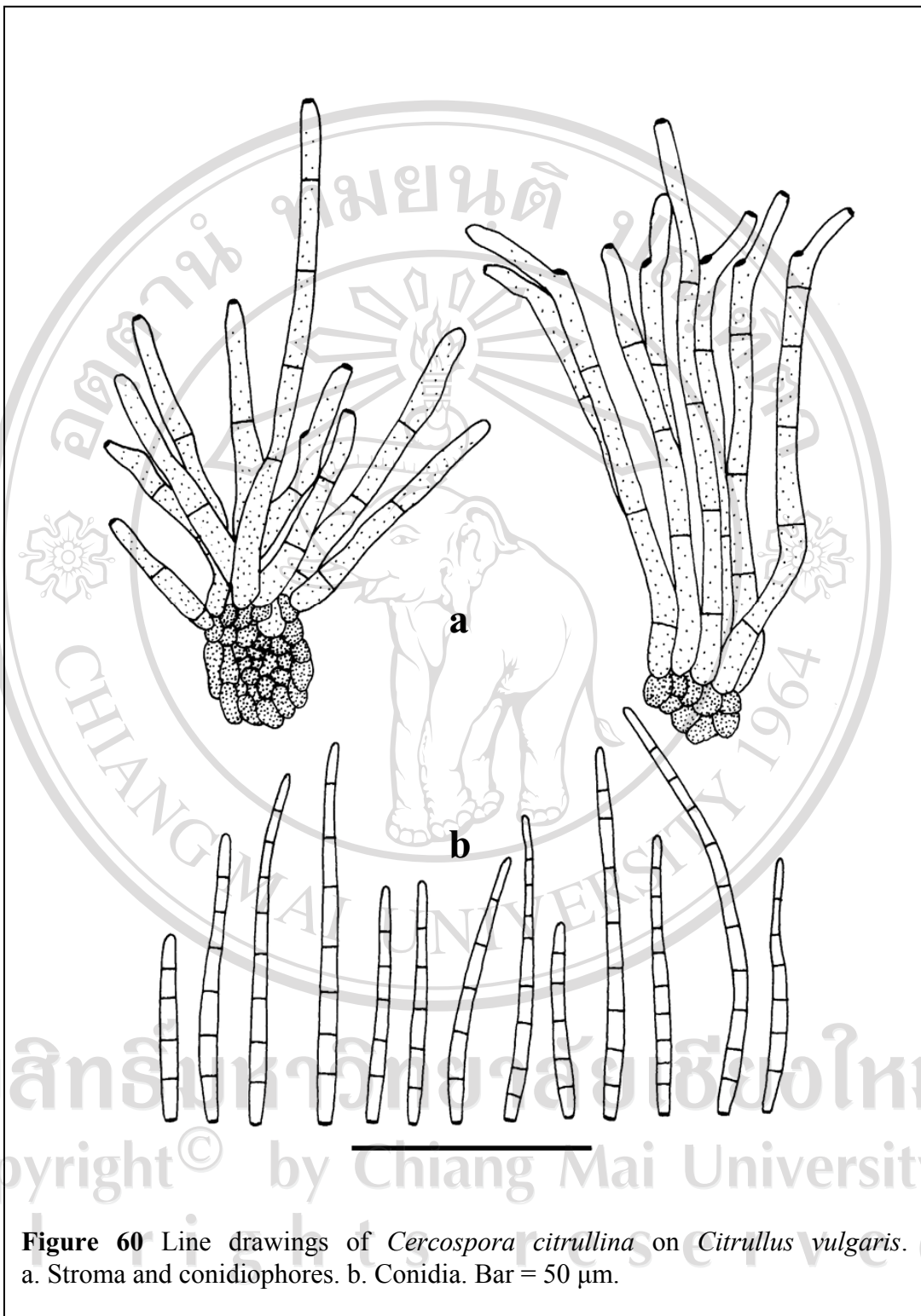
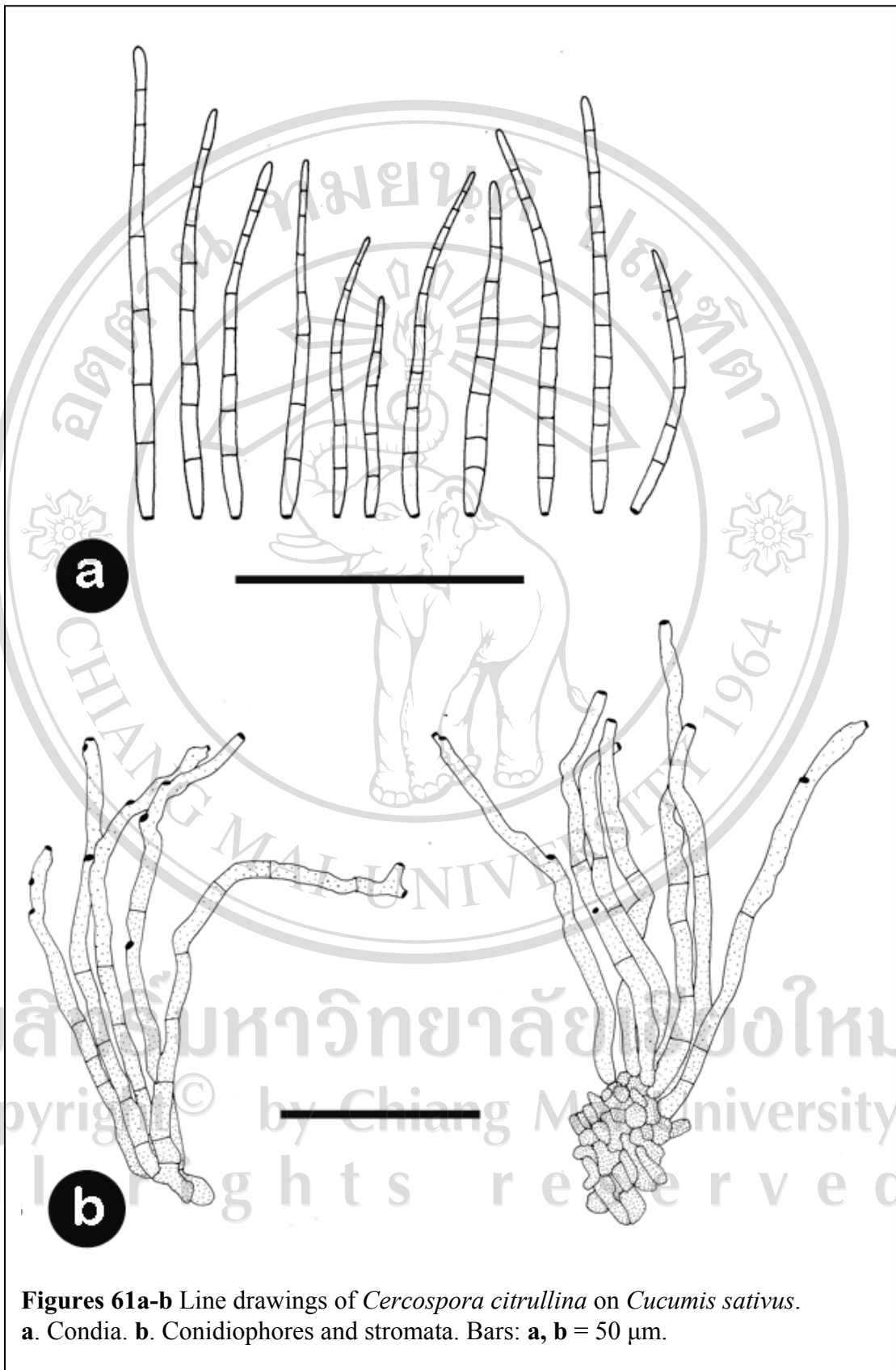


Figure 60 Line drawings of *Cercospora citrullina* on *Citrullus vulgaris*.
a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.



Figures 61a-b Line drawings of *Cercospora citrullina* on *Cucumis sativus*.
a. Conidia. **b.** Conidiophores and stromata. Bars: **a, b** = 50 μm .

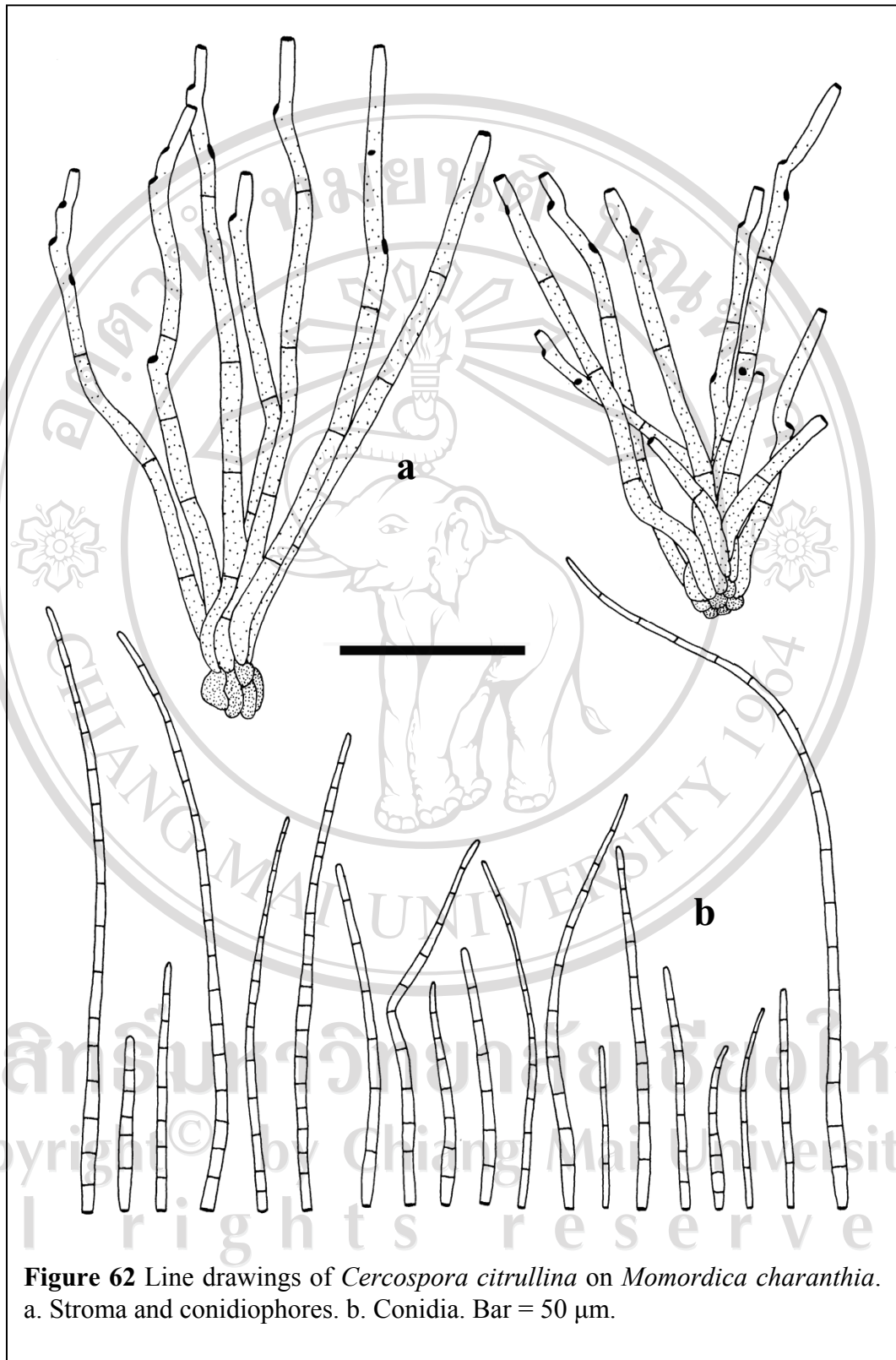


Figure 62 Line drawings of *Cercospora citrullina* on *Momordica charanthis*.
a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

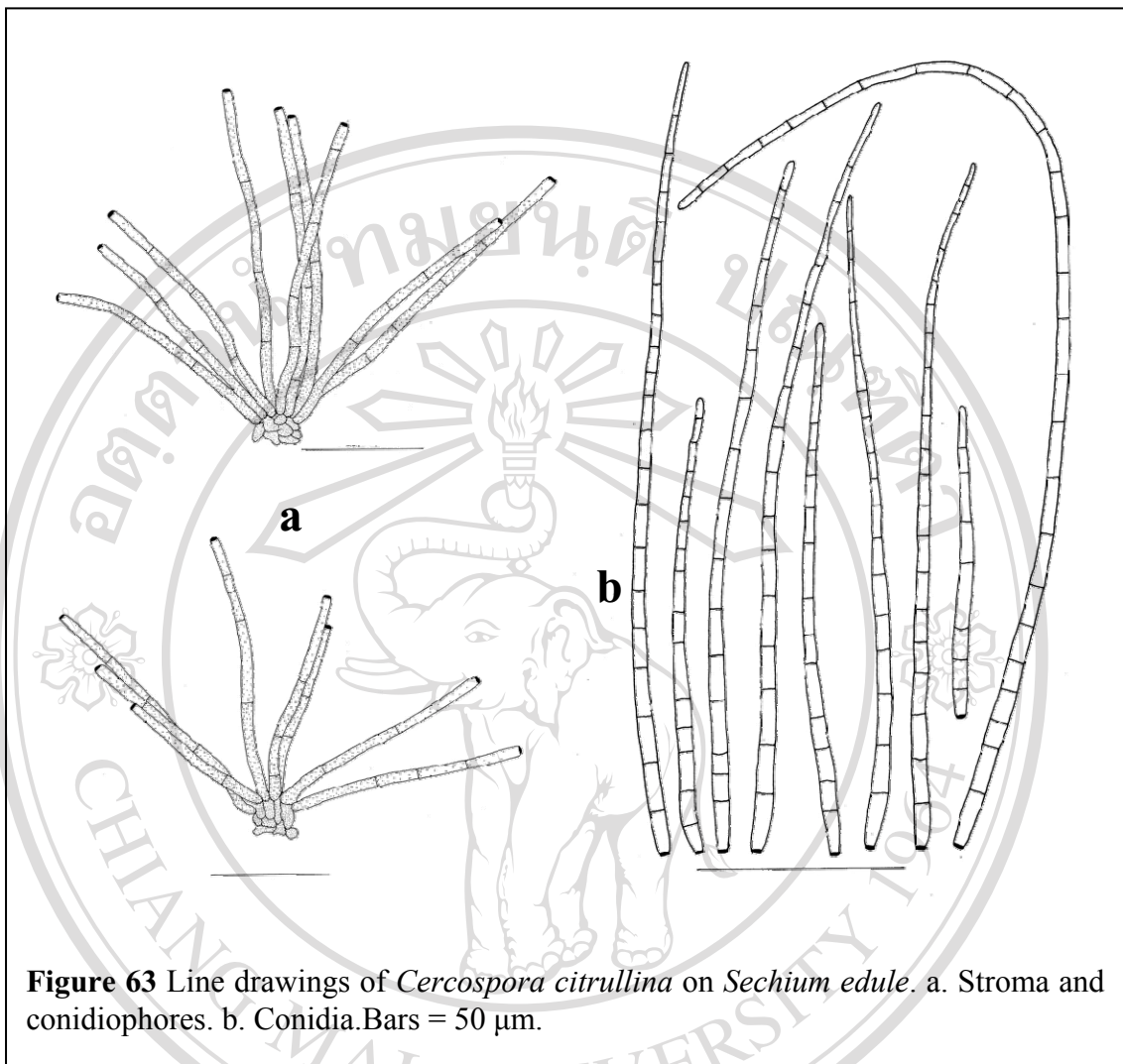


Figure 63 Line drawings of *Cercospora citrullina* on *Sechium edule*. a. Stroma and conidiophores. b. Conidia. Bars = 50 μ m.

Host: *Apadantha sagittifolia*, *Benincasa cerifera*, *B. hispida*, *Bryoania* sp., *Bryonopsis laciniata*, *Citrullus lanatus*, *C. vulgaris*, *Citrullus* sp., *Coccinia cordifolia*, *C. indica*, *Ctenolepsis cerasiformis*, *Ctenolepsis* sp., *Cucumis anguria*, *C. callosus*, *C. maxima*, *C. melo*, *C. sativa*, *Cucurbita foetidissima*, *C. maxima*, *C. moschata*, *C. pepo*, *C. perennis*, *C. sativus*, *Lagenaria leucantha*, *L. siceraria*, *L. vulgaris*, *Luffa acutangula*, *L. aegyptiaca*, *L. amara*, *L. cylindrica*, *L. vulgaris*, *Melothria pendula*, *Momordica charantia*, *M. cochinchinensis*, *M. cordifolia*, *M. dioica*, *M. foetida*,

M. schimperiana, *Sechium edule*, *Sicana odorifera*, *Telfaria pedata*, *Trichosamthes anguina*, *T. japonica* (*Cucurbitaceae*) (Crous and Braun, 2003).

Distribution: Worldwide, where the host plants are cultivated or growing, including American Samoa, Argentina, Austria, Bangladesh, Barbados, Belize, Bolivia, Brazil, Brunei, Bulgaria, Cambodia, Canada, Chile, China, Cook Island, Costa Rica, Cuba, Czech Republ., Denmark, Dominican Republic, El Salvador, Ethiopia, Fiji, French Polynesia, Gabon, Georgia, Germany, Ghana, Great Britain, Greece, Guam, Hong Kong, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Kenya, Korea, Laos, Malawi, Malaysia, Mauritius, Mexico, Morocco, Myanmar, Nepal, Netherlands, New Caledonia, New Zealand, Nicaragua, Nigeria, Norway, Pakistan, Panama, Papua New Guinea, Peru, Philippines, Pitcairn Island, Poland, Puerto Rico, Romania, Russia, Samoa, Saudi Arabia, Solomon Islands, Somalia, South Africa, Sri Lanka, Sweden, Switzerland, Sudan, Taiwan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Uganda, U.Kraine, U.K, U.S.A, Vanuatu, Venezuela, Virgin Islands, Zambia and Zimbabwe (Crous and Braun, 2003).

Notes: *Sechium edule* is reported here as a new host of *C. citrullina*.

Cercospora citrullina was previously reported from Thailand by Petcharat and Kanjanamaneesathian (1989), and Meeboon *et al.* (2007b) on *Coccinia grandis*.

Crous and Braun (2003) considered this species as *C. apii s. lat.*

Literatures: Chupp (1954, p. 185), Ellis (1976, p. 255).

Cercospora cocciniae Munjal, Lall, and Chona, *Indian Phytopathol.* **12**: 86 (1959).

(Figure 64)

Leaf spots 1-5 mm diameter, amphigenous, scattered to confluent, distinct, circular to subcircular, pale to pale brown, greyish brown to greyish white at the center, with distinct, yellowish brown to dark brown margins. *Caespituli* epiphyllous, rarely amphigenous. *Stromata* 18-29.5 μm diameter, small, sometimes rudimentary to poorly developed, composed of a few sub-globular to irregular, brown to dark brown cells. *Conidiophores* 18-108.5 \times 3-5.5 μm , very variable in length, 4-15 in a divergent fascicles, 1-9-septate, arising from stromata through the cuticle, pale olivaceous brown, sometimes paler at the apex, straight to slightly curved, strongly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, mostly polyblastic, sympodially proliferating. *Conidiogenous loci* 1.5-2.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* 41-102 \times 2.5-5 μm , solitary, mostly obclavate-cylindric, sometimes acicular, straight to mildly curved, hyaline, 5-10-septate, very variable in length, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 1.5-2.5 μm diameter, thickened, and darkened

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, Faculty of Agriculture, on leaves of *Coccinia grandis* (L.) Voigt (*Cucurbitaceae*), 29 February 2008, Jamjan Meeboon (BBH 23564).

Host: *Coccinia indica*, *Momordica charantia* (*Cucurbitaceae*) (Crous and Braun, 2003).

Distribution: Brunei, India, and Pakistan (Crous and Braun, 2003).

Notes: This species is typical of *C. cocciniae* as having obclavate conidia. This specimen is the first record of *C. cocciniae* from Thailand, and *Coccinia grandis* is reported here as a new host of this fungus.

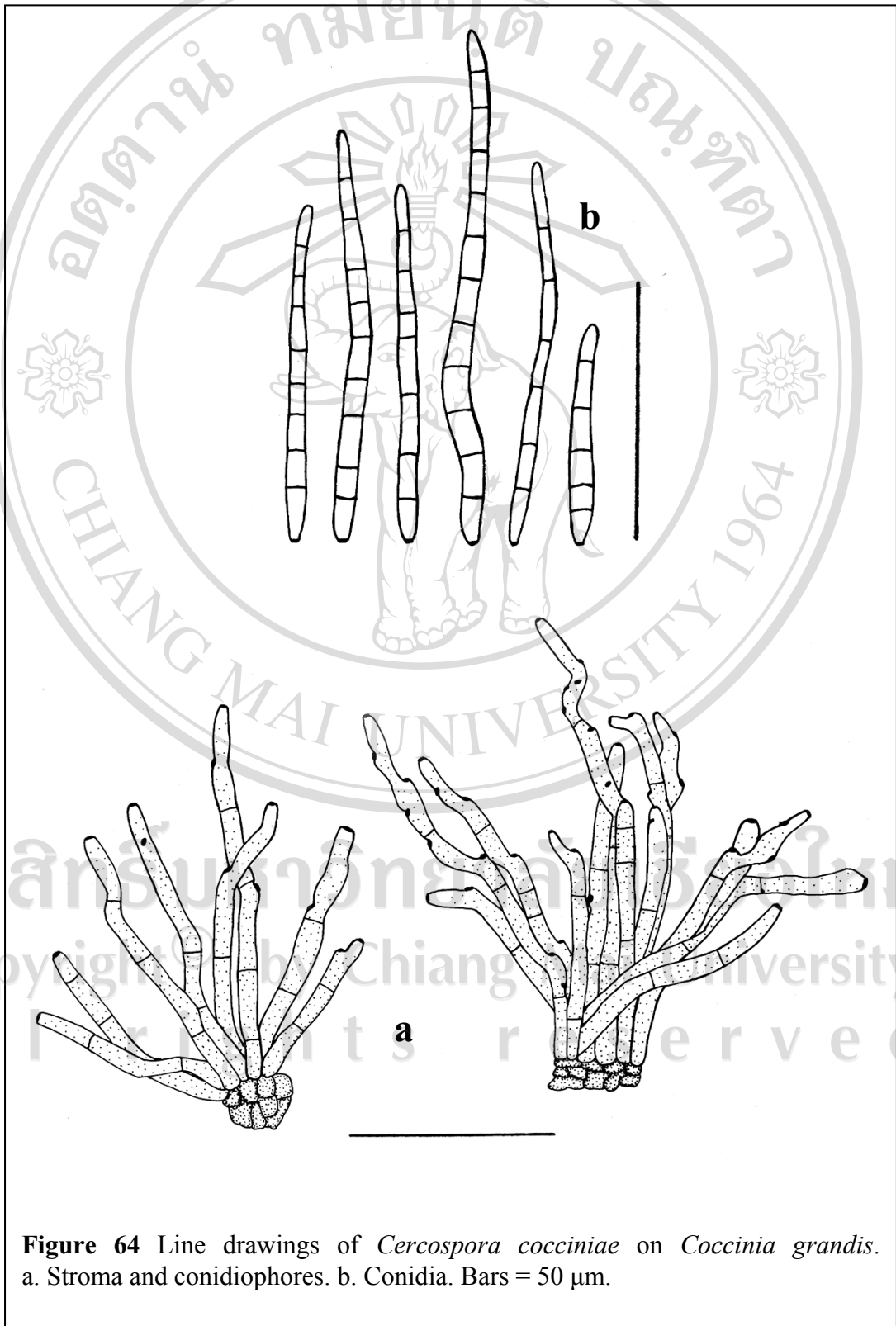


Figure 64 Line drawings of *Cercospora cocciniae* on *Coccinia grandis*. a. Stroma and conidiophores. b. Conidia. Bars = 50 μ m.

Cercospora cucurbitacea Ellis and B. T. Galloway, *U. S. D. A. Dept. Bull.* **1366**: 40 (1926) (*nom. nud.*).

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, Faculty of Agriculture, on leaves of *Cucurbita moschata* (Duchesne) Poir. (*Cucurbitaceae*), 19 January 2005, Jamjan Meeboon (CMU 28216).

Host: *Coccinia* sp., *Cucumis sativus*, *Cucurbita moschata*, *Cucurbita* sp. (*Cucurbitaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007d).

Distribution: U.S.A, Zimbabwe, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007d).

Notes: *Cucurbita moschata* was reported being as a host of *Cercospora cucurbitaceae* by Meeboon *et al.* (2007d).

Family Dioscoreaceae

Passalora dioscoreae (Ellis and G. Martin) U. Braun and Crous, *CBS Biodiversity Series* **1**: 162 (2003).

≡ *Cercospora dioscoreae* Ellis and G. Martin, *Amer. Naturalist* **16**: 1003 (1882).

≡ *Phaeoramularia dioscoreae* (Ellis and G. Martin) Deighton, *More Dematiaceous Hyphomycetes*: 319 (1976).

= *Cercospora nubilosa* Ellis and Everh., *J. Mycol.* **4**: 115 (1888).

= *Cercospora tokoroi* Togashi, *Bulletin Imper. Coll. Agric. and Forest. Morioka, Japan* **22**: 46 (1936).

(Figure 65)

Leaf spots 5-20 mm diameter, amphigenous, irregular, dark brown, limited by vein of a leaf. *Caespituli* amphigenous. *Stromata* 28.5-42 μm diameter, small, substomatal, composed of a few, globose to subglobose, brown cells. *Conidiophores* 17-50 \times 2.5-3.5 μm , densely fasciculate, 1-3-septate, arising from stromata, straight, unbranched, cylindrical, smooth, brown at the base, and paler toward the apex, non-geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic, sympodially proliferating. *Conidiogenous loci* 2-2.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* 36.9-105.78 \times 2.46-4.92 μm , obclavate, straight, subhyaline, 2-8-septate, truncate at the base, and tapering abruptly near the basal end, hila 1-2 μm diameter, conspicuous, and thickened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Sanpatong, Tambol Mae Win, Bahn Mae Sapok, Mae Sapok Royal Project, on leaves of *Dioscorea glabra* Roxb, (*Dioscoreaceae*), 8 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23682).

Host: *Dioscorea alata*, *D. bulbifera*, *D. cayensis*, *D. deltoidea*, *D. esculenta*, *D. hispida*, *D. japonica*, *D. nipponica*, *D. quinqueloba*, *D. sativa*, *D. tokora*, *D. ubi*, *D. villosa* (*Dioscoreaceae*) (Crous and Braun, 2003).

Distribution: Brazil Canada, China, Cuba, India, Indonesia, Italy, Japan, Panama, Philippines, Sri lanka, Taiwan, Togo, Trinidad and Tobago, Uganda, and U.S.A (Crous and Braun, 2003).

Notes: This is the first record of *P. dioscoreae* on from Thailand, and *Dioscorea glabra* is also reported here as a new host to the pathogen.

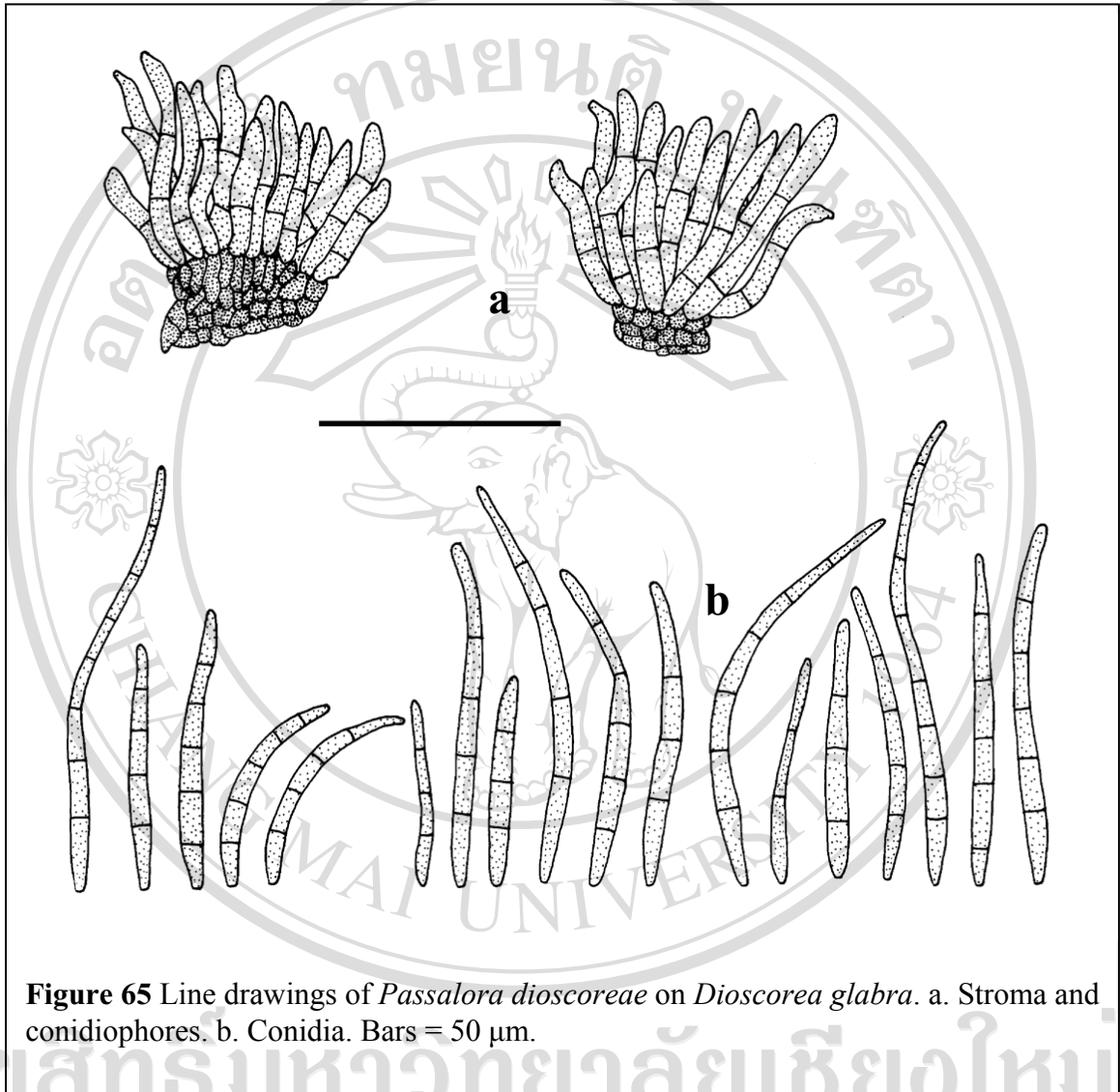


Figure 65 Line drawings of *Passalora dioscoreae* on *Dioscorea glabra*. a. Stroma and conidiophores. b. Conidia. Bars = 50 μ m.

Pseudocercospora carbonacea (L. E. Miles) N. Pons and B. Sutton, *Mycol. Pap.* **160**:

26 (1988).

≡ *Cercospora carbonacea* L. E. Miles, *Trans. Illinois Acad. Sci.* **10**: 255 (1917).

(Figure 66)

Leaf spots 2-19 mm in diameter, amphigenous, on the surface scattered to confluent, distinct, angular, dark brown, without definite margins. *Caespituli* hypophyllous. *Stromata* 38.5-93.5 μm in diameter, substomatal, well-developed, composed of globose to subglobose, dark brown-walled cells. *Conidiophores* (70-) 78.5-93.5 (-102) \times 3-4 μm , numerous, in a rich and densely fasciculate, arising from the upper part of stromata, emerging through stomata or erumpent through the cuticle, 1-3-septate, subcylindrical, brown, slightly geniculation at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (45.5-)72.5-103(-125) \times 4-4(-5) μm , solitary, cylindric-obclavate, straight to mildly curved, hyaline to subhyaline, smooth, 4-12-septate, subtruncate or obconically truncate at the base, with obtuse apex, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Queen Sirikit Botanical Garden, on leaves of *Dioscorea glabra* Roxb. var. *glabra* (*Dioscoreaceae*), 20 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27958); Chiang Mai Province, Amphur Mae Taeng, Tumbol. Pa Pae, Bahn Phadeng, Mushroom Research Centre, on leaves of *Dioscorea bulbifera* L. (*Dioscoreaceae*), 8 November 2006, Ikumitsu Araki (CMU 27909).

Host: *Dioscorea alata*, *D. bulbifera*, *D. caucasia*, *D. cayenensis*, *D. deltoides*, *D. dumetorum*, *D. gilbertii*, *D. glabra*, *D. nipponica*, *D. oppositifolia*, *D. spinosa*, *D. trifida*, *Dioscorea* sp. (*Dioscoreaceae*) (Crous and Braun, 2003; Nakashima *et al.*, 2007).

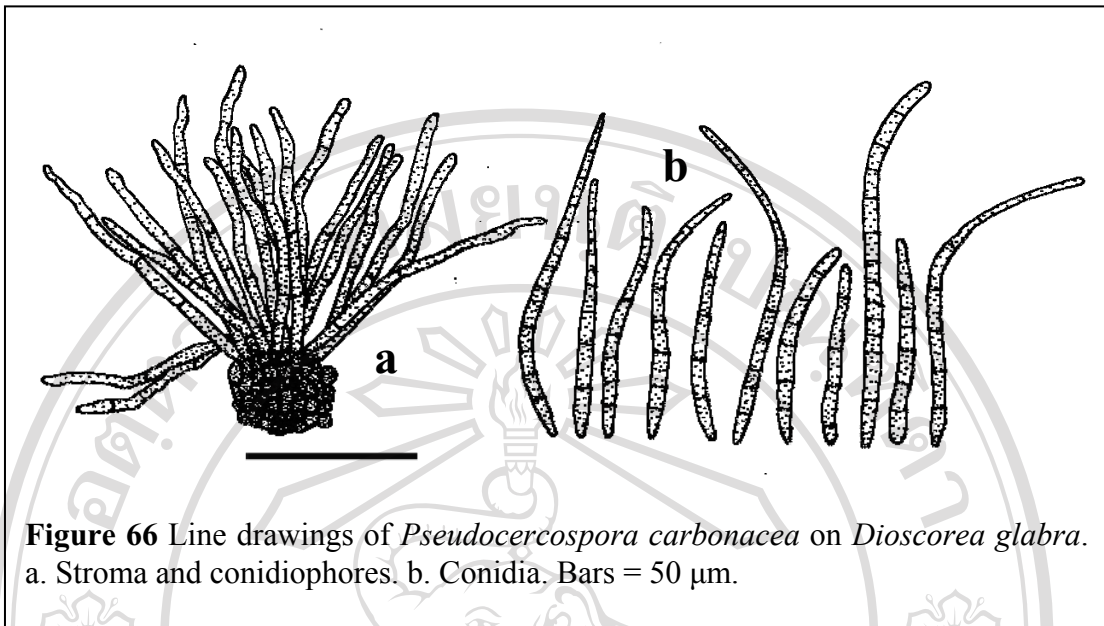


Figure 66 Line drawings of *Pseudocercospora carbonacea* on *Dioscorea glabra*. a. Stroma and conidiophores. b. Conidia. Bars = 50 μ m.

Distribution: Barbados, Brabados, Brazil, Canada, Cuba, Dominican Republic, Ethiopia, French Antilles, Ghana, Grenada, Guinea, Haiti, India, Indonesia, Jamaica, Myanmar, Nigeria, Panama, Puerto Rico, Sierra Leone, Saint Lucia, Saint Vincent and the Grenadines, Tanzania, Thailand, Togo, Trinidad, Tobago, Venezuela, Virgin Islands (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Notes: Nakashima *et al.* (2007) were the first of reporting this species from Thailand.

Pseudocercospora contraria (Syd. and P. Syd.) Deighton, *Mycol. Pap.* **140**: 30 (1976).

≡ *Cercospora contraria* Syd. and P. Syd., *Ann. Mus. Congo, Bot., Ser. V*, **3**: 21 (1909).

= *Cercospora wildemanii* Syd. and P. Syd., *Ann. Mus. Congo, Bot., Ser. V*, **3**: 21 (1909).

(Figure 67)

Leaf spots 2-9 in diameter, distinct, amphigenous, circular to subcircular, scattered, brown, greyish at the centre, with dark margin. *Caespituli* hypophyllous. *Stromata* (24.5) 37.5 ± 11.9 (57.5) µm diameter, substomatal, well-developed, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (18) 34.5 ± 11.6 (54) × (3) 4 ± 0.7 (5) µm, numerous in a dense fascicles, 1-2-septate, brown, simple, smooth, straight, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (37) 57.5 ± 13.9 (80) × (3) 3.5 ± 0.5 (4.5) µm, solitary, long obclavate, 3-7-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the base, with subacute apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Dioscorea alata* L. (*Dioscoreaceae*), 28 November 2005, Jamjan Meeboon (CMU 27943); Chiang Mai Province, Suthep-Pui National Park, on leaves of *Dioscorea glabra* Roxb. (*Dioscoreaceae*), 25 July 2008, Jamjan Meeboon (BBH 23771).

Host: *Dioscorea alata*, *D. asteriscus*, *D. bulbifera*, *D. cochleari-apiculata*, *D. dumetorum*, *D. hirtiflora*, *D. oppositifolia*, *D. quartiniana*, *D. quinqueloba*, *D. sativa*, *D. schimperiana*, *D. trifida*, *D. triphyllum*, *Dioscorea* spp. (*Dioscoreaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Distribution: Brazil, Cameroon, China, Congo, Ghana, Guinea, India, Indonesia, Japan, Java, Korea, Nigeria, Sierra Leone, Sudan, Tanzania, Thailand, Togo, and Uganda (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Notes: This species was firstly reported from Thailand by Meeboon *et al.* (2008)

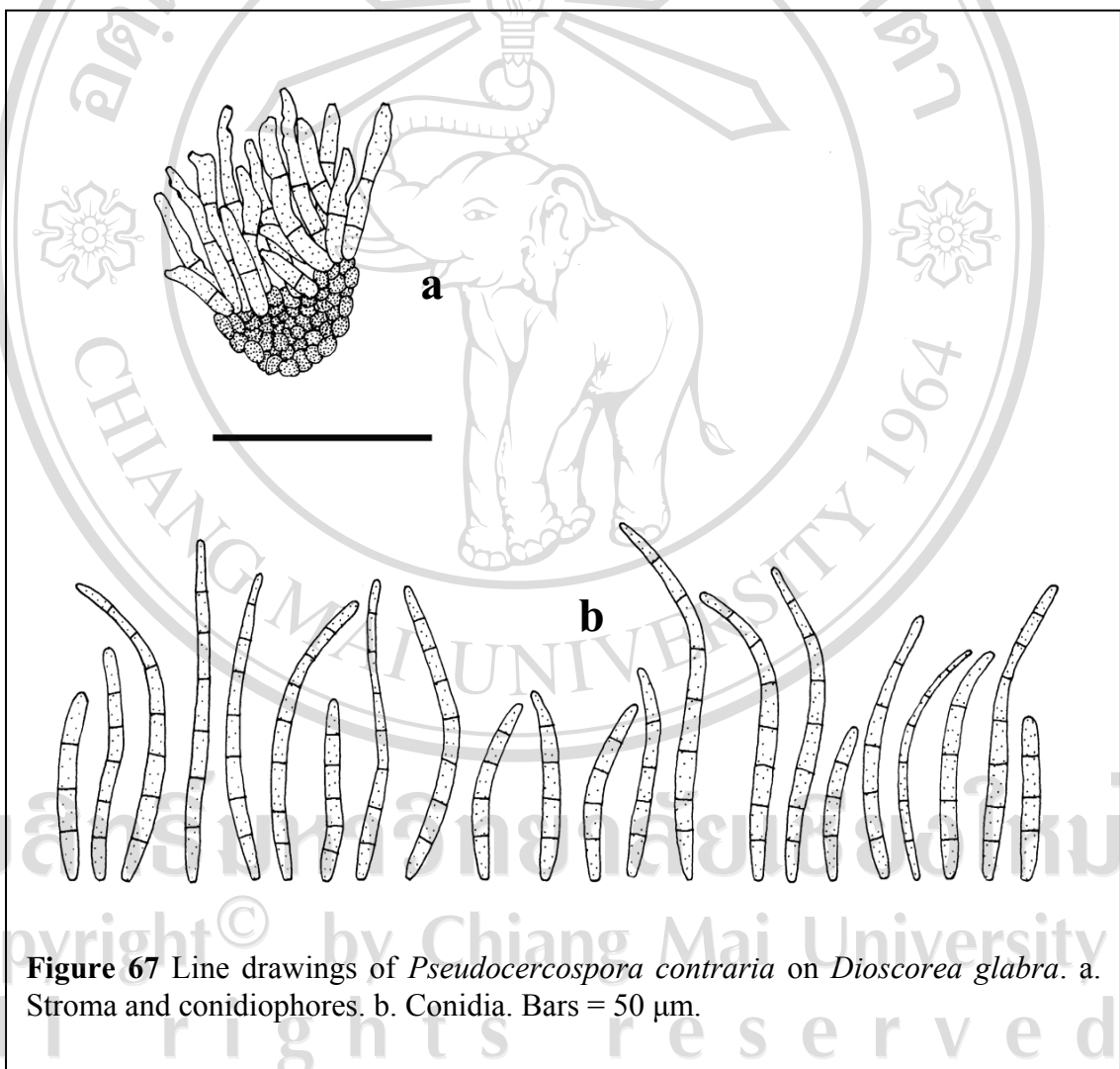


Figure 67 Line drawings of *Pseudocercospora contraria* on *Dioscorea glabra*. a. Stroma and conidiophores. b. Conidia. Bars = 50 μ m.

Family *Dracaenaceae*

Pseudocercospora dracaenae Meeboon, Hidayat, and To-anun, **sp. nov.**

(Figures 68)

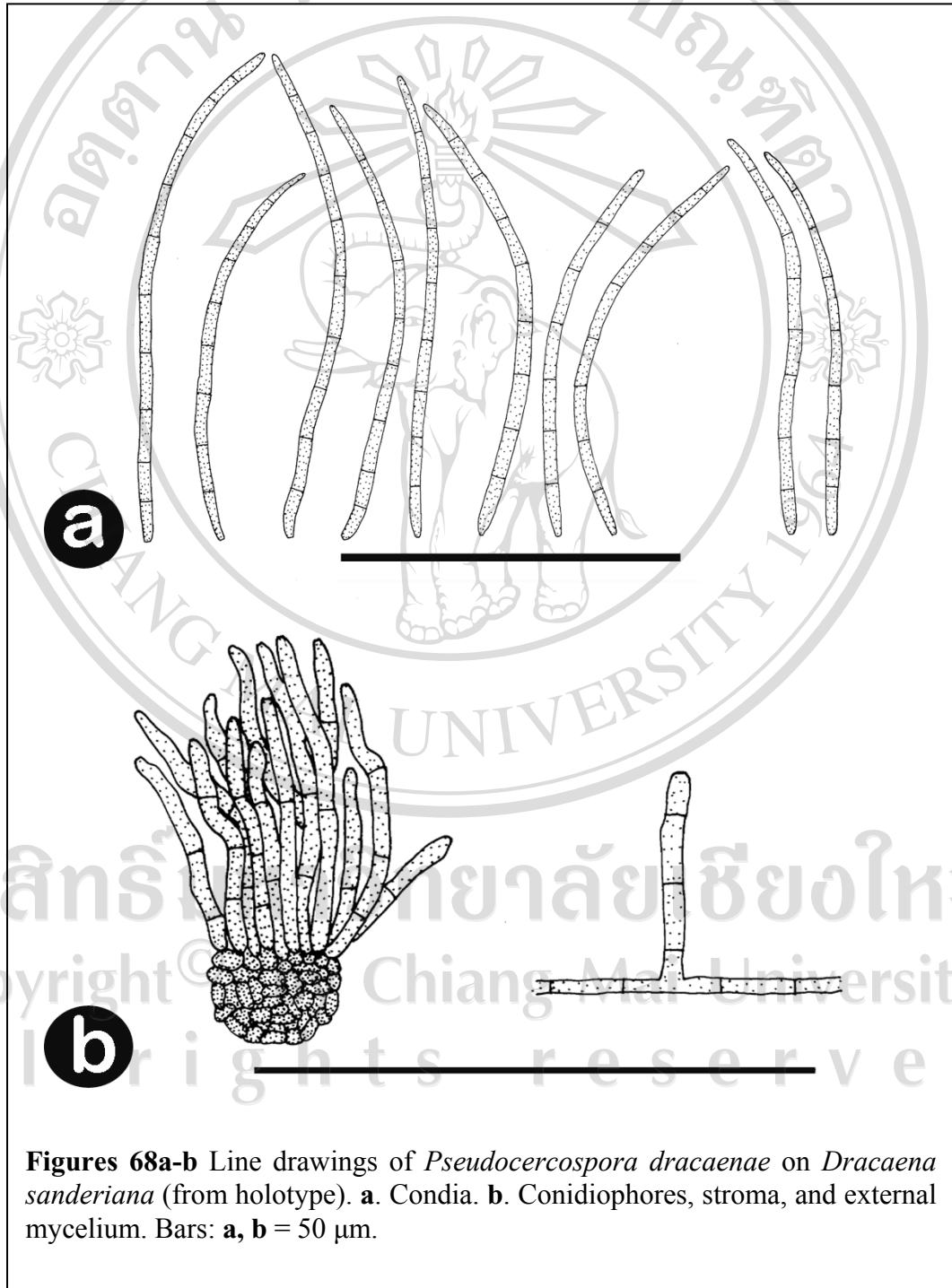
Leaf spots 8-18 mm diameter, amphigenous, distinct, irregular, scattered, brown, with reddish brown margins. *Caespituli* hypophyllous. *Stromata* (13) 21 ± 4.8 (25) μm diameter, intraepidermal, small to well-developed, composed of globose to subglobose, brown to dark brown cells, mycelium internal and external. *Conidiophores* (27) 50 ± 84 (18.6) \times (2) 2.1 ± 0.2 (2.5) μm , numerous in a densely fasciculate, 1-3-septate, arising from the upper part of stromata as well as external mycelium, pale olivaceous-brown, simple, straight, smooth, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (57) 70.5 ± 18.8 (139.5) \times (1) 1.5 ± 0.4 (2) μm , solitary, long filiform, 8-10-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the base, with obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Muang, on leaves of *Dracaena sanderiana* Sander ex Mast. (*Dracaenaceae*), RAMA IX Garden, 26 August 2008, Jamjan Meeboon (BBH 23760: **holotype**).

Host: *Dracaena sanderiana* (*Dracaenaceae*).

Distribution: Thailand (type locality).

Notes: This specimen is a new species of *Pseudocercospora* due to none of members of this genus have been recorded on this host family. Another cercosporoid fungus on family *Dracaenaceae* is *Stenella dracaenae* U. Braun and Crous (Crous and Braun, 2003).



Family Ebenaceae

Pseudocercospora diospyri-erianthae Sawada ex Goh and W. H. Hsieh, *Trans. Mycol. Soc. R. O. C.* **2**: 90 (1987a).

≡ *Cercospora diospyri-erianthae* Sawada, *Report of the Department of Industry, Government Research Institute, Formosa* **85**: 103 (1943).

(Figure 69)

Leaf spots 2-11 mm diameter, solitary, amphigenous, subcircular to irregular, sometimes rectangular, pale olivaceous, with very dark and thick margin. *Caespituli* amphigenous, abundance at the upper surface. *Stromata* 16-53 μm diameter, well-developed, substomatal, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (13-) 19-39 (-62) \times (2.5-) 2.8-4 μm , densely fasciculate, 2-3-septate, arising from stromata, straight, branched, slightly geniculate, smooth, brown, and paler towards the apex. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (21-) 31-45 (-54) \times (2.2-) 2.4-3 (-3.5) μm , solitary, obclavate to cylindrical, straight to mildly curved, hyaline to subhyaline, 1-7-septate, smooth, obconically truncate at the base, with obtuse to subobtuse apex, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Sanpatong, Tambol Mae Win, Bahn Mae Sapok, Mae Sapok Royal Project, on leaves

of *Diospyros kaki* Thunb. (*Ebenaceae*), 8 February 2008, Jamjan Meeboon (BBH 23746).

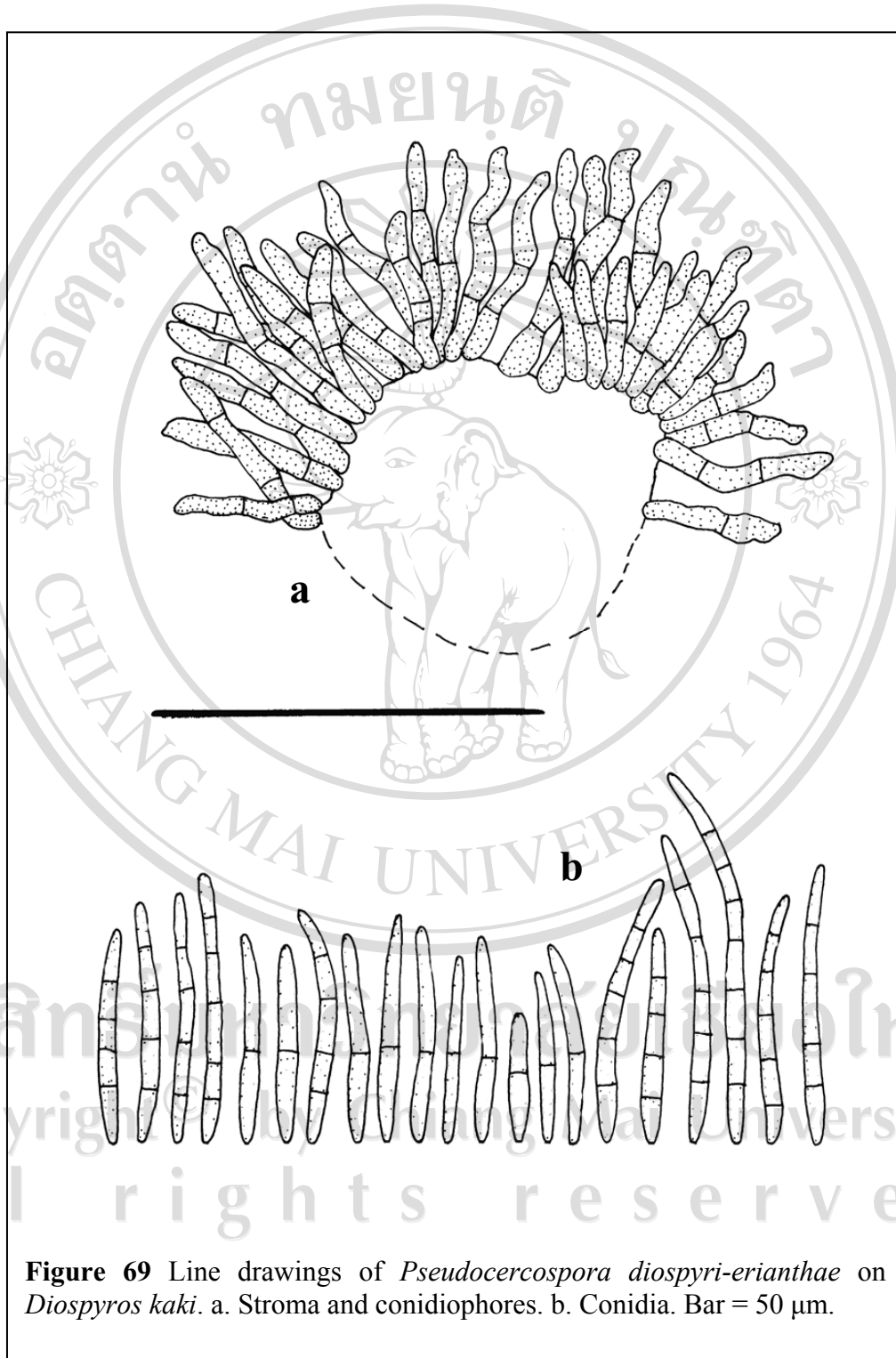


Figure 69 Line drawings of *Pseudocercospora diospyri-erianthae* on *Diospyros kaki*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Host: *Diospyros eriantha*, *D. latifolia* (*Ebenaceae*) (Crous and Braun, 2003).

Distribution: China and Taiwan (Crous and Braun, 2003).

Notes: This specimen is very similar to *Pseudocercospora diospyri-erianthae* in leaf spot characteristics and branched conidiophores. This is the first report of *P. diospyri-erianthae* from Thailand, and *D. kaki* is reported here as a new host of this fungus.

Family *Elaeagnaceae*

Cercospora elaeagni Heald and F. A. Wolf, *Mycologia* **3**: 16 (1911).

≡ *Cercospora elaeagni* (Head and F. A. Wolf) Sacc., *Syll. Fung.* **25**: 901 (1931).

Specimen examined: THAILAND, Chiang Rai Province, Amphur Wiang Pa Pao, on leaves of *Elaeagnus conferta* Roxb. (*Elaeagnaceae*), 11 November 2005, Jamjan Meeboon (CMU 28210).

Host: *Elaeagnus angustifolia*, *E. commutata*, *E. latifolia*, *Elaeagnus* sp. (*Elaeagnaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007d).

Distribution: Iran, Thailand, and U.S.A (Crous and Braun, 2003; Meeboon *et al.*, 2007d).

Notes: The first report of *C. elaeagni* on *E. latifolia* from Thailand was made by Meeboon *et al.* (2007d).

Family *Elaeocarpaceae*

Pseudocercospora elaeocarpicola Meeboon, Hidayat, To-anun, **sp. nov.**

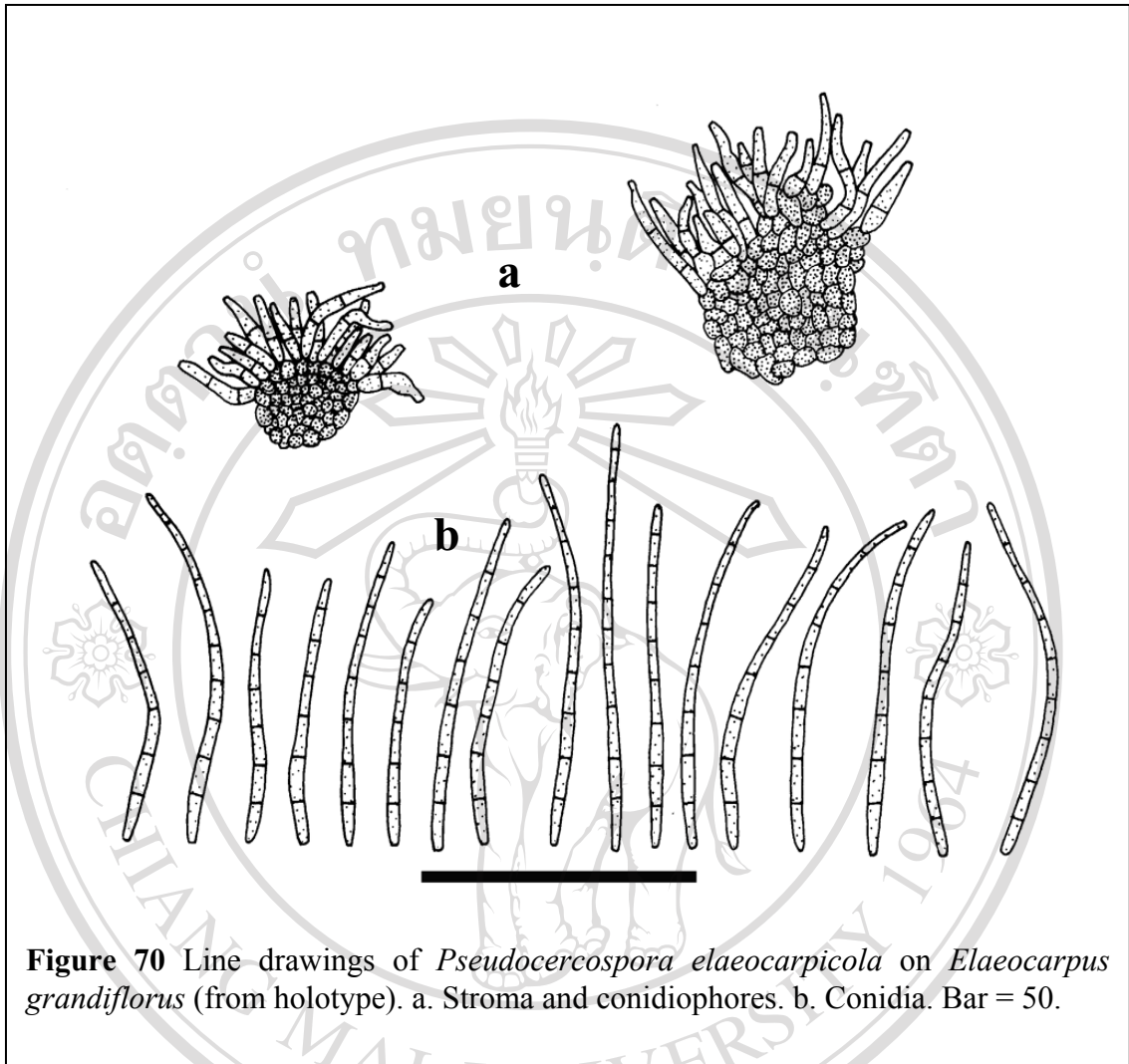
(Figure 70)

Leaf spots 7-16 mm diameter, distinct, amphigenous, circular, angular to irregular, sometimes limited by vein, scattered, pale to grayish, with reddish brown margin. *Caespituli* hypophyllous. *Stromata* (23) 26.5 ± 2.9 (30) μm diameter, intraepidermal, small to well-developed, composed of globular to angular, brown to dark brown cells. *Conidiophores* (13.5) 16.1 ± 1.9 (19) \times (2) 3 ± 0.6 (3.5) μm , numerous in a dense fascicles, 1-2-septate, not divergent to slightly divergent, arising from the stromata, pale olivaceous-brown, smooth, simple, straight, not branched, sometimes slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (45) 62.5 ± 8.1 (79.5) \times (2) 2 ± 0.3 (3) μm , solitary, filiform to subacicular, 5-10-septate, straight or slightly curved, smooth, pale olivaceous, base truncate, with subacute to obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Elaeocarpus grandiflorus* J.E. Smith. (*Elaeocarpaceae*), 25 July 2008, Jamjan Meeboon (BBH 23772: **holotype**).

Host: *Elaeocarpus grandiflorus* (*Elaeocarpaceae*).

Distribution: Thailand (type locality).



Notes: *Pseudocercospora aristoteliae* is the only cercosporoid fungi recorded from plant family *Elaeocarpaceae*. However, this specimen is distinct from

P. aristoteliae by having hypophyllous caespituli, very short conidiophores ($13.5-19 \times 2-3.5 \mu\text{m}$ vs $10-40 \times 4-5 \mu\text{m}$) in a densely fasciculate, and filiform conidia with truncate at the basal end.

Family Euphorbiaceae

Cercospora acalyphae Peck, *Rep. (Annual) New York State Mus. Nat. Hist.* **34**: 48 (1881).

= *Cercospora acalypharum* Tharp, *Mycologia* **9**: 106 (1917).

≡ *Cercosporina acalypharum* (Tharp) Sacc., *Syll. Fung.* **25**: 902 (1931).

(Figure 71)

Leaf spots 15-30 mm diameter, amphigenous, circular or subcircular, symptoms at first pale greenish to ochraceous when young, later brown to dark brown, finally with grayish brown at the centre, surrounded by a dark margin. *Colonies* amphigenous, ochre yellow, velvety. *Stromata* (25) 39 ± 8.2 (47) μm diameter, intraepidermal, well-developed, composed of globose to subglobose, brown to blackish brown cells, *Conidiophores* (48.5) 63.5 ± 8.6 (83.5) \times (4) 5 ± 0.5 (6) μm , 2-8 in a loosely fasciculate, 1-3-septate, arising from stromata, simple, straight, erect to decumbent, smooth, pale yellow to pale brown, rarely branched, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic, sometimes polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3.5 μm diameter, conspicuous, thickened, darkened. *Conidia* (44) 165.5 ± 74.62 (256) \times (1.5) 2.56 ± 0.56 (3) μm , solitary, narrowly obclavate to subacicular, straight, hyaline, 4-18-septate, smooth, base obconically truncate, with subacute apex, hila 2-3 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Phetchabun Province, Amphur Nam Nao National Park, on leaves of *Acalypha wilkesiana* Mull. Arg. (*Euphorbiaceae*), 24 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27898); Chiang Mai Province, A. Mae Jo, Sansai, Farming area, on leaves of *Acalypha wilkesiana* Mull.Arg. (*Euphorbiaceae*), 31 July 2008, Jamjan Meeboon (BBH 23694).

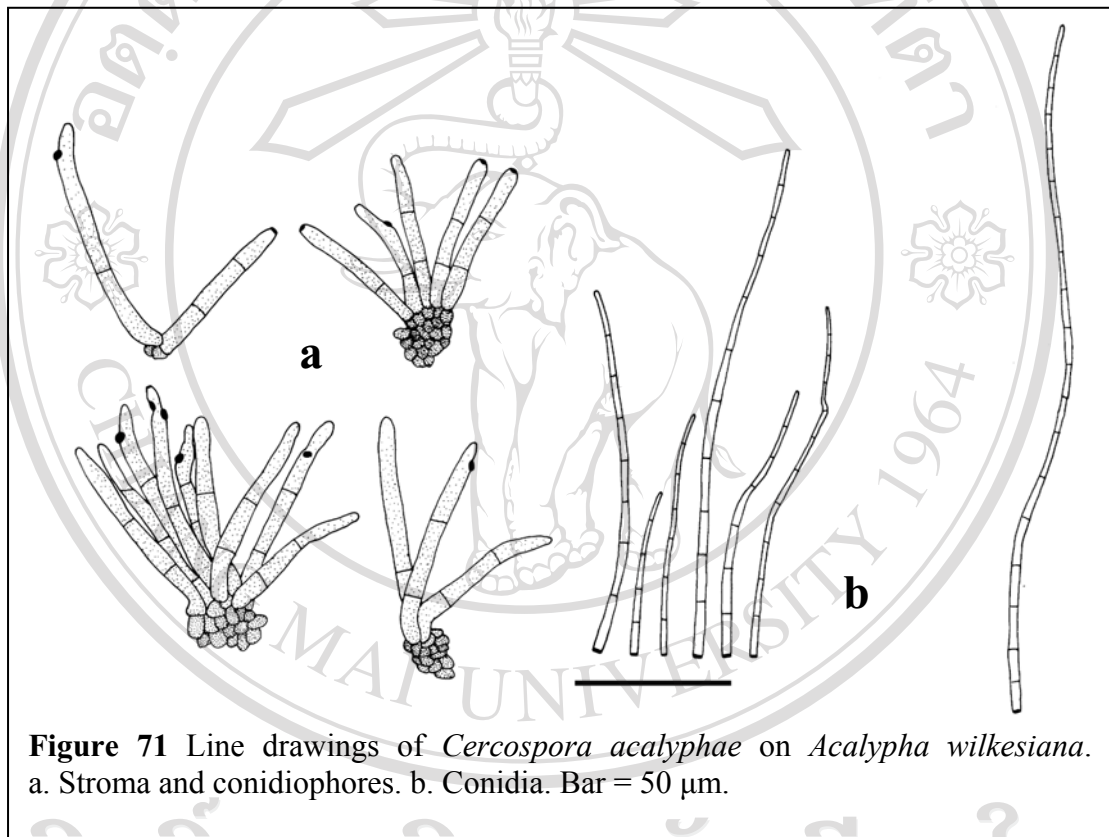


Figure 71 Line drawings of *Cercospora acalyphae* on *Acalypha wilkesiana*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Host: *Acalypha alopecurioides*, *A. australis*, *A. ciliata*, *A. gracilens*, *A. grandis*, *A. hispida*, *A. indica*, *A. marginata*, *A. marvorata*, *A. ostryifolia*, *A. rhomboidea*, *A. virginica*, *A. wilkesiana*, *Acalypha* sp. (*Euphorbiaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Brazil, China, Cuba, India, Jamaica, Japan, Solomon Islands, Thailand, U.S.A, and Venezuela (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: Meeboon *et al.* (2007c) were the first of reporting this species from Thailand.

Literature: Chupp (1954, p. 200-201).

Cercospora codiae Gonz. Frag. and Cif., *Boln de la Real Soc. Españ. Hist. Nat., Madrid* **26**: 199 (1926).

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

(Figures 72a-b)

Leaf spots 2-15 mm diameter, amphigenous, subcircular, solitary, pale brown, with reddish brown margin. *Caespituli* amphigenous. *Stromata* 38-44 μm diameter, small, substomatal, composed of a few globose, dark brown cells. *Conidiophores* (56-)169-213 \times 4-5.5 μm , 5-16 in a loose fascicles, 4-7-septate, arising from stromata, straight, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, slightly geniculate. *Conidiogenous cells* integrated, holoblastic, polyblastic, sometimes monoblastic, terminal, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (29-)103-160 \times 3-4.5 μm , solitary, acicular, rarely obclavate, straight, hyaline, 3-10-septate, smooth, truncate at the base, with tapering toward a subacute apex, hila 1.5-2 μm diameter, conspicuous, thickened, and darkened.

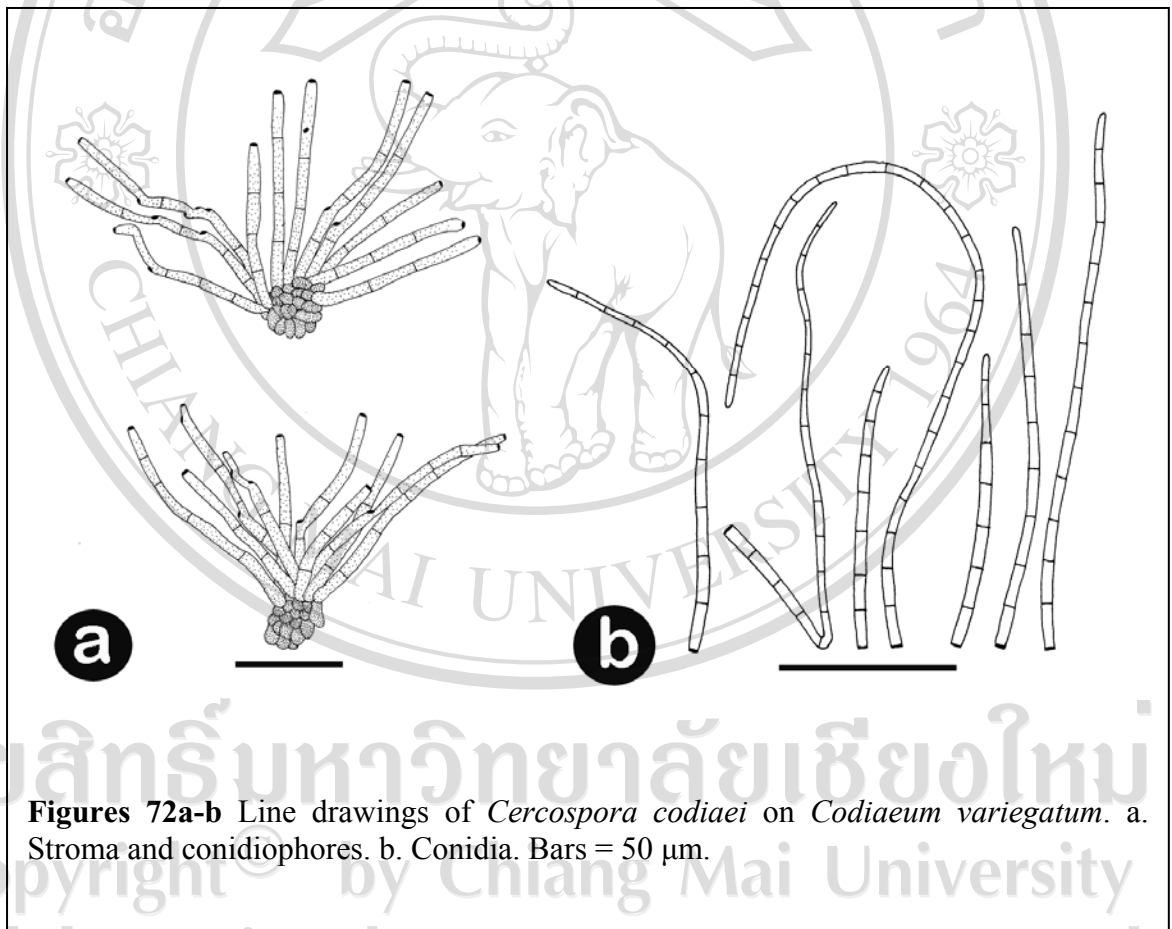
Specimen examined: THAILAND, Chiang Mai Province, Amphur Muang, Tumbol Suthep, Suthep-Pui National Park, Medicinal Plant Garden, on leaves of *Codiaeum variegatum* (L.) A. Juss. (*Euphorbiaceae*), 25 July 2008, Jamjan Meeboon and Iman Hidayat (BBH 23666).

Host: *Codiaeum* sp. (*Euphorbiaceae*) (Crous and Braun, 2003)

Distribution: Cuba, Dominican Republic, and Nigeria (Crous and Braun, 2003).

Notes: This is the first record of *Cercospora codiae* and from Thailand, and *C. variegatum* is reported here as a new host of this fungus.

Literature: Chupp (1954, p. 200-215).



Figures 72a-b Line drawings of *Cercospora codiae* on *Codiaeum variegatum*. a. Stroma and conidiophores. b. Conidia. Bars = 50 μ m.

Cercospora jatrophigena U. Braun, *Fungal Diversity* **8**: 51 (2001).

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Jatropha curcas* L. (*Euphorbiaceae*), 3 November 2005, Jamjan Meeboon (CMU 27933).

Host: *Jatropha curcas*, *Jatropha* sp. (*Euphorbiaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: India and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: *Cercospora jatrophigena* was firstly reported from Thailand by Meeboon *et al.* (2007c).

Cercospora phyllanthicola S. A. Khan and Kamal, *Indian Phytopathol.* **15**: 296 (1962) [1963].

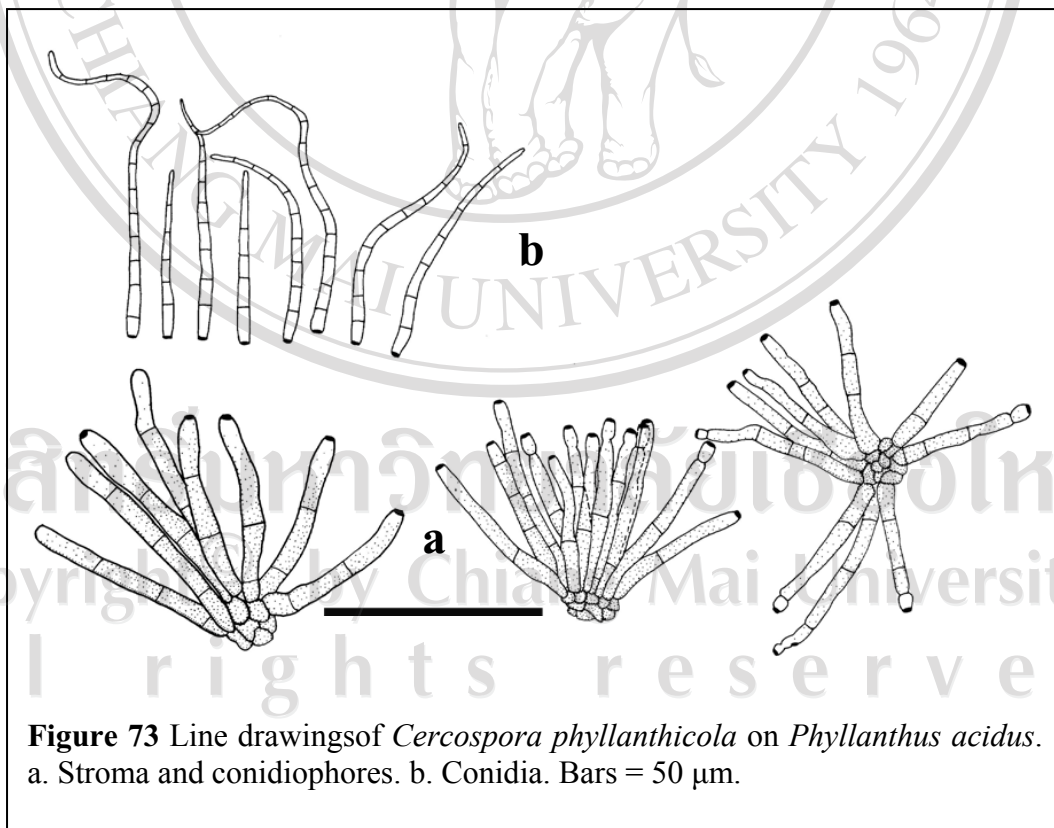
(= *C. apii* s. lat.)

(Figure 73)

Leaf spots 2-5 mm diameter, amphigenous, irregular, brown to dark brown, pale at the center, with dark margin, and limited by vein of the leaf. *Caespituli* amphigenous. *Stromata* 15-32 μm diameter, small, substomatal to intraepidermal, composed of a few globose to subglobose, dark brown cells. *Conidiophores* (36-) 42-59 (-66) \times (3-) 3.5-4.5 (-5) μm , 8-13 in a loose to dense fascicles, 1-3-septate, arising from stromata, straight to decumbent, smooth, brown at the base, and paler toward the apex, cylindrical, sometime constrict at the septate, rough wall, unbranched, geniculate, mostly near the apex. *Conidiogenous cells* integrated, terminal or

intercalary, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* 51-60.5 (-133) \times 3-4 (-4.5) μm , solitary, obclavate to acicular, straight, slightly curved, hyaline, 5-11-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 1-2.3 μm diameter, thickened, and darkened.

Specimen examined: THAILAND, Uthairat Province, Amphur Muang, Sak Yai National Park, on leaves of *Phyllanthus* sp. (*Euphorbiaceae*), 25 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27876); Chiang Rai Province, Wiang Pa Pao, on leaves of *Phyllanthus acidus* (L.) Skeels (*Euphorbiaceae*), 15 February 2008, Jamjan Meeboon (BBH 23670).



Host: *Phyllanthus niruri*, *Sauropus androgynus* (*Euphorbiaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Brunei, India, Malaysia, Myanmar, Pakistan, Singapore, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: Three species of *Cercospora* s. str., viz, *C. kirganeliicola* R. K. Srivast., S. Narayan, and A. K. Srivast. (*C. apii* s. lat.), *C. phyllanthicola* (*C. apii* s. lat.), and *C. tarii* Deighton have been recorded associated with plant genus *Phyllanthus*. This specimen is very close to *C. phyllanthicola* in having simple conidiophores and acicular conidia. The first report of *C. phyllanthicola* from Thailand was carried out by Meeboon *et al.* (2007c). Crous and Braun (2003) assigned this species to *C. apii* s. lat.

Cercospora ricinella Sacc. and Berl., *Atti Reale Ist. Ven. Sci. Lett. Art.*, **6, Ser. 3**: 721 (1885).

≡ *Cercosporina ricinella* (Sacc. and 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).

Specimen examined: THAILAND, Chiang Mai Province, Inthanon National Park, on leaves of *Ricinus communis* L. (*Euphorbiaceae*), 22 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27897).

Host: *Ricinus communis* (*Euphorbiaceae*) (Crous and Braun, 2003).

Distribution: Worldwide, including Angola, Argentina, Australia, Bangladesh, Barbados, Brazil, Bulgaria, Cambodia, China, Colombia, Cuba, Dominican Republic, Egypt., El Salvador, Ethiopia, French Polynesia, Georgia, Ghana, Guatemala, Haiti, India, Indonesia, Iraq, Jamaica, Japan, Kazakhstan, Kenya, Korea, Malawi, Malaysia, Mauritius, Morocco, Mozambique, Myanmar, Nepal, New Caledonia, Nigeria, Pakistan, Panama, Philippines, Puerto Rico, Russia (European part), Sierra Leone, Somalia, South Africa, Sri Lanka, Sudan, Tahiti, Taiwan, Tanzania, Thailand, Togo, Trinidad and Tobago, Uganda, U.Krain, U.S.A, Vanuatu, Venezuela and Zimbabwe (Crous and Braun, 2003).

Notes: The first report of this species from Thailand was made by Petcharat and Kanjanameesathian (1989).

Literatures: Chupp (1954, p. 229), Ellis (1976, p. 259).

Passalora atrides (Syd. and P. Syd.) Y. L. Guo, *Fung. Sci.* **17**: 27 (2002).

≡ *Cercospora atrides* Syd. and P. Syd., *Ann. Mycol.* **20**: 65 (1922).

≡ *Cercosporidium atrides* (Syd. and P. Syd.) Goh and W. H. Hsieh, *Cercospora and similar fungi from Taiwan*: 115 (1990).

≡ *Passalora atrides* (Syd. and P. Syd.) Poonam Srivast., *J. Living World* **1**: 112 (1994) (*nom. inval.*).

Specimen examined: THAILAND, Chiang Mai Province, Queen Sirikit Botanic Garden, on leaves of *Bridelia ovata* Decne. (*Euphorbiaceae*), 18 November 2005, Jamjan Meeboon (CMU MH 054).

Host: *Bridelia micrantha*, *B. monoica*, *B. ovata* (*Euphorbiaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: China, Sierra Leone, Taiwan, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: *Pseudocercospora aberrans* (Petr.) Deighton (Deighton, 1987) is another cercosporoid hyphomycete recorded on *Bridelia* spp. However, the present specimen was identified as *Passalora atrides* based on pigmented, ellipsoid-ovoid conidia and conspicuous, thickened, darkened conidiogenous loci. This species was reported for the first time from Thailand by Meeboon *et al.* (2007c).

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

≡ *Cercospora henningsii* Allesch., *Die Pflanzenwelt Ost. Afrikas and der Nachbargebiete*, **Teil C**: 35 (1895)

≡ *Cercosporidium henningsii* (Allesch.) Deighton, *More Dematiaceous Hyphomycetes*: 295 (1976).

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

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

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

= *Septogleum manihotis* Zimm., *Centralbl. Bakteriolog.*, **Abt. 2**, **8**: 218 (1902).

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

≡ *Mycosphaerella manihotis* Ghesq. and Henrard, *Rev. Zool. Afr. Suppl. Bot.* **12**: 1 (1924) (*nom. illeg.*), homonym of *M. manihotis* Syd. and P. Syd (1901).

Specimen examined: THAILAND, Chiang Rai Province, Amphur Wiang Pa Pao, on leaves of *Manihot esculenta* Crantz (*Euphorbiaceae*), 18 November 2005, Jamjan Meeboon (CMU 27920).

Host: *Manihot esculenta*, *M. glaziovii*, *M. manihot*, *M. piauhyensis*, *M. utilissima* (*Euphorbiaceae*) (Crous and Braun, 2003).

Distribution: Angola, Antigua and Barbuda, Australia, Barbados, Brazil, Brunei, Cambodia, China, Colombia, Congo, Costa Rica, Cuba, Dominican Republic, Fiji, El Salvador, French Polynesia, Gabon, Ghana, Haiti, India, Indonesia, Ivory Coast, Jamaica, Kenya, Madagascar, Malawi, Malaysia, Mauritius, New Caledonia, Nigeria, Palau, Panama, Peru, Philippines, Puerto Rico, Sierra Leone, Singapore, Somalia, Solomon Islands, South Africa, Sri Lanka, Sudan, Suriname, Taiwan, Tanzania, Thailand, Timor, Togo, Trinidad and Tobago, Uganda, U.S.A, Vanuatu, Venezuela, Virgin Islands, Wallis and Futuna Islands, and Zimbabwe (Crous and Braun, 2003).

Notes: In Thailand, this species was first reported by Chandrasrikul (1962) who published it as *C. cassavae* Ellis and Everh.; however, *C. cassavae* is now considered a synonym of *Passalora henningsii* (Crous and Braun, 2003). The present specimen is close to *P. henningsii* rather than *P. manihotis* (F. Stevens and Solheim) U. Braun and Crous due to amphigenous colonies and conidiophores shorter than 100 μm in size [(34-) 46.5-85 (-136.5) \times (3.5-) 4.5-4.5 (-7) μm]. *Passalora manihotis* is

characterized by having hypophyllous colonies and conidiophores longer than 100 μm in size (50-200 \times 3.5-5 μm) (Chupp, 1954).

Passalora manihotis (F. Stevens and Solheim) U. Braun and Crous, *CBS Biodiversity Series 1*: 266 (2003).

≡ *Ragnhildiana manihotis* F. Stevens and Solheim, *Mycologia* **23**: 404 (1931).

≡ *Cercospora caribaea* Cif., in Muller and Chupp, *Arq. Inst. Biol. Veget. Rio de Janeiro* **1**: 215 (1935) (*nom. nov.*), non *Cercospora manihotis* Henn. (1902).

≡ *Phaeoramularia manihotis* (F. Stevens and Solheim) M. B. Ellis, *More Dematiaceous Hyphomycetes*: 321 (1976).

(Figure 74)

Leaf spots 4-15 mm in diameter, amphigenous, subcircular, brown grayish brown, with dark margin. *Caespituli* amphigenous. *Stromata* 20-50.5 μm diameter, well-developed, intraepidermal, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* 23-63 \times 3.5-5.5 μm , in small to moderately large fascicles, loose to moderately dense, 2-4-septate, arising from stromata, erect, straight, smooth, pale brown, unbranched, subcylindrical to moderately geniculate-sinuous.

Conidiogenous cells holoblastic, mostly monoblastic, integrated, terminal, sympodially proliferating. *Conidiogenous loci* 1-1.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* 32-77 \times 3-6 μm , solitary, obclavate to subcylindrical, straight, subhyaline, 3-8-septate, smooth, often verruculose, base obconically truncate, with obtuse apex, hila 1-1.5 μm diameter, conspicuous, slightly thickened, and darkened.

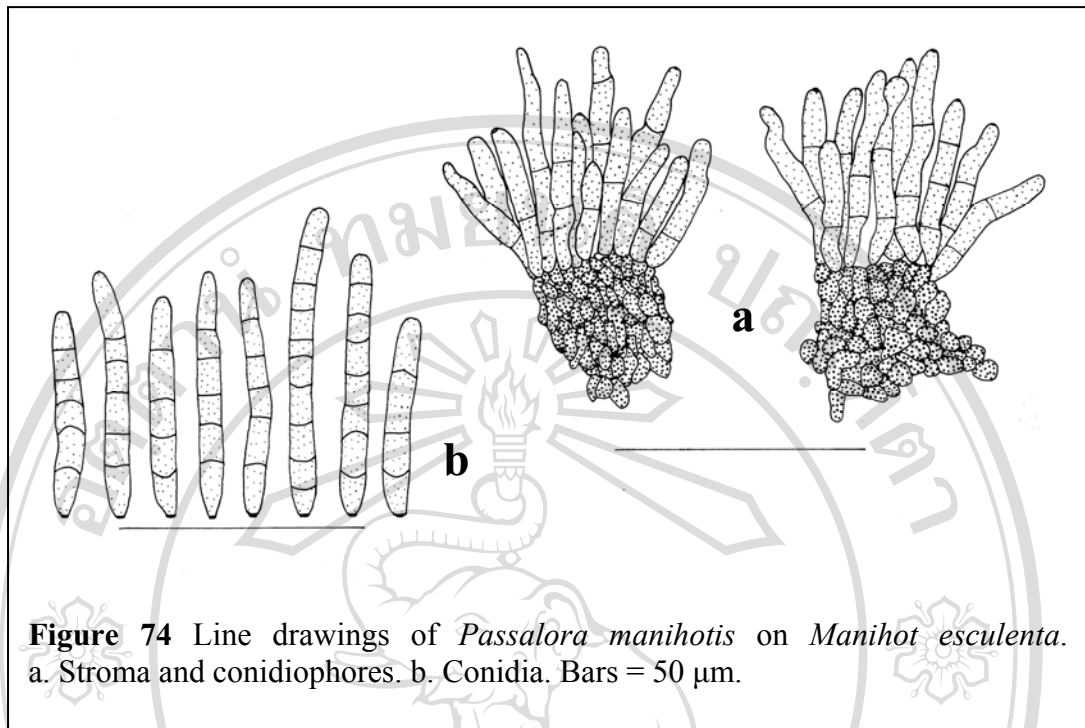


Figure 74 Line drawings of *Passalora manihotis* on *Manihot esculenta*. a. Stroma and conidiophores. b. Conidia. Bars = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Amphur Muang, Ban Umong, Water Reservoir, on leaves of *Manihot esculenta* Crantz (*Euphorbiaceae*), 24 August 2007, Jamjan Meeboon and Iman Hidayat (BBH 23651).

Host: *Manihot esculenta*, *M. utilissima* (*Euphorbiaceae*) (Crous and Braun, 2003).

Distribution: Australia, Barbados, Brazil, Cameroon, Colombia, Congo, Cuba, Dominican Republic, Ghana, Guinea, Guyana, Haiti, India, Indonesia, Ivory Coast, Jamaica, Liberia, Malaysia, Netherlands Antilles, New Caledonia, Nigeria, Panama, peru, Philippines, Puerto Rico, Senegal, Sierra Leone, Somalia, Sri Lanka, Tanzania, Togo, Trinidad and Tobago, U.S.A, Venezuela, and Virgin Islands (Crous and Braun, 2003).

Notes: This is the first report of *P. manihotis* from Thailand.

Passalora codiaei Meeboon, Hidayat, and To-anun, **sp. nov.**

(Figure 75)

Leaf spots 5-15 mm diameter, amphigenous, circular, greyish brown, with dark brown margin. *Caespituli* amphigenous. *Stromata* 22.5-38.5 μm diameter, small, substomatal, composed of a few, globose to subglobose, brown to dark brown cells. *Conidiophores* 43-58 \times 4-4.5 μm , 5-15 in a loose fascicles, 1-3-septate, arising from stromata and secondary mycelium, straight, thick wall, smooth, brown at the base, and paler toward the apex, sometimes branched, cylindrical, geniculate. *Conidiogenous cells* integrated, holoblastic, mostly monoblastic, terminal, sympodially proliferating. *Conidiogenous loci* 2-2.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* 42-96 \times 6.5-9.8 μm , solitary, obclavate, straight to curve, light brown to medium brown, 3-10-septate, smooth, truncate at the base, with tapering toward a subacute apex, hila 1.5-2 μm diameter, conspicuous, thickened, and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae

Taeng, on leaves of *Codiaeum variegatum* (L.) A. Juss. (*Euphorbiaceae*), 6 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23578: **holotype**).

Host: *Codiaeum variegatum* (*Euphorbiaceae*).

Distribution: Thailand (type locality).

Notes: About six species of *Passalora* with amphigenous caespituli, viz, *P. crotonifolia* (Cooke) Crous, U. Braun, and Alfenas, *P. crotoniphila* (Speg.) Crous, *P. crotonis* (Ellis and Everh.) Crous and U. Braun, *P. henningsii* (Allesch.) R. F. Castañeda and U. Braun, *P. maritima* (Tracy and Earle) Crous and U. Braun, and

P. securidacae U. Braun and Crous, have been reported associated with plant family *Euphorbiaceae*. The conidiophores of this species sometimes branched, and only *P. maritima* and *P. securidacae* are characterized by having branched conidiophores (Chupp, 1954; Crous and Braun, 2003). Very wide conidia (6.5-9.8 μm) with light brown to medium brown color are the major morphological characteristic of this specimen which makes it differs with other *Passalora* species in *Euphorbiaceae*. Therefore, we proposed this specimen as a new species of *Passalora*.

Literature: Chupp (1954, p.211-232), Crous and Braun (2003, p. 371).

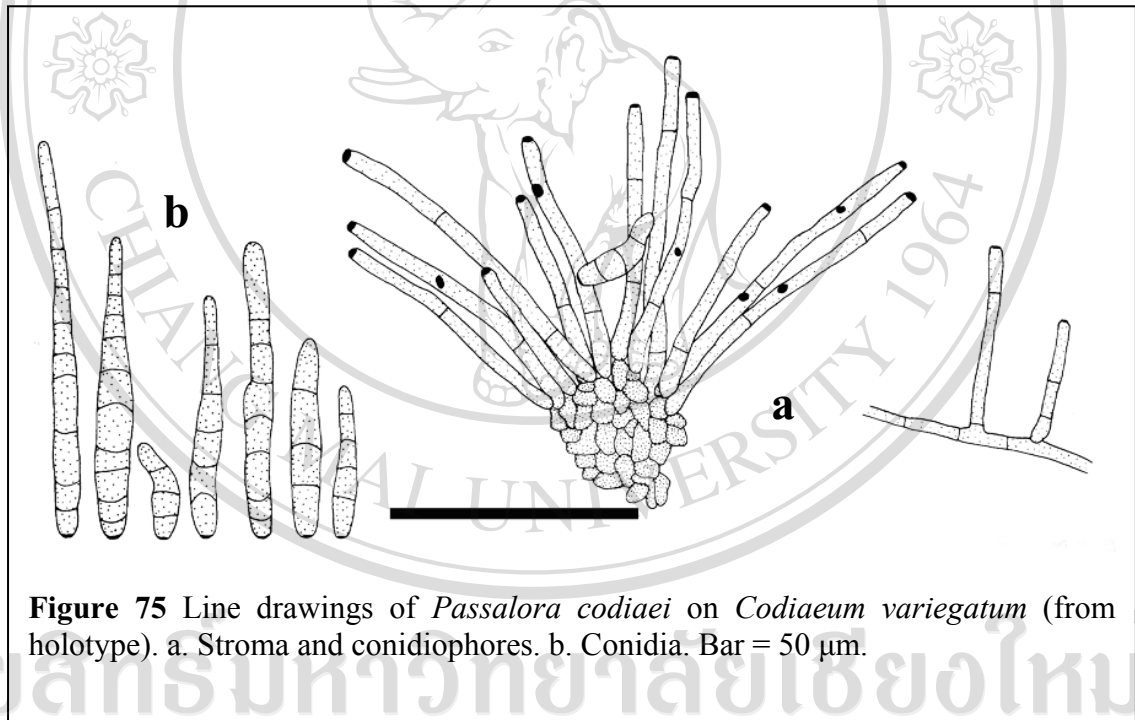


Figure 75 Line drawings of *Passalora codiaei* on *Codiaeum variegatum* (from holotype). a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Pseudocercospora eupatorii-formosani U. Braun and Bagyan, (as '*eupatorii-formosani*'), *Sydowia* **51**: 8 (1999).

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

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

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

(Figure 76)

Leaf spots 1-2 mm diameter, amphigenous, circular, angular to irregular, scattered, later coalescing to large spots, 3-23 mm diameter, grayish-brown with blackish-brown border on the upper leaf surface, and pale greenish, indistinct border on the lower leaf surface. *Caespituli* hypophyllous. *Stromata* (20) 28.5 ± 6.9 (40) μm diameter, substomatal to intraepidermal, small to well-developed, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (11) 18.5 ± 4.8 (25) \times (2.5) 2.5 ± 0.2 (3) μm , 5 to numerous in a densely fasciculate, 0-1-septate, arising from the upper part of stromata, pale olivaceous-brown, simple, smooth, straight or slightly geniculate at the apex. *Conidiogenous cells* integrated, holoblastic, mostly monoblastic, terminal, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (33.5) 67 ± 21.3 (107) \times (2.5) 2.5 ± 0.2 (3) μm , solitary, acicular to obclavate, 3-6-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the basal end, with acute apex, hila unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Sansai, Tumbol Mae Fag, Farming area, on leaves of *Euphorbia cotinifolia* L. (*Euphorbiaceae*), 9 August 2008, Jamjan Meeboon (BBH 23705).

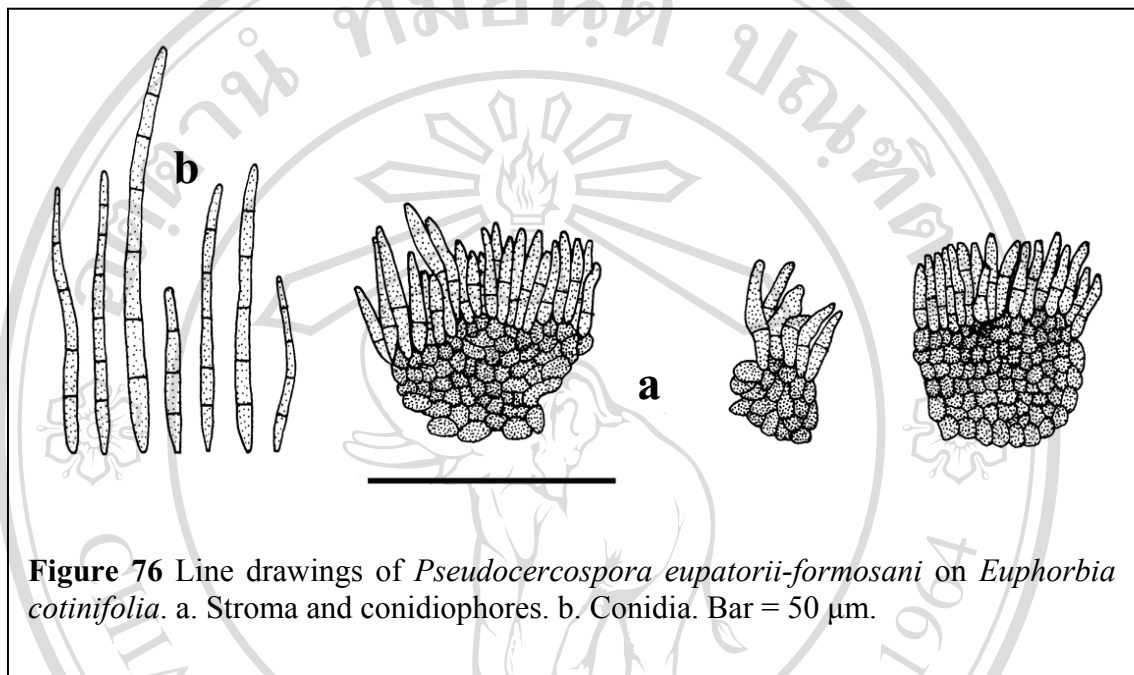


Figure 76 Line drawings of *Pseudocercospora eupatorii-formosani* on *Euphorbia cotinifolia*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Host: *Ageratina adenophora* (*Eupatorium adenophorum*), *Chromolaena odorata*, *Eupatorium ayapana*, *E. coelestinum*, *E. formosanum*, *Eupatorium* sp. (*Euphorbiaceae*) (Crous and Braun, 2003).

Distribution: Australia, Brazil, Brunei, Cambodia, China, Cuba, India, Indonesia, Ivory Coast, Nepal, New Zealand, Malaysia, Taiwan (Crous and Braun, 2003).

Notes: This specimen is the first record of *P. eupatorii-formosani* from Thailand, and *Euphorbia cotinifolia* is reported here as a new host of this fungus.

Pseudocercospora glochidionis (Sawada) Goh and W. H. Hsieh, *Trans. Mycol. Soc. R. O. C.* **2**: 136 (1987c).

≡ *Cercospora glochidionis* Sawada, *Trans. Nat. hist. Soc. Taiwan* **24** (1919)

Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Taeng, Tumbol Pa Pae, Bahn Phadeng, Mushroom Research Centre, on leaves of *Glochidion sphaerogynum* Kurz (*Euphorbiaceae*), 7 November 2006, Ikumitsu Araki (CMU 27913).

Host: *Glochidion fortunei*, *G. hohenackeri*, *G. hongkongense*, *G. zeylanicum* (*Euphorbiaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: China, India, Taiwan, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first report of *P. glochidionis* on *G. sphaerogynum* from Thailand was made by Meeboon *et al.* (2007c). *Glochidion fortunei*, *G. hohenackeri*, *G. hongkongense* and *G. zeylanicum* were previously recorded as hosts of *P. glochidionis* (Crous and Braun, 2003).

Pseudocercospora jatrophae (G. F. Atk.) A. K. Das and Chattopadh., *J. Mycopathol. Res.* **28**: (1990).

≡ *Cercospora jatrophae* G. F. Atk., *J. Elisha Mitchell Sci. Soc.* **8**: 64 (1892).

(Figure 77)

Leaf spots 1-8 mm diameter, amphigenous, angular, dark brown, only leaf decolorization, limited by vein of the leaf, numerous and scattered through the leaf surface. *Caespituli* amphigenous. *Stromata* 9-27 µm diameter, intraepidermal, small,

composed of a few, globose to subglobose, brown to dark brown-walled cells. *Conidiophores* 11.5-23 × 2-3 μm, 3-11 in a loose fascicles, 1-3-septate, arising from stromata, straight to decumbent, smooth, pale brown, cylindrical, unbranched, slightly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 20.5-34 × 2-2.5 μm, solitary, obclavate to cylindrical, 3-6-septate, straight, hyaline to subhyaline, smooth, obconically truncate at the base, tapering toward a subacute apex, hila inconspicuous, unthickened, and not darkened.

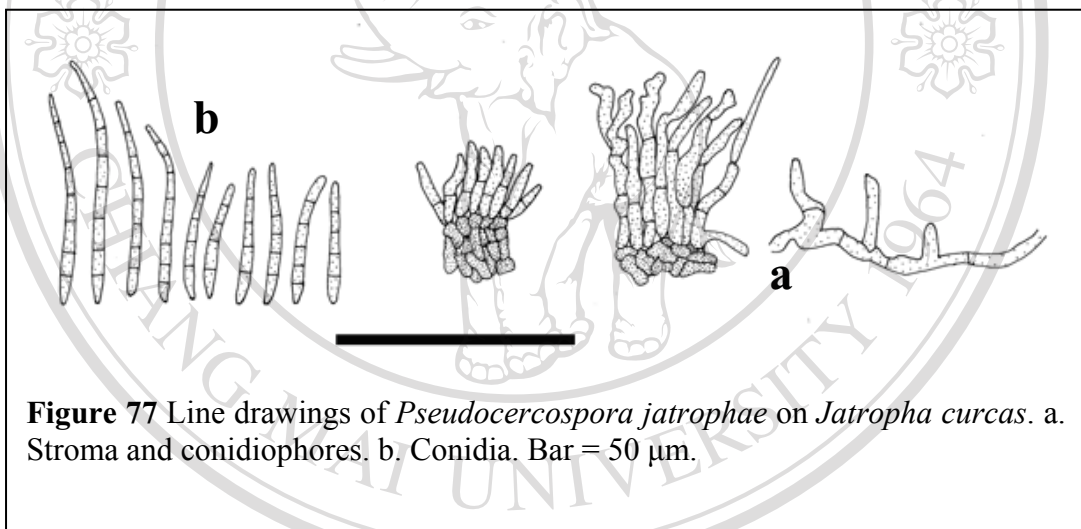


Figure 77 Line drawings of *Pseudocercospora jatrophae* on *Jatropha curcas*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm.

Specimen examined: THAILAND, Chiang Mai Province, T. Suthep, Amphur Sarapee, Tumbol Deu Ngok, Farming Area, on leaves of *Jatropha curcas* L. (*Euphorbiaceae*), 7 March 2008, Jamjan Meeboon (BBH 23736).

Host: *Cnidioscolus stimulosus*, *Jatropha curcas*, *J. urens*, *Jatropha* sp. (*Euphorbiaceae*) (Crous and Braun, 2003).

Distribution: American Samoa, China, India, Martinique, Tonga, and U.S.A (Crous and Braun, 2003).

Notes: This specimen is a new record of *P. jatrophae* from Thailand.

Pseudocercospora melanolepidis Goh and W. H. Hsieh, *Trans. Mycol. Soc. R. O. C.* **2**: 132 (1987c).

≡ *Cercospora melanolepidis* Sawada, *Taiwan Agric. Rep.* **38**: 698 (1942) (*nom. inval.*).

Specimen examined: THAILAND, Uttradit Province, Amphur Muang, Sak Yai National Park, on leaves of *Mallotus pierrei* (Gagnep.) Airy Shaw (*Euphorbiaceae*), 25 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27899).

Host: *Mallotus moluccanus*, *Melanolepis multiglandulosa* (*Euphorbiaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: China, Taiwan, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first report of *P. melanolepidis* on *M. pierrei* from Thailand was carried out by Meeboon *et al.* (2007c). *Pseudocercospora melanolepidis* was previous recorded on *M. moluccanus* and *M. multiglandulosa* by Crous and Braun (2003).

Pseudocercospora euphorbiae-pubescentis (Unamuno) U. Braun and Crous, *CBS Biodiversity Series* **1**: 180 (2003).

≡ *Cercospora euphorbiae-pubescentis* Unamuno, *Bol. Soc. Esp. Hist. Nat.* **35**: 435 (1935).

= *Cercospora euphorbiae* Pat, *Bull. Soc. Mycol. France* **9**: 160 (1893).

(Figure 78)

Leaf spots circular, 1-2 mm diameter, angular to irregular, scattered, later coalescing to large spots, 3-23 mm diameter, grayish-brown with blackish-brown border on the upper leaf surface, and pale greenish, indistinct border on the lower leaf surface. *Caespituli* hypophyllous. *Stromata* (13) 18 ± 4.2 (22) μm diameter, substomatal to intraepidermal, small, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (14) 19.5 ± 4.4 (26) $\times 2.5$ μm , 9 to numerous in a densely fasciculate, 1-2-septate, arising from the stromata, pale olivaceous-brown, smooth, simple, straight to slightly geniculate near the apex. *Conidiogenous cells* integrated, holoblastic, mostly monoblastic, terminal, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (28) 44.5 ± 8.9 (56) \times (2) 2 ± 0.2 (2.5) μm , solitary, filiform to long obclavate, 5-9-septate, straight or slightly curved, smooth, pale olivaceous, subtruncate to truncate at the basal end, with obtuse apex, hila unthickened, not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Hang Dong, Tumbol Num Phrae, Farming area, on leaves of *Euphorbia milii* Des Moul. (*Euphorbiaceae*), 7 August 2008, Jamjan Meeboon (BBH 23588).

Host: *Euphorbia pubescens*, *Euphorbia* sp. (*Euphorbiaceae*) (Crous and Braun, 2003).

Distribution: Brazil, Ecuador, Libya, and Spain (Crous and Braun, 2003).

Notes: Two species of *Pseudocercospora*, viz, *P.euphorbiae-pubescentis* (Unamuno) U. Braun and Crous, and *P. euphorbiicola* (G. F. Atk.) U. Braun and Crous, have been recorded associated with plant genus *Euphorbia* (Crous and Braun,

2003). Of them, only *P. euphorbiae-pubescentis* has very similar morphological characteristics by short conidiophores with almost straight to slight geniculation at the apex, and filiform-long obclavate conidia with subtruncate base. This specimen is the first record of *P. euphorbiae-pubescentis* from Thailand, and *Euphorbia milii* is reported here as a new host of this fungus.

Literature: Chupp (1954, p.218).

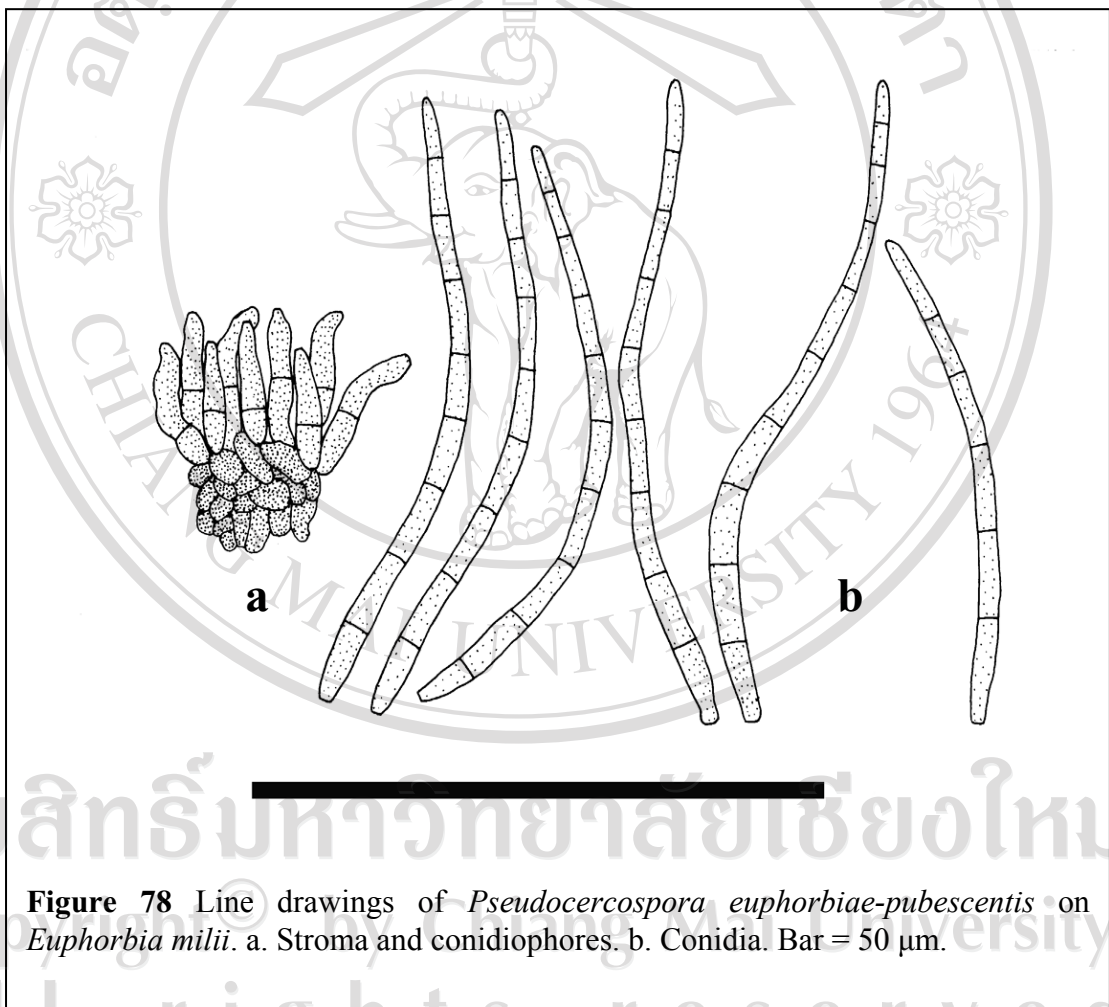


Figure 78 Line drawings of *Pseudocercospora euphorbiae-pubescentis* on *Euphorbia milii*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Family *Fabaceae*

Cercospora canescens Ellis and G. Martin, *Amer. Naturalist* **16**: 1003 (1882).

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

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

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

(Figures 79a-c; 80; 81; 82)

Leaf spots 3-20 mm diameter, amphigenous, irregular, brown to dark brown, limited by vein of the leaf. *Caespituli* amphigenous. *Stromata* 26.5-67 µm diameter, well-developed, intraepidermal, and composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* 60.5-118 × 3-5 µm, 12-20 in a loose to dense fascicles, 1-3-septate, arising from stromata, straight to decumbent, cylindrical, smooth, brown at the base, and paler toward the apex unbranched, geniculate to sinuous. *Conidiogenous cells* 12-35.5 × 3-5 µm, integrated, terminal, holoblastic, polyblastic, sometimes monoblastic, sympodially proliferating. *Conidiogenous loci* 1.5-3 µm diameter, conspicuous, thickened, and darkened. *Conidia* 56-113.5 × 3-4.5 µm, solitary, narrowly obclavate to subacicular, straight, hyaline, 3-9-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 2-3 µm diameter, thickened, and darkened.

Specimen examined: THAILAND, Chiang Rai Province, Amphur Wiang Pa Pao, Tumbol Wiang Ga Long, on leaves of *Vigna radiata* (L.) R. Wilczek, 25 October

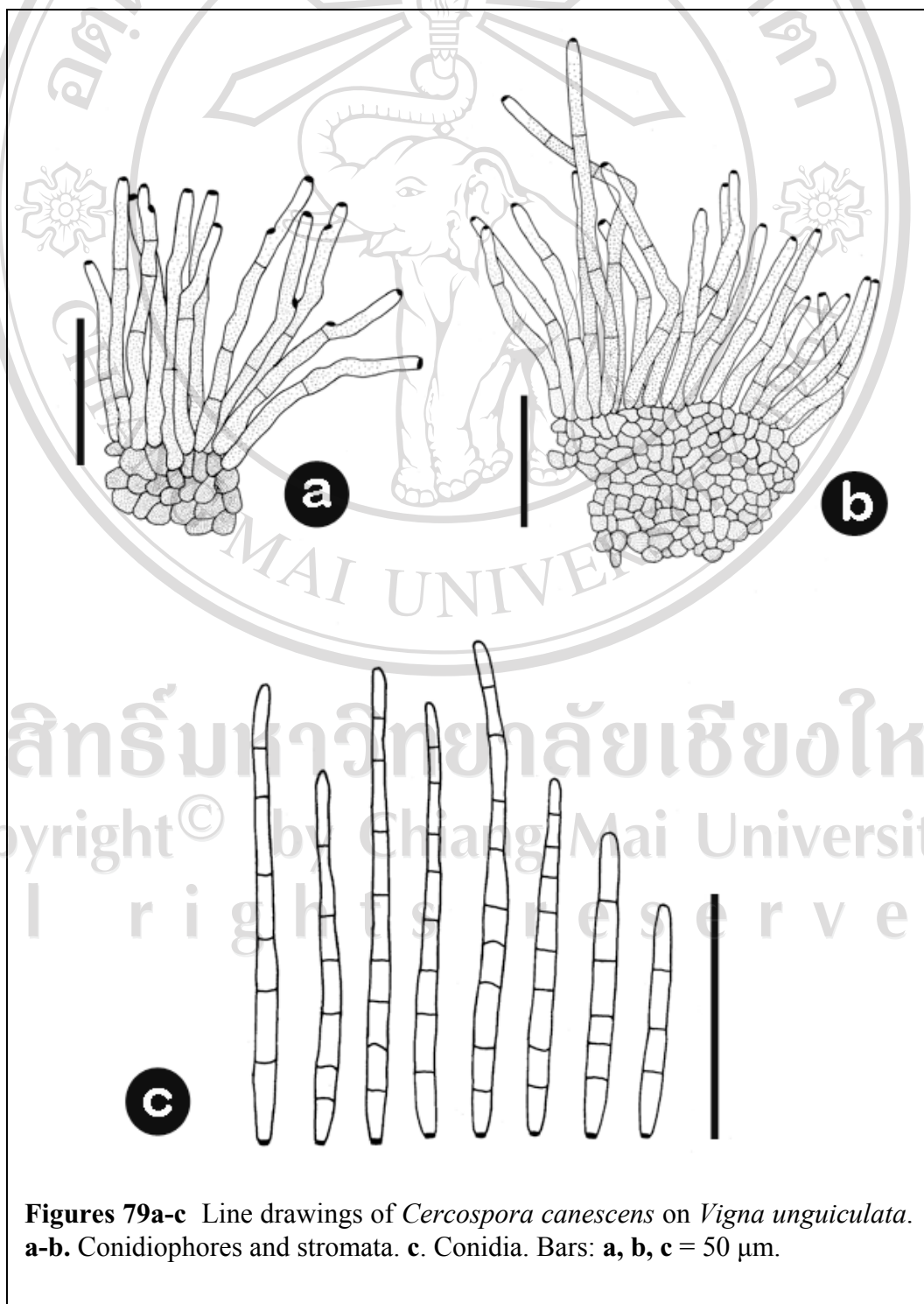
2005, Jamjan Meeboon (CMU 27888); the same locality, on leaves of *Vigna unguiculata* var. *sesquipedalis* (*Fabaceae*), 18 November 2005, Jamjan Meeboon (CMU 27894); the same locality, on leaves of *Lablab purpureus* (L.) Sweet (*Fabaceae*), 16 July 2007, Jamjan Meeboon (BBH 23624); Chiang Mai Province, San Sai, Mae Fag, 3 August 2008, Jamjan Meeboon (BBH 23749); on leaves of *Psophocarpus tetragonolobus* DC. (*Fabaceae*), 31 July 2007, Jamjan Meeboon (JM 104); on leaves of *Dolichos lablab* L. (*Fabaceae*), 25 July 2008, Jamjan Meeboon (BBH 23773); Chiang Mai Province, Amphur Mae Rim, Nong Hoi Royal Project, on leaves of *Vigna unguiculata* (L.) Walp. (*Fabaceae*), 27 September 2007, Jamjan Meeboon and Iman Hidayat (BBH 23678); Chiang Mai Province, Chiang Mai University, Multiple Cropping Centre, on leaves of *Vigna unguiculata* (L.) Walp. (*Fabaceae*), 1 August 2008, Jamjan Meeboon (BBH 23722).

Host: *Amaranthus* sp., *Celosia argentea* (*Amaranthaceae*), *Annona odorata*, *A. squarrosa* (*Annonaceae*), *Rauvolfia serpentina* (*Apocynaceae*), *Verschaffeltia splendida* (*Arecaceae*), *Aster novibelgii* (*Asteraceae*), *Bixa orellana* (*Bixaceae*), *Raphanus sativus* (*Brassicaceae*), *Rhynchosia aurea*, *R. minima*, *Ricinus communis* (*Euphorbiaceae*), *Arachis hagenbeckii*, *A. hypogaea*, *Alysicarpus* sp., *Bauhinia alba*, *B. variegata*, *Cajanus cajan*, *Calopogonium mucunoides*, *Canavalia ensiformis*, *C. gladiata*, *C. maritima*, *Cassia alata*, *C. lathyroides*, *Cassia* sp., *Centrosema acutifolium*, *C. arenarium*, *C. brasilianum*, *C. macrocarpum*, *C. plumieri*, *C. pubescens*, *C. virginianum*, *Clitoria ternatea*, *Codariocalyx gyroides*, *Crotalaria juncea*, *C. mucronata*, *C. mysorensis*, *C. retU.S.A*, *C. spectabilis*, *C. U.S.Aramoensis*, *C. verrucosa*, *C. zanzibarica*, *Crotalaria* spp., *Cyamopsis psoralioides*, *Desmodium canum*, *D. gyrans*, *D. gyroides*, *D. incanum*, *D. intortum*, *D. lycioides* subspecies

guerkei, *D. repandum*, *D. turtuosum*, *D. uncinatum*, *Dolichos biflorus*, *D. daltonii*,
D. lablab, *D. lignosus*, *D. trilobus*, *D. turtuosum*, *D. uniflorus*, *Erythrina addisoniae*,
E. suberosa, *E. subumbrans*, *E. variegata*, *Flemingia macrophylla*, *Gliricidia sepium*,
Glycine max, *G. soja*, *G. ussuriensis*, *G. wightii*, *Heylandia latebrosa*, *Indigofera*
astragalina, *Kotschya* sp., *Lablab niger*, *L. purpureus*, *Lespedeza* sp., *Lathyrus*
odoratus, *Leucaena leucocephala*, *Lotononis bainesii*, *Lupinus* sp., *Macroptilium*
atropurpureum, *M. lathyroides*, *M. daltonii*, *M. uniflorum*, *Medicago sativa*, *Mimosa*
invisa, *Mucuna pruriens*, *Neonotonia wightii*, *Phaseolus aconitifolius*, *P. angularis*,
P. atropurpureus, *P. aureus*, *P. calcaratus*, *P. lathyroides*, *P. limensis*, *P. lunatus*,
P. minimus, *P. panduratus*, *P. radiatus*, *P. trilobus*, *P. vulgaris*, *Pistia stratiotes*,
Pisum sativum, *Psophocarpus tetragonolobus*, *Psoralea bituminosa*, *P. drupacea*,
Pterocarpus marsupia, *Pueraria hirsuta*, *P. lobata*, *P. phaseoloides*, *P. trilobam*,
Quercus sp., *Senna alata*, *S. tora*, *Shuteria involucrata*, *Stylosanthes guianensis*, *S.*
humilis, *Vicia unguiculata*, *Vigna angularis*, *V. catjang*, *V. luteola*, *V. marina*,
V. mungo, *V. parkeri*, *V. radiata*, *V. repens*, *V. reticulata*, *V. sesquipedalis*,
V. sinensis, *V. umbellata*, *V. vexillata*, *Vitis vinivera*, *Voandzeia subterranea*
(Fabaceae), *Coleus* sp., *Ocimum basilicum*, *Plectranthus* sp. (Lamiaceae), *Tetramnus*
labialis, *T. uncinatus* (Malphiaceae), *Artocarpus integrifolia* (Moraceae),
Boerhavia erecta, *Commicarpus* sp. (Nyctaginaceae), *Lycopersicon esculentum*,
Solanum laciniatum (Solanaceae) (Crous and Braun, 2003).

Distribution: Worldwide, wherever the crop is cultivated, including Australia,
Bangladesh, Barbados, Brazil, Bolivia, Brunei, Cambodia, China, Colombia, Costa
Rica, Cuba, Dominican Republic, Ecuador, Fiji, Georgia, Ghana, Guyana, Haiti,
Hong Kong, India, Indonesia, Iran, Japan, Kenya, Korea, Malawi, Malaysia, Malawi,

Mauritus, Myanmar, Nepal, New Caledonia, New Zealand, Nigeria, Pakistan, Panama, Papua New Guinea, Peru, Philippines, Puerto Rico, Russia, Senegal, Sierra Leone, Solomon Islands, Somalia, South Africa, Saint Vincent and the Grenadines, Sudan, Tadjikistan, Taiwan, Tanzania, Trinidad and Tobago, Togo, Uganda, U.S.A, Uzbekistan, Vanuatu, Venezuela, Virgin Islands, Zambia, and Zimbabwe (Crous and Braun, 2003).



Figures 79a-c Line drawings of *Cercospora canescens* on *Vigna unguiculata*. **a-b.** Conidiophores and stromata. **c.** Conidia. Bars: **a, b, c** = 50 μ m.

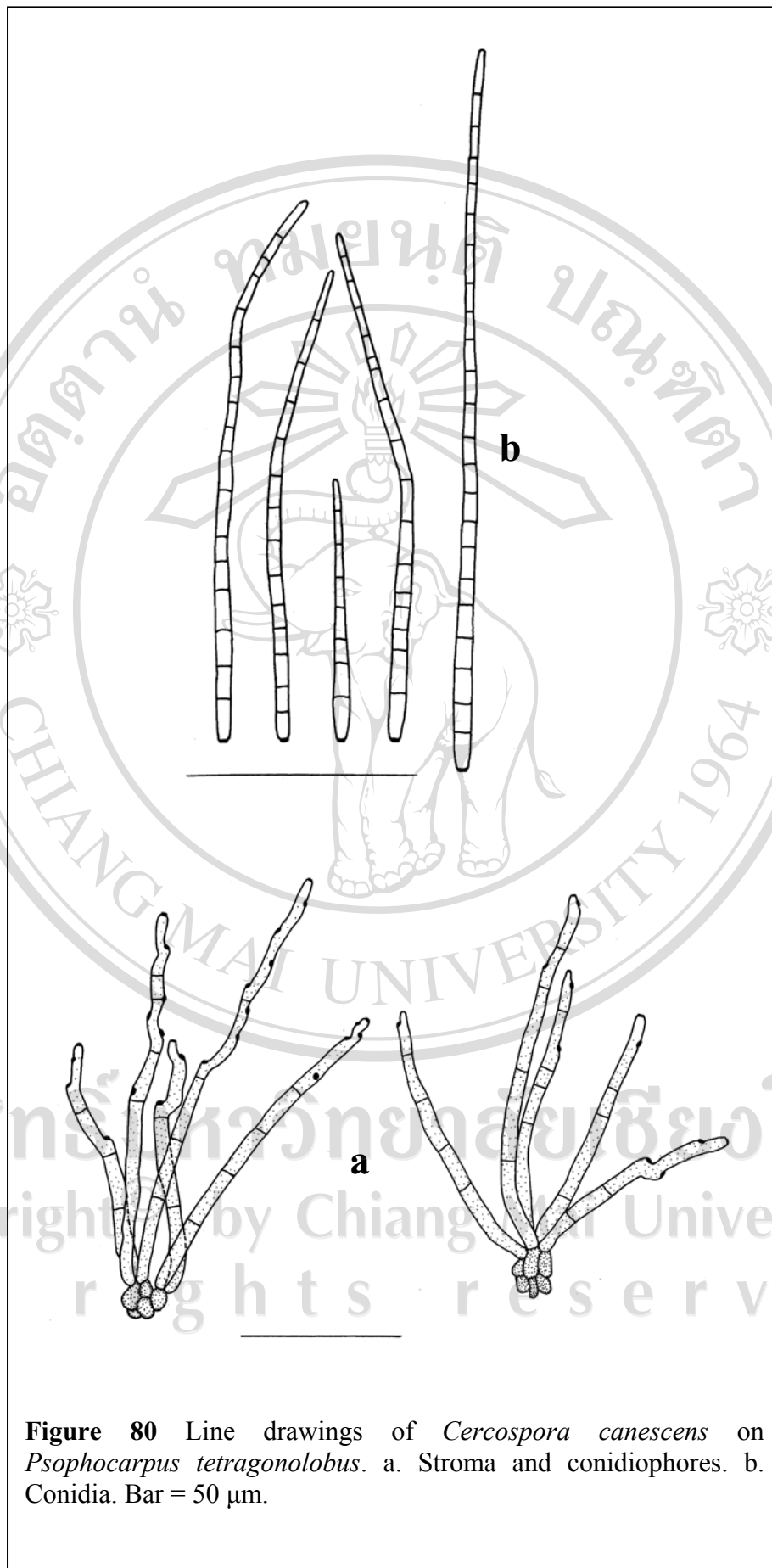


Figure 80 Line drawings of *Cercospora canescens* on *Psophocarpus tetragonolobus*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

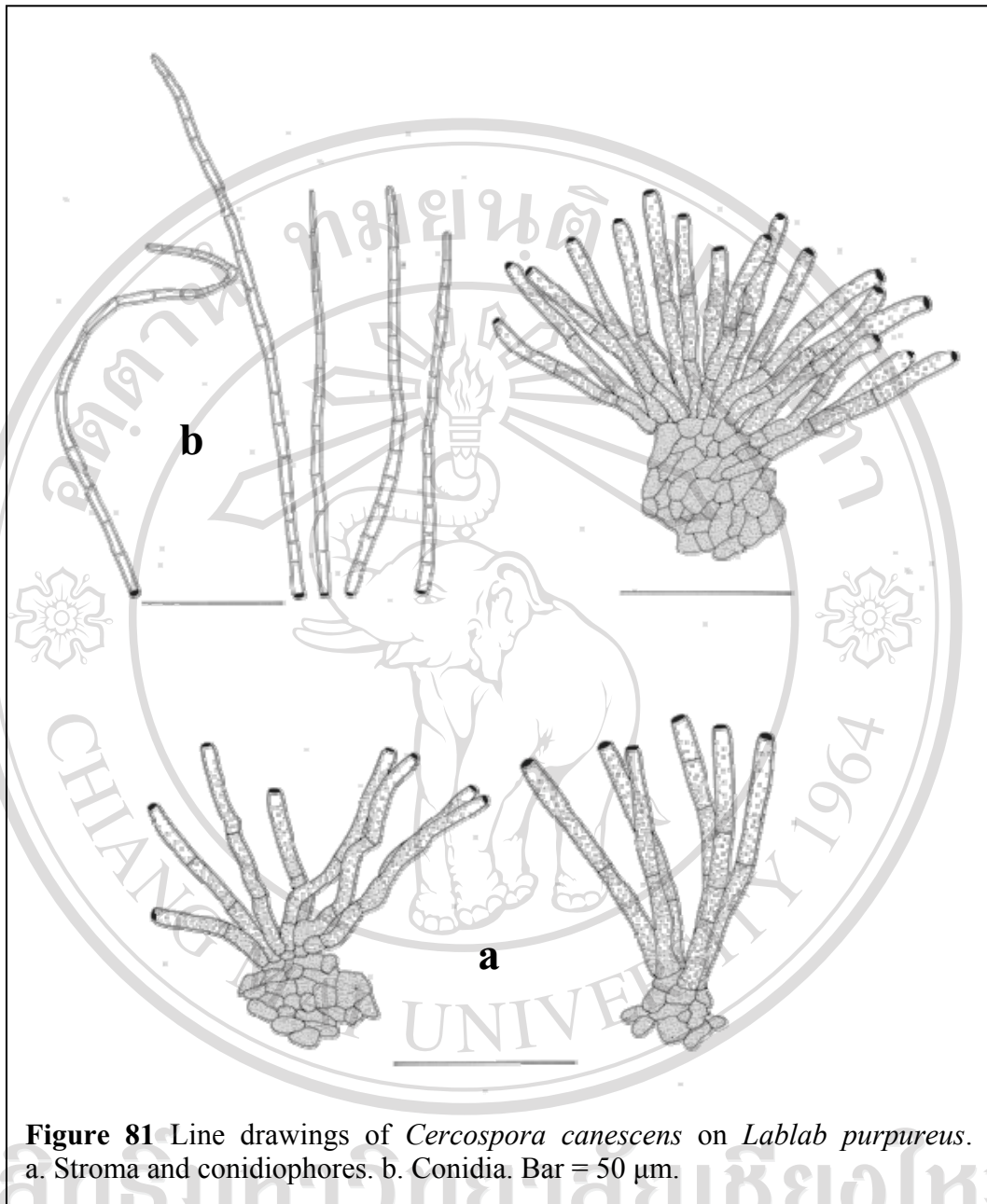
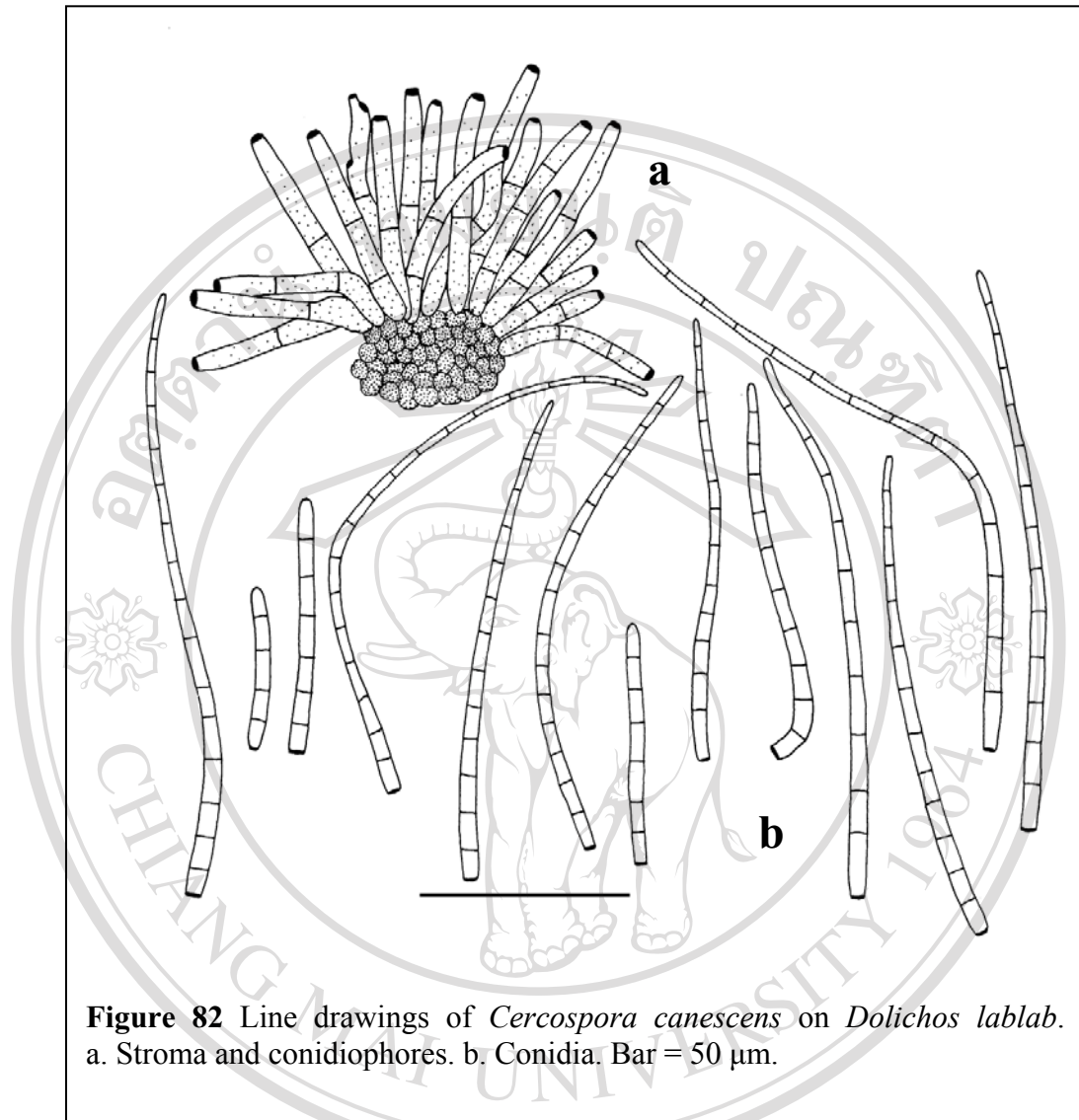


Figure 81 Line drawings of *Cercospora canescens* on *Lablab purpureus*.
 a. Stroma and conidiophores. b. Conidia. Bar = 50 μm.

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
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Notes: This species was first reported from Thailand by Sontirat *et al.* (1980) who found *C. canescens* on *V. radiata*. Crous and Braun (2003) assigned this species to *C. apii* s. lat.

Literature: Chupp (1954, p. 288).

Cercospora crotalariae Sacc., *Syll. Fung.* **22**: 129 (1913).

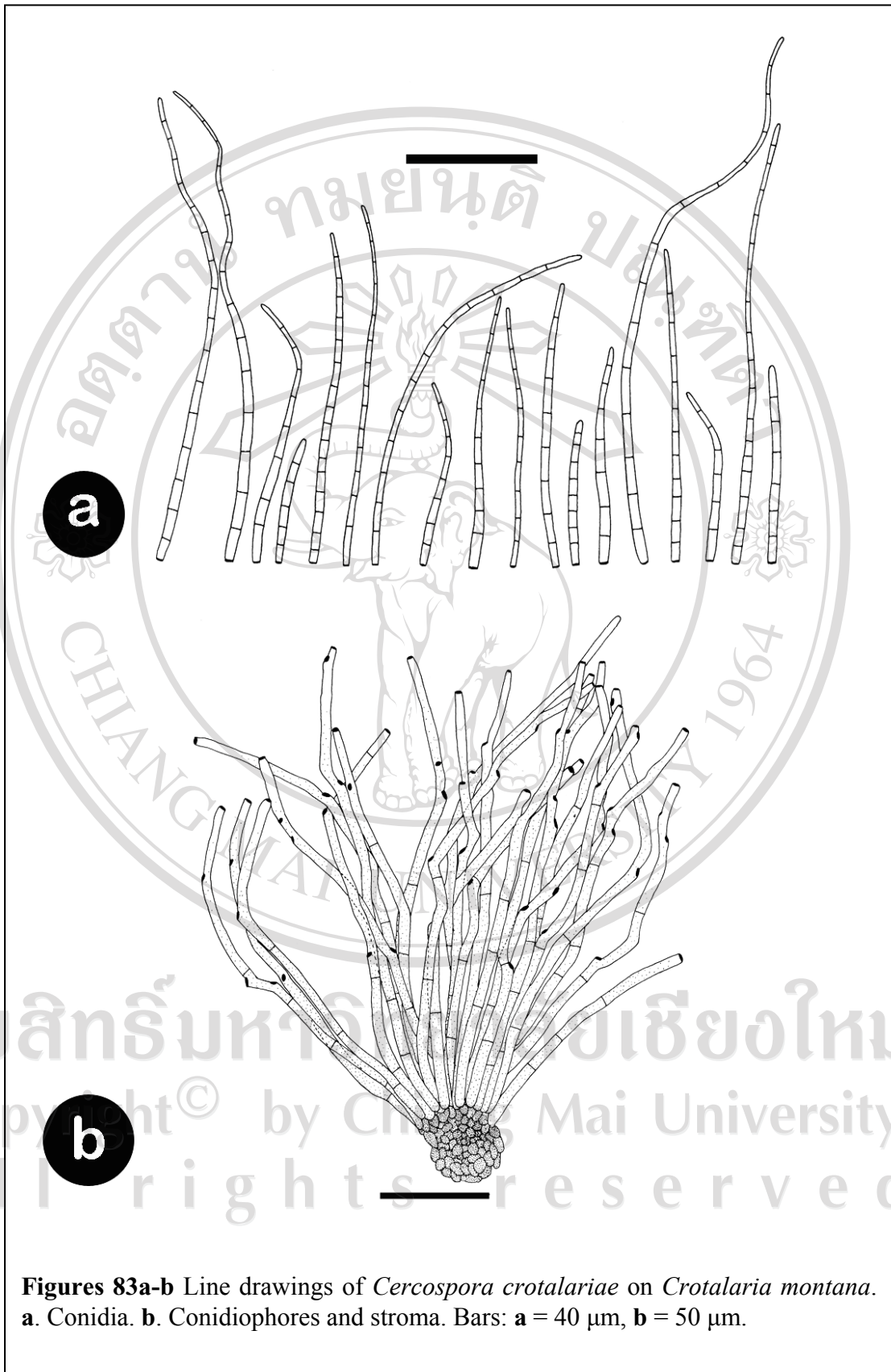
= *Cercospora crotalariae-juncea* Sawada, *J. Taihoku Soc. Agric.* **7**: 27 (1942)
(*nom. inval.*).

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

(Figures 83a-b)

Leaf spots 1-9 mm diameter, amphigenous, scattered to confluent, subcircular to angular, pale brown at the young symptoms, later becoming greyish brown, greyish to pale at the centre, with reddish brown or purplish brown margins. *Caespituli* amphigenous. *Stromata* (25) 30.5 ± 8.4 (30.75) μm diameter, intraepidermal, well-developed, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* (35-) 127.5 ± 64.3 (-231) \times (3.5-) 4.5 ± 0.5 (-5.5) μm , numerous in a densely fasciculate, 2-6-septate, arising from stromata, simple, straight, erect to decumbent, smooth, pale yellow to pale brown, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal, holoblastic, mostly polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3.5 μm diameter, conspicuous, thickened, darkened. *Conidia* (39) 94 ± 53.4 (206) \times (2) 2.5 ± 0.5 (4) μm , solitary, narrowly obclavate to subacicular, straight, hyaline, 5-17-septate, smooth, base obconically truncate, with subacute apex, hila 2.5-3.5 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Sansai, Mae Jo University, Farming area, on leaves of *Crotalaria montana* Heyne ex Roth (*Fabaceae*). 9 August 2008, Jamjan Meeboon (BBH 23708).



Figures 83a-b Line drawings of *Cercospora crotalariae* on *Crotalaria montana*.
a. Conidia. **b.** Conidiophores and stroma. Bars: **a** = 40 μ m, **b** = 50 μ m.

Host: *Crotalaria incana*, *C. juncea*, *C. mucronata*, *C. retU.S.A*, *C. sericeum*, *C. spectabilis*, *C. striata*, *C. stricta*, *C. U.S.Aramoensis*, *Crotalaria* sp. (*Fabaceae*) (Crous and Braun, 2003).

Distribution: Bangladesh, China, Cuba, Ethiopia, India, Indonesia, Pakistan, Papua New Guinea, Puerto Rico, Sri Lanka, Taiwan, Venezuela, and Thailand (Crous and Braun, 2003).

Notes: This specimen is a new record of *C. crotalariae* from Thailand, and *Crotalaria montana* is reported here as a new host of this fungus. Crous and Braun (2003) assigned this species as *C. apii* s. lat.

Cercospora erythrinicola Tharp, *Mycologia* **9**: 109 (1917).

≡ *Cercospora erythrinicola* (Tharp.) Sacc., *Syll. Fung.* **25**: 907 (1917).

= *Cercospora erythrinigena* Kamal, ined., *in herb.* (IMI 375847).

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

Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Teang, Tumbol Pa Pae, Bahn Phadeng, Mushroom Research Centre, on leaves of *Erythrina* sp. (*Fabaceae*), 12 November 2006, Ikumitsu Araki (CMU 27914).

Host: *Erythrina berteriana*, *E. herbacea*, *E. indica*, *E. orientalis*, *E. stricta*, *E. suberosa*, *E. variegata*, *E. velutina* (*Fabaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Brazil, Cuba, India, Pakistan, Taiwan, Thailand, and U.S.A (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: *Cercospora erythrinicola* was firstly reported from Thailand by Meeboon *et al.* (2007c).

Cercospora kikuchii T. Matsumoto and Tomoy., *Ann. Phytopathol. Soc. Japan* **1**: 1 (1925).

≡ *Cercospora kikuchii* T. Matsumoto and Tomoy., *l.c.*: 10.

≡ *Cercospora kikuchii* (T. Matsumoto and Tomoy.) M. W. Gardner, *Proc. Indian Acad. Sci.* **36**: 12 (1927) (*comb. superfl.*).

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

(Figure 84)

Leaf spots 1-9 mm diameter, amphigenous, scattered to confluent, subcircular to angular, initially appearing pale brown, later becoming tan to dingy grey, greyish white at the centre, with reddish brown or purplish brown margins. *Caespituli* hypophyllous. *Stromata* (26) 32 ± 6.1 (39) μm diameter, intraepidermal, well-developed, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* (76) 108 ± 14.3 (129) \times (3.5) 4 ± 0.4 (5) μm , 9 to numerous in a densely and divergent fasciculate, 2-4-septate, arising from stromata, simple, straight, erect to decumbent, smooth, pale yellow to pale brown, rarely branched, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, darkened. *Conidia* (80) 115.11 ± 31.6 (132) \times (3) 3.5 ± 0.2 (3.5) μm , solitary, narrowly obclavate to subacicular, straight, hyaline, 6-11-septate, smooth, base obconically truncate, with subacute apex, hila 2-2.5 μm diameter, thickened and darkened.

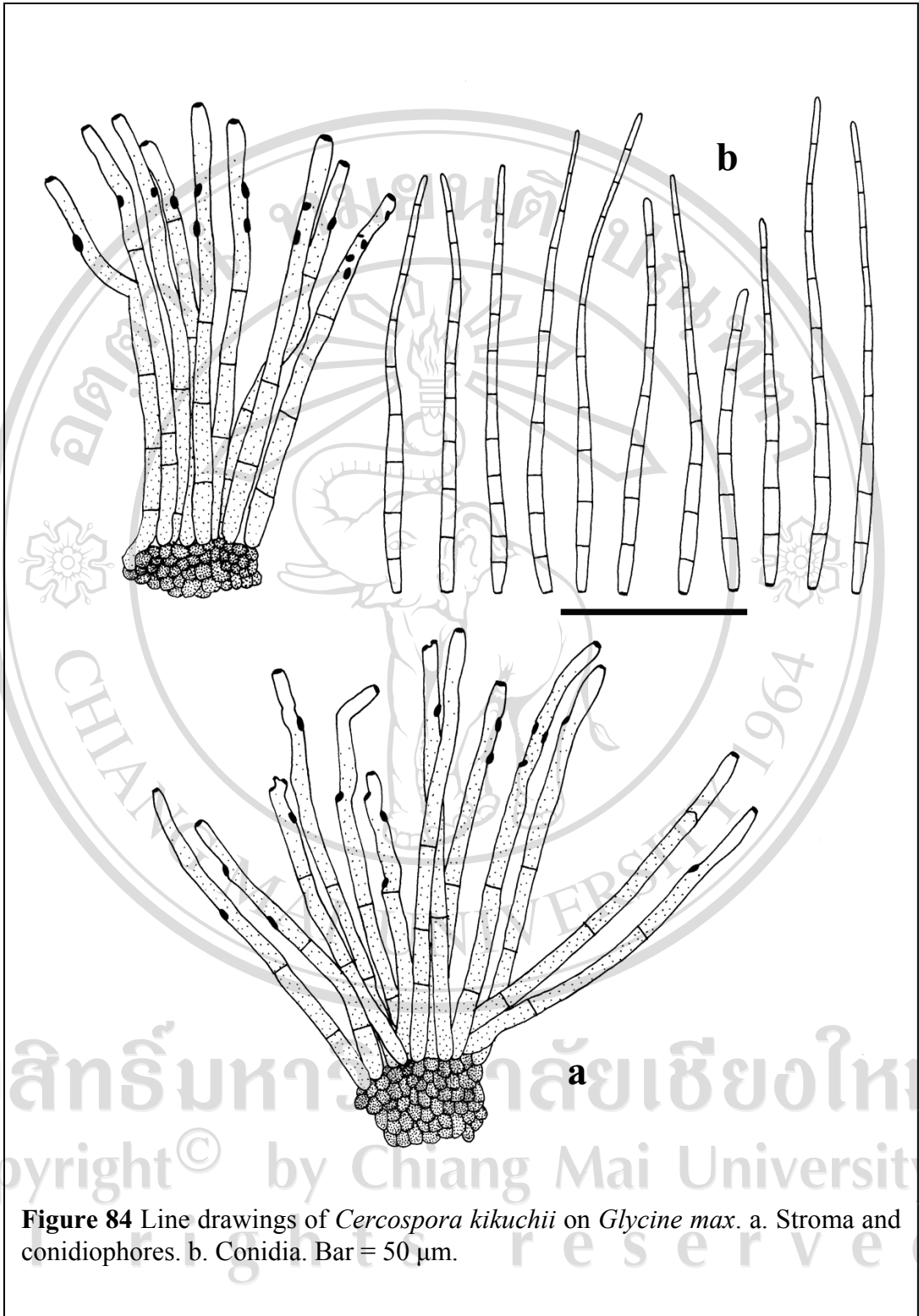


Figure 84 Line drawings of *Cercospora kikuchii* on *Glycine max.* a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Glycine max* Merr. (*Fabaceae*), 21 November 2004, Jamjan Meeboon (CMU 27878); Chiang Mai Province, Mae Jo University, Farming area, on the same host, 9 August 2008, Jamjan Meeboon (BBH 23707).

Host: *Cassia obtusifolia*, *Cyamopsis tetragonoloba*, *Dolichos biflorus*, *Glycine hispida*, *G. max*, *G. soja*, *G. tabacina*, *G. ussuriensis*, *Phaseolus aureus*, *P. lunatus*, *P. mungo*, *Senna* sp., *Vigna prainiana* (*Fabaceae*) (Crous and Braun, 2003).

Distribution: Worldwide where the host is cultivated, including Argentina, Bangladesh, Bolivia, Brazil, Brunei, Burkina Faso, Cameroon, Canada, China, Colombia, Cuba, Egypt, Ethiopia, Fiji, France, Gabon, Ghana, Guinea, India, Indonesia, Iran, Jamaica, Japan, Korea, Liberia, Malaysia, Mexico, Mozambique, Nepal, New Caledonia, Nigeria, Pakistan, Panama, Papua New Guinea, Peru, Puerto Rico, Russia, Sierra Leone, Somalia, South Africa, Sri Lanka, Taiwan, Tanzania, Thailand, Togo, Trinidad and Tobago, Uganda, Zambia, and Zimbabwe (Crous and Braun, 2003).

Notes: The first record of this species from Thailand was listed in Sontirat *et al.* (1980). Crous and Braun (2003) assigned this species to *C. apii* *s.lat.*

Literature: Chupp (1954, p. 313).

Cercospora leucaenae A. N. ShU.Kla and Sarmah, *Indian Forester* **110**: 1066 (1984).

Specimen examined: THAILAND, Chiang Rai Province, A. Wiang Pa Pao, on leaves of *Leucaena leucocephala* (Lam.) de Wit (*Fabaceae*), 11 November 2005, Jamjan Meeboon (CMU 28217).

Host: *Leucaena leucocephala* (*Fabaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007d).

Distribution: India and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007d).

Notes: The first report of *C. leucanae* was made by Meeboon *et al.* (2007d).

Passalora aenea (Cif.) U. Braun and Crous, *CBS Biodiversity Series* **1**: 46-47 (2003).

≡ *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.*), homonym of *Passalora cassiae* Syd. (1939).

≡ *Passalora cassiae* (Henn.) U. Braun, *Mikol. Fitopatol.* **30**: 6 (1996) (*nom. illeg.*), homonym of *Passalora cassiae* Syd. (1939).

= *Cercospora cassiicola* Roum. (*cassiaeicola*), *Fungi sel. exs.*, **No. 4486** (1888) (*nom. nud.*).

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Cassia agnes* (de Wit) Brenan (*Fabaceae*), 10 December 2006, Jamjan Meeboon and Ikumitsu Araki (CMU 27910).

Host: *Cassia fistula*, *C. floribunda*, *C. goratensis*, *C. grandis*, *C. javanica*, *C. leptocarpa*, *C. marylandica*, *Cassia* sp., *Chamaecrista nictitans*, *Senna alata*, *S. bicapsularis*, *S. hirsuta*, *S. macranthera*, *S. occidentalis*, *S. petersiana*, *S. spetemtrionalis*, *S. siamea* (*Fabaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Brazil, Barbados, Colombia, Ethiopia, India, Jamaica, Tanzania, Thailand, Uganda, U.S.A, and Zambia (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: *P. aenea* on *C. agnes* was firstly reported from Thailand by Meeboon *et al.* (2007c). This species was previous reported on several hosts of the genus *Cassia*, viz., *C. fistula*, *C. goratensis*, *C. grandis*, *C. javanica*, *C. leptocarpa*, and *C. marylandica* by Crous and Braun (2003).

Passalora arachidicola (Hori) U. Braun, *New Zealand J. Bot.* **37**: 303 (1999).

≡ *Cercospora arachidicola* Hori, *Nishigahara Agric. Expt. Stat. Tokyo*: 26 (1917).

= *Cercospora arachidis* var. *macrospora* Maffei, *Riv. Pat. Veget.* **12**: 7 (1992).

(Figure 85)

Leaf spots 1-7 mm diameter, amphigenous, subcircular to irregular, blackish to dark brown, surrounded by yellowish of leaf decolorization. *Caespituli* amphigenous. *Stromata* 81-104 μm diameter, substomatal, well-developed, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* 34-88 \times 4-5 μm , in large densely fascicles, 1-4-septate, arising from stromata, straight to often incurved, smooth, pale brown, with paler at the apex, unbranched, subcylindrical, geniculate-sinuuous. *Conidiogenous cells* integrated, holoblastic, terminal, polyblastic, sympodially proliferating. *Conidiogenous loci* 1.5-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* 29-85 \times 3.5-6.5 μm , solitary, obclavate, straight, base obconically truncate, slightly curved toward the obtuse apex, brown, 3-5-septate, smooth, hila 1-2.5 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Arachis hypogaea* L. (*Fabaceae*), 21 November 2004, Jamjan Meeboon (CMU 27890); Chiang Mai Province, Chiang Mai University, Faculty of Agriculture, on leaves of *Arachis hypogaea* L. (*Fabaceae*), 15 March 2007, Jamjan Meeboon (BBH 23691).

Host: *Arachis hypogaea* (*Fabaceae*) (Crous and Braun, 2003).

Distribution: Widely distributed with host, including Afghanistan, Angola, Argentina, Australia, Bangladesh, Benin, Bolivia, Brazil, Brunei, Burkina Faso, China, Cuba, Cameroon, Colombia, Comoros, Congo, Cuba, Dominican Republic, El Salvador, Fiji, Gabon, Gambia, Ghana, Guatemala, Guinea, Guyana, Hong Kong, India, Indonesia, Ivory Coast, Jamaica, Japan, Kenya, Korea, Laos, Lebanon, Libya, Madagascar, Malawi, Malaysia, Mali, Mauritius, Mexico, Mozambique, Myanmar,

Nepal, New Caledonia, Nicaragua, Niger, Nigeria, Pakistan, Panama, Papua New Guinea, Philippines, Puerto Rico, Sabah, Senegal, Sierra Leone, Solomon Islands, Somalia, South Africa, Sudan, Suriname, Taiwan, Tanzania, Thailand, Togo, Uganda, U.S.A, Uruguay, Venezuela, Vietnam, Zambia, and Zimbabwe (Crous and Braun, 2003).

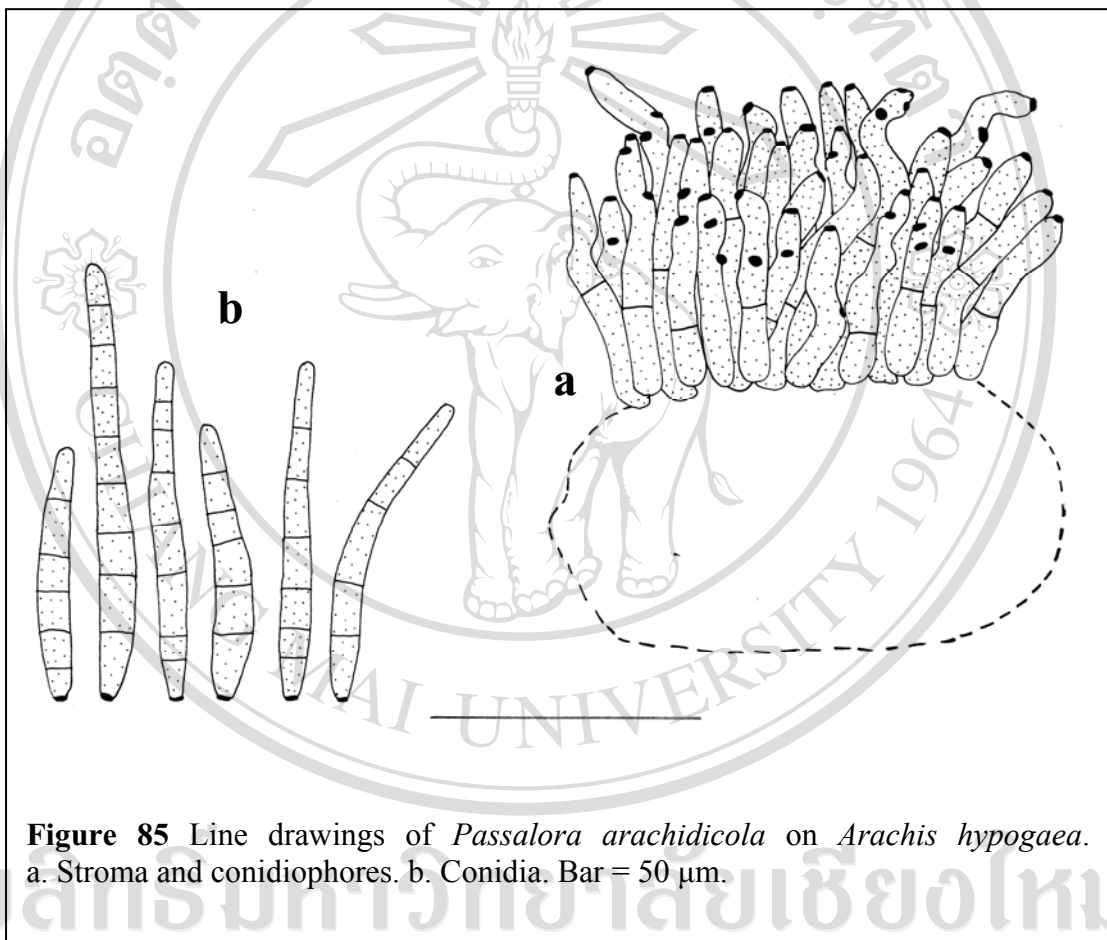


Figure 85 Line drawings of *Passalora arachidicola* on *Arachis hypogaea*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Notes: This species was firstly reported from Thailand by Sontirat (1980) as *Cercospora arachidicola* Hori.

Passalora buteae (Kamal, B. K. Gupta, and C. Gupta) U. Braun and Crous, *CBS Biodiversity Series 1*: 444 (2003).

≡ *Phaeoramularia buteae* Kamal, B. K. Gupta and C. Gupta, *Indian Phytopath.*
43: 144 (1990).

(Figure 86)

Leaf spots 4-35 mm in diameter, amphigenous, irregular, brown to grayish brown, with red margin. *Caespituli* hypophyllous. *Stromata* 22-47 µm diameter, well-developed, intraepidermal, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* 52-86 × 2-5 µm, loose to moderately dense fascicles, 1-3-septate, arising from stromata, erect, straight, smooth, pale brown, branched, subcylindrical to moderately geniculate-sinuous. *Conidiogenous cells* integrated, terminal or intercalary, holoblastic, often polyblastic, sympodially proliferating. *Conidiogenous loci* 1-1.5 µm diameter, conspicuous, thickened, and darkened. *Conidia* 7.5-44 × 2-3 µm, catenate, clavate to subcylindrical, straight, subhyaline, 0-4-septate, smooth, sometimes verruculose, obconically truncate at the base, with obtuse apex, hila 0.5-1 µm diameter, conspicuous, slightly thickened, and darkened.

Specimen examined: THAILAND, Chiang Mai Province, A. Mae Taeng, on leaves of *Butea monosperma* Kuntze (*Fabaceae*), 6 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23758).

Host: *Butea frondosa* (*Fabaceae*) (Crous and Braun, 2003).

Distribution: India (Crous and Braun, 2003).

Notes: This is the first record of *P. buteae* from Thailand, and *B. monosperma* is reported here as a new host of this fungus.

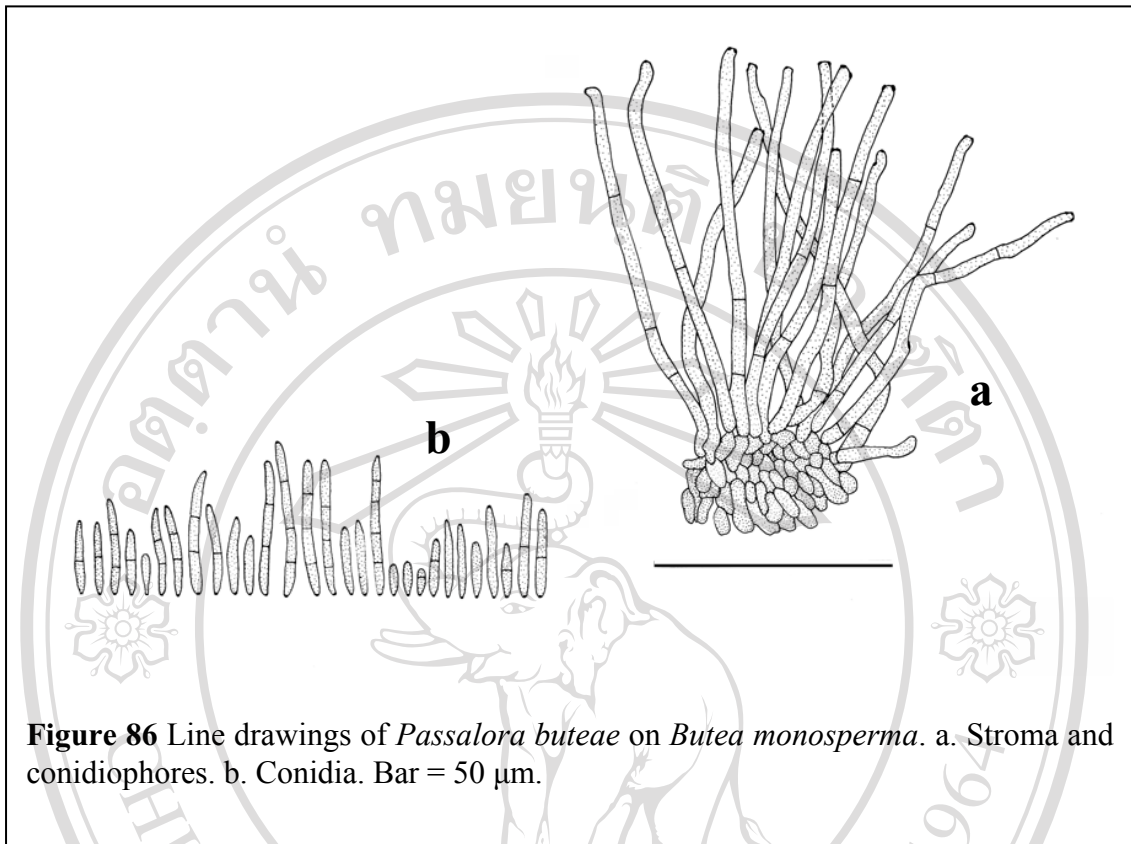


Figure 86 Line drawings of *Passalora buteae* on *Butea monosperma*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Passalora centrosematis N. Pons, U. Braun and Crous, *CBS Biodiversity Series* 1: 114 (2003).

≡ *Cercospora centrosematis* Chupp and A.S. Mull. (*centrosemae*), *Bol. Soc. Venez. Ci. Nat.* 8: 40. (1942) (*nom. inval.*).

Specimen examined: THAILAND, Chiang Mai Province, Queen Sirikit Botanic Garden, on leaves of *Centrosema pubescens* Benth. (*Fabaceae*), 21 November 2004, Jamjan Meeboon (CMU MH 065).

Host: *Centrosema pubescens*, *C. virginianum*, *Centrosema* sp. (*Fabaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Philippines, Puerto Rico, Thailand, and Venezuela (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first record of this species from Thailand was reported by Meeboon *et al.* (2007c).

Passalora mucunicola Crous, U. Braun and Alfenas, *Mycotaxon* **72**: 181 (1999).

Specimen examined: THAILAND, Chiang Mai Province, Queen Sirikit Botanical Garden, on leaves of *Mucuna bracteata* DC. (*Fabaceae*), 20 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27954).

Host: *Mucuna pruriens* var. *utilis* (*Fabaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Brazil and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first report of this species from Thailand was made by Meeboon *et al.* (2007c).

Pseudocercospora bauhiniae (Syd. and P. Syd.) Deighton, *Mycol. Pap.* **140**: 140 (1976).

≡ *Cercospora bauhiniae* Syd. and P. Syd., *Ann. Mycol.* **12**: 202 (1914).

= *Cercospora latimaculans* Wakef., *Bull. Misc. Inform.* **1918**: 210 (1918).

Specimen examined: THAILAND, Chiang Mai Province, Queen Sirikit Botanical Garden, on leaves of *Bauhinia racemosa* Lam. (*Fabaceae*), 20 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27956).

Host: *Bauhinia galpinii*, *B. macrantha*, *B. malabarica*, *B. purpurea*, *B. reticulata*, *B. variegata*, *Bauhinia* sp., *Pithecellobium ligustrinum* (*Fabaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Brazil, Colombia, Ethiopia, Ghana, India, Philippines, Singapore, South Africa, Thailand, U.S.A, and Venezuela (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: Meeboon *et al.* (2007c) were the first of reporting this species from Thailand.

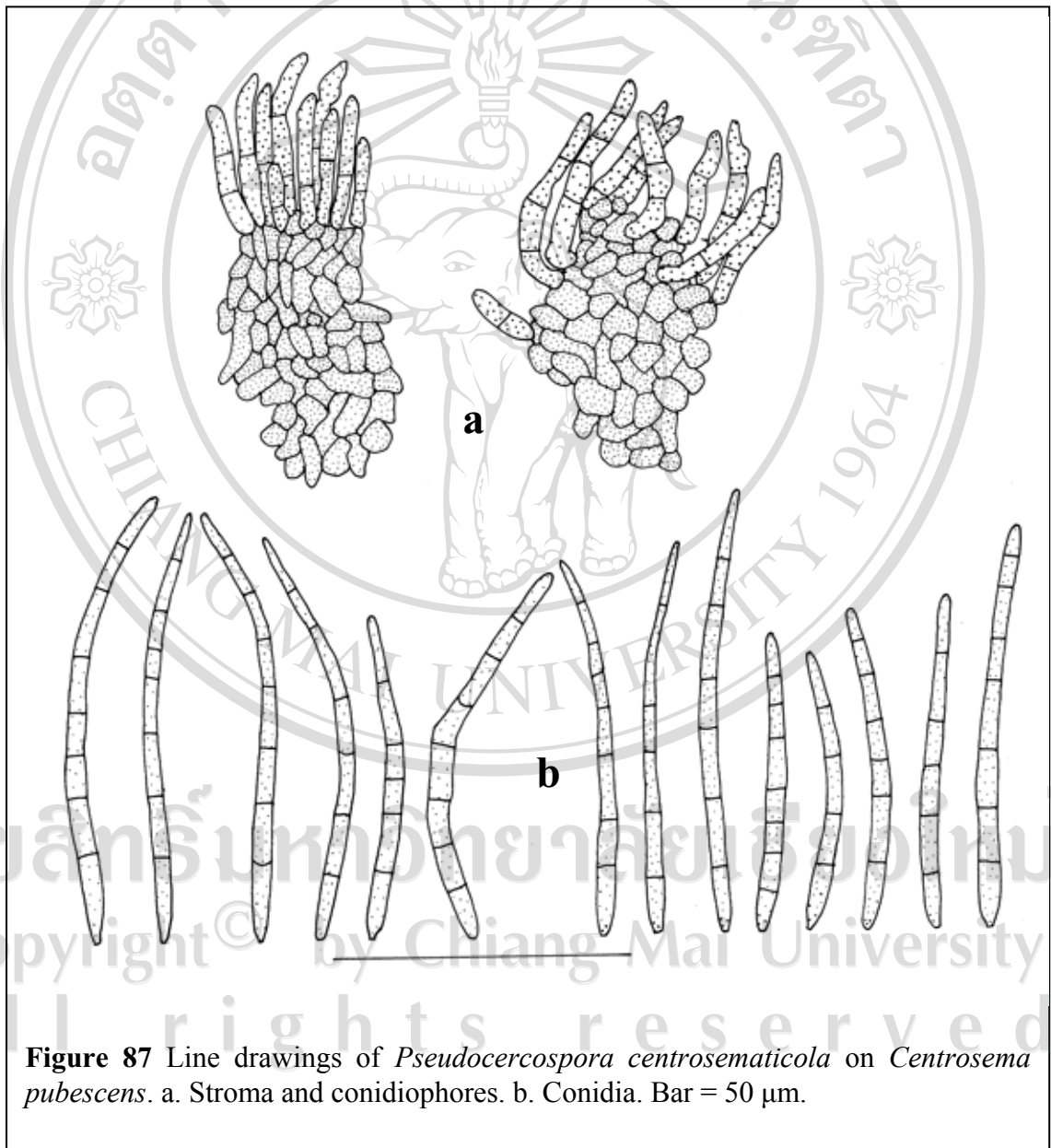
Pseudocercospora centrosematicola (J. M. Yen and G. Lim) J. M. Yen, *Gard. Bull., Singapore* **33**: 171 (1980).

≡ *Cercospora centrosematicola* J. M. Yen and G. Lim, *Cah. Pacifique* **17**: 102 (1973).

(Figure 87)

Leaf spots 10-20 mm diameter, amphigenous, solitary, circular to subcircular, brown, with dark brown margin. *Caespituli* amphigenous. *Stromata* 10-38 μ m diameter, well-developed, intraepidermal, and composed of globose to subglobose, brown to dark brown cells. *Conidiophores* 26-45 \times 2-5 μ m, 6-10 in a dense fascicles, 1-3-septate, arising from stromata, straight to decumbent, smooth, brown, and paler towards the apex, unbranched, plainly geniculate near the apex. *Conidiogenous cells*

integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 48-95 × 2.5-4 μm, solitary, obclavate, straight to mildly curved, hyaline to subhyaline, 4-7-septate, smooth, obconically truncate at the base, with obtuse to subobtuse apex, hila inconspicuous, unthickened, and not darkened.



Specimen examined: THAILAND, Chiang Mai Province, Amphur Sarapee, on leaves of *Centrosema pubescens* Benth (*Fabaceae*), 12 September 2007, Jamjan Meeboon and Iman Hidayat (BBH 23692); *ibid*, 9 August 2008, Jamjan Meeboon and Iman Hidayat (BBH 32487).

Host: *Centrosema pubescens* Benth (*Fabaceae*) (Crous and Braun, 2003).

Distribution: Ivory Coast, Malaysia, and Singapore (Crous and Braun, 2003).

Notes: This specimen is the first record of *Pseudocercospora centrosematicola* from Thailand.

Pseudocercospora clitoriae (G. F. Atk.) Deighton, *Mycol. Pap.* **140**: 51 (1976).

≡ *Cercospora clitoriae* G. F. Atk., *J. Elisha Mitchell Sci. Soc.* **8**: 62 (1892).

(Figure 88)

Leaf spots 1-4 mm diameter, distinct, solitary or clustered, amphigenous, subcircular to irregular, sometimes rectangular, pale to light brown, with dark brown or reddish-brown margin, limited by the leaf vein. *Caespituli* amphigenous, but abundance at the lower surface of the leaf. *Stromata* 21-38.5 µm diameter, substomatal, well-developed, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* 14.5-40.5 × 2.5-3.5 µm, densely fasciculate, not divergent, 1-3-septate, arising from stromata, straight, simple, smooth, brown, and paler towards the apex, unbranched, slightly geniculate near the apex. *Conidiogenous cells* integrated, terminal, holoblastic, polyblastic, sometimes monoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 16.5-37 × 2.7-4 µm, solitary, obclavate, smooth, straight to mildly

curved near the apex, hyaline to pale olivaceous, 0-5-septate, with tapering gradually to the apical end to form conically apex, and abruptly tapering near the basal end to form obconically truncate base, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Muang, Tumbol Mae Hea, Royal Flora, on leaves of *Clitoria ternatea* L. (*Fabaceae*), 13 February 2008, Jamjan Meeboon and Iman Hidayat (BBH23765).

Host: *Clitoria mariana*, *C. ternatea*, *Centrosema vrginianum* (*Fabaceae*) (Crous and Braun, 2003).

Distribution: Australia, Bangladesh, India, Panama, Sudan, U.S.A, and Venezuela (Crous and Braun, 2003).

Notes: This is the first record of *P. clitoriae* from Thailand.

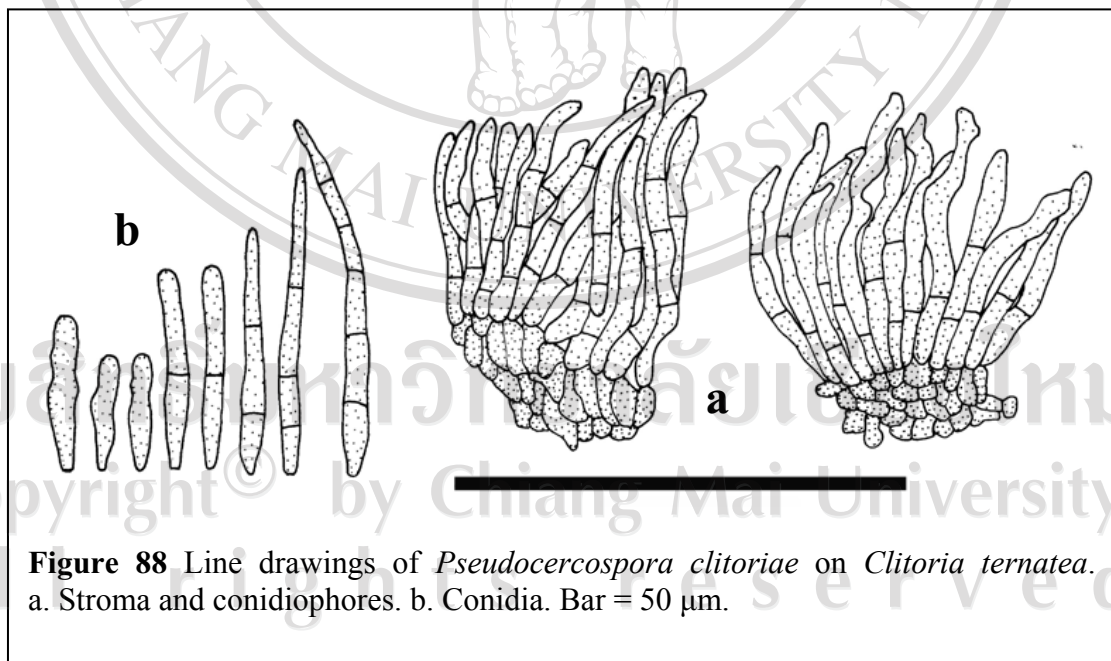


Table 4 Morphological comparison of *Pseudocercospora clitoriae* in this study with other closely related species from plant genus *Clitoria* (data from Chupp, 1954; Deighton, 1976).

Characters	<i>P. clitoriae</i> (type)	<i>P. cruenta</i> (type)
Leaf spots	Amphigenous, 1-5 mm wide, limited by vein	Amphigenous, up to 4 mm wide, Amphigenous, 1-10 mm wide
Caespituli	Amphigenous, mostly at the lower surface	Amphigenous, mostly at the upper surface
Stromata	Small, 21-38.5 μ m diameter, substomatal	Small, \pm 25 μ m diameter, Substomatal
Conidiophores	Densely fasciculate (more than 20), straight, simple, unbranched, 14.5-40.5 \times 2.5-3.5 μ m	Densely fasciculate (more than 40), straight, simple, unbranched, 8-15 (- 10-75 (mostly 10-25) \times 2.5-5 μ m
Conidia	Obclavate, hyaline to olivaceous, 16.5-37 \times 2.7-4 μ m	Obclavate-cylindric, subhyaline to pale olivaceous, 25-150 \times 2-5 μ m

- Pseudocercospora cruenta*** (Sacc.) Deighton, *Mycol. Pap.* **140**: 142 (1976).
- ≡ *Cercospora cruenta* Sacc., *Michelia* **2**: 149 (1880).
- = *Cercospora phaseolorum* Cooke, *Grevillea* **12**: 30 (1883).
- = *Cercospora vignae* Ellis and Everh., *J. Mycol.* **3**: 19 (1887).
- = *Cercospora dolichi* Ellis and Everh., *J. Mycol.* **5**: 71 (1889).
- ≡ *Pseudocercospora dolichi* (Ellis and Everh.) J.M. Yen, *Bull. Trimest. Soc. Mycol. Fr.* **97**: 152 (1981).
- = *Cercospora vignae* Racib., *Z. Pflanzenkr.* **8**: 66 (1898) (*nom. illeg.*), homonym of *C. vignae* Ellis and Everh. (1887).
- = *Cercospora raciborskii* Matsumoto and Nagaoka, *J. Plant Protect.* **18**: 714 (1931).
- = *Cercospora vignae-sinensis* F. L. Tai and C. T. Wei, *Sinensia* **4**: 126 (1933).
- = *Cercospora neovignae* W. Yamam., *Trans. Sapporo Nat. Hist. Soc.* **13**: 142 (1934).
- = *Cercospora vignae-sinensis* Sawada, *Report of the Department of Industry, Government Research Institute, Formosa* **85**: 125 (1943).

(Figure 89)

Leaf spots 5-10 mm diameter, amphigenous, subcircular to irregular, brown, grayish brown at the center, with slightly dark margin. *Caespituli* amphigenous.

Stromata 24-41 µm diameter, small to well-developed, intraepidermal, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* 29-53 × 3-4 µm, 5-21 in a dense and divergent fascicles, 1-3-septate, arising from stromata, erect, straight to decumbent, smooth, brown and becoming pale brown toward the apex,

unbranched, cylindrical, slightly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 38-58 × 2-3 μm, solitary, cylindrical, straight, hyaline to subhyaline, 1-3-septate, smooth, narrow and obconically truncate at the base, broader to the middle and narrowing towards the obtuse apex, with unthickened, and not darkened hila.

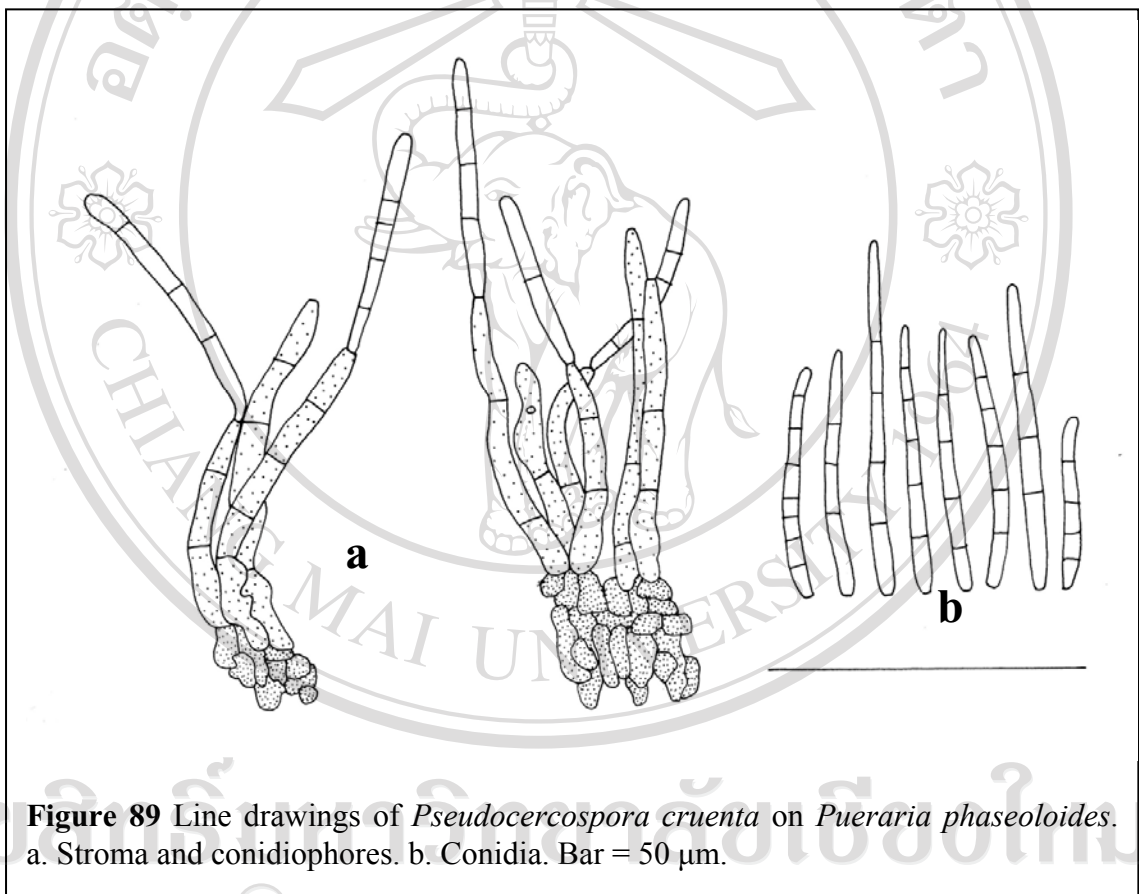


Figure 89 Line drawings of *Pseudocercospora cruenta* on *Pueraria phaseoloides*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm.

Specimen examined: THAILAND, Krabi Province, Sa Morokot Wildlife Sanctuary, on leaves of *Pueraria phaseoloides* Benth. (*Fabaceae*), 8 August 2006, Jamjan Meeboon and Iman Hidayat (BBH 23628).

Host: *Calopogonium* sp., *Canavalia ensiformis*, *C. gladiata*, *C. maritima*, *Canavalis* sp., *Cassia lathyroides*, *Cicer arietinum*, *Clitoria ternatea*, *Dolichos*

biflorus, *D. lablab*, *D. typica*, *Glycine max*, *Glycine* sp., *Lablab niger*, *L. purpureus*, *Mucuna capitata*, *M. deeringiana*, *Phaseolus aconitifolius*, *P. adenanthus*, *P. aureus*, *P. calcaratus*, *P. coccineus*, *P. lathyroides*, *P. lunatus*, *P. radiatus*, *P. sublobatus*, *P. vulgaris*, *Psophocarpus tetragonobolus*, *Pueraria* sp., *Strophostyles helvola*, *Vicia faba*, *Vigna antillana*, *V. catjang*, *V. cylindrica*, *V. luteola*, *V. marina*, *V. mungo*, *V. repens*, *V. sesquipedalis*, *V. sinensis*, *V. unguiculata* (*Fabaceae*) (Crous and Braun, 2003).

Distribution: Worldwide, including Afghanistan, Angola, Argentina, Australia, Azerbaijan, Bangladesh, Barbados, Bolivia, Brazil, Brunei, Cambodia, Canada, China, Colombia, Cuba, Dominican Republic, Egypt, El Salvador, Ethiopia, Fiji, Georgia, Ghana, Grenada, Guatemala, Guyana, Haiti, Honduras, Hong Kong, India, Indonesia, Iran, Iraq, Italy, Jamaica, Japan, Korea, Liberia, Malawi, Malaysia, Mauritius, Mexico, Mosambique, Myanmar, Nepal, New Caledonia, Niger, Nigeria, Pakistan, Panama, Papua New Guinea, Peru, Philippines, Puerto Rico, Russia, Rwanda, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Saudi Arabia, Senegal, Sierra Leone, Singapore, Solomon Islands, Somalia, South Africa, Sri Lanka, Sudan, Suriname, Taiwan, Tanzania, Togo, Tonga, Trinidad and Tobago, Uganda, U.S.A, Venezuela, Virgin Islands, Zambia, and Zimbabwe (Crous and Braun, 2003).

Notes: This specimen is much closed to *P. cruenta* due to the type of leaf spot, amphigenous caespituli, slightly geniculate and dense fascicle of conidiophores and obclavate conidia. This specimen is distinct from *P. puerariicola* due to by geniculation of conidiophores, and shorter conidiophores than *P. puerariae* (up to 350 µm long). This is the first report of *P. cruenta* from Thailand.

Pseudocercospora dalbergiae (S. H. Sun) J. M. Yen, *Bull. Trimest. Soc. Mycol. Fr.* **94**: 386 (1978) [1979].

≡ *Cercospora dalbergiae* S. H. Sun, *J. Agric. Forest. Taiwan* **4**: 179 (1955).

≡ *Cercoseptoria dalbergiae* (S. H. Sun) J. M. Yen, *Bull. Soc. Mycol. France* **97**: 91 (1981).

Specimen examined: THAILAND, Chiang Mai Province, Queen Sirikit Botanical Garden, 20 November 2004, on leaves of *Dalbergia stipulacea* Roxb. (*Fabaceae*), Chiharu Nakashima and Jamjan Meeboon (CMU 27960); Chiang Mai Province, Amphur Mae Taeng, Tummbol Pa Pae, Bahn Phadeng, Mushroom Research Centre, on leaves of *Dalbergia cultrata* Graham (*Fabaceae*), 13 November 2006, Ikumitsu Araki (CMU 27969).

Host: *Dalbergia sissoo* (*Fabaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: China, Taiwan, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first report of *P. dalbergiae* on *D. cultrata* from Thailand was carried out by Meeboon *et al.* (2007c). *Pseudocercospora dalbergiae* was previously recorded on *D. sissoo* (Crous and Braun, 2003).

Pseudocercospora puerariae (Syd. and P. Syd.) Deighton, *Mycol. Pap.* **140**: 64 (1976).

≡ *Cercospora puerariae* Syd. and P. Syd., *Ann. Mycol.* **12**: 204 (1914).

(Figure 90)

Leaf spots 5-10 mm diameter, amphigenous, subcircular to irregular, brown, with grayish brown at center without definite margin. *Caespituli* amphigenous. *Stromata* 18-26 μm diameter, small, immersed, intraepidermal, composed of a few globose to subglobose, brown-walled cells. *Conidiophores* 100-240 \times 2-4 μm , up to 15 in a dense fascicles, not divergent, 3-5-septate, arising from stromata, straight to decumbent, with 1-2-geniculation at the apex, unbranched, cylindrical, smooth, dark brown and paler near the apex. *Conidiogenous cells* integrated, terminal, holoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 88-110 \times 3.5-5.5 μm , solitary, obclavate, curve from the middle to the apex, pale brown, 6-13-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila unthickened, and not darkened.

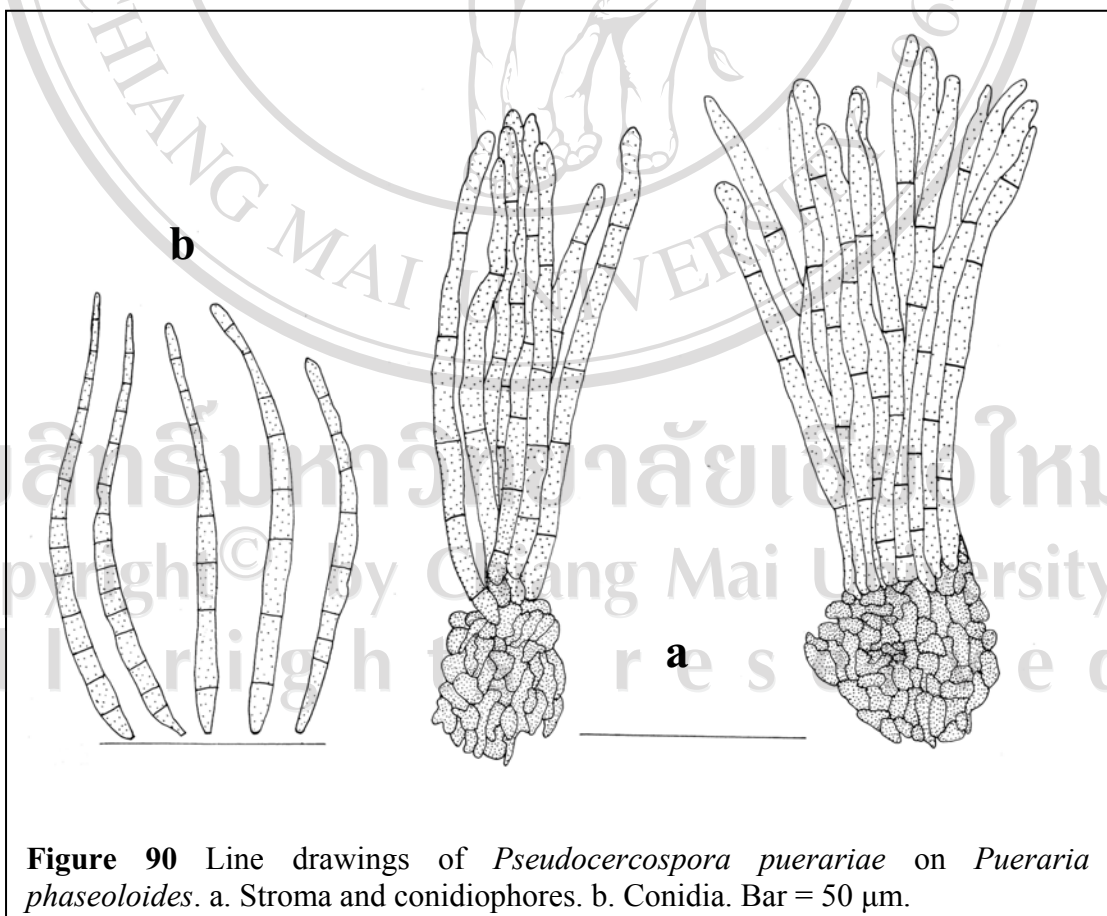


Figure 90 Line drawings of *Pseudocercospora puerariae* on *Pueraria phaseoloides*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Specimen examined: THAILAND, Krabi Province, Sa Morokot Wildlife Sanctuary, on leaves of *Pueraria phaseoloides* Benth. (*Fabaceae*), 8 August 2006, Jamjan Meeboon and Iman Hidayat (BBH 23628).

Host: *Pueraria lobata*, *P. phaseoloides*, *P. thunbergiana* (*Fabaceae*) (Crous and Braun, 2003).

Distribution: Brazil, China, Colombia, Costa Rica, Ecuador, India, Malaysia, Panama, Peru, and Philippines (Crous and Braun, 2003).

Notes: This specimen is much closed to *P. puerariae* particularly due to long and not divergent conidiophores. Other conidiophores characters are also similar in having dark brown color, dense, and slightly geniculation at the apex. This is the first record of *P. puerariae* from Thailand.

Pseudocercospora stizlobii (Syd. and P. Syd.) Deighton, *Mycol. Pap.* **140**: 153 (1976).

≡ *Cercospora stizlobii* Syd. and 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.*).

Specimen examined: THAILAND, Chiang Mai Province, Queen Sirikit Botanical Garden, on leaves of *Mucuna bracteata* DC. (*Fabaceae*), 20 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27967).

Host: *Mucuna aterrima*, *M. capitata*, *M. cochinchinensis*, *M. daeringiana*, *M. ferruginea*, *M. nivea*, *M. pruriens*, *M. prurita*, *M. urens*, *Mucuna* sp., *Stizolobium* sp. (*Fabaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Widespread, including Australia, Barbados, Brazil, Cambodia, China, Colombia, Cuba, Fiji, Gabon, Ghana, Guatemala, Guyana, Haiti, Hong Kong, India, Jamaica, Japan, Java, Malawi, Nigeria, Nepal, Panama, Papua New Guinea, Philippines, Puerto Rico, Sierra Leone, South Africa, Saint Vincent and the Grenadines, Taiwan, Thailand, Togo, Trinidad, Tobago, U.S.A, Venezuela, Virgin Islands, Zambia, and Zimbabwe (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: *Cercospora stizolobii*, which is a synonym of *P. stizolobii*, was already recorded on *Stizolobium deeringianum* Bort, (Florida Velvet Bean) from Thailand (Sontirat *et al.*, 1994). Furthermore, the collection on *Mucuna bracteata* represents a new host record from Thailand was also reported by Meeboon *et al.* (2007c).

Family Flacourtiaceae

Pseudocercospora dovyalidis (Chupp and Doidge) Deighton, *Mycol. Pap.* 140: 143 (1976).

≡ *Cercospora dovyalidis* Chupp and Doidge (*doryalidis*), *Bothalia* 4: 885 (1948).

= *Pseudocercosporella dovyalidis* (Chupp and Doidge) B. Sutton, *Mycol. Pap.* 138: 99 (1975).

(Figure 91)

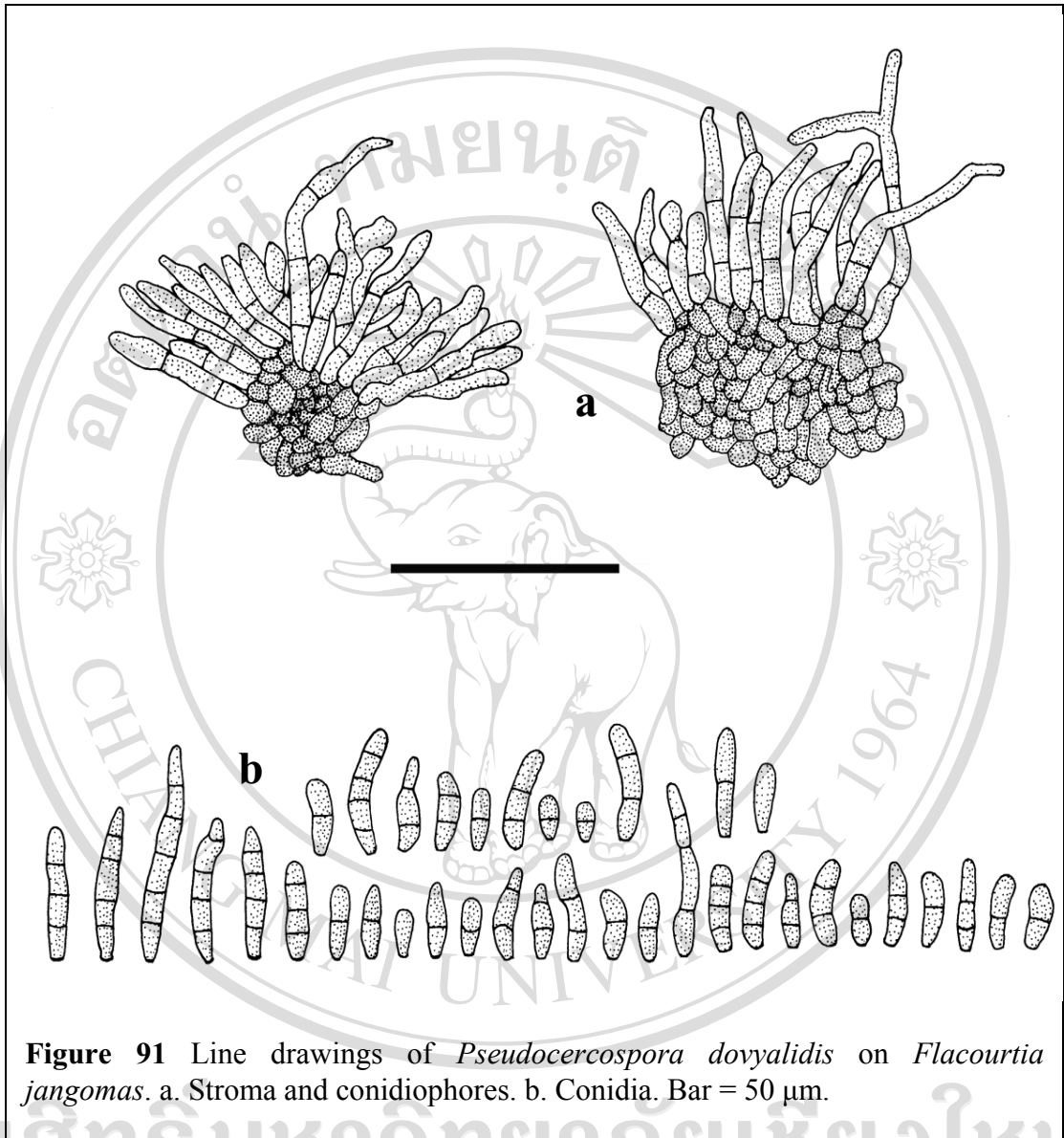
Leaf spots 5-12 mm diameter, amphigenous, circular to irregular, scattered, brown, grayish at the centre, with dark brown margins. *Caespituli* hypophyllous. *Stromata* (45.5) 68.5 ± 19.1 (95) μm diameter, intraepidermal, well-developed, composed of a few globose to subglobose, brown to dark brown cells. *Conidiophores* (20) 36 ± 14.1 (70) \times (3) 4 ± 0.8 (5.5) μm , numerous in a dense fascicles, 1-3-septate, arising from the stromata, pale olivaceous-brown, smooth, simple, straight, sometimes branched, geniculate near the apex. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (8) 21.5 ± 10.2 (49.5) \times (2.5) 4 ± 0.7 (6) μm , solitary, obclavate to subcylindric, 0-5-septate, straight or slightly curved, smooth, pale olivaceous, catenate, truncate at the base, with obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Lamphun Province, Amphur Ban Hong, Farming area, on leaves of *Flacourtia jangomas* (Lour.) Ransch (*Flacourtiaceae*), 24 August 2008, Jamjan Meeboon (BBH 23698).

Host: *Casearia tomentosa*, *Dovyalis hebecarpa*, *D. zeyheri*, *Flacourtia ramonhii*, *Idesia* sp., *Trimeria tropica* (*Flacourtiaceae*) (Crous and Braun, 2003).

Distribution: China, Cuba, India, Kenya, and South Africa (Crous and Braun, 2003).

Notes: This specimen is a new record of *P. dovyalidis* from Thailand, and *Flacourtia jangomas* is reported here as a new host of this pathogen.



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Family *Hamamelidaceae*

Pseudocercospora liquadambaricola (J. M. Yen) U. Braun, *Schlechtendalia* **5**: 44
 (2000).

- ≡ *Cercospora liquidambaricola* J. M. Yen, *Bull. Trimest. Soc. Mycol. France* **94**: 52 (1978).
- ≡ *Cercoseptoria liquidambaricola* (J. M. Yen) J. M. Yen, *Bull. Trimest. Soc. Mycol. France* **97**: 92. 1981.
- = *Cercospora liquidambaris* (Cooke and Ellis) G. F. Atk., *J. Elisha Mitchell Sci. Soc.* **8**: 48 (1892) (*nom. confus.*), *fide* Chupp (1954), non *Pseudocercospora liquidambaris* Goh and W.H. Hsieh (1990).
- ≡ *Pseudocercospora neoliquidambaris* C. Nakash. and Tak. Kobay., *Mycoscience* **43**: 224 (2002) (*nom.superfl.*).
- = *Cercospora liquidambaris* Sawada, *Rep. Gov. Agric. Res. Inst., Taiwan* **85**: 112 (1943) (*nom. inval.*), homonym of *C. liquidambaris* (Cook and Ellis) G. F. Atk. (1892).
- ≡ *Pseudocercospora liquidambaris* (Sawada) Goh and W. H. Hsieh, *Cercospora and Similar Fungi from Taiwan*: 150 (1990).

(Figure 92)

Leaf spots 1-5 mm diameter, amphigenous, subcircular to irregular, dark brown, with pale olivaceous at the center, limited by the leaf vein, sometimes only decoloration on the leaves. *Caespituli* amphigenous, mostly hypophyllous. *Stromata* 29-63 µm diameter, substomatal, well-developed, and composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (15-) 20-21 × (2-) 3-4.5 µm, densely fasciculate, 0-2-septate, straight, smooth, pale brown, paler toward the apex, unbranched, not geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous,

unthickened, and not darkened. *Conidia* (26-) 33-50.5 (-54) × 2-2.5 (-3.5) μm, solitary, acicular to obclavate, straight to mildly curved, subhyaline, 3-6-septate, smooth, truncate at the base, with acute apex, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Samoeng, Pang Da Royal Project, on leaves of *Liquidambar formosana* Hance (*Hamamelidaceae*), 7 February 2008, Jamjan Meeboon and Iman Hidayat (JM 105).

Host: *Liquidambar formosana*, *L. styraciflua*, *Loropetalum chienense* (*Hamamelidaceae*) (Crous and Braun, 2003).

Distribution: China, Hong Kong, Japan, Mexico, Taiwan, and U.S.A (Crous and Braun, 2003).

Note: This specimen is the first record of *P. liquidambaricola* from Thailand.

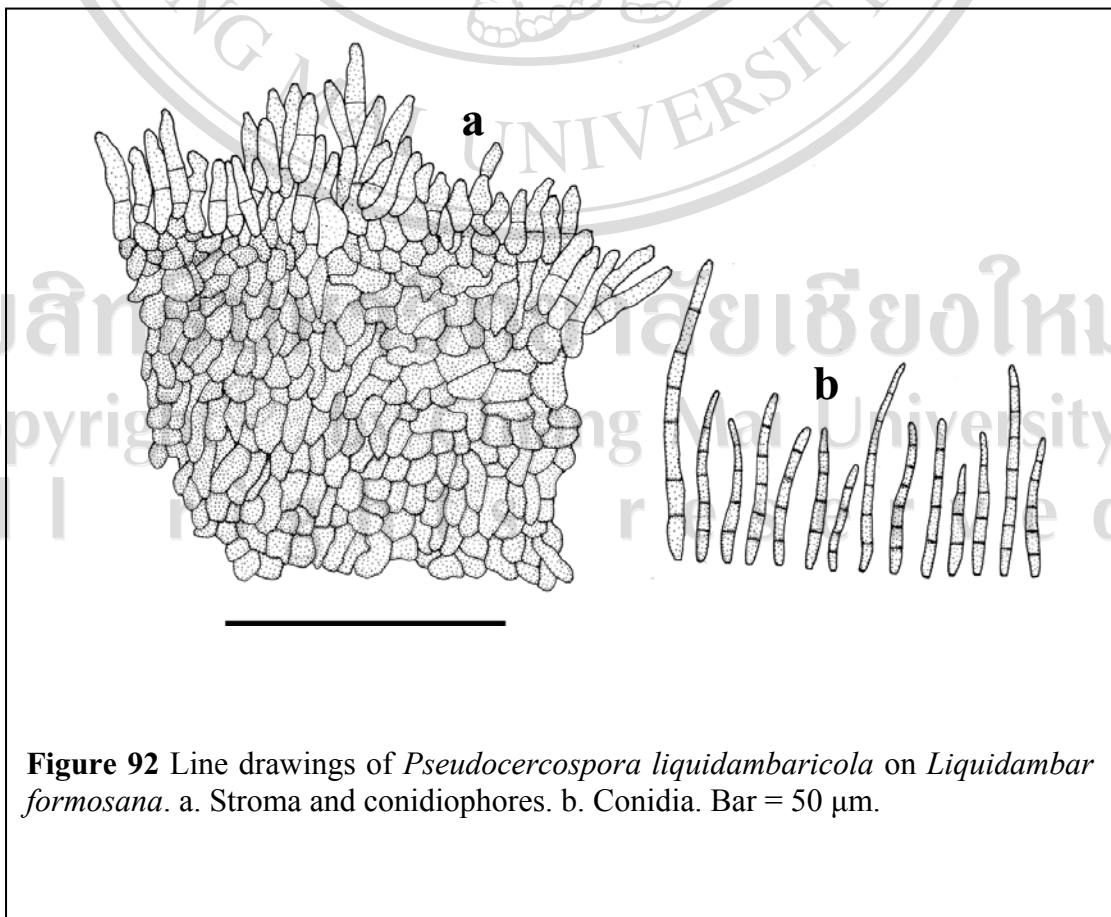


Figure 92 Line drawings of *Pseudocercospora liquidambaricola* on *Liquidambar formosana*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm.

Family Hydrangeaceae

- Cercospora hydrangeae*** Ellis and Everh., *J. Elisha Mitch. Sci. Soc.* **8**: 52 (1892).
 = *Cercosporina hydrangeicola* Speg., *Anales Mus. Nac. Buenos Aires* **20**: 426 (1910).
 ≡ *Cercospora hydrangeicola* (Speg.) Vassiljevsky, in Vassiljevsky and Karakulin, *Fungi imperfecti parasitici 1. Hyphomycetes*: 339 (1937).
 = *Cercospora hydrangeana* Tharp, *Mycologia* **9**: 110 (1917).
 ≡ *Cercosporina hydrangeana* (Tharp) Sacc., *Syll. Fung.* **25**: 915 (1931).
 = *Cercospora arboriscentis* Tehon and E. Daniels, *Mycologia* **17**: 246 (1925).
 (= *C. apii* s. lat.) **(Figure 93)**

Leaf spots 3-15 mm diameter, amphigenous, irregular, pale olivaceous to light brown, centre grayish brown to grayish white with purplish brown to dark brown margins. *Caespituli* amphigenous. *Stromata* lacking. *Conidiophores* 111-227 × 3.5-5 µm, 3-11 in a loose fascicles, 1-3-septate, straight to decumbent, unbranched, smooth, very dark brown at the base, and paler toward the apex, cylindrical, geniculate to strongly geniculate. *Conidiogenous cells* integrated, holoblastic, polyblastic, sometimes monoblastic when young, sympodially proliferating. *Conidiogenous loci* 2-3 µm diameter, conspicuous, thickened, and darkened. *Conidia* 113-278 × 2.5-3.5 µm, acicular, hyaline, 13-27-septate, solitary, slightly curved at the apex, base obconically truncate, hila 1.5-2.5 µm diameter, conspicuous, thickened, and darkened.

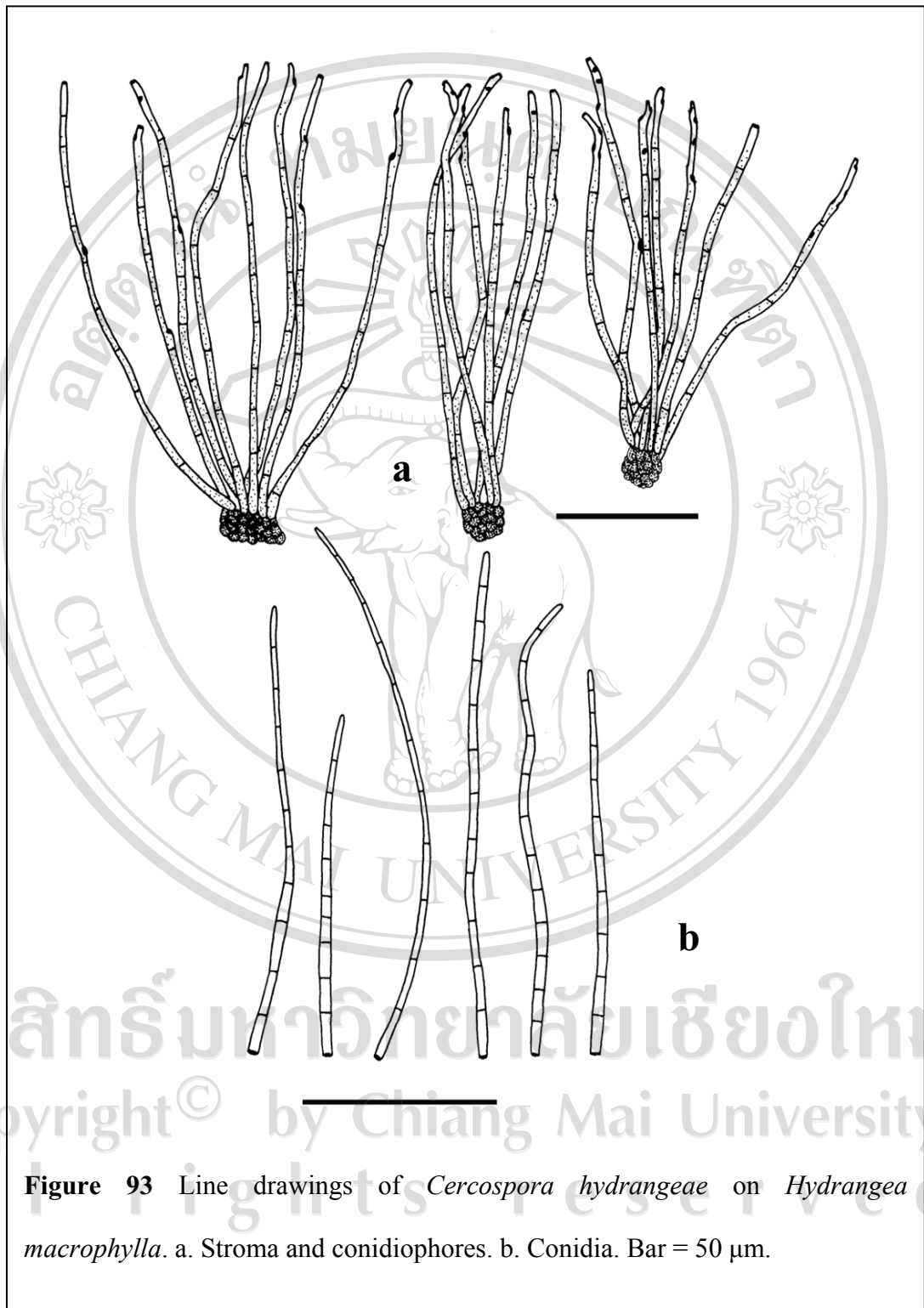


Figure 93 Line drawings of *Cercospora hydrangeae* on *Hydrangea macrophylla*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Hydrangea macrophylla* (Thunb.) Ser. (*Hydrangeaceae*), 21 November 2004, Jamjan Meeboon (CMU 27921); Chiang Mai Province, Sanpatong District, Mae Wang Sub-district, Tambol Mae Win, Bahn Mae Sapok, Mae Sapok Royal Project, on the same host, 8 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23567).

Host: *Hydrangea angustisepala*, *H. arborescens*, *H. hortensis*, *H. macrophylla*, *H. opuloides*, *H. paniculata*, *H. serrata*, *Hydrangea* sp. (*Hydrangeaceae*) (Crous and Braun, 2003).

Distribution: Argentina, Borneo, Brazil, Brunei, China, Hong Kong, India, Iran, Japan, Korea, Malawi, Malaysia, Myanmar, Nigeria, Philippines, Puerto Rico, Romania, Russia (Asian part), Sabah, Sierra Leone, Singapore, Taiwan, Thailand, U.S.A, Virgin Islands, and Zimbabwe (Crous and Braun, 2003).

Notes: The first record of this species from Thailand was published by Petcharat and Kanjanamaneesathian (1989), but they did not give any detailed morphological description and illustration for this fungus. Braun (2000) assigned this species to *C. apii* s.lat.

Literature: Chupp (1954, p. 517).

Family *Lamiaceae*

Cercospora kabatiana Allesch. ex Lindau, *Rabenh. Krypt.-Fl.* ed. 2, 9: 130 (1910).

- ≡ *Cercospora kabatiana* (Allesch. ex Lindau) Moesz, *Magyar Biol. Kutatóint. Munkái* 3: 115 (1930).

(Figure 94)

Leaf spots 15-30 mm diameter, amphigenous, circular or subcircular, at first pale greenish to ochraceous, later become dull brown, finally with pale to grayish white at the centre, surrounded by a dark margin. *Caespituli* amphigenous. *Stromata* slight or lacking. *Conidiophores* (78) 142.5 ± 38.4 (185) \times (3) 4 ± 0.5 (5) μm , numerous in a loosely fasciculate, 2-5-septate, arising from stromata, simple, straight, erect to decumbent, smooth, pale yellow to pale brown, rarely branched, subcylindrical, geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (95) 115 ± 15.2 (144) \times (2.5) 3 ± 0.7 (4) μm , solitary, narrowly obclavate to subacicular, straight, hyaline, 7-12-septate, smooth, base truncate, with subacute apex, hila 2-2.5 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Solenostemon scutellarioides* (L.) Codd (*Lamiaceae*), 1 August 2008, Jamjan Meeboon (BBH 23583).

Host: *Lamium amplexicaule*, *L. galeobdolon*, *L. maculatum*, *L. montanum*, *L. nepetaefolia*, *Leonotis* sp. (*Lamiaceae*) (Crous and Braun, 2003).

Distribution: Armenia, Austria, Czech Republic, Lesotho, and U.S.A (Crous and Braun, 2003).

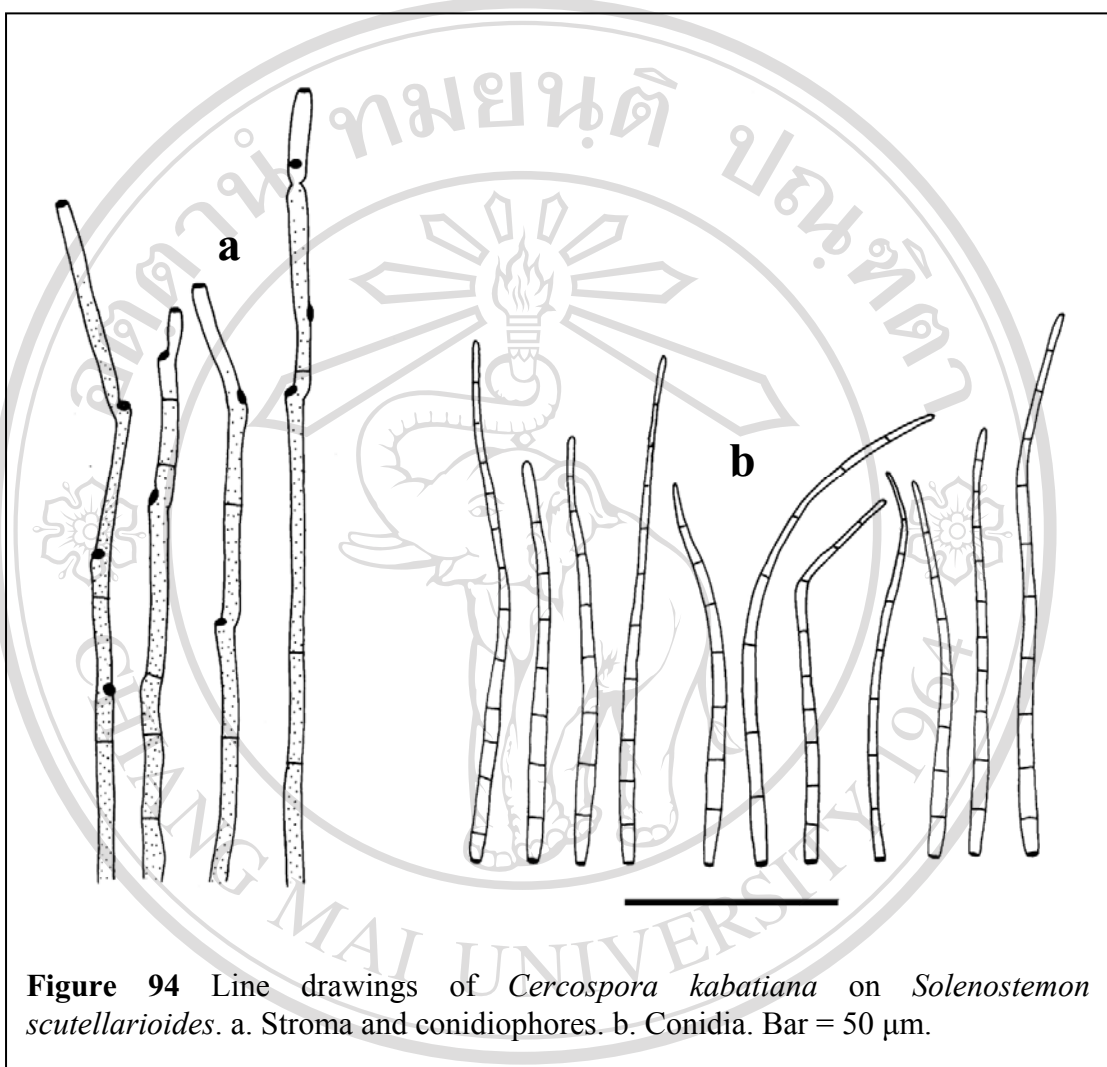


Figure 94 Line drawings of *Cercospora kabatiana* on *Solenostemon scutellarioides*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Notes: This specimen is a typical of *C. apii* s. lat. by having slight or lacking stromata, long conidiophores, and hyaline and long acicular conidia, with truncate base. *Cercospora kabatiana* was assigned to *C. apii* s. lat. by Crous and Braun (2003). This specimen is the first record of *C. kabatiana* from Thailand, and *Solenostemon scutellarioides* is reported here as a new host of this fungus.

Literature: Chupp (1954, p. 266).

Cercospora physostegiae Jenkins, *Phytopathology* **35**: 329 (1945).

(Figure 95)

Leaf spots 1-8 mm diameter, amphigenous, solitary, sometimes clustered to form larger spots, circular to subcircular, sometimes irregular, greyish brown, with dark brown margin, limited by leaf veins. *Caespituli* amphigenous. *Stromata* 14-30 μm diameter, small, substomatal, composed of a few globose to subglobose, brown-walled cells. *Conidiophores* 20-70 \times 3-6 μm , 6-14 in a loose fascicles, 1-3-septate, arising from stromata, straight, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, often not geniculate, very rarely geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* 20-129 \times 2-4 μm , solitary, obclavato-filiform to acicular, straight, hyaline, 12-19-septate, smooth, truncate at the base, tapering toward a subacute apex, hila 1.5-2 μm diameter, conspicuous, thickened, and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Muang, Tumbol Mae Hea, Royal Flora, on leaves of *Clerodendrum paniculatum* L. (*Lamiaceae*), 13 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23579).

Host: *Physostegia virginiana* (*Lamiaceae*) (Chupp, 1954).

Distribution: U.S.A (Chupp, 1954).

Notes: Four species of *Cercospora* s. str. non *C. apii* s. lat. have been reported from the plant family *Lamiaceae*, viz, *C. isanthi* Ellis and Kellerm., *C. physostegiae*, *C. scorodoniae* Unamuno, and *C. teucarii* Ellis and Kellerm. All of these species are

characterized by relatively short conidiophores and amphigenous caespituli (Chupp, 1954). This species is much closed to *C. physostegiae* due to conidiophores often not geniculate and obclavate conidia with obconically truncate base. Another three species are characterized by acicular conidia and geniculate conidiophores. This specimen is the first record of *C. physostegiae* from Thailand, and *Clerodendrum paniculatum* is reported here as a new host of this fungus.

Literature: Chupp (1954, p. 270-271).

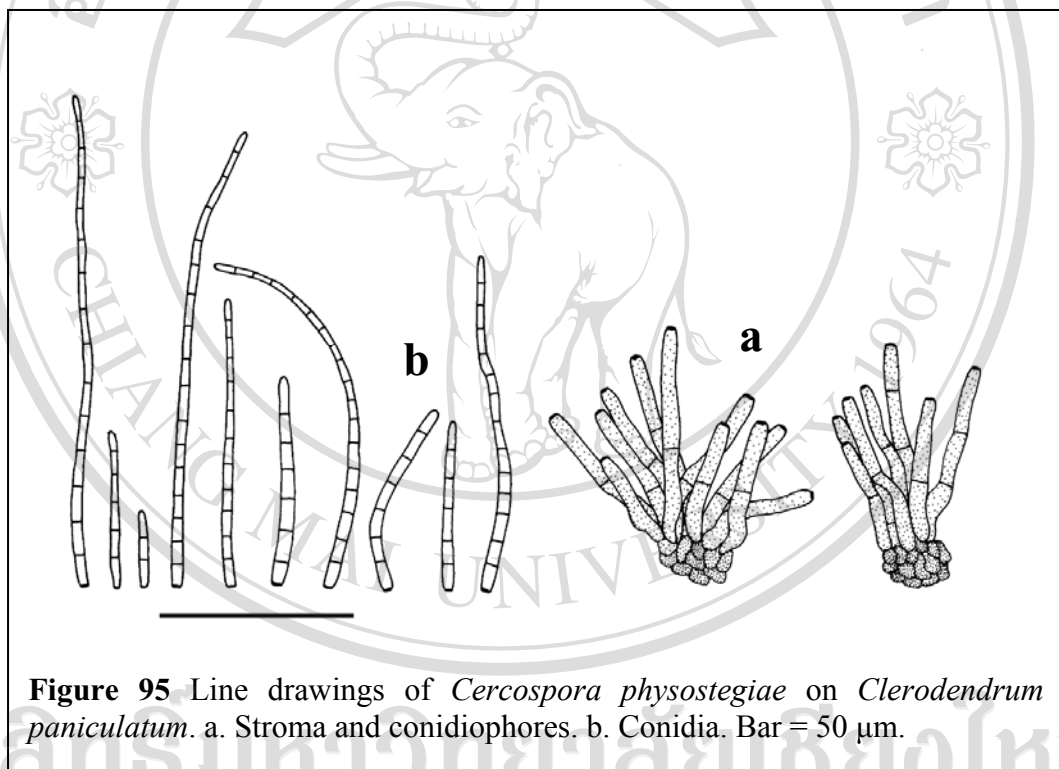


Figure 95 Line drawings of *Cercospora physostegiae* on *Clerodendrum paniculatum*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Cercospora volkameriae Speg., *Revista del Museo de La Plata* **15**: 47 (1908).

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

(Figure 96)

Leaf spots 2-5 mm diameter, amphigenous, circular or subcircular, limited by vein, often greyish at the centre, brown with a dark reddish margins. *Caespituli*

epiphyllous. *Stromata* (12) 23 ± 8.9 (32) μm diameter, intraepidermal, well-developed, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* (36) 67 ± 22.1 (127.5) \times (2.5) 3 ± 0.5 (4) μm , 8-10 in a loosely and divergent fasciculate, 2-4-septate, arising from stromata, erect to decumbent, smooth, pale yellow to pale brown, straight, rarely branched, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal to intercalary, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (40) 60 ± 20.7 (87) \times (2) 2.5 ± 0.4 (3) μm , solitary, narrowly obclavate to subacicular, 3-10-septate, straight, hyaline, smooth, base obconically truncate, with subacute apex, hila 2-2.5 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Royal Flora, on leaves of *Clerodendrum fragrans* Willd. (*Lamiaceae*), 27 July 2008, Jamjan Meeboon (BBH 23763).

Host: *Clerodendrum cordifolium*, *C. fragrans*, *C. indicum*, *C. infortunatum*, *C. paniculatum*, *C. scandens*, *C. schweinfurthii*, *C. siphonatus*, *C. speciosissimum*, *C. speciosum*, *C. splendens*, *C. thomsonae*, *C. trichotomum*, *C. volubile*, *Gmelina arborea* (*Lamiaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Barbados, Brazil, Brunei, Cuba, Ghana, Guinea, India, Indonesia, Jamaica, Korea, Malawi, Malaysia, Nepal, Nigeria, Sierra Leone, Singapore, Sudan, Taiwan, Tanzania, Thailand, and Togo (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

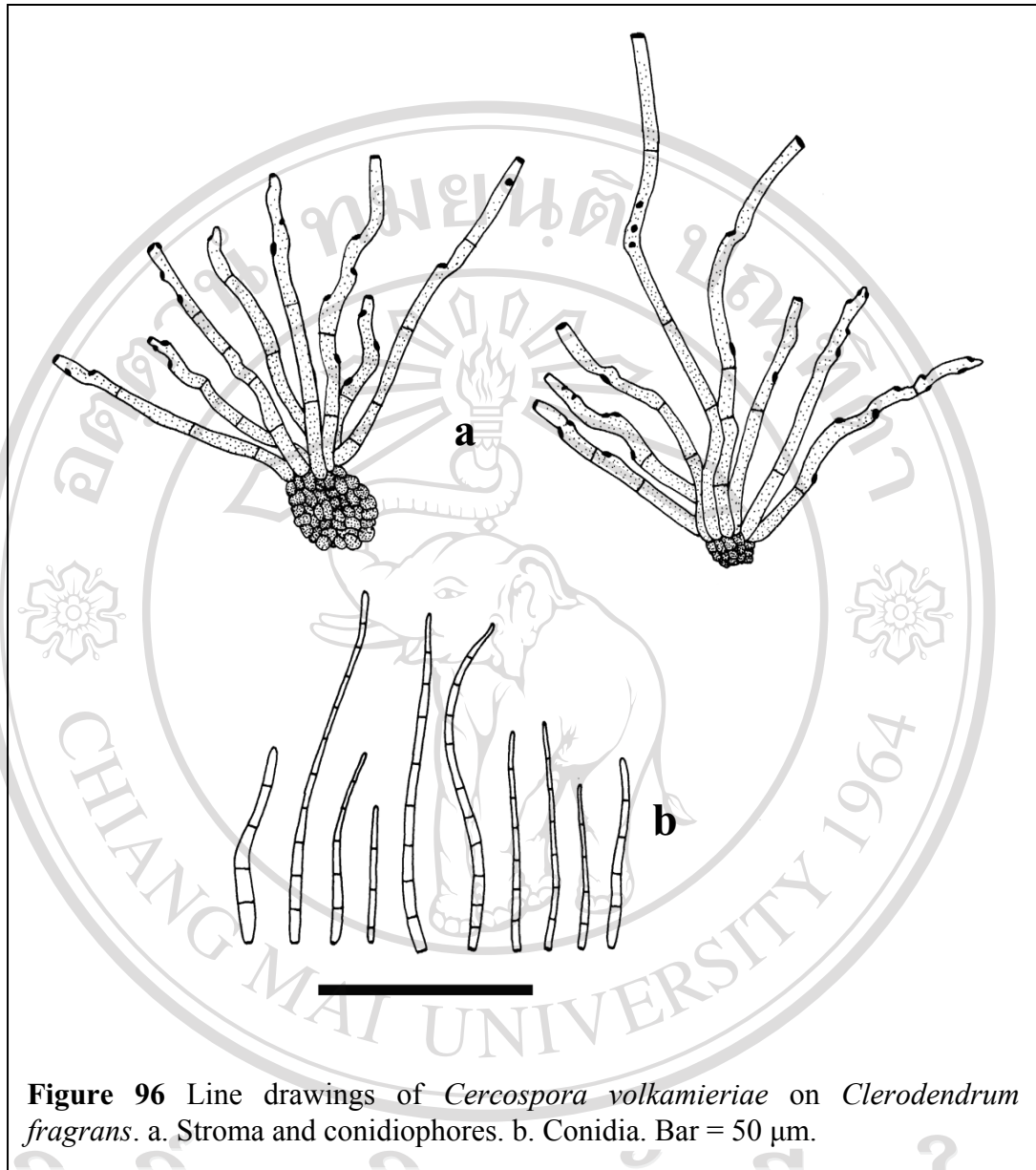


Figure 96 Line drawings of *Cercospora volkammeriae* on *Clerodendrum fragrans*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Notes: The morphological characteristics of this specimen are much closed to *C. volkammeriae*. The first record of *C. volkammeriae* from Thailand was made by Meeboon *et al.* (2007c). Crous and Braun (2003) considered this species as *C. apii s.lat.*

Literature: Chupp (1954, p. 597).

Passalora gmeliniicola C. Nakash. and Meeboon, *Fungal Diversity* **26**: 260-261 (2007).

MycoBank: 510509

(Figure 97)

Maculis in foliis vivis dispersis, irregularibus vel angularibus, per venas limitatis, atro-brunneis, centro pallide brunneis, 1-9 mm diameter, ultimo confluentibus, griseo-albidis; stromatibus epiphyllis, substomaicis vel intraepidermicis, bene evolutis, brunneis vel atrobrunneis, 25-57.5 µm diameter Conidiophoris dense fasciculatis, atro-brunneis, pachydermis, apicem versus pallide brunneis, asperulatis, proliferationibus percurrentibus, geniculatis, 39-45 × 3-3.7 µm, 1-5-septatis. Locis conidiogenis parvis, distinctis, incrassatis, 0.9-1.7 µm diameter Conidiis solitariis, raro catenatis, brunneis, cylindricis vel obclavatis, pachydermis, rectis vel paulo curvatis, asperulatis, ad apicem obtusis vel subobtusis, ad basim obconice truncatis et leviter incrassatis, 3-16-septatis, raro pauci-distoseptatis, 16-80 × 5.6-7.8 µm.

Etymology: gmeliniicola, derived from the genus name of the host plant.

Leaf spots scattered, distinct, irregular to angular, vein-limited, dark brown, centre pale brown, 1-9 mm wide, later coalescing to large spots, grayish white. *Stromata* epiphyllous, substomatal to intraepidermal, well-developed, composed of swollen brown to dark brown hyphal cells, 25-57.5 µm diameter *Conidiophores* 39-45 × 3-3.7 µm, densely fasciculate, 1-5-septate, thick-walled, dark brown, paler toward the apex, geniculate. *Conidiogenous cells* integrated, terminal, sympodially proliferating. *Conidiogenous loci* 1-2 µm diameter, distinct, darkened and thickened.

Conidia solitary, brown, occasionally catenulate, cylindro-obclavate to obclavate, thick-walled, straight to mildly curved, asperulate, $16-80 \times 5.6-7.8 \mu\text{m}$, 3-16-euseptate, rarely with a few additional distosepta, obtuse to subobtuse at the apex, obconically truncate and slightly thickened at the base.

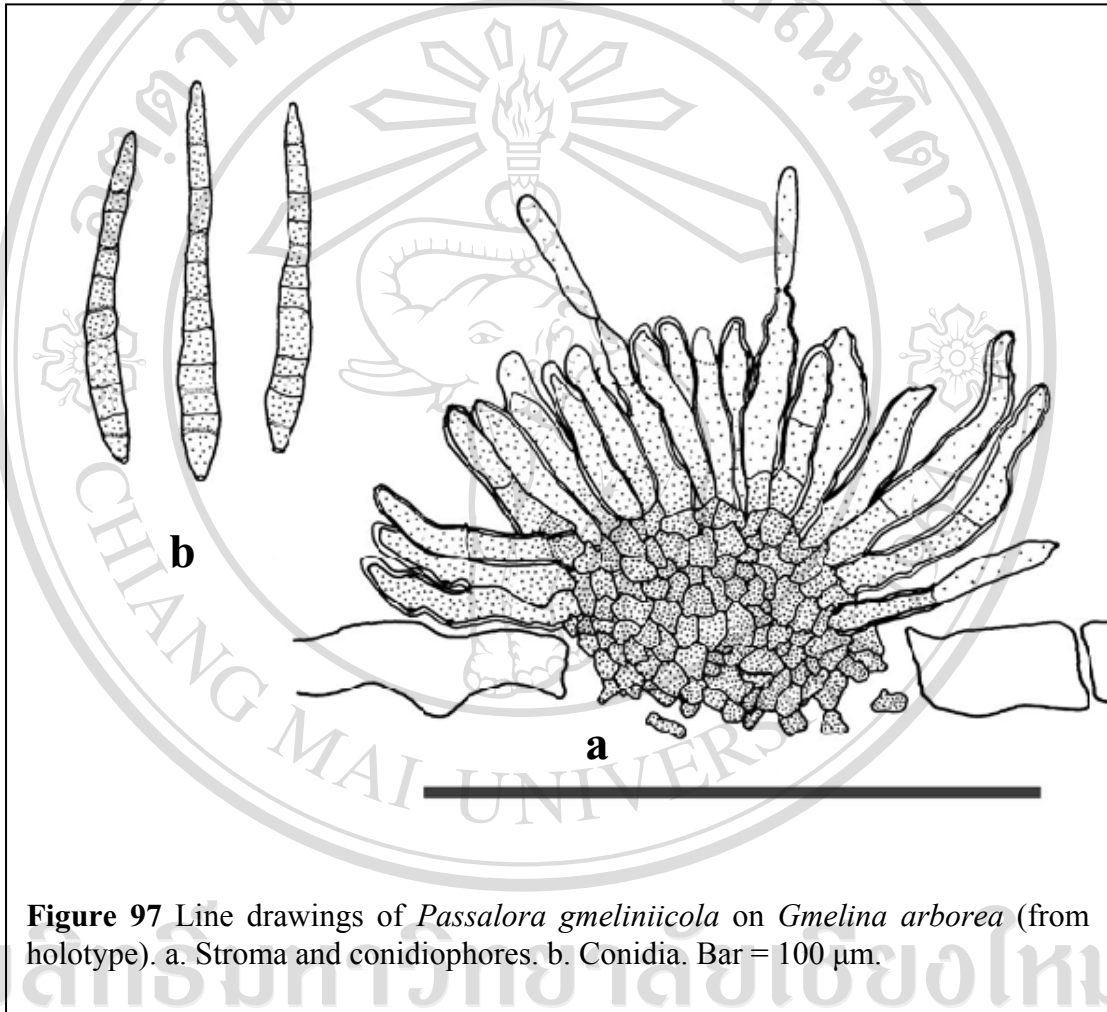


Figure 97 Line drawings of *Passalora gmeliniicola* on *Gmelina arborea* (from holotype). a. Stroma and conidiophores. b. Conidia. Bar = 100 μm .

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Gmelina arborea* Roxb. (*Lamiaceae*). 21 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27953; **holotype**); 10 December 2006, Ikumitsu Araki and Jamjan Meeboon (CMU 28047).

Host: *Gmelina arborea* (*Lamiaceae*).

Distribution: Thailand (type locality).

Notes: *Passalora gmelinae-arboreae* (A. K. Sarbhoy, Hosag. and N. Ahmad) U. Braun and Crous (Sarbhoy *et al.*, 1985; Crous and Braun, 2003) which was previously belonging to *Mycovellosiella* Rangel, is different from the present new species by having superficial mycelium with solitary conidiophores, longer and wider, branched conidiophores and lacking stromata.

Family Lomariopsidaceae

Pseudocercospora phyllitidis (H. H. Hume) U. Braun and Crous, *CBS Biodiversity Series 1*: 321 (2003).

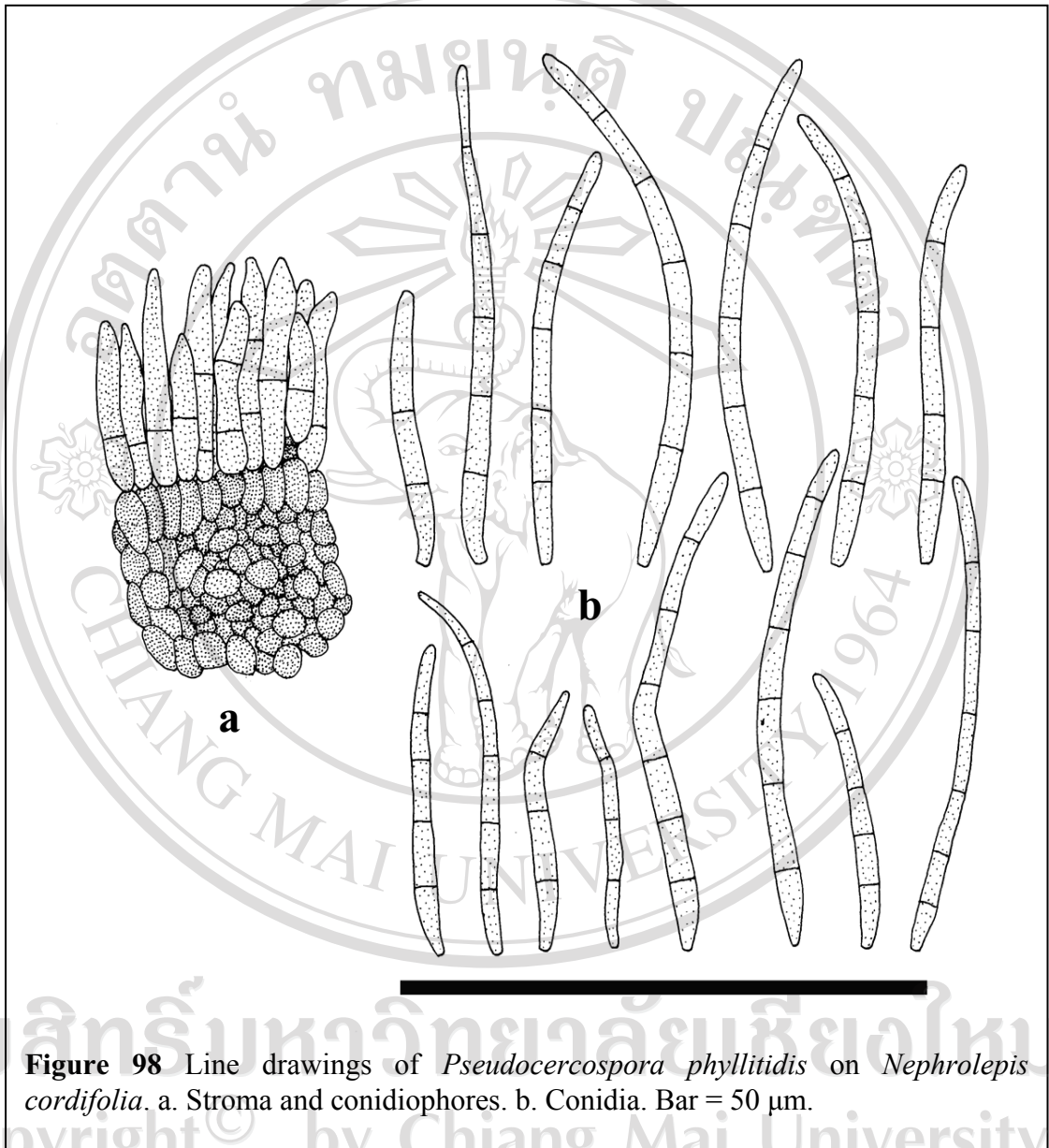
≡ *Cercospora phyllitidis* H. H. Hume, *Bull. Torrey Bot. Club* **27**: 577 (1900).

(Figure 98)

Leaf spots 1-4 mm diameter, amphigenous, subcircular to irregular, usually vein-limited, pale brown to brown, with pale yellowish halo. *Caespituli* epiphyllous.

Stromata 24-74 μm diameter, intraepidermal, well-developed, composed of globose to subglobose, brown-walled cells. *Conidiophores* 4-34 \times 2-3 μm , densely fasciculate or sometimes solitary, 1-2-septate, arising from stromata and external hyphae, straight, pale brown, geniculate to slightly curved, wall somewhat thickened, slightly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, sympodially proliferating. *Conidiogenous loci* indistinct, unthickened and not darkened, non refractive. *Conidia* 36-118 \times 1.8-3.7 μm , solitary, acicular to obclavate, 2-10-septate,

subhyaline to pale olivaceous brown, straight to mildly curved, smooth, tip acute, base truncate, hila unthickened and not darkened.



Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Nephrolepis biserrata* (Sw.) Schott (*Lomariopsidaceae*), 21 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27962); 10 December 2006, Ikumitsu Araki and Jamjan Meeboon (CMU 28058); Chiang Mai

Province, Suthep-Pui National Park, on leaves of *Nephrolepis cordifolia* (L.) C. Presl (*Lomariopsidaceae*), 10 December 2006, Jamjan Meeboon and Ikumitsu Araki (CMU 27912); Chiang Mai Province, A. Sansai, Mae Jo, 9 August 2008, Jamjan Meeboon and Iman Hidayat (BBH 23700).

Host: *Davallia trichomanoides*, *Rumohra adiantiformis* (*Davalliaceae*), *Nephrolepis exaltata* (*Lomariopsidaceae*), *Angiopteris* sp. (*Marattiaceae*), *Osmunda regalis* (*Osmundaceae*), *Polypodium phyllitidis*, *P. polypodioides* (*Polypodiaceae*), *Pteris biaurita*, *P. ensiformis* (*Pteridaceae*), *Thelypteris tetragona* (*Thelypteridaceae*) (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Distribution: Canada, Great Britain, India, Puerto Rico, Thailand, U.S.A, and Virgin Islands (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Notes: This species was described on a wide range of ferns, including *Nephrolepis exaltata* (Crous and Braun, 2003). Nakashima *et al.* (2007) were the first of reporting this species on *Nephrolepis biserrata* from Thailand. In this study, *Nephrolepis cordifolia* is reported as a new host of *P. phyllitidis*.

Family *Lythraceae*

Cercospora apii Fresen., *Beitr. Mykol.* **3**: 91 (1863).

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

= *Cercospora apii* f. *dauci-carotae* Ellis and Everh., *N. Amer. Fungi*: 2482 (1890) (*nom. nud.*).

= *Cercospora levistici* Kvashnina, *Izv. Severo-Kavkazsk. Kraev. Stantsii Zashch. rast.* **4**: 38 (1928).

= *Cercospora apii* f. *Clerodendri* Sobers and Martinez, *Proc. Florida State Hort. Soc.* **79**: 433 (1966) [1967] (*nom. inval.*).

(Figure 99)

Leaf spots 1-5 mm diameter, amphigenous, subcircular, black, with dark brown margin, and surrounding by yellow discoloration around the margin. *Caespituli* amphigenous. *Stromata* up to 10 µm diameter, small, mostly lacking, intraepidermal, composed of few, globose to subglobose, brown-walled cells. *Conidiophores* (66-) 145-191 (-204) × (3-) 4.5-5 (-6) µm, 3-6 in a loose fascicles, straight, 3-9-septate, unbranched, cylindrical, geniculate to strongly geniculate, thick wall, smooth, brown at the base, and paler toward the apex. *Conidiogenous cells* integrated, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3 µm diameter, conspicuous, thickened, and darkened. *Conidia* (44.5-) 80-140 × (2.5-) 4-5 µm, acicular, hyaline, 5-7-septate, solitary, base truncate, with slightly curved at the apex, hila 2-3 µm diameter, conspicuous, thickened, and darkened.

Specimen examined: THAILAND, Chiang Mai province, Amphur Samoeng, Pang Da Royal Project, on leaves of *Punica granatum* L. (*Lythraceae*), 7 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23596).

Host: *Abelmoschus esculenta*, *Aloysia virgata*, *Amaranthus* sp., *Anethum graveolens*, *Angelica dahurica*, *A. dawsonii*, *Annona odorata*, *Anthurium* sp., *Anthurus* sp., *Apium graveolens*, *A. sativum*, *Arracacia xanthorrhiza*, *Astilbe*

chinensis, *Atkinsia cubensis*, *Bixa*, *orellata*, *Cajanus cajan*, *Careya arborea*, *Carica papaya*, *Cedrela toona*, *Centella asiatica*, *Chamaechrista aeschynomenes*, *Chenopodium ambrosioides*, *Chondrilla juncea*, *Citrullus vulgaris*, *Clerodendrum fragrans*, *C. thomsoniae*, *Coleus hybridus*, *Coleus* sp., *Conioselinum benthamii*, *C. chinense*, *C. pacificum*, *C. tataricum*, *Coriandrum sativum*, *Crepis capillaris*, *Cucumis melo*, *Cucurbita pepo*, *Cyamopsis psoraloides*, *Daucus carota*, *Dichondra repens*, *Drejerella guttata*, *Droguetia debilis*, *Emilia sonchifolia*, *Emilia* sp., *Erucastrum arabicum*, *Eryngium foetidum*, *Euphorbia heterophylla*, *Foeniculum dulce*, *F. vulgare*, *Galinsoga parviflora*, *Gloriosa virescens*, *Hedychium coronarium*, *Heliotropium europaeum*, *Heliotropium* sp., *Hemigraphis* sp., *Hydrocotyle* sp., *Indigofera suffruticosa*, *lablab purpureus*, *lactuca canadensis*, *laportea crenulata*, *Leonotis* sp., *leonurus sibiricus*, *Levisticum* sp., *Limonium sinuatum*, *Limonium* spp., *Marlea begoniifolia*, *Modiola caroliniana*, *Momordica charanthia*, *Myrrhis* sp., *Nicotiana tabacum*, *Oenanthe javanica*, *Papaver rhoeas*, *Pastinaca sativa*, *Petrea volubilis*, *Petroselinum crispum*, *P. hortense*, *Physalis* sp., *Plumbago capensis*, *P. rosea*, *Pegostemon benghalensis*, *Premna mucronata*, *Pseucedanum graveolens*, *Rauvolfia serpentina*, *Rinorea microdon*, *Ruellia* sp., *Schwenkia americana*, *Selinum gmelini*, *Senna alata*, *Seseli indicum*, *SmyrniolU.S.Atrum*, *Spigelia anthelmia*, *Stellaria media*, *Stigmaphyllon sagraeanum*, *Tabebuia serratifolia*, *Tagetes* sp., *Wdelia paludosa*, *Zinnia elegans* (Crous and Braun, 2003).

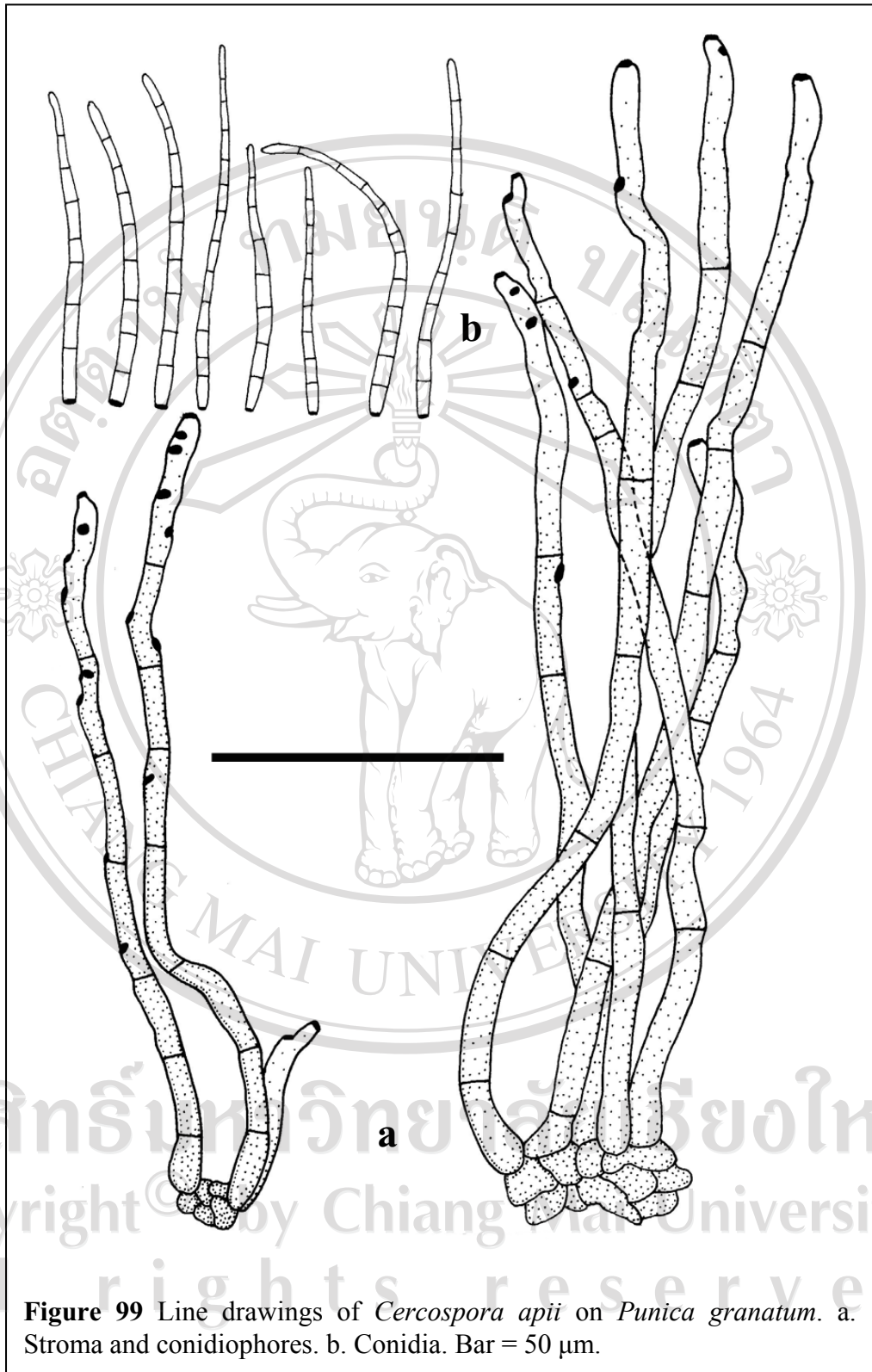


Figure 99 Line drawings of *Cercospora apii* on *Punica granatum*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Distribution: Worldwide, including Australia, Austria, Azerbaijan, Bangladesh, Barbados, Brazil, Brunei, Bulgaria, Cambodia, Canada, Canary Islands, China, Colombia, Congo, Cuba, Czech Republ., Denmark, Dominican Republ., Egypt, El Salvador, France, Germany, Greece, Guatemala, Hong Kong, India, Indonesia, Iraq, Italy, Jamaica, Jordan, Kenya, Korea, Latvia, Lebanon, Libya, Lithuania, Mexico, Malaysia, Mauritius, Morocco, Myanmar, Nepal, Netherlands, New Caledonia, New Zealand, Morocco, Nepal, Nigeria, New Zealand, Panama, Papua New Guinea, Peru, Philippines, Poland, Puerto Rico, Romania, Russia, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Sudan, Suriname, Switzerland, Taiwan, Tanzania, Thailand, Togo, Trinidad, Tobago, Uruguay, U.S.A, Vanuatu, Venezuela, and Zimbabwe (Crous and Braun, 2003).

Notes: The morphological characteristics of this specimen are much closed to *C. apii* Fresen. due to stromata small to lacking, conidiophores not in a dense fascicles and relatively long with geniculation near the apex, and long acicular conidia with truncate base. *Cercospora ammaniae* Tharp is the only *Cercospora* species which does not belong to *C. apii* s. lat; however, Crous and Braun (2003) noted that this species is closed or identical to *C. apii* s. lat. Since the conidiophores of this species is branched (Chupp, 1954); therefore, this specimen is not *C. ammaniae*. Therefore, we assigned this specimen to *C. apii*. In this report, *Punica granatum* is reported as a new host of this fungus.

Pseudocercospora cupheae (Syd.) U. Braun, *Schlechtendalia* **2**: 14 (1999).

≡ *Cercospora cupheae* Syd., *Ann. Mycol.* **37**: 428 (1939).

Specimen examined: THAILAND, Chiang Mai Province, Queen Sirikit Botanic Garden, on leaves of *Cuphea hyssopifolia* Kunth (*Lythraceae*), 21 November 2004, Jamjan Meeboon (CMU MH 074).

Host: *Cuphea parsonsia*, and *C. strigulosa* (*Lythraceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Dominican Republic, Ecuador, Mexico, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first record of this species from Thailand was published by Meeboon *et al.* (2007c).

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

≡ *Cercospora lythracearum* Heald and F. A. Wolf, *Mycologia* **3**: 18 (1911).

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

= *Cercospora lagerstroemiae* Syd. and P. Syd., *Ann. Mycol.* **12**: 203 (1914).

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

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

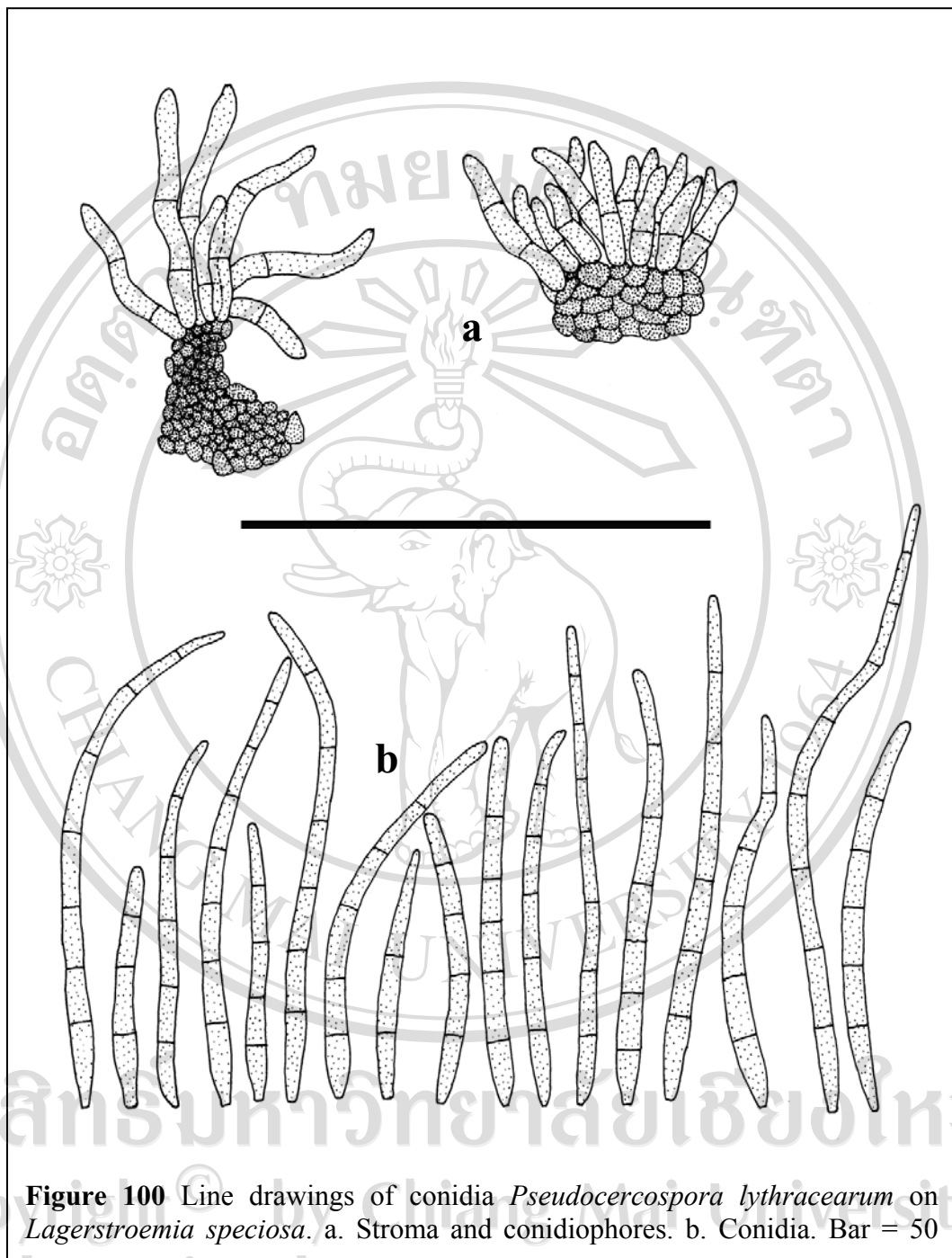
= *Cercospora lagerstroemiicola* Sawada, *Taiwan Agric. Res. Inst. Rept.* **85**: 112 (1943).

(Figure 100)

Leaf spots 9-25, amphigenous, irregular, scattered, often as necrosis at the edge of the leaves, brown with indistinct border. *Caespituli* mostly hypophyllous. *Stromata* (16) 18 ± 1.8 (20) μm diameter, intraepidermal, well-developed, composed of a few globular to angular, brown to dark brown cells. *Conidiophores* (16) 20.5 ± 3 (25.5) \times (2) 2.5 ± 0.3 (2.5) μm , 6 to numerous in a loose to dense fascicles, mostly not divergent, 1-2-septate, arising from stromata, light brown to brown, smooth, simple, straight, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (33) 47 ± 10.3 (64) \times 2 μm , solitary, long cylindrical to obclavate, 2-8-septate, straight or slightly curved, smooth, subhyaline to pale olivaceous, truncate at the base, with subacute to obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Tumbol Mae Fag, Sansai, Farming area, on leaves of *Lagerstroemia speciosa* (L.) Pers. (*Lythraceae*). Thailand, 9 August 2008, Jamjan Meeboon (BBH 23706).

Host: *Lagerstroemia flos-reginae*, *L. indica*, *L. parviflora*, *L. speciosa*, *L. subcostata*, *Punica granatum*, *Semecarpus anacardium* (*Lythraceae*) (Crous and Braun, 2003).



Distribution: Brunei, Bulgaria, China, Dominican Republic, Hong Kong, India, Japan, Korea, Mauritius, Myanmar, Panama, Papua New Guinea, Philippines,

Puerto Rico, Taiwan, Trinidad and Tobago, Uganda, U.S.A, and Virgin Islands
(Crous and Braun, 2003).

Notes: This specimen is a new record of *P. lythracearum* from Thailand.

Family Malvaceae

Cercospora althaeina Sacc. *Michelia* **1**: 269 (1878).

= *Cercospora kellermanii* Bubák, *J. Mycol.* **9**: 3 (1903).

= *Cercospora ramularia* Siemaszko, *Izv. Kavkazsk. Muz.* **12**: 28 (1919) and
Arch. Nauk Biol. Towarz. Nauk. Warszawsk. **1**: 49 (1923).

≡ *Cercopsorina ramularia* (Siemaszko) Sacc., *Syll. Fung.* **25**: 910
(1931).

= *Cercospora althaeina* var. *praecincta* Davis, *Trans. Wisconsin Acad. Sci.* **18**:
260 (1915).

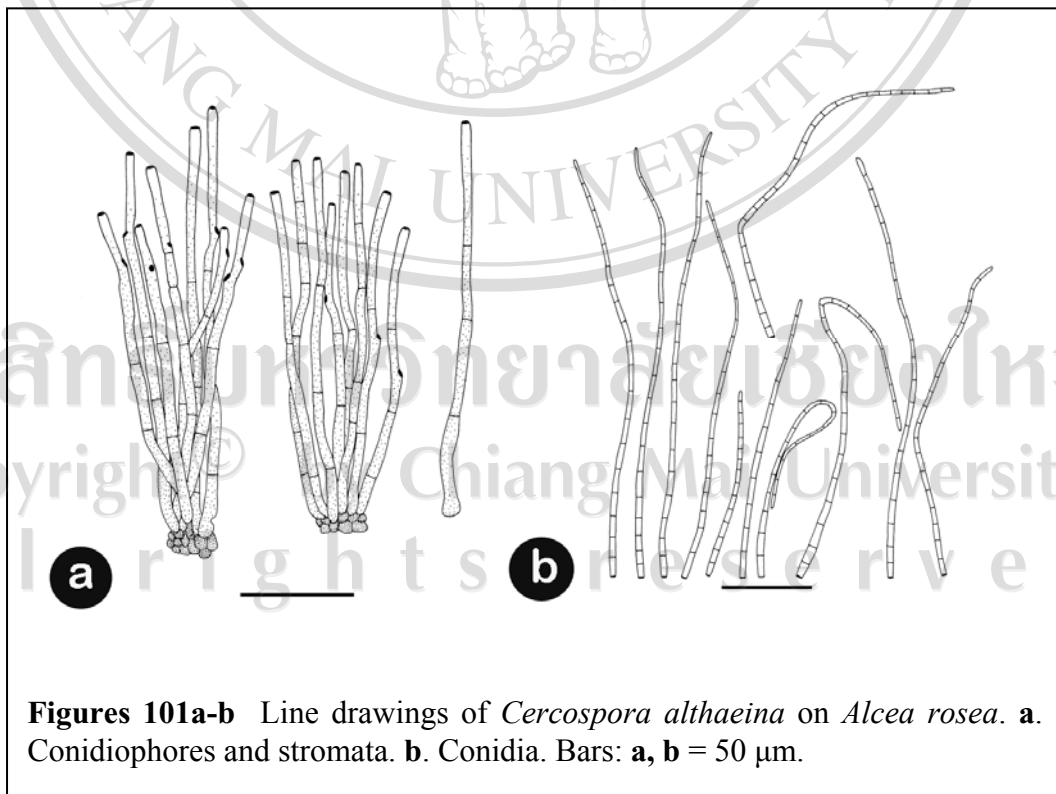
≡ *Cercospora praecincta* (Davis) Chupp, *A monograph of the fungus
genus Cercospora*: 376 (1954).

= *Cercospora althaeina* var. *althaeae-officinalis* Săvul. And Sandu, *Hedwigia*
73: 127 (1933).

= *Cercospora althaeicola* J. M. Yen and S. K. Sun, *Cryptog. Mycol.* **4**: 189
(1983).

(Figures 101a-b)

Leaf spots 1-5 mm diameter, amphigenous, dark to yellowish, only leaf decoloration on the host. *Caespituli* amphigenous. *Stromata* (12) 22.5 ± 7.8 (36) μm diameter, substomatal, small, composed of a few globose to subglobose, brown to blackish brown cells. *Conidiophores* (41) 106 ± 40.1 (186) \times (3) 3.5 ± 0.6 (5) μm , up to 8 in a densely fasciculate, 3-7-septate, arising from stromata, straight, sometime slightly constricted at the septate, smooth, brown at the base, and paler toward the apex, cylindrical, unbranched, not geniculate. *Conidiogenous cells* integrated, holoblastic, often monoblastic, sometimes polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (57) 197 ± 72.1 (316) \times (2) 3 ± 0.4 (4) μm , solitary, acicular, straight, hyaline, 14-25-septate, smooth, truncate at the base, tapering toward a subacute apex, hila 2-2.5 μm diameter, conspicuous, thickened, and darkened.



Figures 101a-b Line drawings of *Cercospora althaeina* on *Alcea rosea*. **a.** Conidiophores and stromata. **b.** Conidia. Bars: **a, b** = 50 μm .

Specimen examined: THAILAND, Chiang Rai Province, Amphur Mae Jan, Tumbol Mae Fah Luang, Doi Tung Development, on leaves of *Alcea rosea* L. (*Malvaceae*), 16 August 2008, Jamjan Meeboon (BBH 23585).

Host: *Abutilon avicennae*, *A. incanum*, *A. theophrastii*, *Alcea flavovirens*, *A. froloviana*, *A. kusariensis*, *A. litwinowii*, *A. nudiflora*, *A. pallida*, *A. rosea*, *A. rugosa*, *A. tabrisiana*, *Alcea* sp., *Althaea ficifolia*, *A. hirsuta*, *A. officinalis*, *A. rosea*, *Callirhoë involucrata*, *C. triangulata*, *Gossypium hirsutum*, *Hibiscus trionum*, *Hibiscus* sp., *Kydia calycina*, *Kydia* sp., *Lavatera thuringiaca*, *Malva neglecta*, *M. pusilla*, *M. rotundifolia*, *Malva* sp., *Modiola caroliniana*, *Napaea dioica* (*Malvaceae*) (Crous and Braun, 2003).

Distribution: Worldwide, Argentina, Armenia, Australia, Azerbaijan, Bangladesh, Brazil, Bulgaria, Canada, China, Cuba, Georgia, Germany, Guatemala, India, Iran, Italy, Jamaica, Japan, Kazakhstan, Kenya, Kirghizia, Korea, Lithuania, Malawi, Malaysia, Mauritius, Moldova, Myanmar, New Zealand, Pakistan, Romania, Russia (European part), Tadjikistan, Taiwan, Ukraine, U.S.A, Zambia, and Zimbabwe (Crous and Braun, 2003).

Notes: This specimen is the first record of *C. althaeina* from Thailand.

Literature: Chupp (1954, p.369, 376).

Cercospora malayensis F. Stevens and Solheim, *Mycologia* **23**: 394 (1931).

= *Cercospora hibisci-esculenti* Sawada (*nom. nud.*) *fide* Hsieh and Goh: 219 (1990).

= *Cercospora hibisci-sabdariffae* Sawada, *Special Publ. Coll. Agric. Natl. Taiwan Univ.* **8**: 220 (1959) (*nom. nud.*).

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

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Hibiscus rosa-sinensis* L. (*Malvaceae*), 3 November 2005, Jamjan Meeboon (CMU 27936).

Host: *Hibiscus ablemoschus*, *H. cannabinus*, *H. esculentus*, *H. ficulneus*, *H. manihot*, *H. meeusei*, *H. mutabilis*, *H. obtusilobus*, *H. rosa-sinensis*, *H. sabdariffa*, *H. suranensis*, *H. syriacus*, *H. tiliacus*, *H. urticifolius*, *Lavatera* sp., *Sphaeralcea cisplantina*, *S. cuspidata* (*Malvaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Distribution: Brazil, Brunei, Cambodia, China, Cuba, El Salvador, Ethiopia, Fiji, Ghana, India, Indonesia, Iran, Jamaica, Japan, Korea, Malaysia, Mauritius, Nepal, New Caledonia, Nigeria, Niue, Pakistan, Papua New Guinea, Philippines, Senegal, Sierra Leone, Singapore, Solomon Islands, South Africa, Sudan, Taiwan, Tanzania, Thailand, Togo, Trinidad and Tobago, Uganda, U.S.A, Venezuela, Zambia, Zimbabwe (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Notes: The first record of this species was published by Meeboon *et al.* (2008).

Passalora sidae-mysorensis Meeboon and Hidayat, *Mycotaxon* **102**: 142-143 (2007).

Mycobank MB 510840

(Figure 102)

Maculae amphigenae, subcirculares, centro pallide brunneo, deinde atro-brunneo, margine indistincto, 3-13 mm diameter Caespituli amphigeni. Stromata nulla vel parva, ad 9.5 μm diameter, ex cellulis globosis vel subglobosis, 2-4, composita. Conidiophora 5-12, laxe vel dense fasciculata, 2-4-septata, ramosa, 2-3-geniculata, 83-112 \times 5-6.5 μm , basi brunnea, apicem versus pallidiora, tenuitunicata vel leviter crassitunicata, levia. Cellulae conidiogenae integratae, terminales, sympodiales. Loci conidiogeni conspicui, leviter incassati et fuscati, 1-2.5 μm diameter Conidia catenata, interdum ramificata, cylindrica vel breve clavata, basi obconice truncata, apicem versus saepe latiora, 14-40 \times 6-9 μm , 0-3-septata, subhyalina vel pallidus-brunneus, levia, tenuitunicata, hila incrassata et fuscata, 1-2.5 μm diameter

Etymology: the epithet refers to the name of the host.

Leaf spots amphigenous, subcircular, center pale brown, darker towards the periphery with inconspicuous margin, 3-13 mm in diameter. *Caespituli* amphigenous. *Stromata* lacking to small, if present up to 9.5 μm in diameter, composed of 2-4 globose to subglobose, brown cells. *Conidiophores* 83-112 \times 5-6.5 μm , 5-12 in a loosely to densely fasciculate, 2-4-septate, arising from stromata, thin-walled to slightly thickened, smooth, brown at the base and paler towards the apex, branched, strongly geniculate 2-3 times near the tip. *Conidiogenous cells* integrated, terminal, sympodially proliferating. *Conidiogenous loci* 1-2.5 μm in diameter, conspicuous, slightly thickened and darkened. *Conidia* 14-40 \times 6-9 μm , catenate, sometimes in branched chains, cylindrical to short clavate, at base obconically truncate and narrow at the base, broader towards the apex, 0-3-septate, subhyaline to pale brown, thin-walled, smooth, hila 1-2.5 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Sida mysorensis* Wight and Arn. (*Malvaceae*), 15 November 2005, Jamjan Meeboon (CMU 28207: **holotype**). **Paratype:** the same locality, 2 October 2006, Jamjan Meeboon (CMU 28206).

Host: *Sida mysorensis* (*Malvaceae*).

Distribution: Thailand (type locality).

Notes: Seven species of *Passalora* are hitherto known associated with *Malvaceae*, viz, *P. althaeigena* (J. M. Yen and S. K. Sun) U. Braun and Crous, *P. bastardiae* (Petr. and Cif.) U. Braun and Crous, *P. hughesii* (Munt.-Cvetk.) U. Braun and Crous, *P. malvacearum* (B. Rai and Kamal) U. Braun and Crous, *P. pavoniicola* U. Braun and Freire, *P. sidarum* (Petr. and Cif.) U. Braun and Crous and *P. sidae-cordifoliae* Crous et al. These species, except for *P. althaeigena* and *P. sidae-cordifoliae*, are former *Mycovellosiella* species, i.e., they are distinguished from *P. sidae-mysorensis* by having superficial mycelium with solitary conidiophores (Braun and Freire, 2004; Chupp, 1954; Muntañola, 1960; Petrak and Ciferri, 1932; Rai and Kamal, 1985). *Passalora althaeigena* is also characterized by having amphigenous leaf spots and colonies, as well as fasciculate conidiophores (Hsieh and Goh 1990, Crous and Braun 2003), but it is distinct from *P. sidae-mysorensis* by its much longer, pluriseptate conidia, formed singly. Two species of *Passalora* have been described from *Sida* spp., viz, *P. sidae-cordifoliae* and *P. sidarum*. The latter species, previously assigned to *Mycovellosiella*, has superficial mycelium with solitary conidiophores, and *P. sidae-cordifoliae* is distinguished from *P. sidae-mysorensis* by solitary, much longer, pluriseptate conidia (Crous et al., 1999).

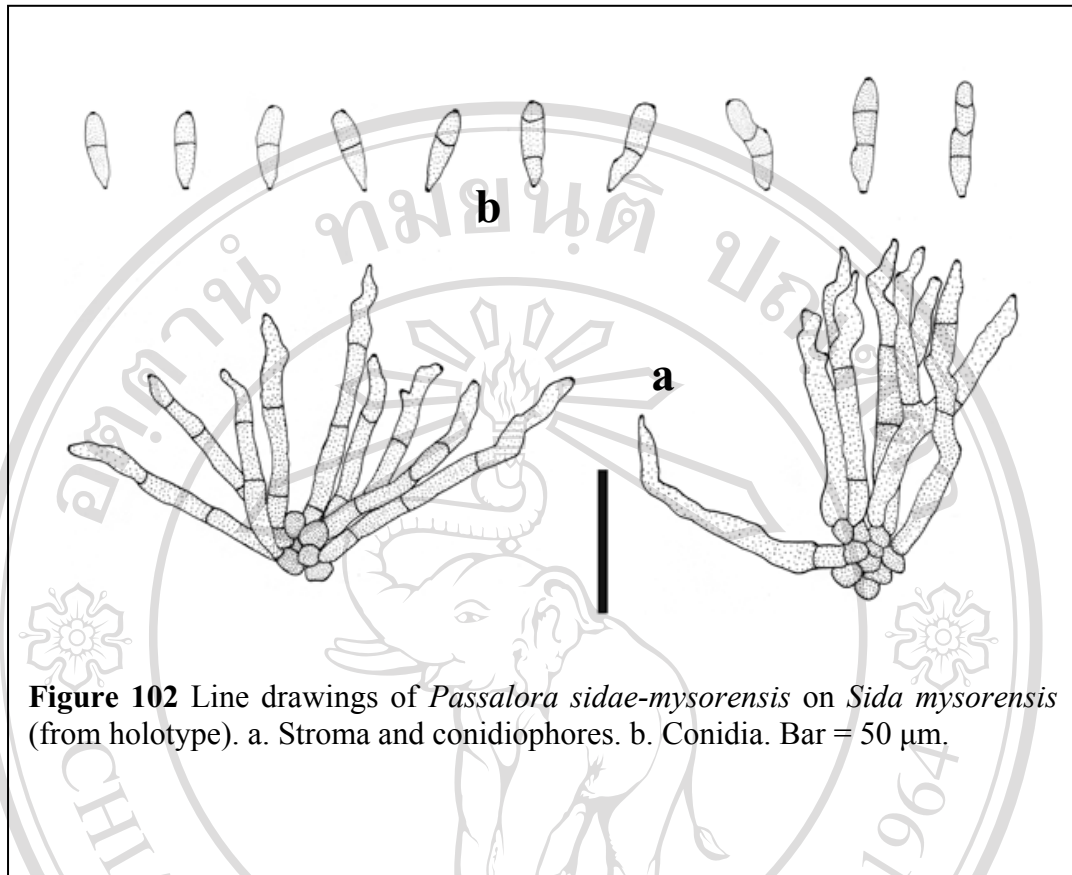


Figure 102 Line drawings of *Passalora sidae-mysorensis* on *Sida mysorensis* (from holotype). a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Pseudocercospora abelmoschi (Ellis and Everh.) Deighton, *Mycol. Pap.* **140**: 138 (1976).

= *Cercospora abelmoschi* Ellis and Everh., *J. Inst. Jamaica* **1**: 347 (1893).

= *Cercospora hibisci* Tracy and Earle, *Bull. Torrey Bot. Club* **22**: 179 (1895).

= *Cercospora hibisci-manihotis* Henn., *Hedwigia* **43**: 146 (1904).

(Figure 103)

Leaf spots 6-20 mm diameter, amphigenous, circular to irregular, scattered, brown, with blackish-brown margins. *Caespituli* hypophyllous. *Stromata* (24) 48 ± 23.3 (79) μ m diameter, intraepidermal, well-developed, composed of globose and

subglobose, brown to dark brown cells. *Conidiophores* (10) 15.5 ± 3.6 (22.5) \times (2) 2.5 ± 0.4 (3) μm , numerous in a densely fasciculate, 0-1-septate, arising from the stromata, straight, pale olivaceous-brown, smooth, simple, slightly geniculate near the apex. *Conidiogenous cells* integrated, terminal holoblastic, monoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (10) 20.5 ± 5.8 (28) \times (2.5) 2.5 ± 0.5 (3) μm , solitary, obclavate to subcylindric, 1-5-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the base, with obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Queen Sirikit Botanic Garden, on leaves of *Hibiscus* sp. (*Malvaceae*), 20 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27922); Chiang Mai Province, Tumbol Mae Fag, Sansai, Farming area, on leaves of *Hibiscus sabdariffa* L. (*Malvaceae*), 9 August 2008, Jamjan Meeboon (BBH 23709).

Host: *Hibiscus abelmoschus*, *H. cannabis*, *H. cannabinus*, *H. esculentus*, *H. manihot*, *H. ponticus*, *H. rosa-sinensis*, *H. sabdariffa*, *H. syriacus*, *H. tiliaceus* (*Malvaceae*) (Crous and Braun, 2003).

Distribution: American Samoa, Antigua and Barbuda, Australia, Bangladesh, Barbados, Bermuda, Brazil Brunei, China, Cuba, Dominican Republic, Fiji, French Antilles, gabon, Georgia, Ghana, Grenada, Guinea, India, Indonesia, Iran, Jamaica, Japan, Kenya, Korea, Malawi, Malaysia, Mauritius, Myanmar, Nepal, Nigeria, Pakistan, Palau, Panama, Philippines, Puerto Rico, Samoa, Sarawak, Saint Vincent and the Grenadines, Singapore, Sri Lanka, Sudan, Taiwan, Tanzania, Thailand, Togo,

Tonga, Trinidad and Tobago, Uganda, U.S.A, Vanuatu, Venezuela, Virgin Islands, Yemen, and Zimbabwe (Crous and Braun, 2003).

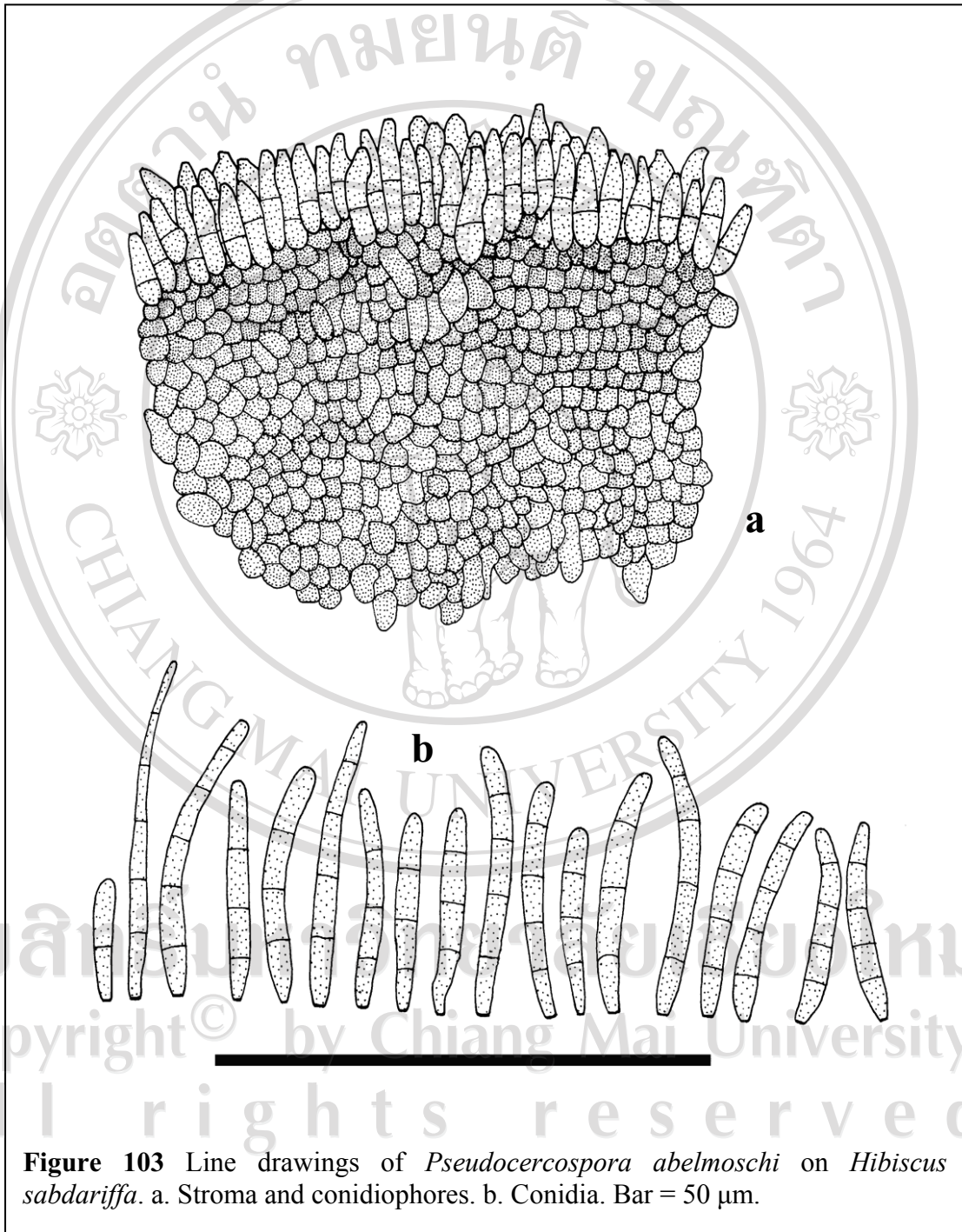


Figure 103 Line drawings of *Pseudocercospora abelmoschi* on *Hibiscus sabdariffa*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Notes: Petcharat and Kanjanamansethian (1989) reported this species as ‘*C. abelmoschi* Ellis and Everh.’ on *A. esculentus*. However, Deighton (1976) transferred *C. abelmoschi* to *Pseudocercospora*. The present specimen is a true *Pseudocercospora* due to unthickened conidiogenous loci and hila. The leaf spots of this specimen are amphigenous and have small stromata (12-27 µm in diameter). The conidiophores are brown or pale brown, straight and (12) 20-46.5 (56.5) × 2.5-5 µm. The conidia are obclavate and (17) 22-61.5 (66) × 3.5-5 µm, with 4-6 septate.

Family Meliaceae

Pseudocercospora subsessilis (Syd. and P. Syd.) Deighton, *Mycol. Pap.* **140**: 154 (1976).

≡ *Cercospora subsessilis* Syd. and P. Syd, *Ann. Mycol.* **11**: 329 (1913).

≡ *Cercosporina subsessilis* (Syd. and P. Syd.) Sacc. *Syll. Fung.* **25**: 911 (1931).

= *Cercosporia domingensis* Cif., *Ann. Mycol.* **36**: 231 (1938).

= *Pseudocercospora meliae* A. N. Rai and Kamal, *Curr. Sci.* **51**: 287 (1982).

= *Cercospora subsessilisi* var. *azadirachtae* R. Srivast. (*acadirachtii*), *Zentralbl.*

Bakteriol. Parasitenk. Infektionskrankheiten Hyg., 2. Abt., Allg.

Landwirtschaftliche techn. Mikrobiol. **135**: 559 (1980).

= *Pseudocercospora meliae* S. R. Chowdhury and Chandal, *Proc. Natl. Acad.*

Sci. India, Sect. B, **56**: 83 (1986).

= *Pseudocercospora indica* A. N. Rai, B. Rai, and Kamal, *Mycol. Res.* **97**: 29 (1993).

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Melia azedarach* L. (*Meliaceae*), 10 December 2006, Jamjan Meeboon and Ikumitsu Araki (CMU 27915).

Host: *Azadirachta indica*, *Melia azedarach*, *Melia* sp., *Swietenia macrophylla*, *S. mahagoni* (*Meliaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Barbados, China, Cuba, Dominican Republic, Ecuador, Hong Kong, India, Jamaica, Japan, Myanmar, Nepal, Pakistan, Palestine, Peru, Philippines, Puerto Rico, Sierra Leone, Somalia, Sri Lanka, Sudan, Taiwan, Thailand, U.S.A, Venezuela, and Virgin Islands (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: *Pseudocercospora subsessilis* was firstly reported on *M. azedarach* from Thailand by Meeboon *et al.* (2007c).

Family *Menispermaceae*

***Pseudocercospora pericampyli* Meeboon, Hidayat, and To-anun, sp. nov.**

(Figure 104)

Leaf spots 10-20 mm diameter, amphigenous, solitary, scattered through the host surface, circular to subcircular, brown, with dark brown margin. *Caespituli* amphigenous. *Stromata* 22-53 μm diameter, intraepidermal, well-developed, and composed of globose to subglobose, brown to dark brown cells. *Conidiophores* 84-207 \times 3-4 μm , 13-25 in a very dense fascicles, not divergent, 2-6-septate, arising from stromata, smooth, brown, and paler towards the apex, straight to decumbent,

sometimes branched, slightly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* $27-116 \times 3-4 \mu\text{m}$, solitary, obclavate to filiform, straight to mildly curved, hyaline to subhyaline, 6-8-septate, smooth, truncate at the base, with obtuse to subobtuse apex, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Taeng, T. Pa Pae, Bahn Phadeng, Pathumikaram Temple, on leaves of *Pericampylus glaucus* Merr. (*Menispermaceae*), 9 September 2007, Nilam Wulandari (JM 106: **holotype**).

Host: *Pericampylus glaucus* (*Menispermaceae*).

Distribution: Thailand (type locality).

Notes: About four species of *Pseudocercospora*, viz, *P. cocculi* (Syd.) Deighton, *P. cocculicola* (W. W. Ray) U. Braun and Crous, *P. pareirae* (Speg.) Crous and U. Braun, and *P. triloba* (Chupp) U. Braun and Crous, have been recorded from plant family *Menispermaceae*. This specimen is distinct from these similar species by having very long conidiophores ($84-207 \times 3-4 \mu\text{m}$) in a very densely fasciculate but not divergent, and long conidia with truncate base.

Literature: Chupp (1954, p. 389-391).



Figure 104 Line drawings of *Pseudocercospora pericampyli* on *Pericampylus glaucus* (from holotype). a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Family Moraceae

Cercospora broussonetiicola Y. L. Guo and L. Xu, *Mycosystema* **21**: 181 (2002).

Specimen examined: THAILAND, Chiang Mai Province, Mae Jo University, on leaves of *Broussonetia papyrifera* Vent. (*Moraceae*), 19 August 2005, Jamjan Meeboon (CMU 28209).

Host: *Broussonetia kaempferi* (*Moraceae*) (Guo and Xu, 2002; Meeboon *et al.*, 2007d).

Distribution: China and Thailand (Guo and Xu, 2002; Meeboon *et al.*, 2007d).

Notes: *Cercospora broussonetiicola* has only been reported on *Broussonetia kaempferi* Siebold (Crous and Braun 2003). This species was firstly reported occurred on *B. papyrifera* from Thailand by Meeboon *et al.* (2007d).

Cercospora ficina Tharp, *Mycologia* **9**: 109 (1917).

≡ *Cercospora ficina* (Tharp) Sacc., *Syll. Fung.* **25**: 911 (1931).

(Figures 105a-b)

Leaf spots amphigenous, circular or subcircular, 15-30 mm diameter, at first pale greenish to ochraceous, later brown to dark brown, finally with grayish brown centre, surrounded by a dark margin or brown halo. Colonies hypophyllous, ochre yellow, velvety. *Stromata* intraepidermal, well-developed, subglobose, brown to blackish brown, (17)30 ± 8.03(38) µm diameter *Conidiophores* loosely to densely

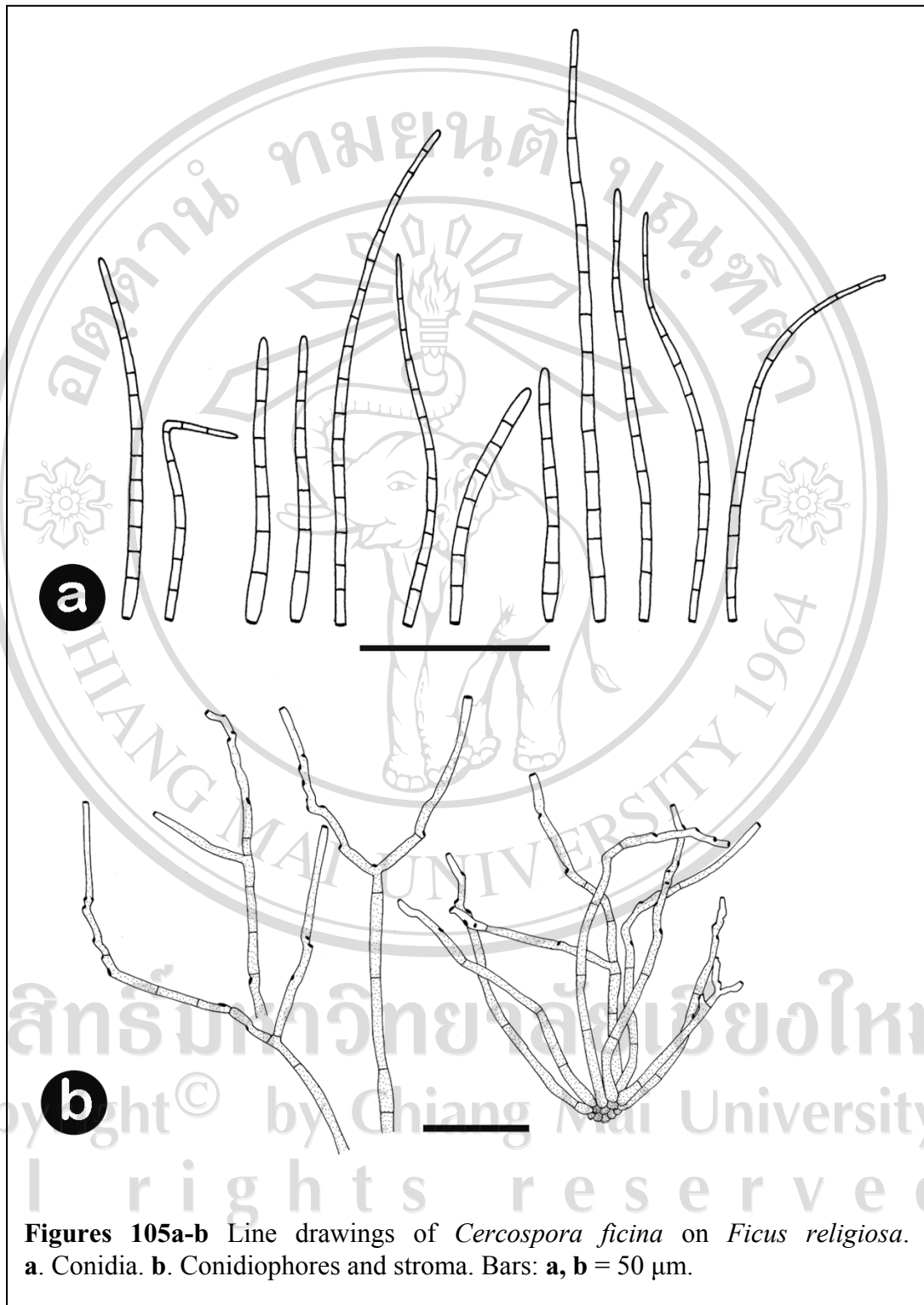
fasciculate, numerous, arising from stromata, simple, straight, branched, subcylindrical, geniculate to sinuous, erect to decumbent, $(42)143.07 \pm 64.75(229) \times (3)4.52 \pm 0.85(6) \mu\text{m}$, smooth, pale yellow to pale brown, 2-9-septate. *Conidiogenous cell* integrated, terminal, sympodially proliferating. *Conidiogenous loci* conspicuous, thickened, darkened. *Conidia* solitary, narrowly obclavate to subacicular, straight, $(42.5)83.78 \pm 24.05(161) \times (2) 2.75 \pm 0.63 (4.5) \mu\text{m}$, hyaline, 7-14-septate, smooth, apex subacute, base obconically truncate, hilum thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, Faculty of Agriculture, on leaves of *Ficus religiosa* L. (*Moraceae*), 18 August 2008, Jamjan Meeboon (BBH 23557).

Host: *Ficus carica*, *F. hispida*, *F. religiosa*, *F. uliginosa*, *F. urceolaria*, *Streblus asper* (*Moraceae*) (Crous and Braun, 2003).

Distribution: India, Indonesia, Nigeria, Pakistan, Sudan, Uganda, and U.S.A (Crous and Braun, 2003).

Notes: This specimen is a new record of *C. ficina* from Thailand.



Cercospora elasticae A. Zimm., *Bull. Inst. Bot. Buitenzorg* **10**: 17 (1901).

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

(Figure 106)

Leaf spots 5-8 mm diameter, distinct, amphigenous, scattered, circular or subcircular to angular, sometimes forming large symptoms, up to 30 mm diameter, greyish brown, with dark margins. *Caespituli* epiphyllous. *Stromata* (18) 20.5 ± 2.3 (24) μm diameter, intraepidermal, small, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* (63) 91.5 ± 26.5 (139) \times (3) 3.5 ± 0.5 (4) μm , 5-8 in a loosely and divergent fasciculate, 2-4-septate, arising from stromata, erect to decumbent, smooth, pale yellow to pale brown, not branched, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic to polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (120) 142 ± 15.4 (160) \times 3 μm , solitary, acicular, 8-13-septate, hyaline, smooth, truncate at the base, with acute to subacute apex, hila 2-2.5 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Samoeng, Pang Da Royal project, on leaves of *Ficus carica* L. (*Moraceae*), 5 August 2008, Jamjan Meeboon (BBH 23728).

Host: *Ficus carica*, *F. elastica* (*Moraceae*) (Crous and Braun, 2003).

Distribution: India, Indonesia, U.S.A, and Venezuela (Crous and Braun, 2003).

Notes: This specimen is a new record of *C. elasticae* from Thailand.

Literature: Chupp (1954, p. 395).

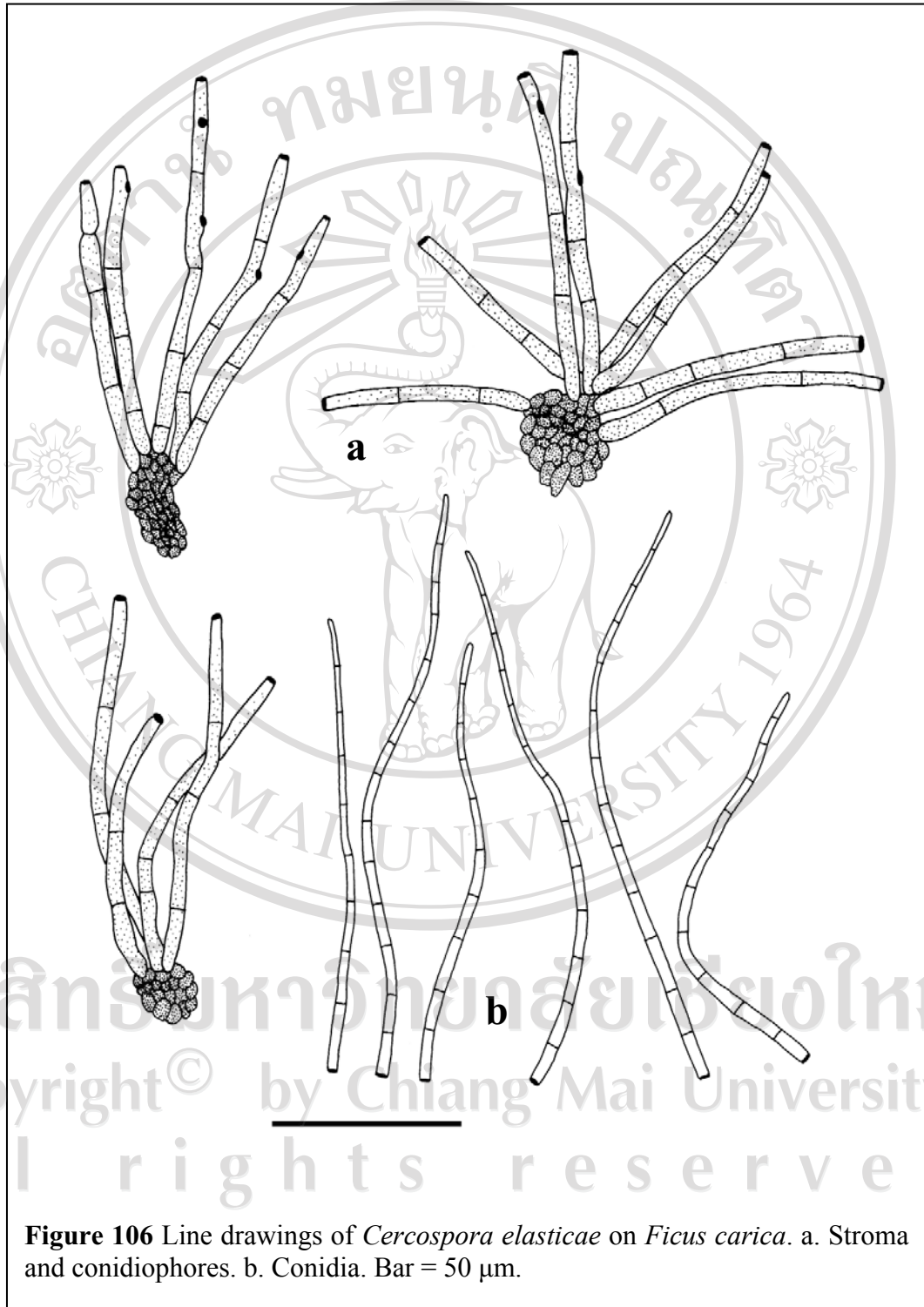


Figure 106 Line drawings of *Cercospora elasticae* on *Ficus carica*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Cercospora morina Chupp, *A monograph of the genus Cercospora*: 400 (1954).

(= *C. apii* s. lat)

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Morus alba* L. (*Moraceae*), 3 December 2005, Jamjan Meeboon (CMU 27926).

Host: *Morus alba* (*Moraceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007b).

Distribution: Brazil, Estonia, Latvia, Russia (European part), and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007b).

Notes: The first report of *C. morina* on this plant in Thailand was made by Chandrasrikul (1962). Meeboon *et al.* (2007b) re-collected and illustrated this species.

Pseudocercospora fici (Heald and F. A. Wolf) X. J. Liu and Y. L. Guo, *Mycosystema* 4: 100 (1991).

≡ *Cercospora fici* Head and F. A. Wolf, *Mycologia* 3: 16 (1911).

= *Cercospora ficicola* Bond. -Mont., *Trudy Bot. Inst. Akad. Nauk SSR*, Ser. 2, 3: 755 (1936).

(Figure 107)

Leaf spots 1-2 mm diameter, circular, angular to irregular, scattered, later coalescing to large spots, 3-23 mm diameter, grayish-brown, with blackish-brown border on the upper leaf surface, pale greenish with indistinct border on the lower leaf

surface. *Caespituli* amphigenous. *Stromata* (21) 34.5 ± 11 (54) μm diameter, intraepidermal, small to well-developed, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (36.5) 50.5 ± 10.2 (70) \times (2.5) 3 ± 0.2 (3) μm , numerous in a dense fascicles, 1-4-septate, arising from the stromata, pale olivaceous-brown, smooth, simple, geniculate near the apex.. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (44) 77.5 ± 19.3 (100) \times (2.5) 2.5 ± 0.3 (3.5) μm , solitary, acicular to obclavate, 6-10-septate, straight or slightly curved, smooth, pale olivaceous, truncate at basal end, with acute apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Ficus rumphii* Blume (*Moraceae*), 3 December 2005, Jamjan Meeboon (CMU 27923); Chiang Mai Province, Amphur Muang, Tumbol Sri Pum, Chiang Mai Park, on leaves of *Ficus punctata* Thunb. (*Moraceae*), 15 August 2008, Jamjan Meeboon (BBH 23581).

Host: *Ficus bengalensis*, *F. carica*, *F. coronata*, *F. chartacea*, *F. cunia*, *F. elastica*, *F. fistulosa*, *F. hispida*, *F. orthoneurea*, *F. pumila*, *F. radicans*, *F. religiosa*, *F. repens*, *F. scandens*, *F. sycomorus*, *F. uliginosa* and *F. urceolaris* (*Moraceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Australia, Azerbaijan, China, Georgia, India, Iran, Japan, Madagascar, Nigeria, Russia (European part), Taiwan, Thailand, U.S.A, Uganda, and Vanuatu (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first report of *P. fici* from Thailand was made by Meeboon *et al.* (2007c), including *Ficus rumphii* as a new host. Previously recorded hosts of this

species are *Ficus bengalensis*, *F. carica*, *F. coronata*, *F. chartacea*, *F. cunia*, *F. elastica*, *F. fistulosa*, *F. hispida*, *F. orthoneurea*, *F. pumila*, *F. radicans*, *F. religiosa*, *F. repens*, *F. scandens*, *F. sycomorus*, *F. uliginosa*, and *F. urceolaris* (Crous and Braun, 2003).

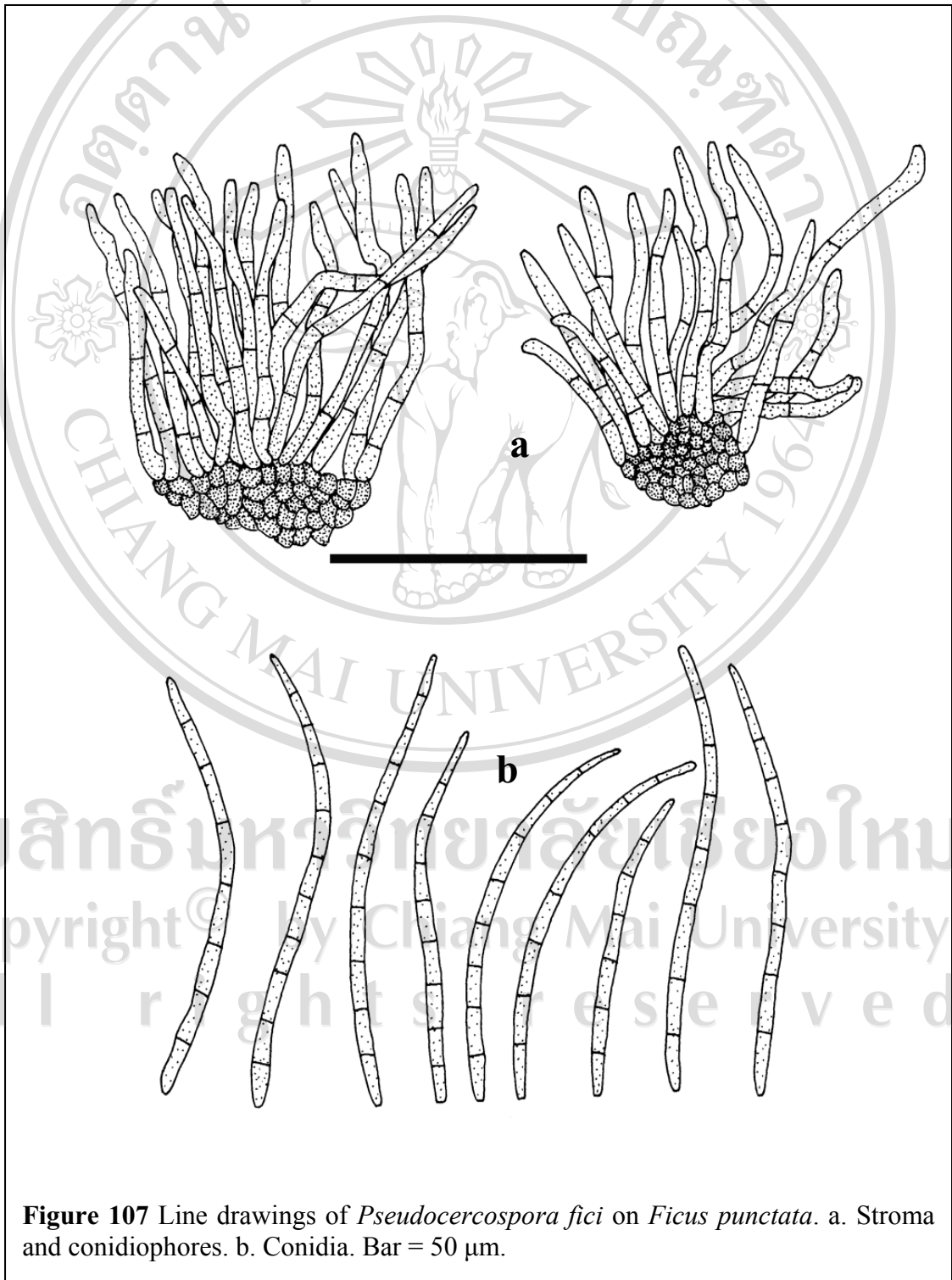


Figure 107 Line drawings of *Pseudocercospora fici* on *Ficus punctata*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Pseudocercospora fici-religiosae (Chidd.) U. Braun, Bagyan., and Jagad, *Int. J. Mycol. Lichenol.* **4**: 366 (1992).

≡ *Cercospora fici-religiosae* Chidd., *Sydowia* **13**: 161 (1959).

(Figures 108a-b)

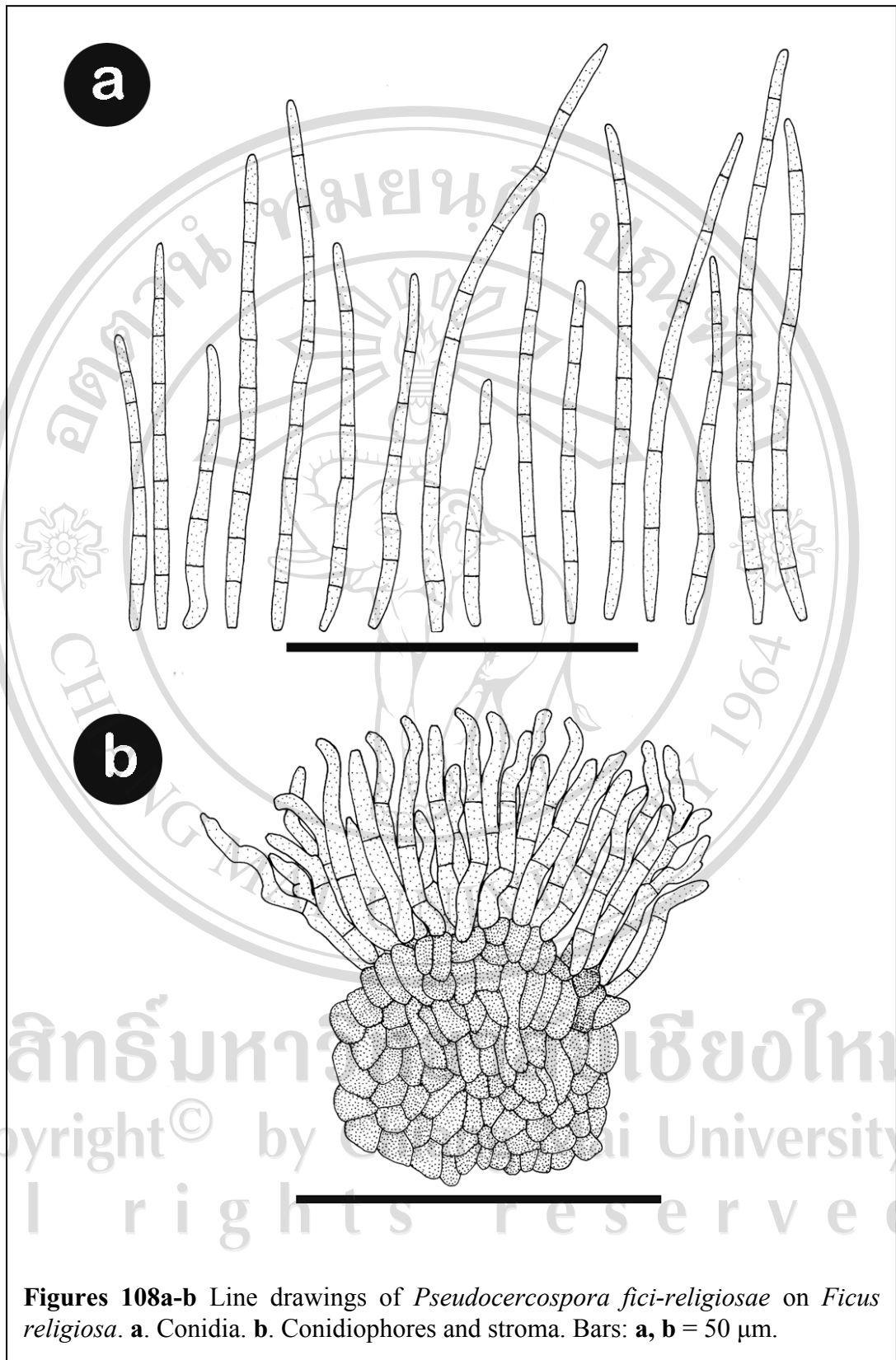
Leaf spots 3-23 mm diameter, amphigenous, circular, circular to irregular, sometimes angular, scattered, grayish-brown, with dark brown margin. *Caespituli* hypophyllous. *Stromata* (40) 47 ± 4.1 (53) μm diameter, intraepidermal, well-developed, composed of brown and dark brown cells. *Conidiophores* (24) 46 ± 11 (60) \times (2) 2.5 ± 0.4 (3.5) μm , numerous in a densely fasciculate, 1-3-septate, arising from the stromata, straight, pale olivaceous-brown, smooth, simple, geniculate near the apex. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic, sumpodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (25) 51.5 ± 17 (88.5) \times (1.5) 2 ± 0.3 (2.5) μm , solitary, acicular to obclavate, 4-10-septate, straight or slightly curved, smooth, pale olivaceous, truncated at the base, with acute apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, Faculty of Agriculture, on leaves of *Ficus religiosa* L. (*Moraceae*), 18 August 2008, Jamjan Meeboon (BBH 23557).

Host: *Ficus cunia*, *F. religiosa*, *F. uliginosa* (*Moraceae*) (Crous and Braun, 2003).

Distribution: India (Crous and Braun, 2003).

Notes: This specimen is a new record of *P. fici-religiosae* from Thailand.



Figures 108a-b Line drawings of *Pseudocercospora fici-religiosae* on *Ficus religiosa*. **a.** Conidia. **b.** Conidiophores and stroma. Bars: **a, b** = 50 µm.

Pseudocercospora mori (Hara) Deighton, *Mycol. Pap.* **140**: 148 (1976).

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

= *Cercospora mori* Marchal and Steyaert, *Bull. Soc. Roy. Bot. Belgique* **61**: 166 (1929) (*nom. illeg.*), homonym of *C. Mori* Hara (1918).

(Figure 109)

Leaf spots amphigenous, but almost indistinct, only leaf decoloration. *Caespituli* hypophyllous. *Stromata* (24) 29.5 ± 6.2 (38) μm diameter, small, substomatal to intraepidermal, composed of globose to subglobose, brown to dark brown cells, mycelium internal and external also present. *Conidiophores* (19) 23 ± 4.3 (31) \times (2) 2.5 ± 0.4 (3) μm , 6-10 in a dense fascicles, 1-2-septate, not divergent, arising from the upper part of stromata as well as external hyphae and stoma, smooth, pale olivaceous-brown, simple, straight, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, monblastic, sometimes polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (23) 32.5 ± 10.2 (54) \times (2) 2 ± 0.3 (3) μm , solitary, mostly obclavate, sometimes long cylindrical to slightly acicular, 3-5-septate, straight or slightly curved, smooth, pale olivaceous, base obconically truncate, with subacute to obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Tumbol Mae Fag, Sansai, Farming area, on leaves of *Morus* sp. (*Moraceae*) 9 August 2008, Jamjan Meeboon (BBH 23711).

Host: *Morus acidosa*, *M. alba*, *M. nigra*, *M. rura*, *Morus* sp. (*Moraceae*)
(Crous and Braun, 2003).

Distribution: Bangladesh, Belgium, China, Congo, Georgia, India, Japan, Lebanon, Myanmar, Pakistan, Singapore, Taiwan, Thailand, and U.S.A (Crous and Braun, 2003).

Notes: The first report of *P. mori* in Thailand was made by Sontirat *et al.* (1980) as '*Cercospora mori*' on *Morus alba* L.

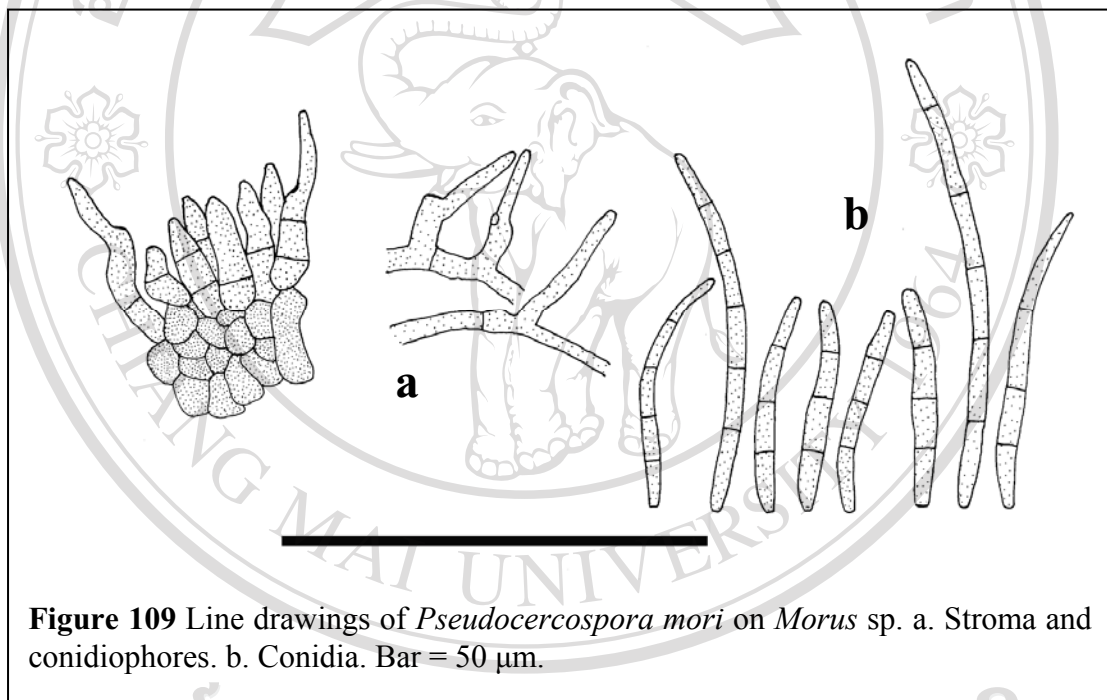


Figure 109 Line drawings of *Pseudocercospora mori* on *Morus* sp. a. Stroma and conidiophores. b. Conidia. Bar = 50 µm.

Pseudocercospora fici-caricae (Sawada) Goh and W. H. Hsieh, *Cercospora and similar Fungi from Taiwan*: 237 (1990).

≡ *Cercospora fici-caricae* Sawada, *Rep. Dept. Agric. Gov. Res. Inst. Formosa* 2: 151 (1922).

(Figure 110)

Leaf spots 2-11 mm diameter, amphigenous, distinct, angular to irregular, scattered, grayish brown with pale at the centre, with dark brown margin, sometimes limited by vein. *Caespituli* epiphyllous. *Stromata* 14-24.5 µm diameter, intraepidermal, small, composed of globular to angular, brown to blackish brown cells. *Conidiophores* 10-25 × 3-4 µm, numerous in a dense fascicles, 2-4-septate, not divergent, arising from the stromata, brown, smooth, simple, straight, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 12.5-80 × 2.5-3 µm, solitary, filiform-obclavate, 1-3-septate, straight or curved, smooth, pale olivaceous, truncate at the base, with subacute to obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Pang Da Royal Project, on leaves of *Ficus carica* L. (*Moraceae*), 5 August 2008, Jamjan Meeboon (BBH 23728).

Host: *Ficus carica* (*Moraceae*) (Crous and Braun, 2003).

Distribution: Korea and Taiwan (Crous and Braun, 2003).

Notes: About eight species of *Pseudocercospora*, viz, *P. angulomaculae* (A. K. Kar and M. Mandal) U. Braun and Crous, *P. caudata* (J. Kranz) U. Braun, *P. cladophora* Sawada ex Goh and W. H. Hsieh, *P. fici* (Heald and F. A. Wolf) X. J. Liu and Y. L. Guo, *P. fici-caricae* (Sawada) Goh and W. H. Hsieh, *P. fici-chartaceae* (J. M. Yen and Lim) J. M. Yen, *P. fici-religiosae* (Chidd.) U. Braun, Bagyan., and Jagad., and *P. fici-septicae* Goh and W. H. Hsieh, have been recorded associated with plant genus *Ficus*. This specimen is much closed to *P. fici-caricae* in having epiphyllous

caespituli, small stromata, and short conidiophores in a densely fasciculate, and filiform-obclavate conidia. This specimen is a new record of *P. fici-caricae* from Thailand.

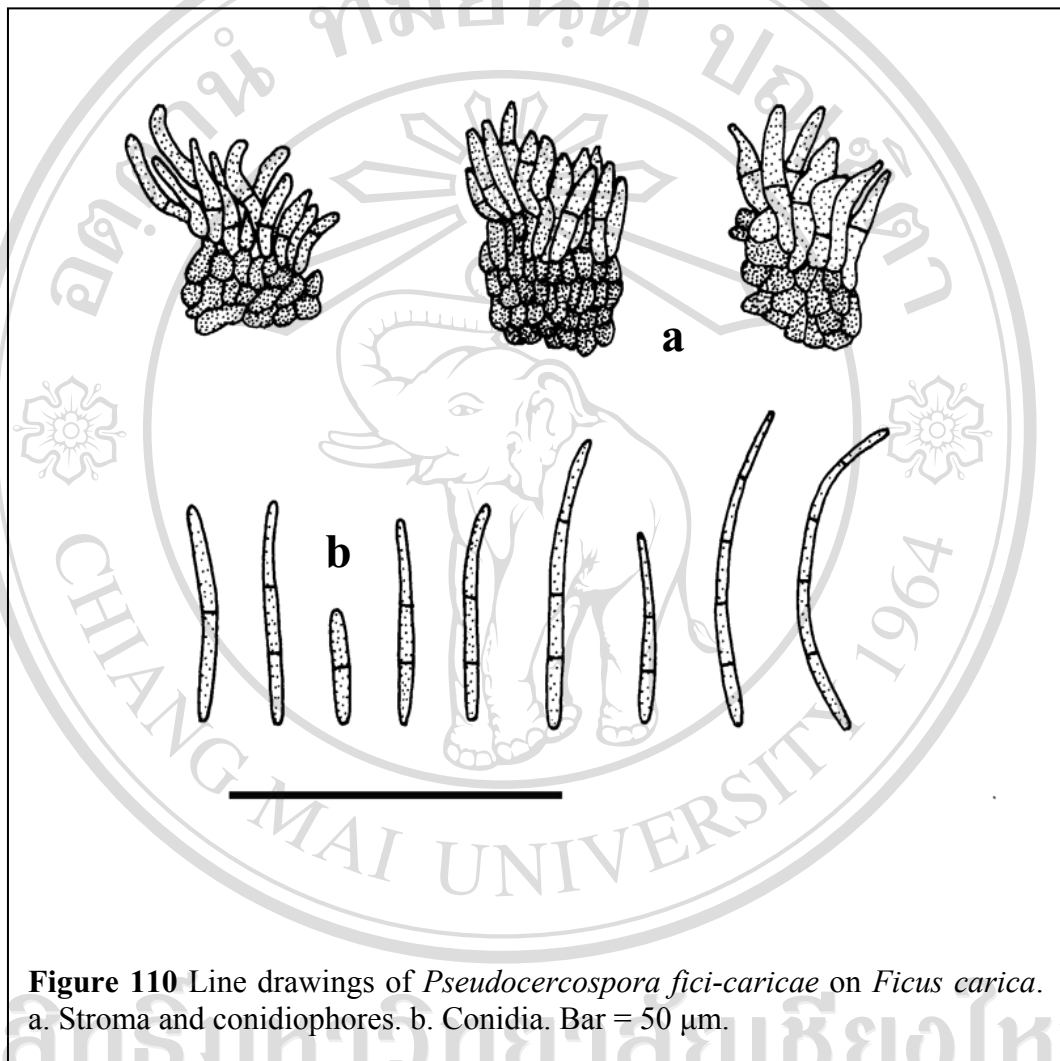


Figure 110 Line drawings of *Pseudocercospora fici-caricae* on *Ficus carica*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Pseudocercospora mU.S.Ae (Zimm.) Deighton, *Mycol. Pap.* **140**: 148 (1976).

≡ *Cercospora mU.S.Ae* Zimm., *Centralbl. Bakteriolog.*, **Abt. 2, 8**: 219 (1902).

= *Cercospora mU.S.Ae* Masee, *Bull. Misc. Inform.* **28**: 159 (1914).

≡ *Mycosphaerella musicola* R. Leach, *Trop. Agric.* **18**: 92. (1941) (*nom. nud.*).

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *MU.S.A acuminata* Colla (*MU.S.Aceae*), 3 November 2005, Jamjan Meeboon (CMU 27945).

Host: *MU.S.A acuminata*, *M. banksii*, *M. basjoo*, *M. cavendishii*, *M. liukiensis*, *M. nana*, *M. paradisiaca*, *M. sapientum*, *M. textilis*, *M. ventricosa* (*MU.S.Aceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Distribution: Widely distributed, including American Samoa, Angola, Antigua and Barbuda, Argentina, Australia, Bahamas, Barbados, Belau, Belize, Bolivia, Brazil, Brunei, Bhutan, Cambodia, Cameroon, Cape Verde, Cayman Islands, China, Colombia, Congo, Cook Islands, Costa Rica, Cuba, Dominican Republ., Ecuador, Egypt, El Salvador, Ethiopia, Fiji, France, Guiana, French Polynesia, Guiana, French Polynesia, Gabon, Ghana, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, India, Indonesia, Ivory Coast, Jamaica, Kenya, Kiribati, Laos, Madagascar, Malawi, Malaysia, Martinique, Mauritius, Mexico, Micronesia, Montserrat, Mozambique, Nepal, New Caledonia, Nicaragua, Nigeria, Niue, Norfolk Island, Panama, Papua New Guinea, Peru, Philippines, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, São Tomé e Príncipe, Sierra Leone, Solomon Islands, Somalia, South Africa, Sri Lanka, Suriname, Taiwan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tuvalu, Uganda, U.S.A, Vanuatu, Venezuela, Vietnam, Wallis and Futuna Islands, Yemen, Zambia, and Zimbabwe (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Notes: Meeboon *et al.* (2008) were the first of reporting this species from Thailand.

Family *Myricaceae*

Passalora myricae Meeboon, Hidayat and C. Nakash., *Sydowia* **60**: 256-257 (2008)

Mycobank No. MB 510476

(Figure 111)

Maculae amphigenae, orbiculares, centro pallide brunneae vel fumosae, margine fuscae, 0.5-5 mm diameter Caespituli amphigeni. Stromata intraepidermalia, parva, (0.5) 12.2 ± 4.5 (26.5) µm diameter, ex cellulis, globosis vel subglobosis, brunneis vel atro-brunneis. Conidiophora 2-14-fasciculata, per stroma emergentia, cylindrica, 0-1-septata, non-ramosa, recta, ad apicem leviter truncata, tenuitunicata, levia, (7.6) 22.3 ± 5.4 (36.4) × (1.8) 4.1 ± 0.7 (5.7) µm, basi brunnea, apicem versus pallidiora. Cellulae conidiogenae (5.9) 7.5 ± 0.6 (9.1) × (1.7) 4.1 ± 0.8 (5.8) µm, integratae, terminales, monoblastic, sympodiales. Loci conidiogeni conspicui, incrassati et fuscati, (0.6) 1.3 ± 0.4 (2.4) µm diameter Conidia solitaria, obclavata, recta vel leviter curvata, basi truncata, apicem acuta vel subacuta, protuberantia, (13.6) 40.1 ± 9.9 (66.9) × (1.8) 4.2 ± 0.7 (5.7) µm, 4-5-septata, pallide brunneae, tenuitunicata, levia, hila incrassata et fuscata, (0.6) 1.3 ± 0.4 (2.4) µm diameter

Etymology: the epithet refers to the genus name of the host.

Leaf spots 0.5-5 mm diameter, amphigenous, orbicular, pale brown to dingy gray at center, with a darker margin. *Caespituli* amphigenous. *Stromata* (0.5) 12.2 ± 4.5 (26.5) μm diameter ($n = 10$), intraepidermal, small, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (7.6) 22.3 ± 5.4 (36.4) \times (1.8) 4.1 ± 0.7 (5.7) μm ($n = 30$), 2-14 in a divergent fasciculate, 0-1-septate, arising from stromata, cylindrical, thin-walled, smooth, brown at the base and paler towards to the apex, unbranched, straight, slightly truncated at the apex. *Conidiogenous cells* (5.9) 7.5 ± 0.6 (9.1) \times (1.7) 4.1 ± 0.8 (5.8) μm ($n = 30$), integrated, terminal, monoblastic, sympodial proliferation. *Conidiogenous loci* (0.6) 1.3 ± 0.4 (2.4) μm diameter ($n = 30$), conspicuous, thickened, and darkened. *Conidia* (13.6) 40.1 ± 9.9 (66.9) \times (1.8) 4.2 ± 0.7 (5.7) μm ($n = 30$), solitary, obclavate, straight to slightly curved, truncate at the base, acute to subacute at the apex, protuberant, 4-5-septate, pale brown, thin-walled, smooth, hila (0.6) 1.3 ± 0.4 (2.4) μm diameter ($n = 30$), thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui

National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Myrica esculenta*

(Buch. -Ham) D. Don. (*Myricaceae*), 2 Nov 2004, Jamjan Meeboon (CMU 27932:

holotype).

Host: *Myrica esculenta* (*Myricaceae*).

Distribution: Thailand (type locality).

Notes: *Pseudocercospora penicillus* (Ellis and Everh.) U. Braun and Crous (synonym: *Cercospora penicillus* Ellis and Everhart), is the only species of cercosporoid fungi recorded from *Myricaceae* (Crous and Braun 2003). In the

previous publication, Chupp (1954) placed *C. dispersa* Ellis and Everhart and *C. myricae* Tracy and Earle as synonyms of *C. penicillus*, the latter being characterized by stromata lacking or up to 50 μm in diameter; non fasciculate conidiophores (50-150 \times 4-5.5 μm) and obclavate to cylindro-obclavate conidia with pale olivaceous in colour (30-125 \times 3-5.5 μm). Crous and Braun (2003) noted that the morphological characteristics of *C. penicillus* are typical of *Pseudocercospora* Speg. by having inconspicuous conidiogenous loci, and unthickened, non-pigmented conidial hila, with long conidiophores arising from external hyphae or stromata. The specimen examined here is a typical member of the genus *Passalora* Fr. due to conspicuous, darkened, and thickened scars and hila, with pigmented conidia. Therefore, we propose *P. myricae* as a new species.

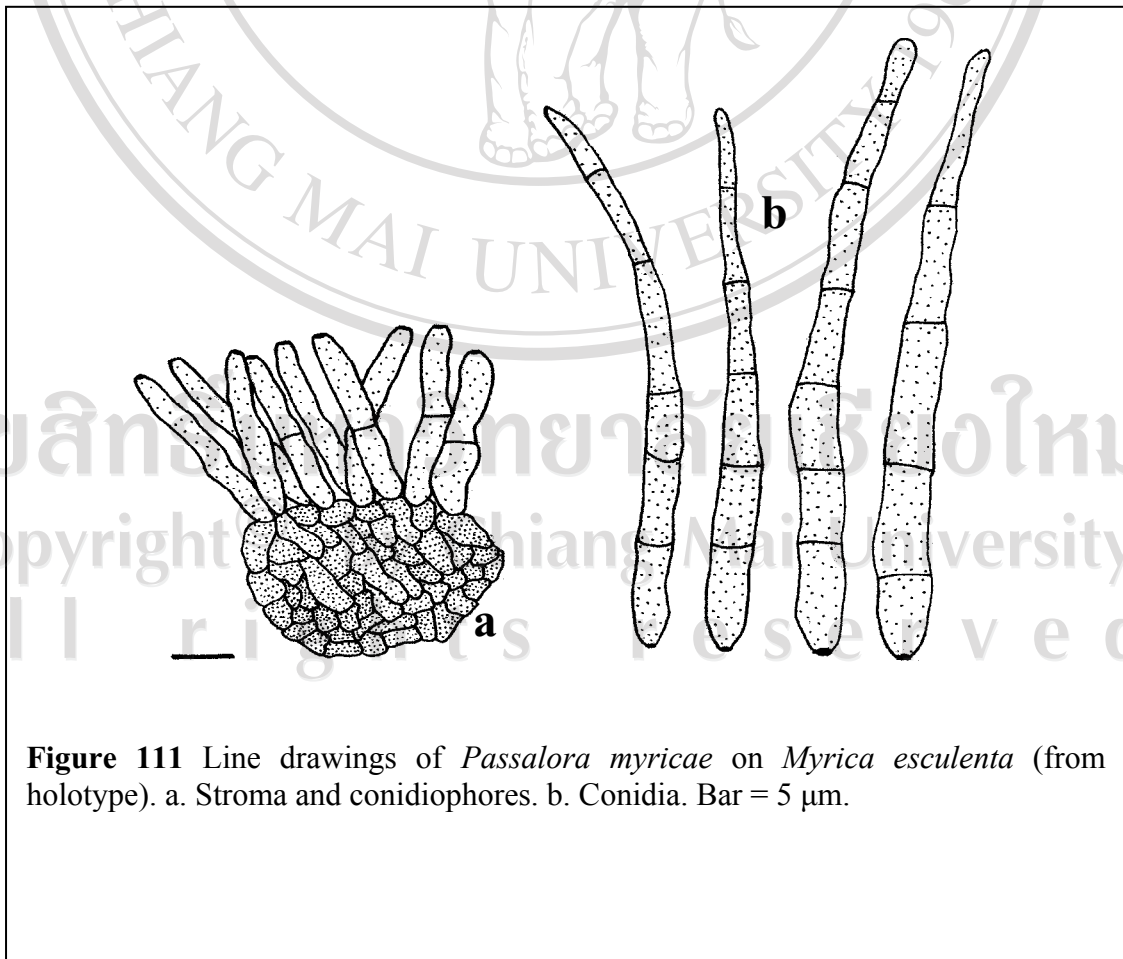


Figure 111 Line drawings of *Passalora myricae* on *Myrica esculenta* (from holotype). a. Stroma and conidiophores. b. Conidia. Bar = 5 μm .

Family Myrtaceae

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

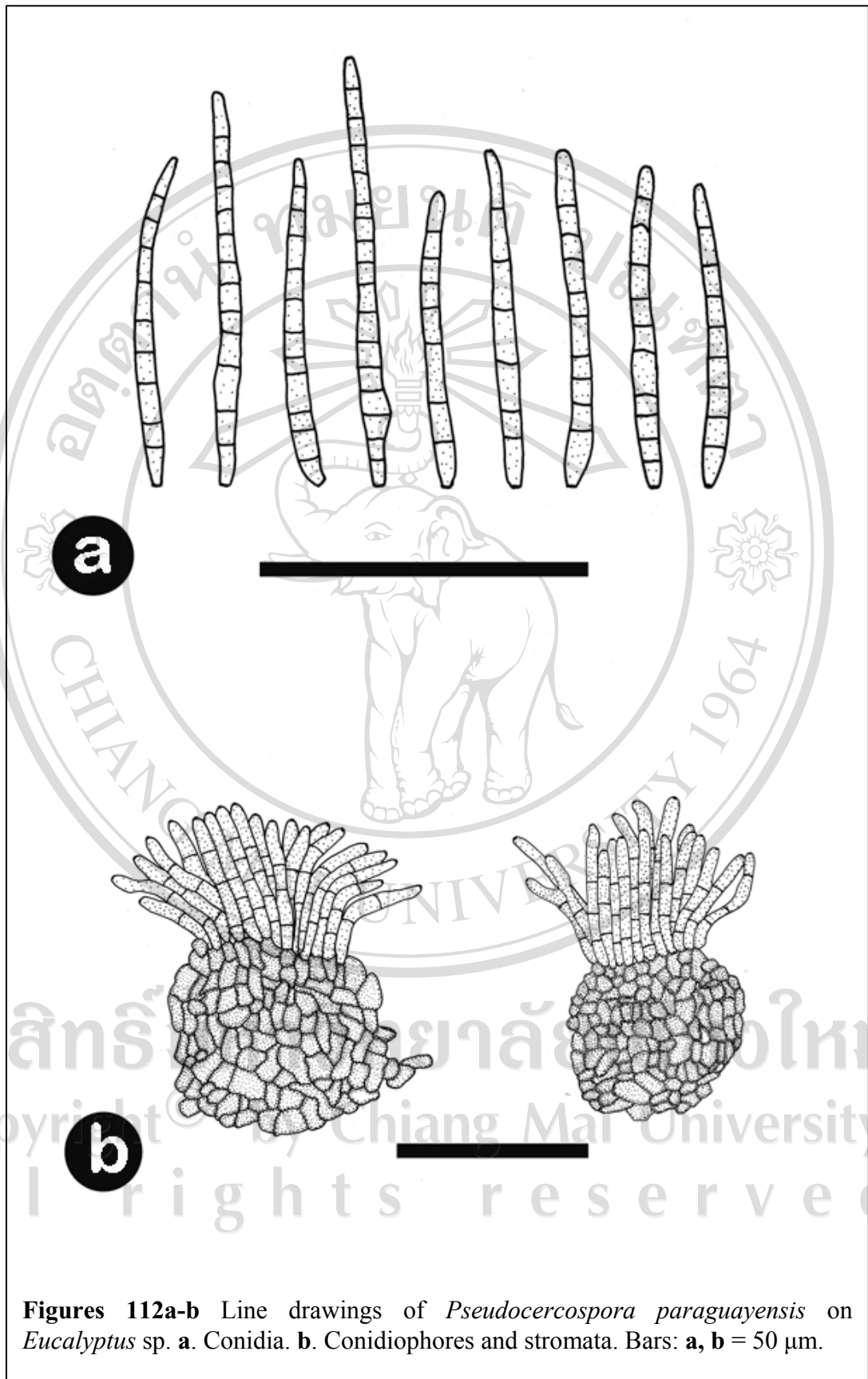
≡ *Cercospora paraguayensis* Tak. Kobay., *Trans. Mycol. Soc. Japan* **25**: 263 (1984).

= *Pseudocercospora eucalypti* Goh and Hsieh, *Cercospora and Similar Fungi from Taiwan*: 244 (1990).

(Figures 112a-b)

Leaf spots 3-15 mm diameter, amphigenous, irregular, brown, only leaf decolorization, numerous and scattered through the leaf surface. *Caespituli* amphigenous. *Stromata* 11-69.5 µm diameter, intraepidermal, well-developed, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* 27-43 × 2.5-5 µm, 12-20 in a densely fasciculate, 1-4-septate, arising from stromata, straight to decumbent, smooth, pale brown, cylindrical, unbranched, non-geniculate. *Conidiogenous cells* 4-6 × 2-4 µm, integrated, terminal, holoblastic, mostly monoblastic. *Conidiogenous loci* un conspicuous, non-thickened, and not darkened. *Conidia* 31.5-60 × 2-4 µm, solitary, obclavate to cylindrical, straight, hyaline, 6-16-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila un conspicuous, non-thickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Doi Lo, on leaves of *Eucalyptus* sp. (*Myrtaceae*), 15 August 2006, Jamjan Meeboon (CMU 27906).



Figures 112a-b Line drawings of *Pseudocercospora paraguayensis* on *Eucalyptus* sp. **a.** Conidia. **b.** Conidiophores and stromata. Bars: **a, b** = 50 μm .

Host: *Eucalyptus globulus*, *E. nitens*, *Eucalyptus* spp. (Myrtaceae) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Brazil, China, Israel, Paraguay, Taiwan, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: *Pseudocercospora paraguayensis* was firstly reported from Thailand by Meeboon *et al.* (2007c).

Family *Nelumbonaceae*

Pseudocercospora nymphaeacea (Cooke and Ellis) Deighton, *Trans. Brit. Mycol. Soc.* **88**: 390 (1987).

≡ *Cercospora nymphaeacea* Cooke and Ellis

≡ *Cercoseptoria nymphaeacea* (Cooke and Ellis) Deighton, *Mycol. Pap.* **140**: 165 (1976).

= *Cercospora exotica* Ellis and Everh., *Proc. Acad. Nat. Sci. Philadelphia* **45**: 463 (1893).

= *Cercospora nelumbinis* Tharp, *Mycologia* **9**: 111 (1917).

≡ *Cercosporina nelumbinis* (Tharp) Sacc., *Syll. Fung.* **25**: 912 (1931).

(Figure 113)

Leaf spots 3-7 mm diameter, amphigenous, circular to subcircular, brown, blacish to dark brown margin. *Caespituli* amphigenous. *Stromata* 11-29 µm diameter, intraepidermal, well-developed, and composed of globose to subglobose, brown to

blackish brown cells. *Conidiophores* 20-46 × 1.5-2 μm, 7-15 to numerous in a dense fascicles, not divergent, 0-2-septate, arising from stromata, straight to decumbent, smooth, pale brown, paler toward the apex, unbranched, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 34-54 × 1.5-2 μm, solitary, obclavate to cylindric, 2-4-septate, straight to mildly curved, subhyaline to pale, smooth, obconically truncate at the base, with obtuse to subobtuse at the apex, hila inconspicuous, unthickened, and not darkened.

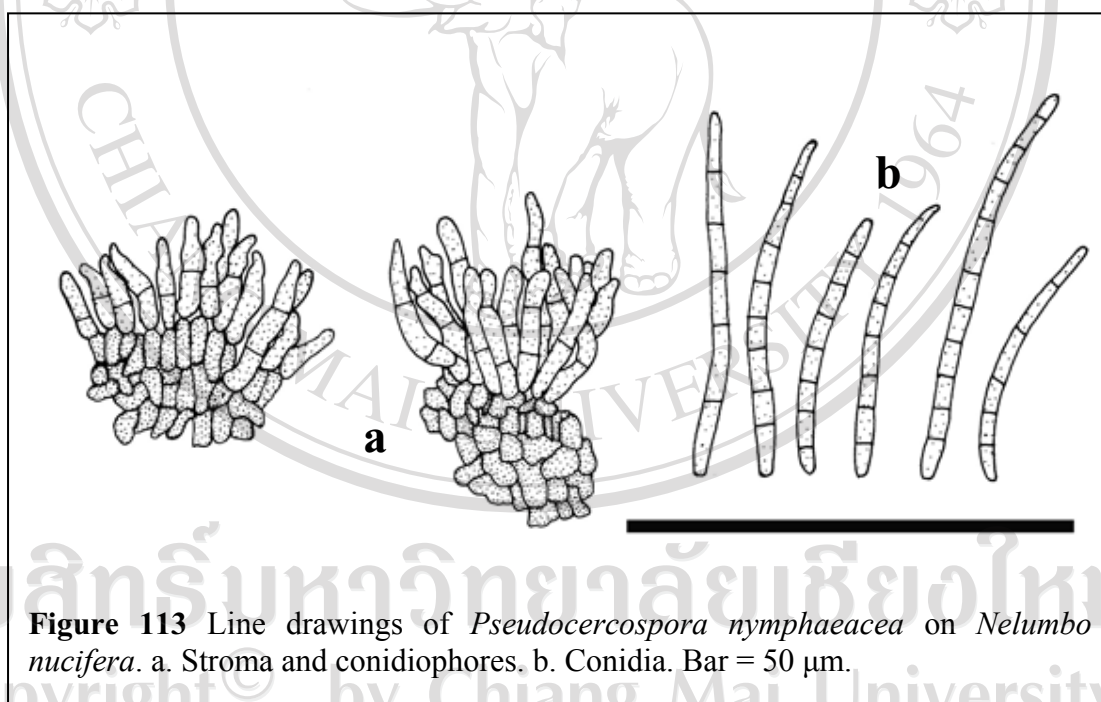


Figure 113 Line drawings of *Pseudocercospora nymphaeacea* on *Nelumbo nucifera*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai

University, on leaves of *Nelumbo nucifera* Gaertn. (*Nelumbonaceae*), 9 July 2007,

Jamjan Meeboon (BBH 23738).

Host: *Nelumbo lutea*, *N. nucifera* (*Nelumbonaceae*), *Nuphor japonicum*, *Nymphaea advena*, *N. capensis*, *N. lotus*, *N. odorata*, *N. tuberosa* (*Nymphaeaceae*) (Crous and Braun, 2003).

Distribution: Brazil, China, Colombia, Dominican Republic, India, Jamaica, Japan, Kenya, Mauritius, Panama, and U.S.A (Crous and Braun, 2003).

Notes: This specimen is the first report of *Pseudocercospora nymphaeacea* from Thailand.

Family Nyctaginaceae

Cercospora neobougainvilleae Meeboon, Hidayat, and C. Nakash., *Sydowia* **60**: 254-256 (2008).

Mycobank No. MB 510475

(Figure 114)

Maculae amphigenae, orbiculares, centro pallide brunneo, margine atro-brunneae, 2-8 mm diameter Caespituli epiphylli. Stromata intraepidermalia, bene evolutis, (11.5) 37.25 ± 11.5 (71.5) μm diameter, ex cellulis, globosis vel subglobosis, atro-brunneis. Conidiophora 4-20, laxe vel dense fasciculata, per stroma emergentia, 1-3-septata, apicem versus coangusto, non-ramosa, 1-2-geniculata, tenuitunicata vel leviter crassitunicata, (13.7) 90.2 ± 27.8 (165.3) × (0.9) 5.1 ± 1.6 (9.1) μm, basi brunnea, apicem versus pallidiora. Cellulae conidiogenae (1.8) 16.3 ± 5.2 (30.2) × (1.1) 5.1 ± 1.4 (8.9) μm, integratae, terminales, sympodiales. Loci conidiogeni

conspicui, incrassati et fuscati, (1.1) 2.2 ± 0.4 (3.4) μm diameter Conidia solitaria, obclavata, recta vel leviter curvata, basi truncata vel obconica truncata, apicem acuta vel subobtusU.S.A, (3.9) 53.2 ± 14.6 (112.1) × (4.2) 6.3 ± 0.8 (8.3) μm, 4-5-septata, hyalina, tenuitunicata, levia, hila incrassata et fuscata, (0.9) 2.25 ± 0.6 (4.1) μm diameter

Etymology: The epithet refers to the genus name of the host.

Leaf spots 2-8 mm diameter, amphigenous, orbicular, center pale brown, with dark brown margin. *Caespituli* epiphyllous. *Stromata* (11.5) 37.25 ± 11.5 (71.5) μm diameter (n = 10), intraepidermal, well-developed, composed of globose to subglobose, dark brown cells. *Conidiophores* (13.7) 90.2 ± 27.8 (165.3) × (0.9) 5.1 ± 1.6 (9.1) μm (n = 30), 4-20 in a loosely to densely fasciculate, 1-3-septate, arising from stromata, narrower toward the apex, unbranched, geniculate 1-2 times near the apex, thin-walled to slightly thickened, smooth, brown at the base and paler towards the apex. *Conidiogenous cells* (1.8) 16.3 ± 5.2 (30.2) × (1.1) 5.1 ± 1.4 (8.9) μm (n = 30), integrated, terminal, sympodial proliferation. – *Conidiogenous loci* (1.1) 2.2 ± 0.4 (3.4) μm diameter (n = 30), conspicuous, thickened, darkened. *Conidia* (3.9) 53.2 ± 14.6 (112.1) × (4.2) 6.3 ± 0.8 (8.3) μm (n = 30), solitary, obclavate, straight to mildly curve, truncate to obconically truncate at base, acute to subobtusate at the apex, 4-5-septate, hyaline, thin-walled, smooth, hila (0.9) 2.25 ± 0.6 (4.1) μm diameter (n = 30), thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Bougainvillea spectabilis* Willd. (*Nyctaginaceae*), 30

November 2005, Jamjan Meeboon (CMU 27930: **holotype**); Chiang Mai Province, A. Muang, RAMA IX Garden, on leaves of *Bougainvillea spectabilis* Willd. (*Nyctaginaceae*), 26 August 2008, Jamjan Meeboon (BBH 23759).

Host: *Bougainvillea spectabilis* (*Nyctaginaceae*).

Distribution: Thailand (type locality).

Notes: Four species of genus *Cercospora* are hitherto known associated with *Nyctaginaceae*, viz, *Cercospora canescens* Ellis and G. Martin, *C. furfurella* Speng., *C. mirabilis* Tharp, and *C. salpianthi* Chupp and A. S. Mull. (Crous and Braun 2003). Two species, *C. canescens* and *C. salpianthi* belong to the species complex *C. apii* s. lat. (Crous and Braun, 2003). *Cercospora neobougainvilleae* differs from the plurivorous *C. apii* s. lat. by having obclavate conidia and well-developed stromata [(11.5) 37.25 ± 11.5 (71.5) µm diameter].

Cercospora neobougainvilleae sp. nov. differs from *C. furfurella* in leaf spots appearances, stromata, and septation characteristics. The symptoms of *C. neobougainvilleae* are pale at the center with dark brown margin, but *C. furfurella* symptoms are almost lacking or dark purple to almost black with gray center. The stromata of *C. neobougainvilleae* are well-developed but *C. furfurella* stromata are small or sometimes lacking. The conidia septation in *C. neobougainvilleae* are distinct with 3-6-septa, but *C. furfurella* is characterized by 4-5-indistinct septa. Moreover, the conidia sizes of *C. neobougainvilleae* are different [(3.9) 53.2 ± 14.6 (112.1) × (4.2) 6.3 ± 0.8 (8.3) µm vs 30-120 × 2-4.5 µm of *C. furfurella*].

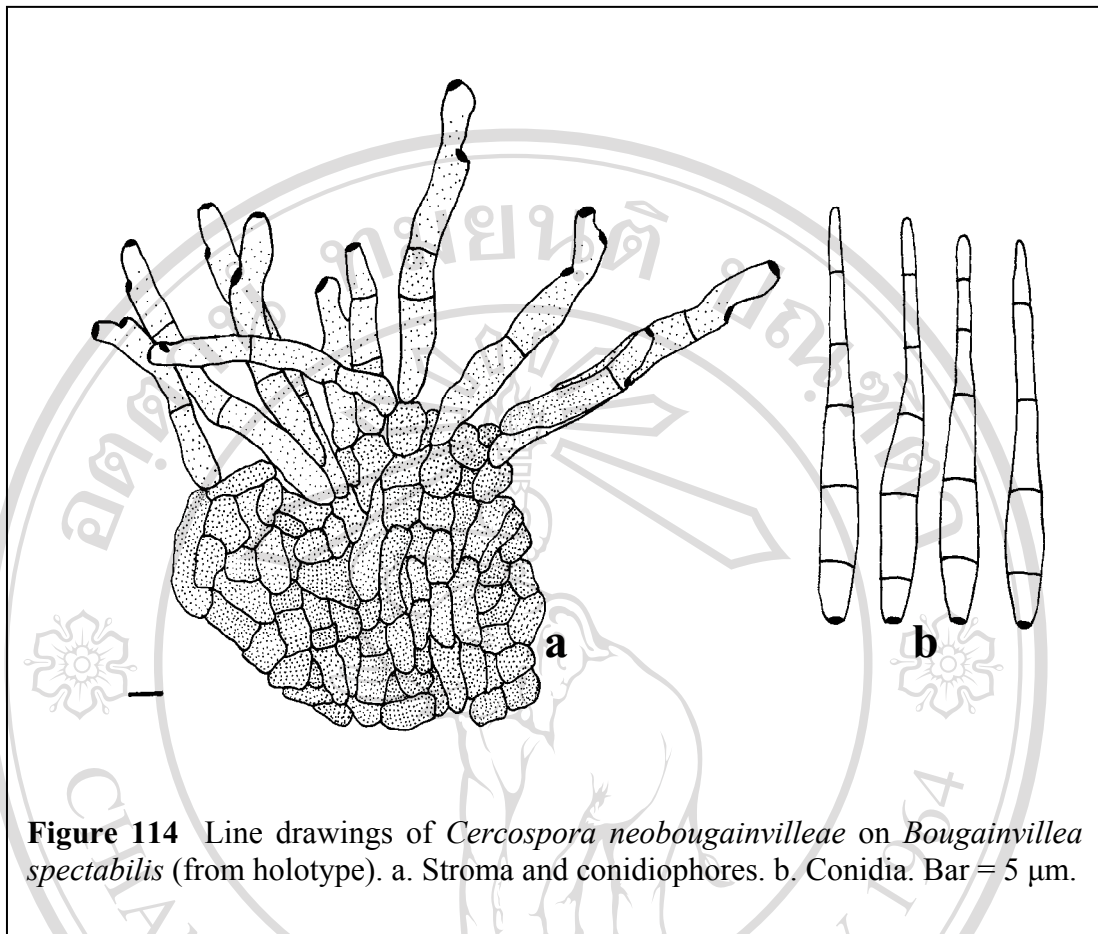


Figure 114 Line drawings of *Cercospora neobougainvilleae* on *Bougainvillea spectabilis* (from holotype). a. Stroma and conidiophores. b. Conidia. Bar = 5 μ m.

Cercospora mirabilis Tharp, described from *Mirabilis jalapa*, is characterized by having amphigenous caespituli, small or lacking stromata, short branches conidiophores, and acicular conidia with indistinct septation (Chupp 1954).

Cercospora neobougainvilleae differs from *C. mirabilis* by having epiphyllous caespituli, well-developed stromata, unbranched conidiophores, and obclavate conidia with distinct septation.

As the result of our comparative study, *C. neobougainvilleae* is recognized as an independent species from other *Cercospora* species associated with plants from Nyctaginaceae. Therefore, this study propose *C. neobougainvilleae* as a new species.

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

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

≡ *Cercosporidium bougainvilleae* (Munt.-Cvetk.) Sobers and C. P. Seymour, *Proc. Florida State Hort. Soc.* **81**:398 (1969).

(Figure 115)

Leaf spots 1-3 mm in diameter, amphigenous, circular to subcircular, pale brown to brown in the center, with dark brown margins. *Caespituli* amphigenous. *Stromata* 27-57 µm diameter, composed of a few globose to subglobose, brown to dark brown cells. *Conidiophores* (26-) 44-93 (-126) × 3-4 (-5) µm, numerous in a densely fasciculate, 1-4-septate, arising from stromata, straight to curve, uniformly pale brown to brown, branched, plainly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, mostly ploblastic, sympodial proliferating. *Conidiogenous loci* 2-3 µm diameter, conspicuous, thickened, darkened. *Conidia* (31-) 35.5-63 (-67) × 4(-4.5)-6 µm, ovoid to obclavate, 1-8-septate, brown, straight to mildly curve, base obconically truncate with obtuse apex, hila 1.5-2 µm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui

National Park, on leaves of *Bougainvillea spectabilis* Willd. (*Nyctaginaceae*), 21 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27955); Chiang Mai University, Chiang Mai Province, on the same host, 1 November 2006, Jamjan

Meeboon (CMU 28048); 6 December 2006, Ikumitsu Araki (CMU 28049); *ibid* 10 December 2006, Ikumitsu Araki and Jamjan Meeboon (CMU 28050).

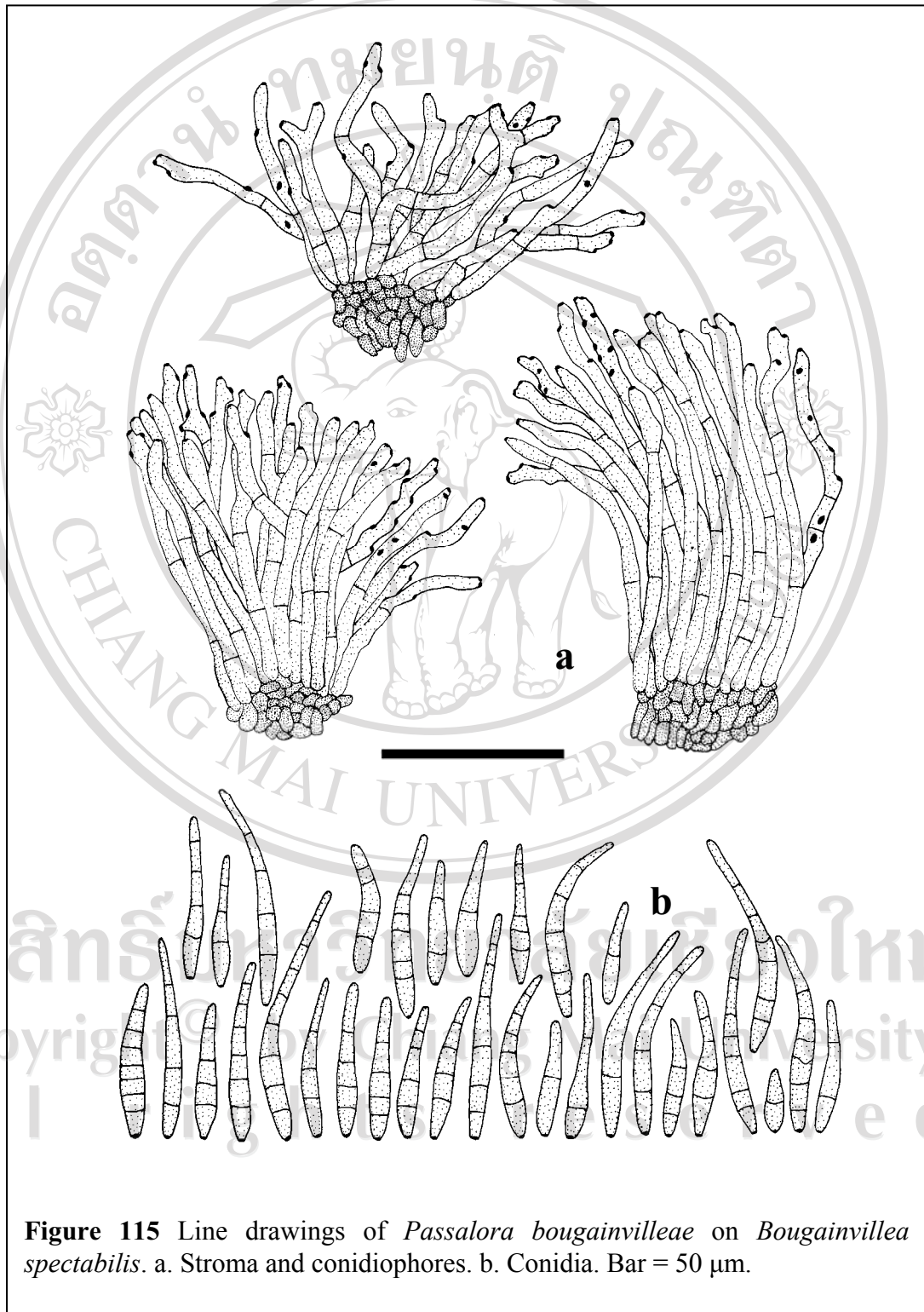


Figure 115 Line drawings of *Passalora bougainvilleae* on *Bougainvillea spectabilis*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Host: *Bougainvillea glabra*, *B. spectabilis*, *B. stipitata*, *Bougainvillea* sp. (*Nyctaginaceae*) (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Distribution: Argentina, Brazil, Brunei, China, Cuba, El Salvador, India, Indonesia, Jamaica, Japan, Thailand, U.S.A, and Venezuela (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Notes: *Passalora bougainvilleae* was firstly reported from Thailand by Nakashima *et al.* (2007).

Literature: Ellis (1976, p. 297).

Pseudocercospora bougainvilleae Y. L. Guo, *Mycotaxon* **72**: 351 (1999).

≡ *Cercospora bougainvilleae* P. N. Rao, *Indian Phytopathol.* **15**: 113 (1962) (*nom. illeg.*), homonym of *C. bougainvilleae* Munt.-Cvetk. (1957).

(Figure 116)

Leaf spots 3-13 mm diameter, distinct, aphigenous, circular, angular to irregular, scattered, light brown, with blackish-brown margins. *Caespituli* hypophyllous. *Stromata* (36) 53.5 ± 14.1 (76) μm diameter, intraepidermal, well-developed, composed of globular to angular, brown to dark brown cells.

Conidiophores (9) 18.5 ± 5.7 (28.50) \times (1.5) 2 ± 0.2 (2) μm , 11 to numerous in a densely fasciculate, 1-2-septate, not divergent, arising from stromata, smooth, brown, straight, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (20) 42 ± 15.6 (67) \times (1.5) 2 ± 0.3 (2.5) μm , solitary, obclavate

to long filiform, 4-6-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the base, with obtuse apex, hila unthickened and not darkened.

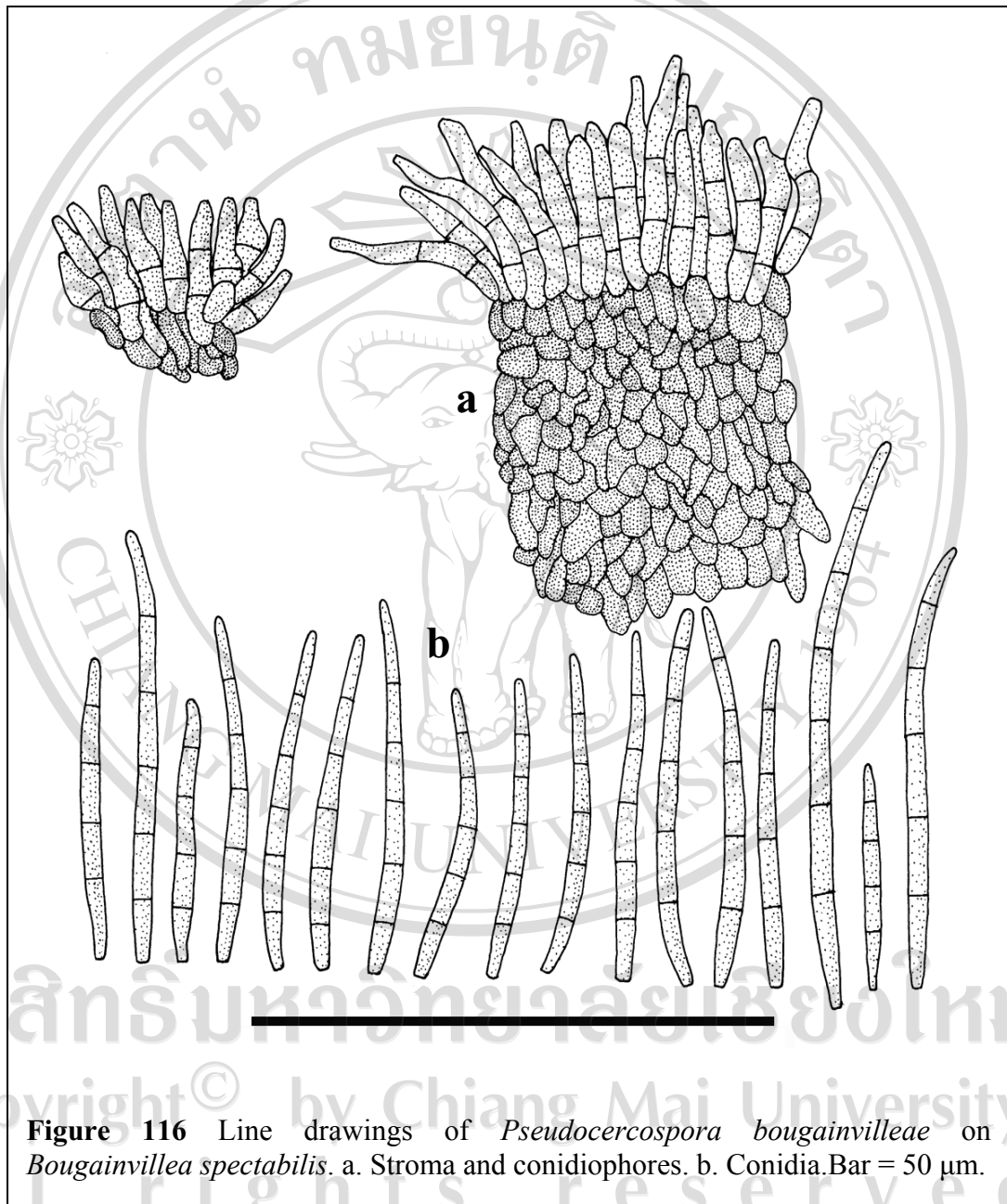


Figure 116 Line drawings of *Pseudocercospora bougainvilleae* on *Bougainvillea spectabilis*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Specimen examined: THAILAND, Chiang Mai Province, A. Muang, RAMA IX Garden, on leaves of *Bougainvillea spectabilis* Willd. (*Nyctaginaceae*), 26 August 2008, Jamjan Meeboon (BBH 23759).

Host: *Bougainvillea glabra*, *B. spectabilis*, *B. stipitata*, *Bougainvillea* sp. (*Nyctaginaceae*) (Crous and Braun, 2003).

Distribution: Argentina, Brazil, Brunei, China, Cuba, El-Salvador, India, Indonesia, Jamaica, Japan, U.S.A, and Venezuela (Crous and Braun, 2003).

Notes: This specimen is a new record of *Pseudocercospora bougainvilleae* from Thailand.

Family Nymphaeaceae

Pseudocercospora nymphaeacea (Cooke and Ellis) Deighton, *Trans. Brit. Mycol. Soc.* **88**: 390 (1987).

≡ *Cercospora nymphaeacea* Cooke and Ellis

≡ *Cercoseptoria nymphaeacea* (Cooke and Ellis) Deighton, *Mycol. Pap.* **140**: 165 (1976).

= *Cercospora exotica* Ellis and Everh., *Proc. Acad. Nat. Sci. Philadelphia* **45**: 463 (1893).

= *Cercospora nelumbinis* Tharp, *Mycologia* **9**: 111 (1917).

≡ *Cercosporina nelumbinis* (Tharp) Sacc., *Syll. Fung.* **25**: 912 (1931).

(Figure 117)

Leaf spots 3-6 mm diameter, amphigenous, circular to subcircular, brown, with dark brown margin. *Caespituli* amphigenous. *Stromata* 11-29 μm diameter, intraepidermal, well-developed, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* 20-46 \times 1.5-2 μm , 7-15 in a densely fasciculate, 0-2-septate, arising from stromata, straight to decumbent, smooth, pale brown, paler toward the apex, unbranched, slightly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 34-54 \times 1.5-2 μm , solitary, obclavate to cylindrical, straight to mildly curved, subhyaline, 2-4-septate, smooth, obtuse to subobtuse at the apex, obconically truncate at the base, hila inconspicuous, unthickened, and not darkened.

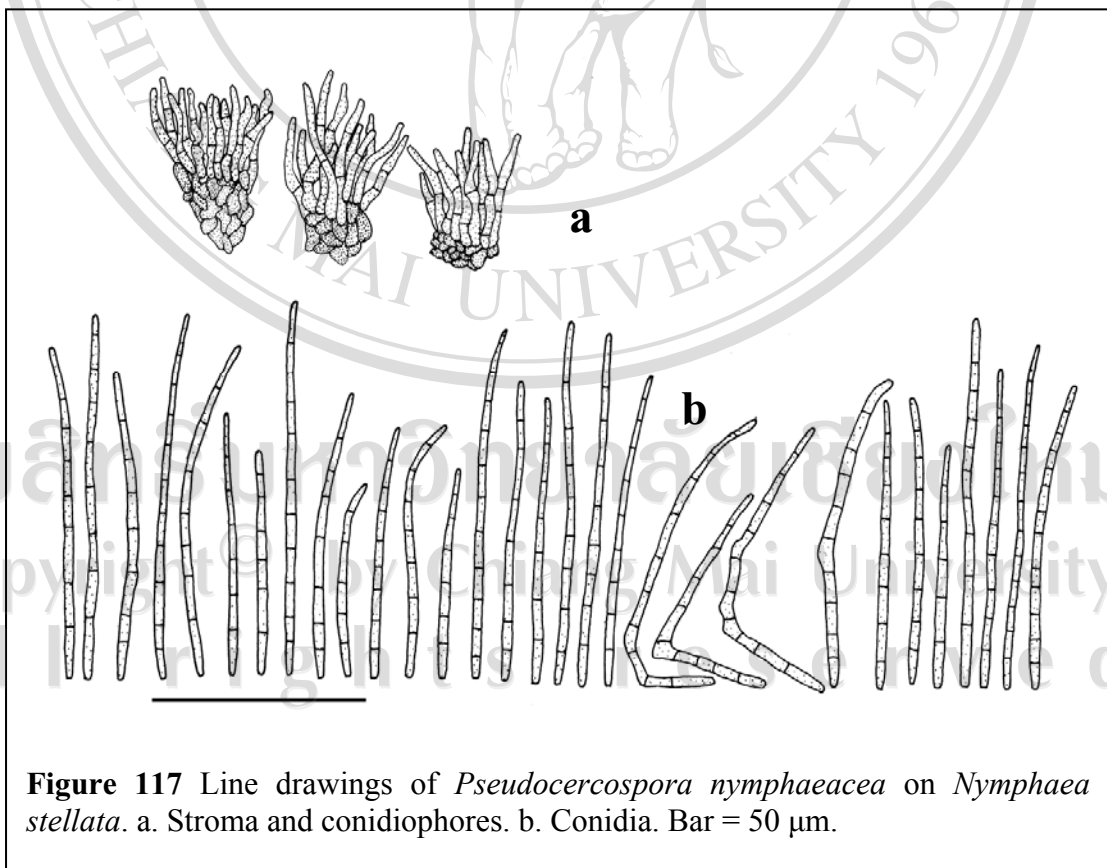


Figure 117 Line drawings of *Pseudocercospora nymphaeacea* on *Nymphaea stellata*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Nymphaea stellata* Willd. (*Nymphaeaceae*), 20 November 2005. Jamjan Meeboon (CMU 27944).

Host: *Nelumbo lutea*, *N. nucifera* (*Nelumbonaceae*), *Nuphor japonicum*, *Nymphaea advena*, *N. capensis*, *N. lotus*, *N. odorata*, *N. tuberosa* (*Nymphaeaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Distribution: Brazil, China, Colombia, Dominican Republic, India, Jamaica, Japan, Kenya, Mauritius, Panama, Thailand, U.S.A (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Notes: The first report of *P. nymphaeacea* on *Nymphaea stellata* from Thailand was made by Meeboon *et al.* (2008).

Family *Oleaceae*

Pseudocercospora butleri (Syd.) U. Braun, *Schlechtendalia* **5**: 42 (2000).

≡ *Fusicladium butleri* Syd., *Ann. Mycol.* **14**: 260 (1916).

= *Cercospora jasminicola* A. S. Mull. and Chupp, *Arq. Inst. Biol. Veg. Rio de Janeiro* **3**: 93 (1936) (*nom. inval.*).

≡ *Pseudocercospora jasminicola* (A. S. Mull. and Chupp) Deighton, *Mycol. Pap.* **140**: 74 (1976).

= *Cercospora jasmini* Sawada, *J. Taihoku Soc. Agric.* **7**: 119 (1942).

= *Cercospora odoratissimi* Sawada, *Report of the Department of Indutry, Government Research Institute, Formosa* **85**: 110 (1943).

= *Cercospora jasminicola* var. *kandalensis* Chidd., *Mycopathologia* 17: 1 (1962).

(Figures 118; 119)

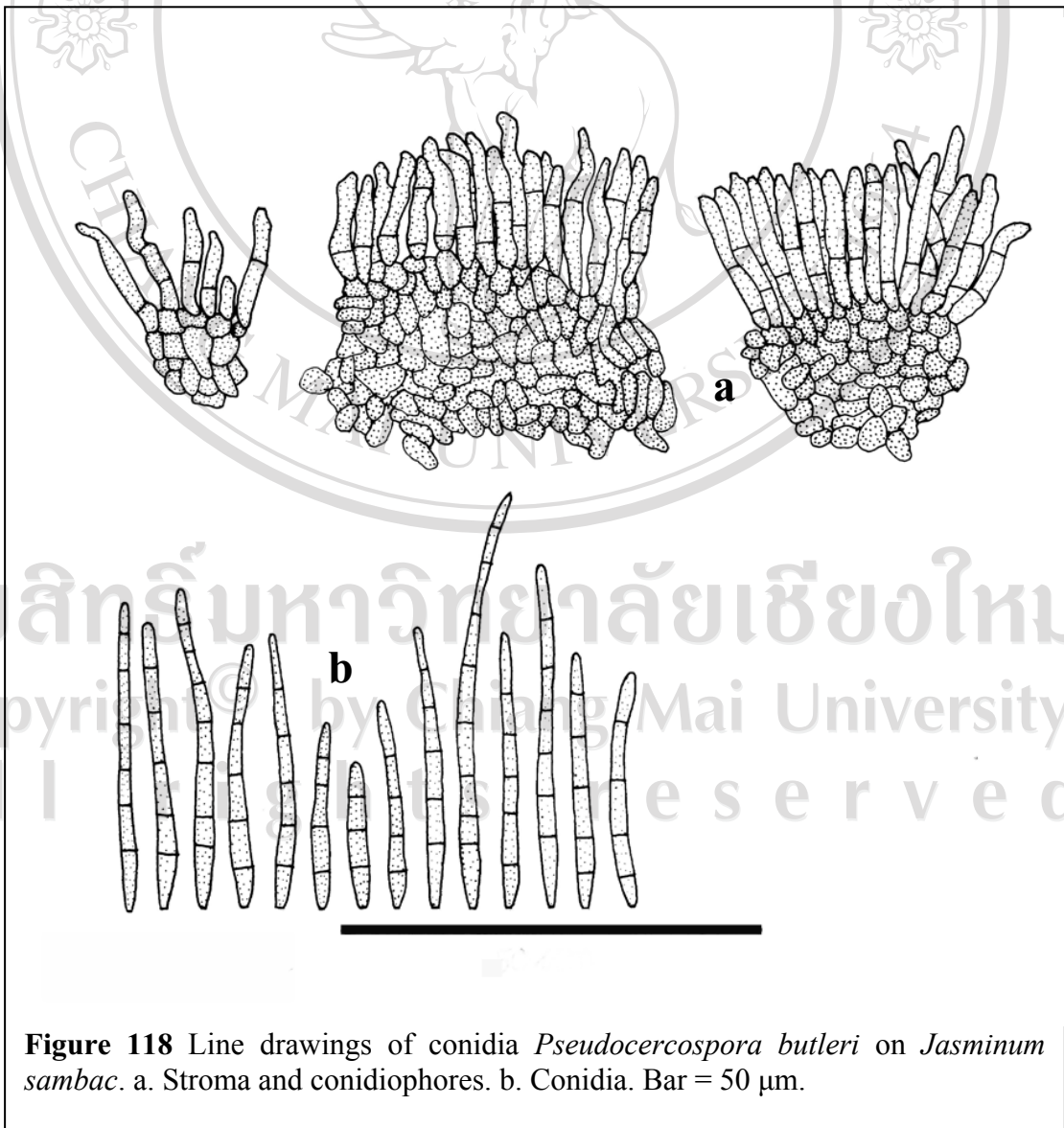
Leaf spots 2-9 mm diameter, amphigenous, solitary, scattered on the host surface, subcircular to irregular, pale to white, with reddish-brown margin. *Caespituli* amphigenous. *Stromata* 16-53 μm diameter, small to well-developed, substomatal, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* (17.5-) 24-35.5 (-42) \times (2-) 2.5-3 (-3.5) μm , densely fasciculate, not divergent, 1-2-septate, arising from stromata, mostly straight, smooth, brown, and paler towards the apex, branched, slightly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (16-) 24-54.5 (-75) \times 2-3 μm , solitary, obclavate to cylindrical, straight to mildly curved, hyaline to subhyaline, 3-11-septate, smooth, obconically truncate at the base, tapering towards the apex, with obtuse to subobtuse at the apex, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai province, Royal Flora, on leaves of *Jasminum sambac* [Soland.] (*Oleaceae*), 12 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23744); Chiang Mai Province, Royal Flora, on leaves of *Jasminum nobile* C. B. Clarke (*Oleaceae*), 27 July 2008, Jamjan Meeboon, RF4 (BBH 23767).

Host: *Jasminum arborescens*, *J. dichotomum*, *J. grandiflorum*, *J. humile*, *J. malabaricum*, *J. mesnyi*, *J. multiflorum*, *J. odoratissimum*, *J. officinale*, *J. pubescens*, *J. rigidum*, *J. sambac*, *J. scandens*, *J. subtriplinerve*, *Jasminum* sp. (*Oleaceae*) (Crous and Braun, 2003).

Distribution: Brazil, Brunei, China, Cuba, El Salvador, Guatemala, Hong Kong, India, Indonesia, Jamaica, Myanmar, Philippines, Salvador, Singapore, Taiwan, Uganda, U.S.A, and Venezuela (Crous and Braun, 2003).

Notes: This specimen is the first record of *P. butleri* from Thailand, and *J. nobile* is reported here as a new host of this fungus.



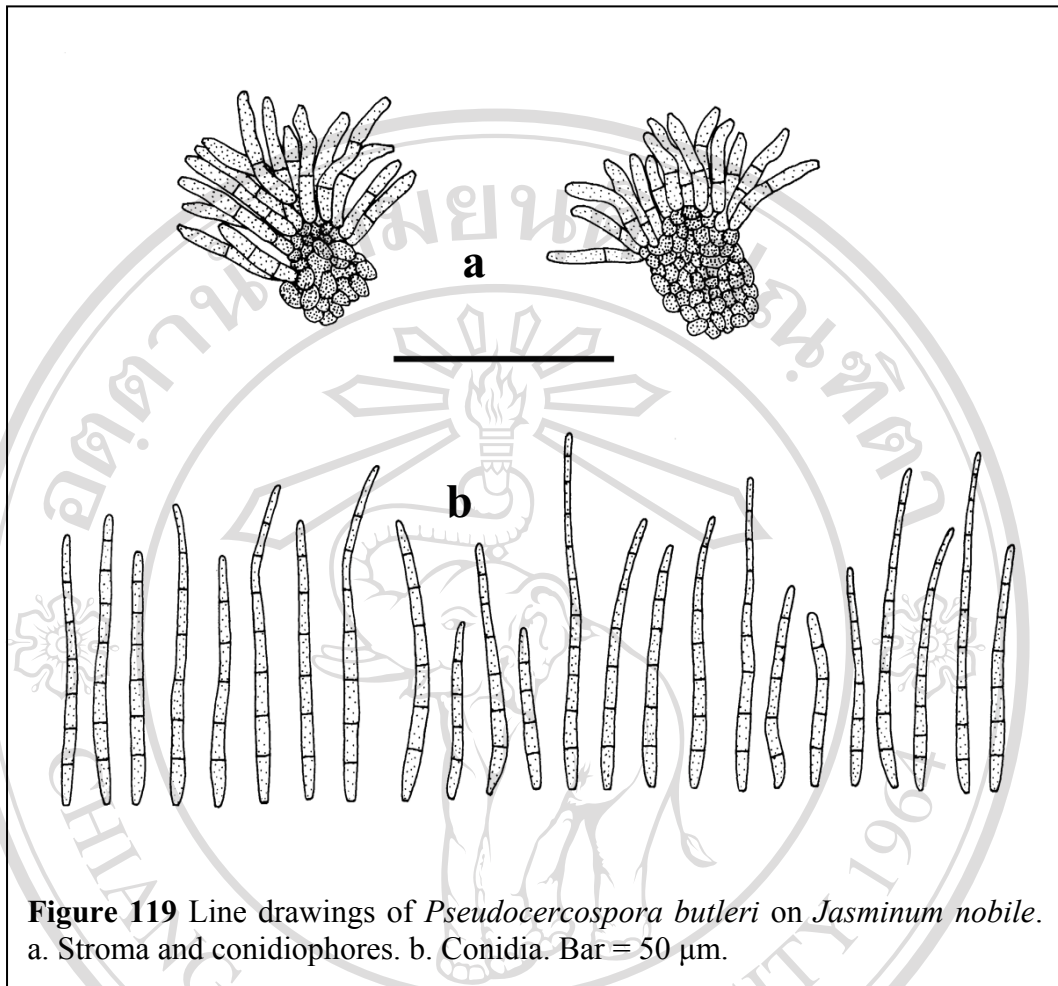


Figure 119 Line drawings of *Pseudocercospora butleri* on *Jasminum nobile*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Family Onagraceae

Cercospora fuchsiae Chupp and A. S. Mull., *Bol. Soc. Venez. Ci. Nat.* **8**: 45 (1942).

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

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Fuchsia* sp. (*Onagraceae*), 3 Nov 2005, Jamjan Meeboon (CMU 27935).

Host: *Fuchsia hybrida*, *Fuchsia* sp. (*Onagraceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Distribution: Brazil Guatemala, Thailand, U.S.A, Venezuela, and Zimbabwe (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Notes: The first report of *C. fuchsiae* from Thailand was made by Meeboon *et al.* (2008). Crous and Braun (2003) assigned this species to *C. apii* s. lat.

Literature: Chupp (1954, p. 420).

Family Orchidaceae

Cercospora habenariicola Meeboon, Hidayat and C. Nakash., *Mycotaxon* **99**: 118-119 (2007a).

Mycobank No. MB 510367

(Figure

120)

Maculae amphigenae, circulares vel subcirculares, 15-30 mm diameter, primo pallide viridulae, ochraceae, deinde brunneae vel atro-brunneae, ultimo centro griseo-brunneo, margine fusco vel brunno cinctae. Coloniae amphigenae, ochraceae, velutinae. Stromata substomatalia vel intraepidermalia, subglobosa, 25-75 µm diameter, brunnea vel atro-brunnea. Conidiophora laxe vel dense fasciculata, numerosa, simplicia, raro ramosa, recta, subcylindrica, geniculata vel sinuosa, erecta

vel decumbentia, 50-285 × 7.3-7.5 μm, interdum ad 952 μm longa, laevia, pallide olivacea vel pallide brunnea, 2-9-septata. Cellulae conidiogenae integratae, terminales, sympodiales. Loci conidiogeni conspicui, incrassati, fuscati, 2.4-3.6 μm diameter Conidia solitaria, obclavata vel subacicularis, recta, 75-110 × 4.9-5 μm, hyalina, 6-10-septata, laevia, apice subacuto, basi obconice truncata, hila incrassata et fuscata, 1.2-2.9 μm diameter

Etymology: *habenariicola*, from the genus name of the host plant.

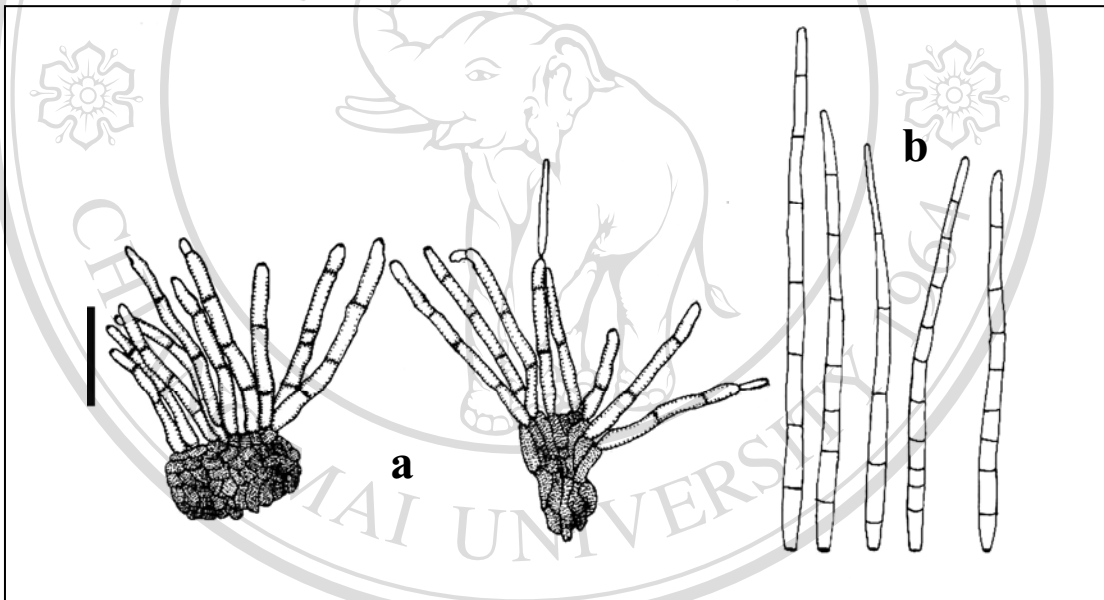


Figure 120 Line drawings of *Cercospora habenariicola* on *Habenaria susanna* (from holotype). a. Stroma and conidiophores. b. Conidia. Bar = 40 μm.

Leaf spots 15-30 mm diameter, amphigenous, circular or subcircular, at first pale greenish to ochraceous, later brown to dark brown, finally with grayish brown centre, surrounded by a dark margin or brown halo. *Caespituli* amphigenous, ochre yellow, velvety. *Stromata* 25-75 μm diameter, intraepidermal, well-developed,

subglobose, brown to blackish brown. *Conidiophores* 50-285 × 7.3-7.5 μm, occasionally up to 952 μm long, loosely to densely fasciculate, 2-9-septate, numerous, arising from stromata, simple, straight, erect to decumbent, smooth, pale yellow to pale brown, rarely branched, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal, sympodially proliferating. *Conidiogenous loci* 2.4-3.6 μm diameter, conspicuous, thickened, darkened. *Conidia* 75-110 × 4.9-5 μm, solitary, narrowly obclavate to subacicular, straight, hyaline, 6-10-septate, smooth, apex subacute, base obconically truncate, hila 1.2-2.9 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Queen Sirikit Botanic Garden, on leaves of *Habenaria s.U.S. Annae* (L.) R. Br. (*Orchidaceae*), 14 July 2006, Jamjan Meeboon (CMUMH 155: **holotype**).

Host: *Habenaria susanna* (*Orchidaceae*).

Distribution: Thailand (type locality).

Notes: Because of pigmented conidiophores, thickened and darkened conidiogenous loci, hyaline scolecoïd conidia, the new species on *Habenaria s.U.S. Annae* belongs to *Cercospora s. str.* (Crous and Braun, 2003). It is easily distinguishable from the plurivorous *C. apii s. lat.* by having well-developed stromata and obclavate conidia with obconically truncate bases (Crous and Braun, 2003).

On orchids numerous species of *Cercospora s. lat.* are known, including *C. cypripedii* Ellis and Dearn., *C. dendrobii* H.C.Burnett, *C. odontoglossii* Prill. and Delacr. and *C. peristeriae* H.C.Burnett, which have been excluded and reallocated to the genus *Pseudocercospora* Speg. (Crous and Braun, 2003). *Cercospora angraeci*

Feuilleaub. and Roum., described from orchids, is an insufficiently known species of unclear generic affinity (Crous and Braun, 2003), but based on the original description *C. habenariicola* differs from *C. angraeci* in having much longer, occasionally branched conidiophores (Chupp, 1954). *Cercospora cephalantherae* Ondřej and Závřel ('*cephalenterae*'; Ondřej and Závřel, 1971), a genuine species of *Cercospora* s. str., is characterized by having very short, narrow conidiophores ($10-25 \times 3.5 \mu\text{m}$) and relatively short, narrow conidia [$40-80(100) \times 2-3(3.5) \mu\text{m}$] (Ondřej and Závřel, 1971). *Cercospora habenariicola* is morphologically fairly very close to *C. epipactidis* C.Massal. However, the latter species has consistently unbranched, small conidiophores ($10-45 \times 4-6 \mu\text{m}$), and short, narrow conidia [$30-130 \times 3.5-5 \mu\text{m}$] (Chupp, 1954). *Cercospora eulophiae* M.S.Patil (Patil, 1978) is another cercosporoid fungus on an orchid (*Eulophia* sp.), but this species was described having straight to flexuous, smaller conidiophores, and pigmented conidia [$75-250 \times 3.2-4 \mu\text{m}$] (Patil, 1978).

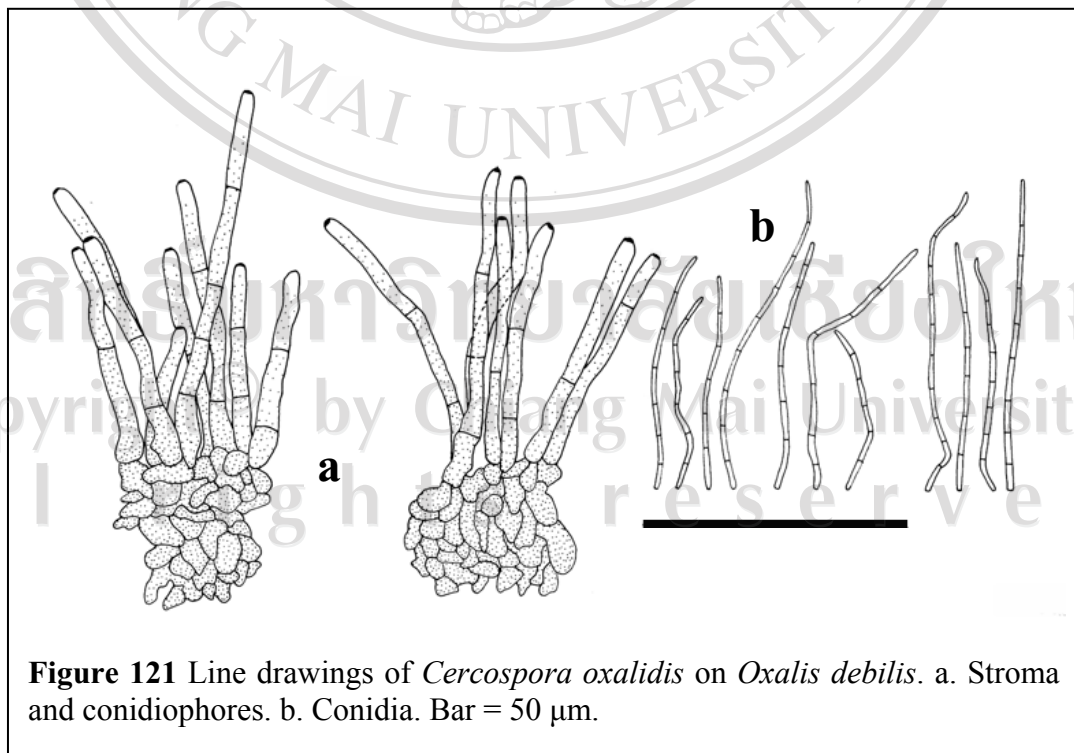
Family Oxalidaceae

Cercospora oxalidis (A. S. Mull. and Chupp) U. Braun and Crous, *CBS Biodiversity Series* 1: 300 (2003).

≡ *Cercospora oxalidis* A. S. Mull. and Chupp, *Arq. Inst. Biol. Veget. Rio de Janeiro* 1: 218 (1935) (*nom. inval.*).

(Figure 121)

Leaf spots 1-5 mm in diameter, amphigenous, scattered to confluent, distinct, circular to subcircular, pale brown to tan, centre greyish brown to greyish white, dark brown margin. *Caespituli* amphigenous. *Stromata* 14-41 μm in diameter, small, often rudimentary to poorly developed, brown to dark brown, irregular, composed of a few brown hyphal cells. *Conidiophores* 14-122 \times 2.5-4.5 μm , loosely fasciculate, 1-4-septate, emerging through the cuticle, or sometimes from stromata, straight to slightly curved, pale olivaceous brown or sometimes paler towards the apex, geniculate. *Conidiogenous cells* integrated, terminal or intercalary, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* 57-91 \times 1-2.4 μm , solitary, acicular, straight to mildly curved, hyaline, 5-10-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila \pm 1 μm diameter, thickened, and darkened.



Specimen examined: THAILAND, Chiang Mai province, Amphur Mae Jam, Mae Hae Royal Project Area, on leaves of *Oxalis debilis* Kunth var. *corymbosa* (DC.) Lourteig (*Oxalidaceae*), 12 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23595).

Host: *Oxalis* sp. (*Oxalidaceae*) (Crous and Braun, 2003).

Distribution: Brazil, and U.S.A (Crous and Braun, 2003).

Notes: This is the first record of *C. oxalidis* from Thailand, and *Oxalis debilis* is reported in this study as a new host of this fungus.

Pseudocercospora biophyti (Syd. and P. Syd.) Deighton, *Mycol. Pap.* **140**: 140 (1976).

≡ *Cercospora biophyti* Syd. and P. Syd., *Philipp. J. Sci. (Bot.)* **8**: 284 (1913).

(Figure 122)

Leaf spots 2-11 mm diameter, solitary, amphigenous, subcircular to irregular, sometimes rectangular, pale olivaceous, with very dark and thick margin. *Caespituli* amphigenous, abundance at the upper surface. *Stromata* 5-15 μm diameter, substomatal, well-developed, and composed of globose to subglobose, brown to dark brown cells. *Conidiophores* 15-40 \times 2.5-4.5 μm , loosely fasciculate, 1-2-septate, arising from stromata, straight, smooth, brown, paler towards the apex, unbranched, not geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened.

Conidia 30-110 × 2-2.5 μm, solitary, obclavate to cylindrical, straight to mildly curved, hyaline to subhyaline, 3-14-septate, smooth, obtuse to subobtuse at the apex, obconically truncate at the base, hila inconspicuous, unthickened, and not darkened.

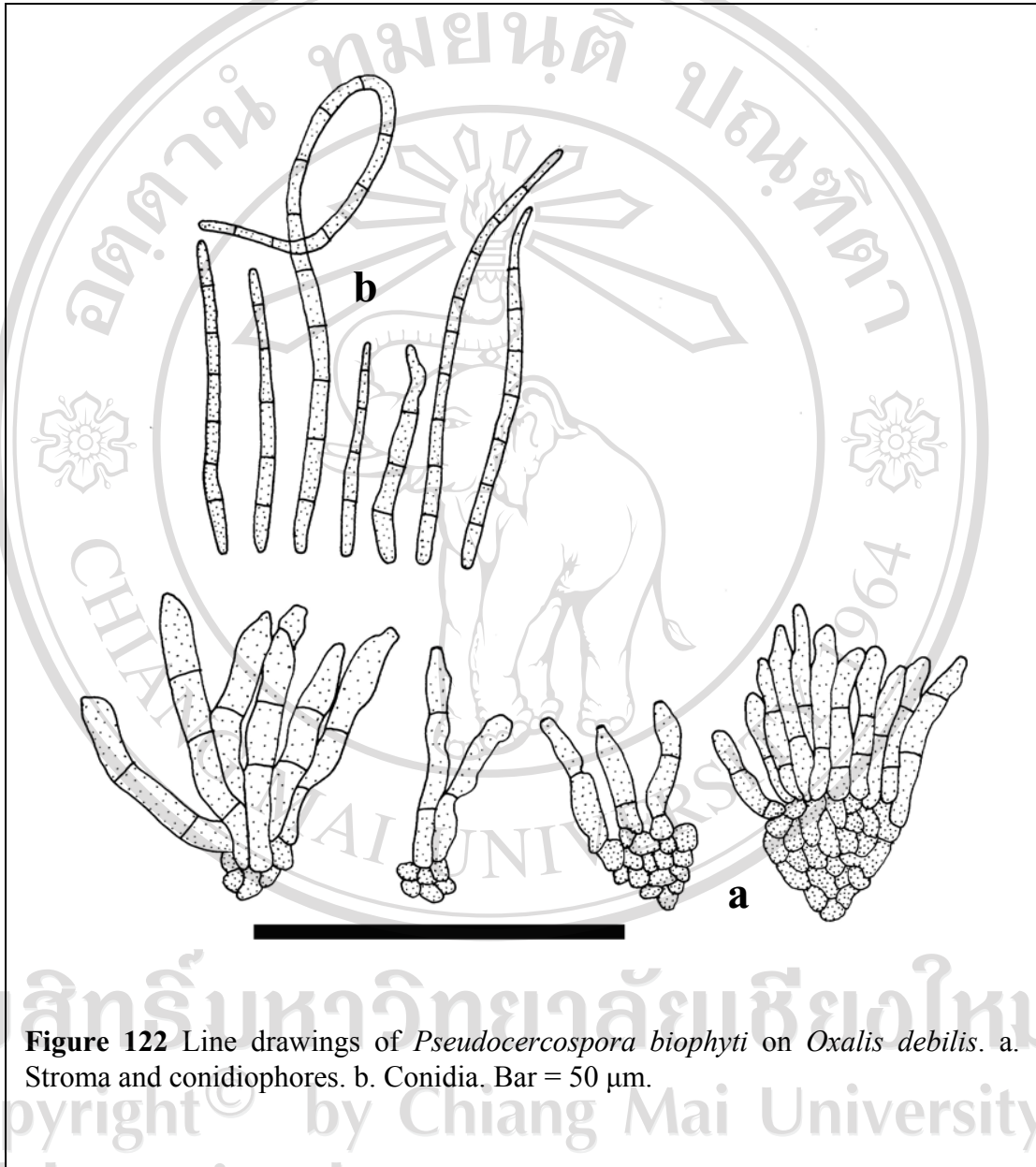


Figure 122 Line drawings of *Pseudocercospora biophyti* on *Oxalis debilis*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm.

Specimen examined: THAILAND, Chiang Mai province, Amphur Mae Jam, Mae Hae Royal Project Area, on leaves of *Oxalis debilis* Kunth var. *corymbosa* (DC.)

Lourteig (*Oxalidaceae*), 12 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23595).

Host: *Biophytum sensitivum*, *Biophytum* sp. (*Oxalidaceae*) (Crous and Braun, 2003)

Distribution: India, and Philippines (Crous and Braun, 2003).

Notes: This is the first record of *P. biophyti* from Thailand, and *Oxalis debilis* is reported here as a new host of this fungus.

Family Polypodiaceae

Cercospora platycerii Chupp, *Monograph of Cercospora*: 456 (1954).

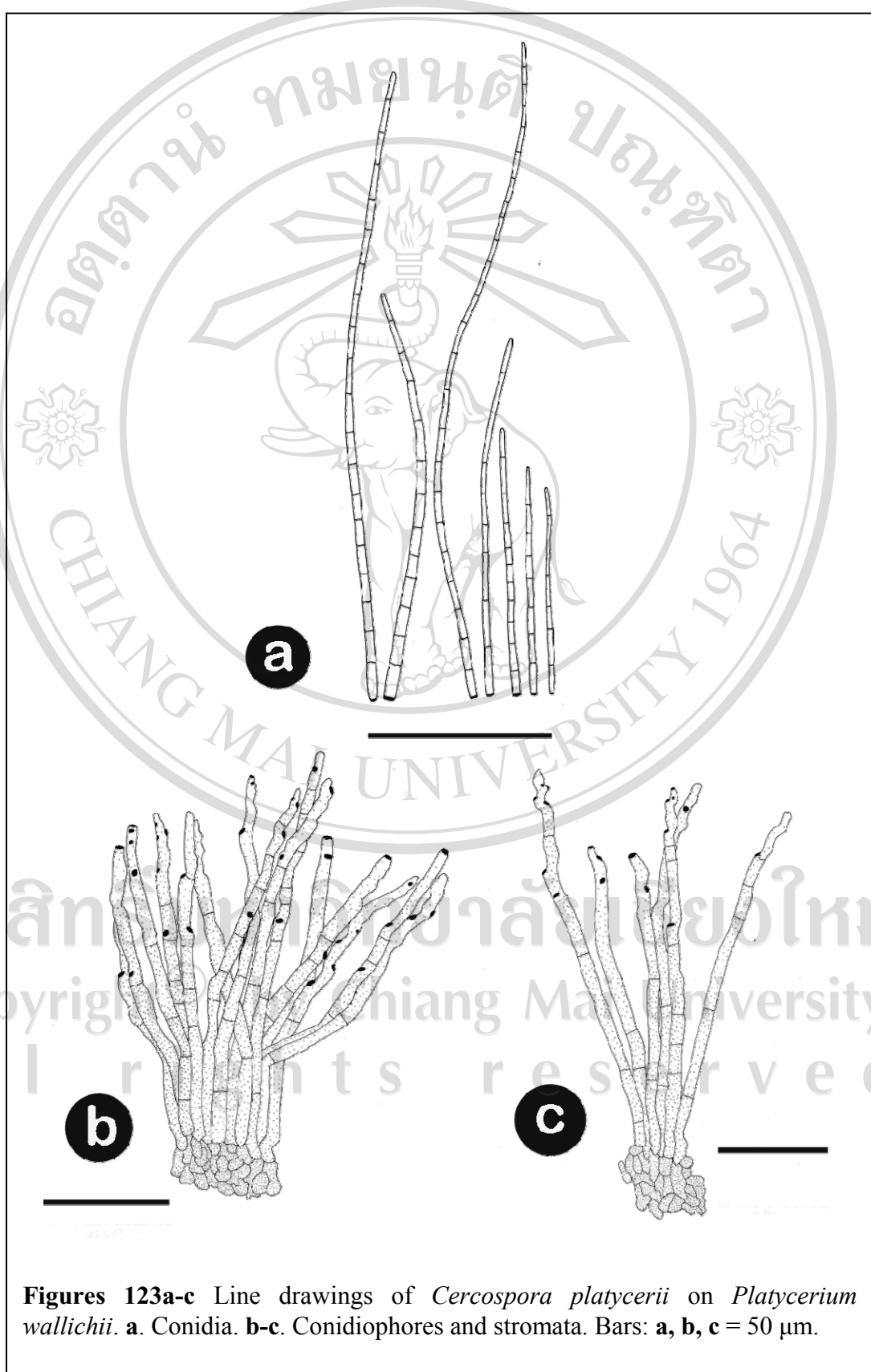
(Figures 123a-c)

Leaf spots 5-30 mm diameter, amphigenous, subcircular to irregular, grey to pale brown, with dark brown margin, numerous and scattered through the leaf surface.

Caespituli amphigenous. *Stromata* 16-58 μm diameter, small to well-developed, substomatal and composed of globose to subglobose, brown to blackish few brown cells. *Conidiophores* 61-200 \times 3-5.5 μm , densely fasciculate, 3-10-septate, arising from stromata, straight to decumbent, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, geniculate, sinuous at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, polyblastic, sympodially proliferating.

Conidiogenous loci 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* 25-280 \times 1-3 μm , solitary, obclavate to acicular, straight, hyaline, 5-24-septate,

smooth, truncate at the base, tapering toward a subacute apex, hila 0.5-2 μm diameter, conspicuous, thickened, and darkened.



Figures 123a-c Line drawings of *Cercospora platycerii* on *Platycerium wallichii*. **a.** Conidia. **b-c.** Conidiophores and stromata. Bars: **a, b, c** = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Amphur Doisaket on leaves of *Platyserium bifurcatum* (Cav.) C. Chr. (*Polypodiaceae*), 5 July 2006, Jamjan Meeboon (CMU 27904); Chiang Mai Province, Tumbol Sansai, on leaves of *Platyserium wallichii* Hook. (*Polypodiaceae*), 12 September 2007, Parin Noiruang (BBH 23741); Chiang Mai Province, Pang Da Royal Project, on leaves of *Platyserium wallichii* Hook. (*Polypodiaceae*), 5 August 2008, Jamjan Meeboon (BBH 23733).

Host: *Platyserium bifurcatum*, *Platyserium* sp. (*Polypodiaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007b, c).

Distribution: Thailand and U.S.A (Crous and Braun, 2003; Meeboon *et al.*, 2007b, c).

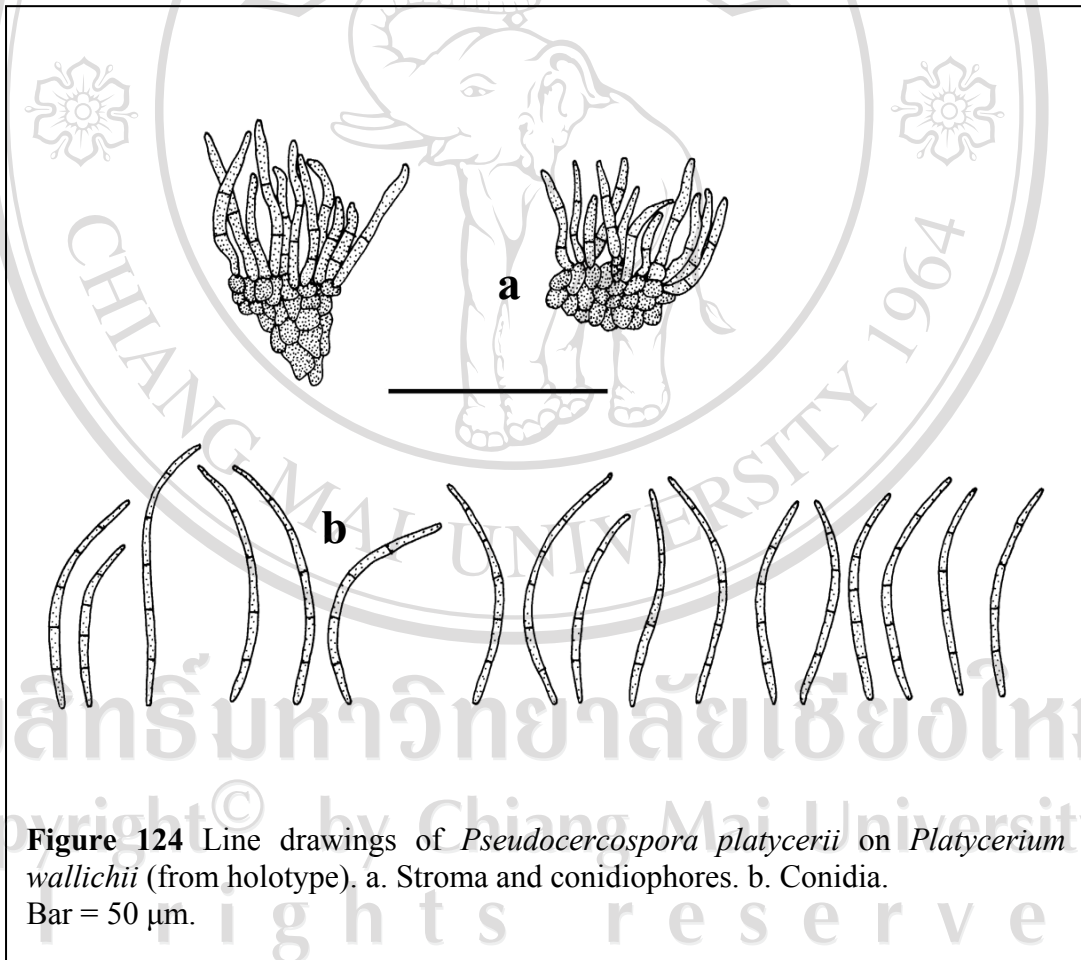
Notes: The first record of *C. platycerii* from Thailand was made by Meeboon *et al.* (2007b, c) on *P. wallichii* and *P. bifurcatum*.

***Pseudocercospora platycerii* Meeboon, Hidayat, and To-anun, sp. nov.**

(Figure 124)

Leaf spots 2-7 mm diameter, distinct, amphigenous, angular to irregular, scattered, often at the edge of the leaves, brown, with dark brown margins, whitish at the centre. *Caespituli* epiphyllous. *Stromata* (36) 53 ± 14 (75) μm diameter, intraepidermal, well-developed, composed of globular to angular, brown to dark brown cells. *Conidiophores* (12) 25.5 ± 8.5 (39) \times (2) 2 ± 0.3 (3) μm , numerous in

densely fasciculate, 1-2-septate, arising from the upper part of stromata, brown, smooth, paler towards the apex, simple, straight, mostly not geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (24) 46.5 ± 10.1 (64) $\times 2$ μm , solitary, filiform to subacicular, 4-6-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the base, with obtuse apex, hila unthickened and not darkened.



Specimen examined: THAILAND, Chiang Mai Province, Pang Da Royal Project, on leaves of *Platycerium wallichii* Hook. (*Polypodiaceae*), 5 August 2008, Jamjan Meeboon (BBH 23735: **holotype**).

Host: *Platynerium wallichii* (Polypodiaceae).

Distribution: Thailand (type locality).

Notes: Two species, *Pseudocercospora abacopteridicola* (J. M. Yen and Lim) J. M. Yen and *P. phyllitidis* (H. H. Hume) U. Braun and Crous, have been recorded from ferns. This specimen differs from *P. abacopteridicola* due to epiphyllous caespituli, well-developed stromata, and conidiophores arising from stromata. Comparing to *P. phyllitidis*, this specimen differs also in having epiphyllous caespituli and base truncate of conidia. Therefore, we proposed this specimen as a new species.

Literature: Chupp (1954, p. 456), Yen and Lim (1980, p.168 and 204).

Family *Polygonaceae*

Pseudocercospora polygonigena (J. M. Yen) U. Braun and Crous, *CBS Biodiversity Series* 1: 332 (2003).

≡ *Cercospora polygonigena* J. M. Yen, *Rev. Mycol.* 42: 143 (1978).

≡ *Cercoseptoria polygonigena* (J. M. Yen) J. M. Yen, *Gard. Bull. Singapore* 33: 152 (1980), also in *Cryptog. Mycol.* 1: 253 (1980).

(Figure 125)

Leaf spots 3-5 mm diameter, distinct, circular, angular to irregular, scattered, grayish-brown with blackish-brown border on the upper leaf surface, and pale greenish, indistinct border on the lower leaf surface. *Caespituli* amphigenous. *Stromata* 12-75 μm diameter, substomatal to intraepidermal, small to well-developed,

composed of globular to angular, brown to blackish brown cells. *Conidiophores* (14-) 20-45 (-77.5) \times (2-) 2.5-3 (-4) μm , numerous in a densely fasciculate, 2-3-septate, arising from the stromata, smooth, medium brown to brown, simple, straight to decumbent, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (45.5-) 56-62 (-89) \times (2-) 3-4 μm , solitary, filiform-slightly acicular to obclavate, 5-10-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the base, with acute apex, hila unthickened and not darkened.

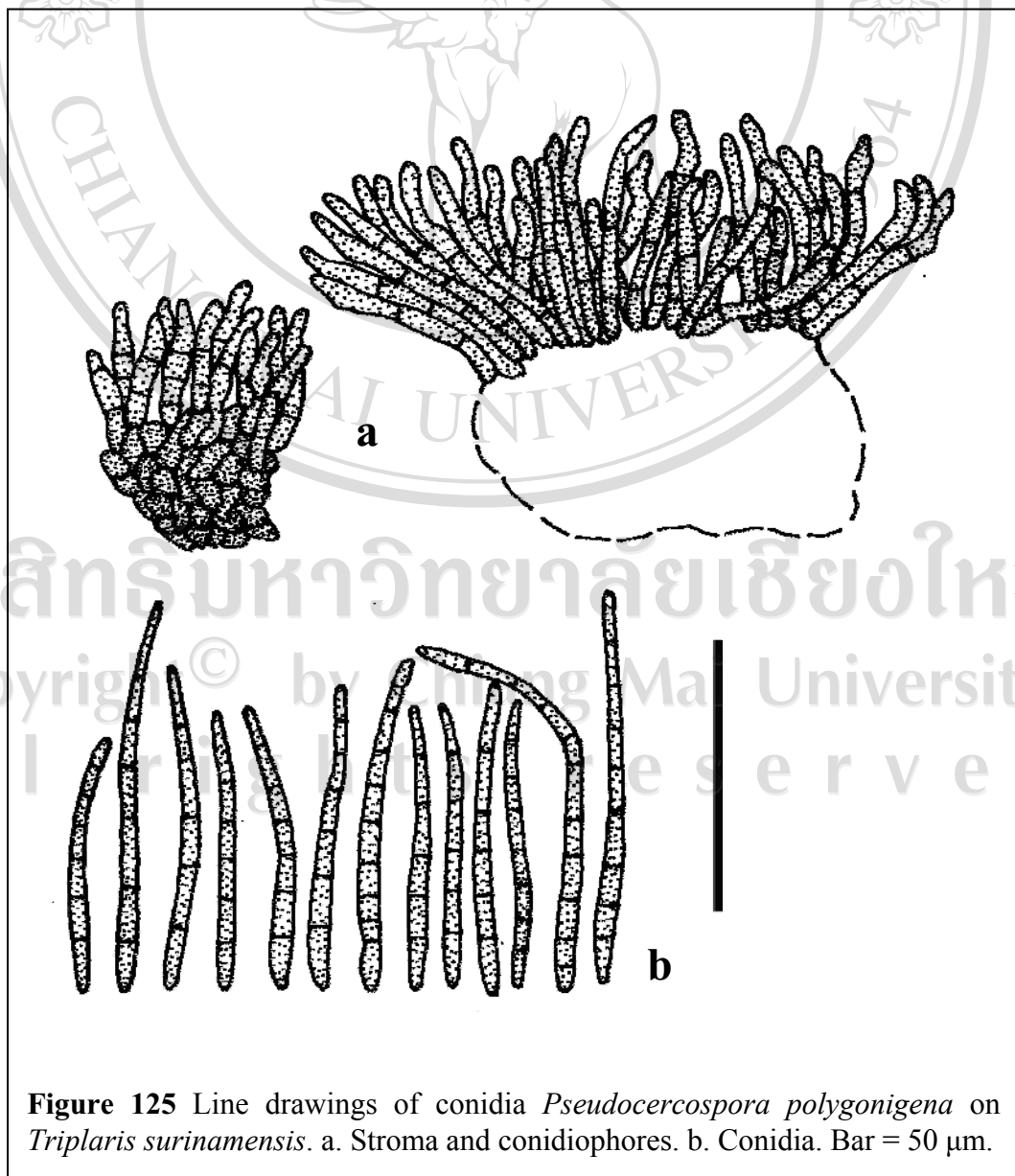


Figure 125 Line drawings of conidia *Pseudocercospora polygonigena* on *Triplaris surinamensis*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Specimen examined: Thailand, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Triplaris surinamensis* Cham. (*Polygonaceae*), 10 December 2006, Jamjan Meeboon (JM 107).

Host: *Polygonum* sp. (*Polygonaceae*) (Yen and Lim, 1980).

Distribution: Singapore (Yen and Lim, 1980).

Notes: About four species of *Pseudocercospora*, viz, *Pseudocercospora persicariae* (W. Yamam.) Deighton, *Pseudocercospora platensis* (Speg.) U. Braun, *Pseudocercospora polygonicola* (A.K. Kar and M. Mandal) Deighton (1987), and *Pseudocercospora polygonigena* (J.M. Yen) U. Braun and Crous (2003) Yen and Lim (1980, p. 154), have been recorded from plant family *Polygonaceae*. This specimen differs from *P. persicariae*, *P. platensis*, and *P. polygonicola* in having amphigenous caespituli, short and not branched conidiophores in a dense fascicles, and acicular conidia with truncate base. *Pseudocercospora polygonigena* is the most closed species due to amphigenous caespituli, relatively well-developed stromata, short conidiophores in a densely fasciculate, and conidia truncate at the base (Yen and Lim, 1980). This specimen is the first record of *P. polygonigena* from Thailand, and *Triplaris surinamensis* is reported here as a new host of this fungus.

Literature: Chupp (1954, p. 450), Deighton (1987, p. 388), Yen and Lim (1980, p. 152).

Family *Portulacaceae*

Cercospora talini Syd. and P. Syd., *Mém. Herb. Boissier* **8**: 2 (1900).

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

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Talinum triangulare* Willd. (*Portulacaceae*), 21 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27968).

Host: *Talinum patens* (*Portulacaceae*) (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Distribution: Argentina, Thailand, and Venezuela (Crous and Braun, 2003; Nakashima *et al.*, 2007).

Notes: The first report of *C. talini* from Thailand was made by Nakashima *et al.* (2007).

Literature: Chupp (1954, p. 458).

Family *Pteridaceae*

Cercospora cyclosori Goh and W. H. Hsieh, *Trans. Mycol. Soc. R. O. C.* **4**: 26 (1989).

≡ *Cercospora cyclosori* Sarbajna and Chattopadh., *J. Mycopathol. Res.* **28**: 14 (1990) (*nom. illeg.*), homonym of *C. cyclosori* Goh and W. H. Hsieh (1989).

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

(Figures 126a-b)

Leaf spots 2-8 mm diameter, amphigenous, irregular, white to pale at the center, with brown margin, sometimes limited by vein. *Caespituli* amphigenous. *Stromata* 23-55 μm diameter, substomatal, small, composed of a few subglobose, brown-walled cells. *Conidiophores* (111-) 146-181 (-190) \times 3-4.5 (-5) μm , 9-17 in a loosely fasciculate, 5-7-septate, arising from stromata, straight, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, not geniculate. *Conidiogenous cells* integrated, holoblastic, monoblastic, terminal, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* 179-283 \times 2.5-3.5 μm , solitary, acicular, straight, hyaline, 14-25-septate, smooth, truncate at the base, tapering toward a subacute apex, hila 1.5-2 μm diameter, conspicuous, thickened, and darkened.

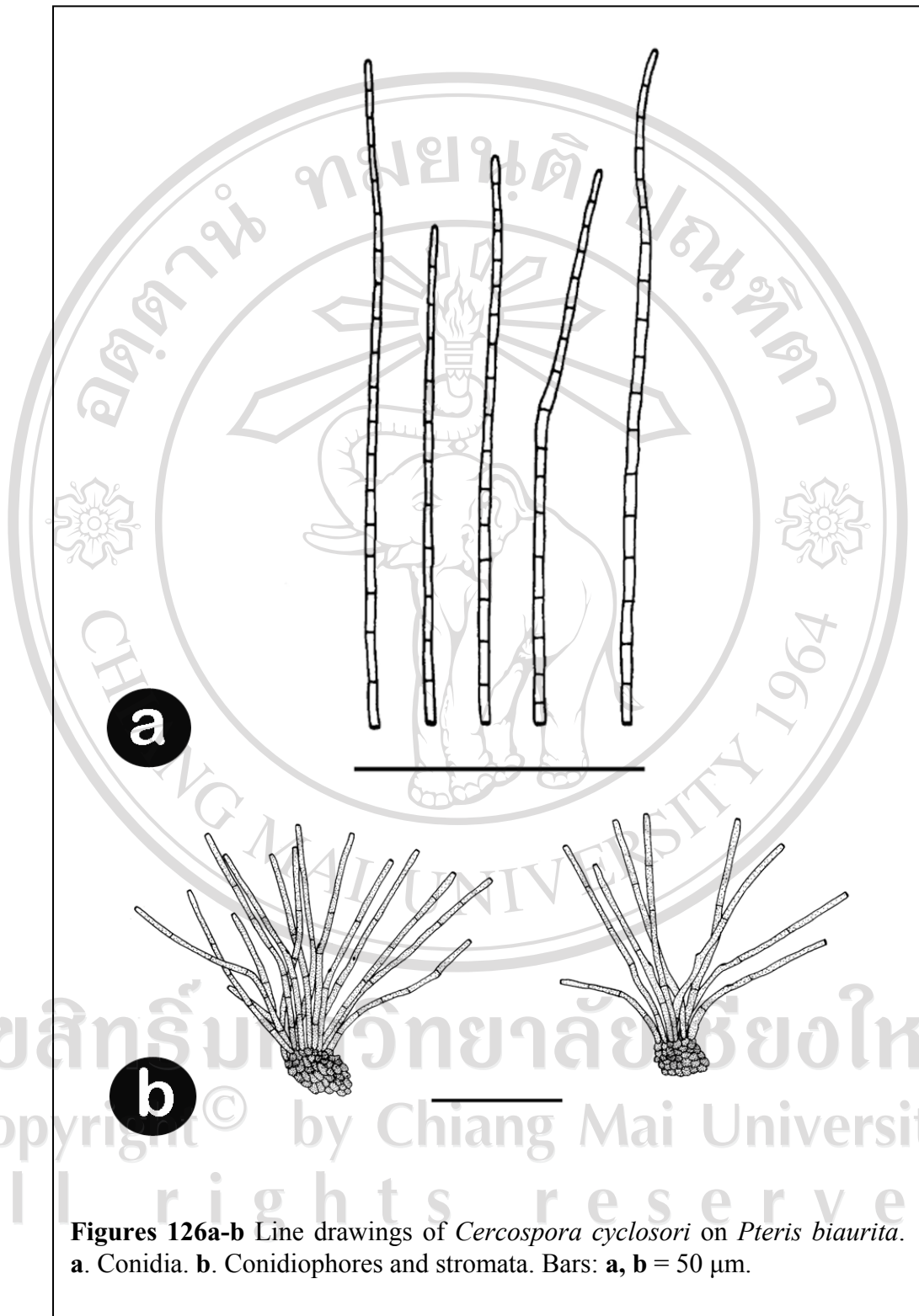
Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Jam, Mae-Hae Royal Project Area, on leaves of *Pteris biaurita* L. (*Pteridaceae*), 12 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23617).

Host: *Cyclosorus acuminatus*, *Cyclosorus* sp. (*Thelypteridaceae*) (Crous and Braun, 2003).

Distribution: India, and Taiwan (Crous and Braun, 2003).

Notes: This specimen is much closed to *C. cyclosori* in having dark brown symptoms, amphigenous caespituli, conidiophores in a divergent fascicles, and long acicular conidia with truncate base (Hsieh and Goh, 1990). Crous and Braun (2003) assigned this species to *C. apii* s. lat. This specimen is the first record from Thailand, and *Pteris biaurita* is reported here as a new host of this fungus.

Literature: Hsieh and Goh (1990, p. 327-329).



Family Rosaceae

Cercospora scharifii Petr., *Sydowia* **10**: 14 (1957) [1956].

(Figure 127)

Leaf spots 3-8 mm diameter, amphigenous, circular to subcircular, brown, with dark brown to blackish margin. *Caespituli* amphigenous. *Stromata* lacking. *Conidiophores* (30.5) 69-116 (-141) × (3-) 3.5-5 µm, 4-9 in a loosely fasciculate, 1-6-septate, arising from stromata, straight to decumbent, unbranched, cylindrical, smooth, brown at the base, and paler toward the apex, geniculate, mostly near the apex. *Conidiogenous cells* integrated, terminal or intercalary, sympodially proliferating. *Conidiogenous loci* 1.5-2.5 µm diameter, conspicuous, thickened, and darkened. *Conidia* 25-38.5 × 3.5 µm, solitary, obclavate, straight, hyaline, 4-5-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 1.5-2 µm diameter, thickened, and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Jam, Mae Hae Royal Project Area, on leaves of *Rosa hybrida* E. H. L. Krause (*Rosaceae*), 12 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23671).

Host: *Rosa* sp. (*Rosaceae*) (Crous and Braun, 2003).

Distribution: Iran (Crous and Braun, 2003).

Notes: This specimen is the first record of *C. scharifii* from Thailand, and *R. hybrida* is reported in this study as a new host of this fungus.

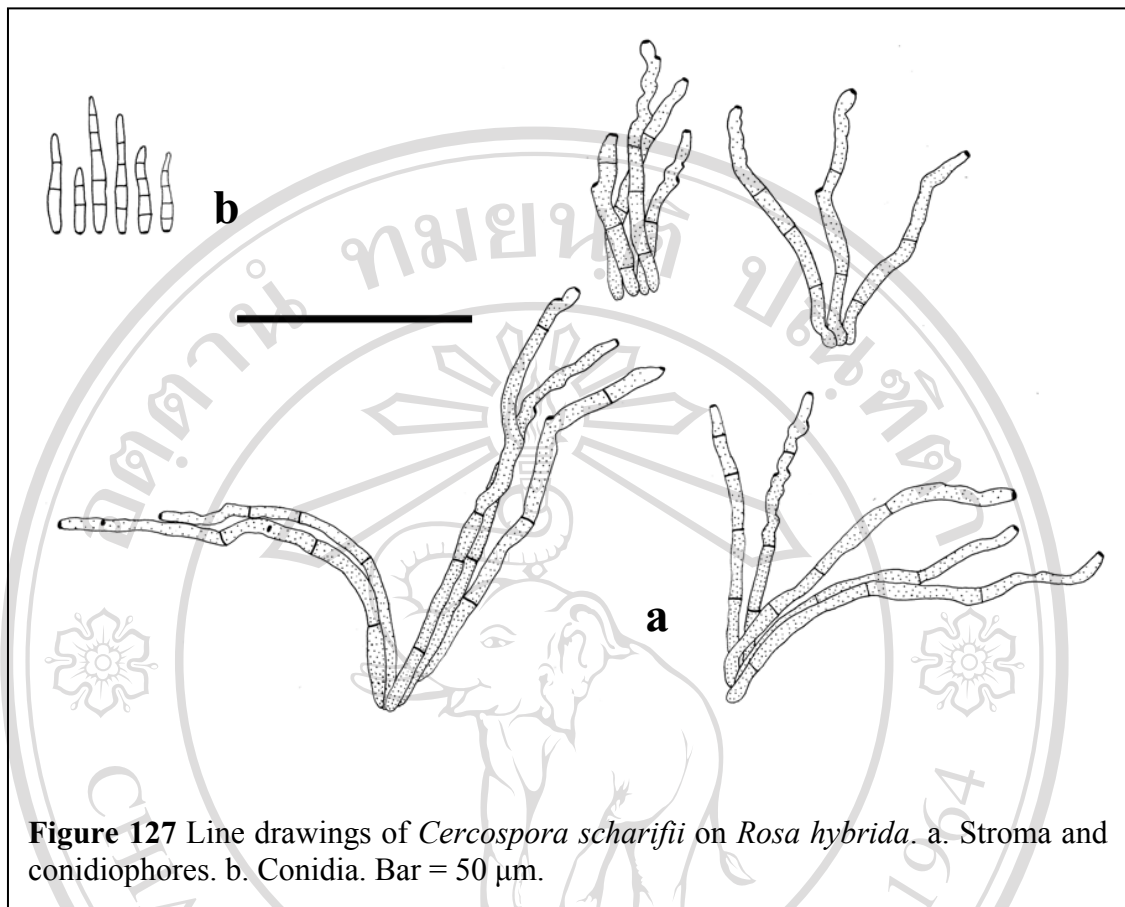


Figure 127 Line drawings of *Cercospora scharifii* on *Rosa hybrida*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

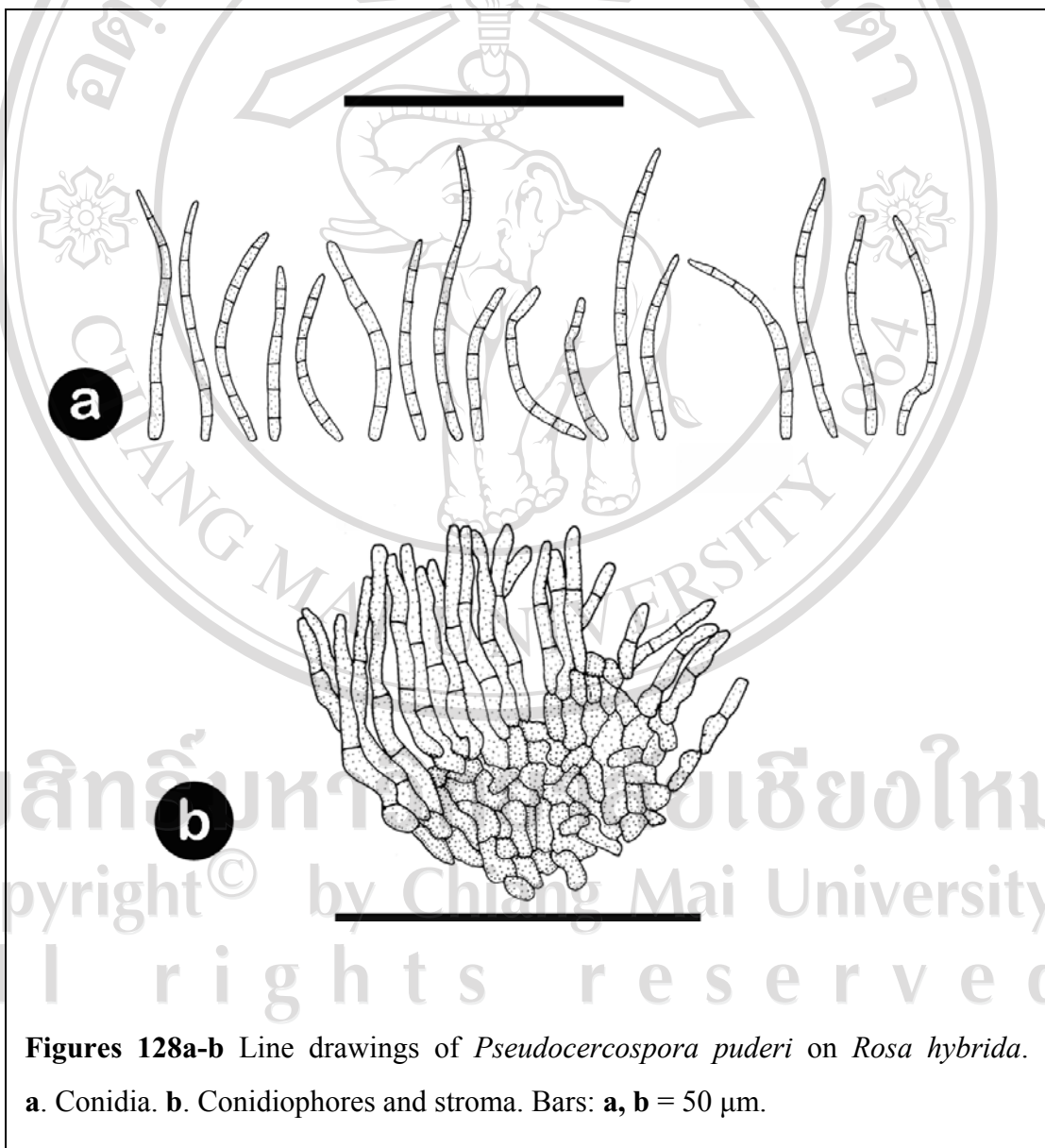
Pseudocercospora puderi Deighton, *Mycol. Pap.* **140**: 90 (1976).

≡ *Cercospora puderii* B.H. Davis (*puderii*), *Mycologia* 30: 291 (1938) (*nom. inval.*).

(Figures 128a-b)

Leaf spots 3-8 mm diameter, amphigenous, circular to subcircular, pale to brown, with dark margin. *Caespituli* amphigenous. *Stromata* 30-46 μm diameter, substomatal to intraepidermal, composed of a few globose to subglobose, brown to dark brown-walled cells. *Conidiophores* 36-40 \times 2-2.5 μm , densely fasciculate, 0-2-septate, straight, unbranched, smooth, pale brown, paler toward the apex, not

geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (36-) 42-61 (-72) \times 2-3 μm , solitary, acicular to obclavate, straight to mildly curved, subhyaline, 4-7-septate, smooth, truncate at the base, with subacute apex, hila inconspicuous, unthickened, and not darkened.



Figures 128a-b Line drawings of *Pseudocercospora puderi* on *Rosa hybrida*.

a. Conidia. **b.** Conidiophores and stroma. Bars: **a, b** = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Jam, Mae Hae Royal Project Area, on leaves of *Rosa hybrida* E. H. L. Krause (*Rosaceae*), 12 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23671).

Host: *Rosa centifolia*, *R. davurica*, *R. involucrata*, *R. multiflora*, *R. odorata*, *Rosa* sp. (*Rosaceae*) (Crous and Braun, 2003).

Distribution: Cambodia, China, Cuba, Cyprus, Dominican Republic, Haiti, Hong Kong, India, Jamaica, Korea, Malaysia, Mauritius, Malaysia, Mexico, Netherlands, Papua New Guinea, Philippines, Sabah, Sierra Leone, U.S.A, and Venezuela (Crous and Braun, 2003).

Notes: This is the first record of *P. puderii* from Thailand, and *R. hybrida* is reported here as a new host of this fungus.

Pseudocercospora prunicola (Ellis and Everh.) U. Braun, *Trudy Bot. Inst. im V. L. Komarova* **20**: 82 (1997).

≡ *Cercospora prunicola* Ellis and Everh., *J. Mycol.* **3**: 17 (1887).

≡ *Cercoseptoria prunicola* (Ellis and Everh.) J. M. Yen, *Bull. Soc. Mycol. France* **97**: 92 (1981).

= *Cercospora pruni-yedoensis* Sawada, *Rep. Gov. Agric. Res. Inst. Taiwan* **85**: 120 (1943) (*nom. inval.*).

≡ *Pseudocercospora pruni-yedoensis* Goh and W. H. Hsieh, *Cercospora and similar Fungi from Taiwan*: 282 (1990).

= *Cercospora pruni-persicae* J. M. Yen, *Bull. Soc. Mycol. France* **94**: 61 (1978), also in *Rev. Mycol.* **42**: 59 (1978).

≡ *Cercospetoria pruni-persicae* (J. M. Yen) J. M. Yen (*pruni-perciae*),
Bull. Soc. Mycol. France **97**: 92 (1981).

(Figure 129)

Leaf spots 5-16 mm diameter, distinct, amphigenous, angular to irregular, reddish brown, with dark margin, sometimes limited by vein. *Caespituli* amphigenous. *Stromata* (39.5) 40.5 ± 1.1 (42) μm diameter, intraepidermal, well-developed, composed of globular to angular, brown to dark brown cells. *Conidiophores* (13.5) 25.5 ± 8.5 (39) \times (2) 2.5 ± 0.3 (2.5) μm , 0-2-septate, numerous in a densely fasciculate, arising from the stromata, brown, simple, straight, smooth, not geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (13.5) 27 ± 6.3 (40.5) \times (1.5) 2 ± 0.3 (2.5) μm , solitary, filiform to obclavate, 1-5-septate, straight or slightly curved, smooth, pale olivaceous, base truncate, with subacute to obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Pang Da Royal Project, on leaves of *Prunus persica* (L.) Batsch (*Rosaceae*), 5 August 2008, Jamjan Meeboon (BBH 23727).

Host: *Prunus americana*, *P. campanulata*, *P. cerasoides*, *P. domestica*, *P. donarium*, *P. persica*, *P. salicina*, *P. subhirtella*, *P. yedoensis* (*Rosaceae*) (Crous and Braun, 2003).

Distribution: China, Hong Kong, India, Japan, Kirghizia, Korea, Myanmar, Russia (Asian and European part), Taiwan, U.S.A, and Vanuatu (Crous and Braun, 2003).

Notes: Two *Pseudocercospora* species, viz, *P. graphioides* U. Braun and *P. prunicola* (Ellis and Everh.) U. Braun, have been recorded associated with palnt genus *Prunus*. This specimen differs from *P. graphioides* in having shorter ($13.5\text{-}39 \times 2\text{-}2.5 \mu\text{m}$ vs $30\text{-}130 \times 4\text{-}6 \mu\text{m}$) and not geniculate conidiophores, and shorter conidia ($(13.5\text{-}40.5 \times 1.5\text{-}2.5 \mu\text{m}$ vs $30\text{-}100 \times 4.5\text{-}8 \mu\text{m}$) with truncate base. This specimen is much closed to *P. prunicola* by having similar morphological characteristics, such as short and not geniculate conidiophores, and obclavate and short conidia. This specimen is a new record of *P. prunicola* from Thailand.

Literature: Chupp (1954, p. 478 and 484).

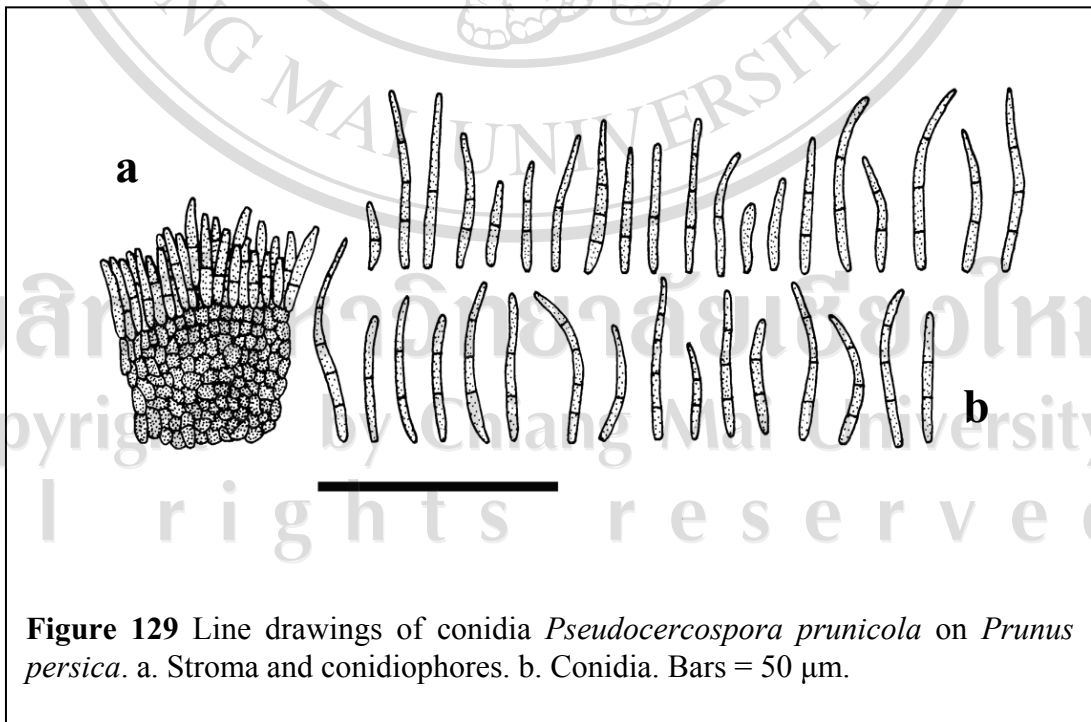


Figure 129 Line drawings of conidia *Pseudocercospora prunicola* on *Prunus persica*. a. Stroma and conidiophores. b. Conidia. Bars = 50 μm .

Family Rubiaceae

Cercospora coffeicola Berk. and M. A. Curtis, *Grevillea* **9**: 99 (1881).

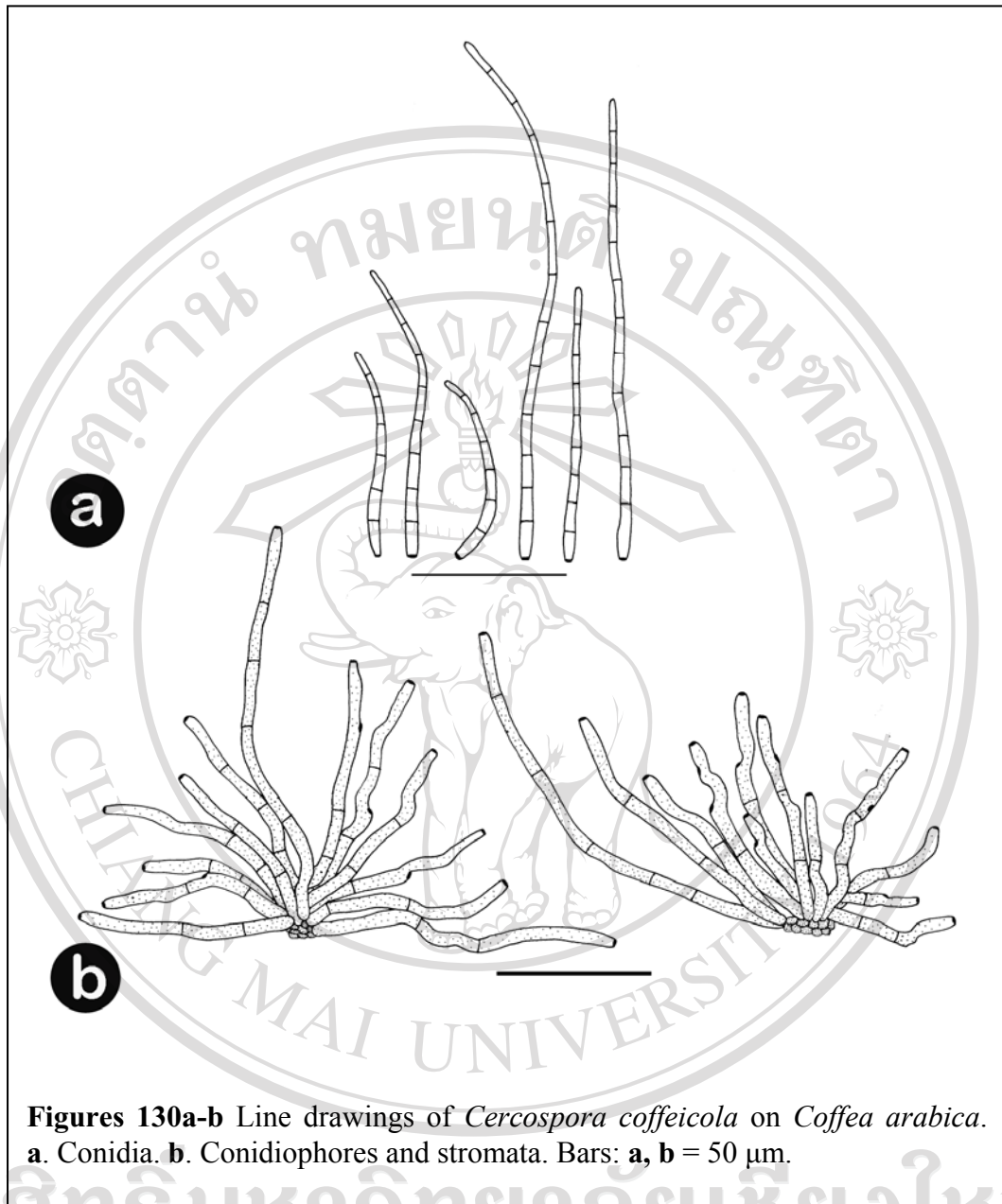
= *Cercospora coffeae* Zimm., *Ber. Land-Forstw. Deutch-Oatafr.* **2**: 35 (1904).

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

(Figures 130a-b)

Leaf spots 5-8 mm diameter, amphigenous, circular, to subcircular brown to dark brown, pale at the center, with dark margin. *Caespituli* amphigenous. *Stromata* 16.5-31 μm diameter, substomatal to intraepidermal, small, composed of a few globose and brown-walled cells. *Conidiophores* (20-) 22-86 (-140) \times (2.5-) 3.5-4 (5) μm , 9-23 in a loosely to densely fasciculate, divergent, 2-7-septate, arising from stromata, straight, mostly near the apex, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, geniculate. *Conidiogenous cells* integrated, holoblastic, polyblastic, sometimes monoblastic, terminal or intercalary, sympodially proliferating. *Conidiogenous loci* 2-2.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* (35-)-99-178 \times 3-4 μm , solitary, obclavate, straight, slightly curved, hyaline, 4-21-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 2-2.3 μm diameter, thickened, and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Mae Jam, Mae Hae Royal Project Area, on leaves of *Coffea arabica* L. (*Rubiaceae*), 12 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23600).



Host: *Coffea arabica*, *C. canephora*, *C. excelsa*, *C. laurina*, *C. liberica*,
C. robusta, *C. stenophylla*, *Coffea* spp. (*Rubiaceae*) (Crous and Braun, 2003).

Distribution: Widely distributed, including American Samoa, Angola, Australia, Brazil, Brunei, Cambodia, China, Colombia, Congo, Costa Rica, Cuba, Dominican Republ., El Salvador, Ethiopia, Fiji, French Guiana, French Polynesia,

Guiana, French Polynesia, Gabon, Ghana, Guadeloupe, Guatemala, Guyana, Haiti, India, Indonesia, Ivory Coast, Jamaica, Japan, Kenya, Laos, Madagascar, Malawi, Martinique, Mauritius, Micronesia, Mosambique, Myanmar, Nepal, New Caledonia, Nigeria, Panama, Papua New Guinea, Peru, Philippines, Puerto Rico, Samoa, Sierra Leone, Somalia, South Africa, Sudan, Suriname, Taiwan, Tanzania, Thailand, Togo, Trinidad and Tobago, Uganda, U.S.A, Vanuatu, Venezuela, Yemen, and Zimbabwe (Crous and Braun, 2003).

Notes: *Cercospora coffeicola* was firstly reported from Thailand by Sontirat *et al.* (1980).

Literature: Chupp (1954, p. 493-494).

Passalora haldinae C. Nakash. and Meeboon [as '*haldinae*'], *Fungal Diversity* 26: 259-260 (2007).

Mycobank: 510508

(Figure 131)

Maculis in foliis vivis subcirculibus vel irregularibus, pallide brunneis vel atro-brunneis, margine indefinitis, 1-14 mm diameter; caespitulis praecipue epiphyllis. Stromatibus praecipue epiphyllis, parvis vel bene evolutis, intraepidermicis, usque 67 µm diameter, brunneis, subglobosis vel globosis. Conidiophoris laxe vel dense fasciculatis, erumpentibus, brunneis, valde 1-10-geniculatis, 15-63 × 2.8-3.6 µm, 2-7-septatis, raro ramosis; locis conidiogenis parvis, distinctis, leviter incrassatis, 0.8-1.3 µm diameter Conidiis solitariis, cylindricis vel

obclavatis, rectis, laevibus, ad apicem obtusis, ad basim obconice truncates, leviter incrassatis, brunneis, 1-7-septatis, 24-80 × 2.7-5 μm.

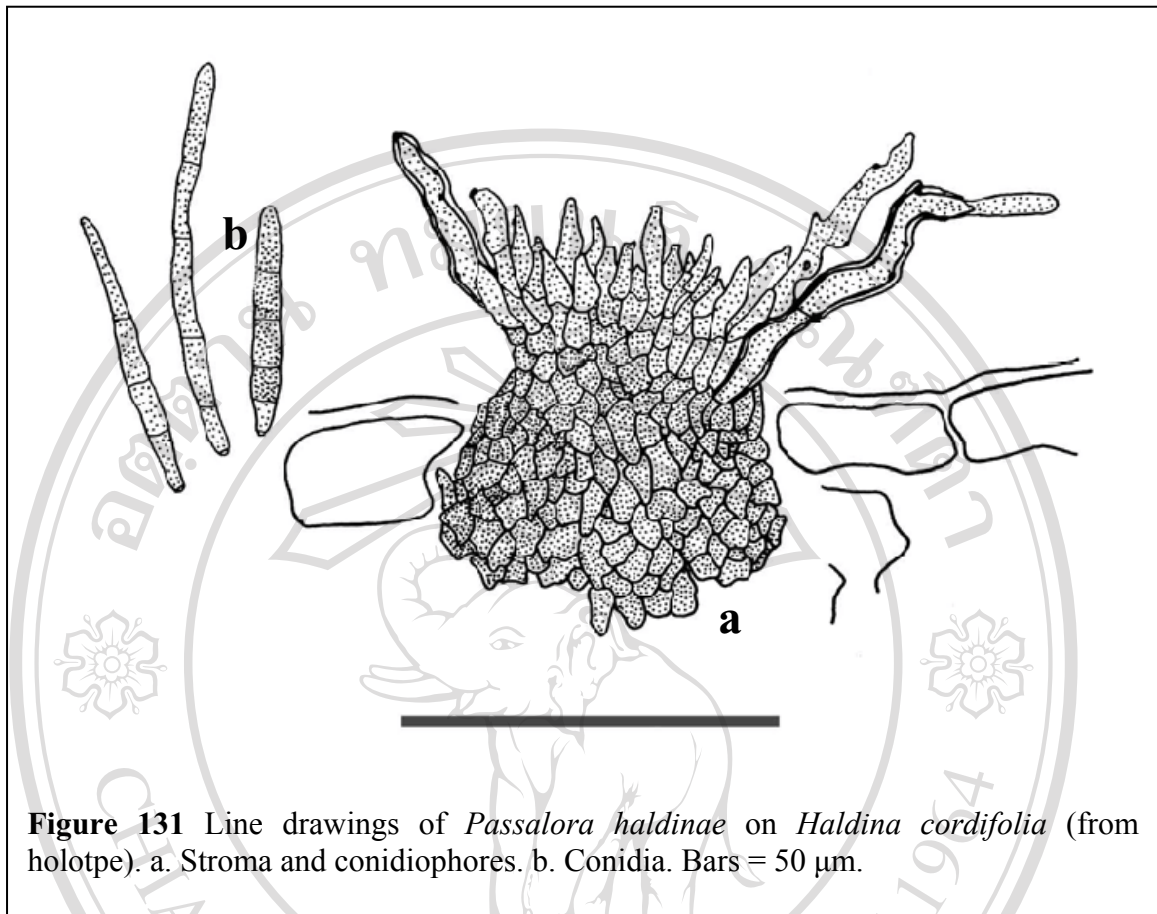
Etymology: *haldinae*, derived from the genus name of the host plant.

Leaf spots 1-14 mm diameter, subcircular to irregular, pale brown to dark brown, with indefinite margins. *Caespituli* mainly epiphyllous. *Stromata* up to 67 μm diameter, small or well-developed, intraepidermal, subglobular to globular, brown. *Conidiophores* 15-63 × 2.8-3.6 μm, loosely to densely fasciculate, 2-7-septate, erumpent through the cuticle, brown, strongly 1-10-geniculate, occasionally branched. *Conidogenous cells* integrated, intercalary or terminal, proliferating sympodially. *Conidogenous loci* 1-1.5 μm diameter, small, distinct and slightly thickened. *Conidia* 24-80 × 2.7-5 μm, solitary, cylindrical to obclavate, 1-7-septate, brown, straight, smooth, apex obtuse, base obconically truncated, with a slightly thickened hila.

Specimen examined: THAILAND, Uttradit Province, Amphur Muang, Sak Yai National Park, on leaves of *Haldina cordifolia* (Roxb.) Rids. (*Rubiaceae*), 25 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27886: **holotype**).

Host: *Haldina cordifolia* (*Rubiaceae*).

Distribution: Thailand (type locality).



Notes: The species of *Cercospora* and allied genera on hosts of the genus *Haldina* are not yet known. Six species of *Passalora* have been recorded on other hosts belonging to the *Rubiaceae*, viz. *Passalora cephalanti* (Ellis and Kellerm.) U. Braun and Crous (Crous and Braun, 2003), *P. diodiae* (Cooke) Crous, U. Braun and Alfenas (Crous *et al.*, 1999), *P. mitracari-hirti* O.L. Pereira and R.W. Barreto (Pereira and Barreto, 2005), *P. okinawaensis* (Tak. Kobay. and T. Nishijima) U. Braun (Crous and Braun, 2003), *P. pseudocapnodioides* O.L. Pereira and R.W. Barreto (Pereira and Barreto, 2005), and *P. ubatubensis* (Chupp and Viégas) Crous, Alfenas and R. W. Barreto (Crous *et al.*, 1997). Compared with the morphological characteristics of these species, *Passalora haldinia* is distinguished by having strongly geniculate,

occasionally branched conidiophores (conidiogenous cells), and conidia formed singly.

Pseudocercospora gardeniae (Boedijn) Deighton, *Mycol. Pap.* **140**: 144 (1976).

≡ *Cercospora gardeniae* Boedijn, *Nova Hedwigia* **3**: 427 (1961).

(Figure 132)

Leaf spots 2-7 mm diameter, amphigenous, distinct, circular to subcircular, brown, pale at the center, with dark brown margin. *Caespituli* amphigenous. *Stromata* 15-27.5 μm diameter, small, intraepidermal, composed of a few globose to subglobose, dark brown-walled cells. *Conidiophores* (7.5-) 12-21 (-25) \times 2-3 (-3.5) μm , 5-16 in a densely fasciculate, curved, 1-3-septate, smooth, pale brown, paler toward the apex, unbranched, slightly geniculate near the apex. *Conidiogenous cells* integrated, terminal to intercalary, holoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (10-) 23.5-62 (-75) \times (1.5-) 2-2.5 (-3) μm , solitary, mostly obclavate, sometimes acicular to cylindrical, straight to mildly curved, subhyaline, 3-8-septate, smooth, truncate at the base, with obtuse apex, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Muang, Tumbol Mae Hea, Royal Flora, on leaves of *Gardenia jasminoides* Ellis (*Rubiaceae*), 13 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23747).

Host: *Gardenia jasminoides*, *G. phylastreii* (*Rubiaceae*) (Crous and Braun, 2003).

Distribution: Indonesia and Philippines (Crous and Braun, 2003).

Notes: This specimen is the first report of *P. gardeniae* from Thailand.

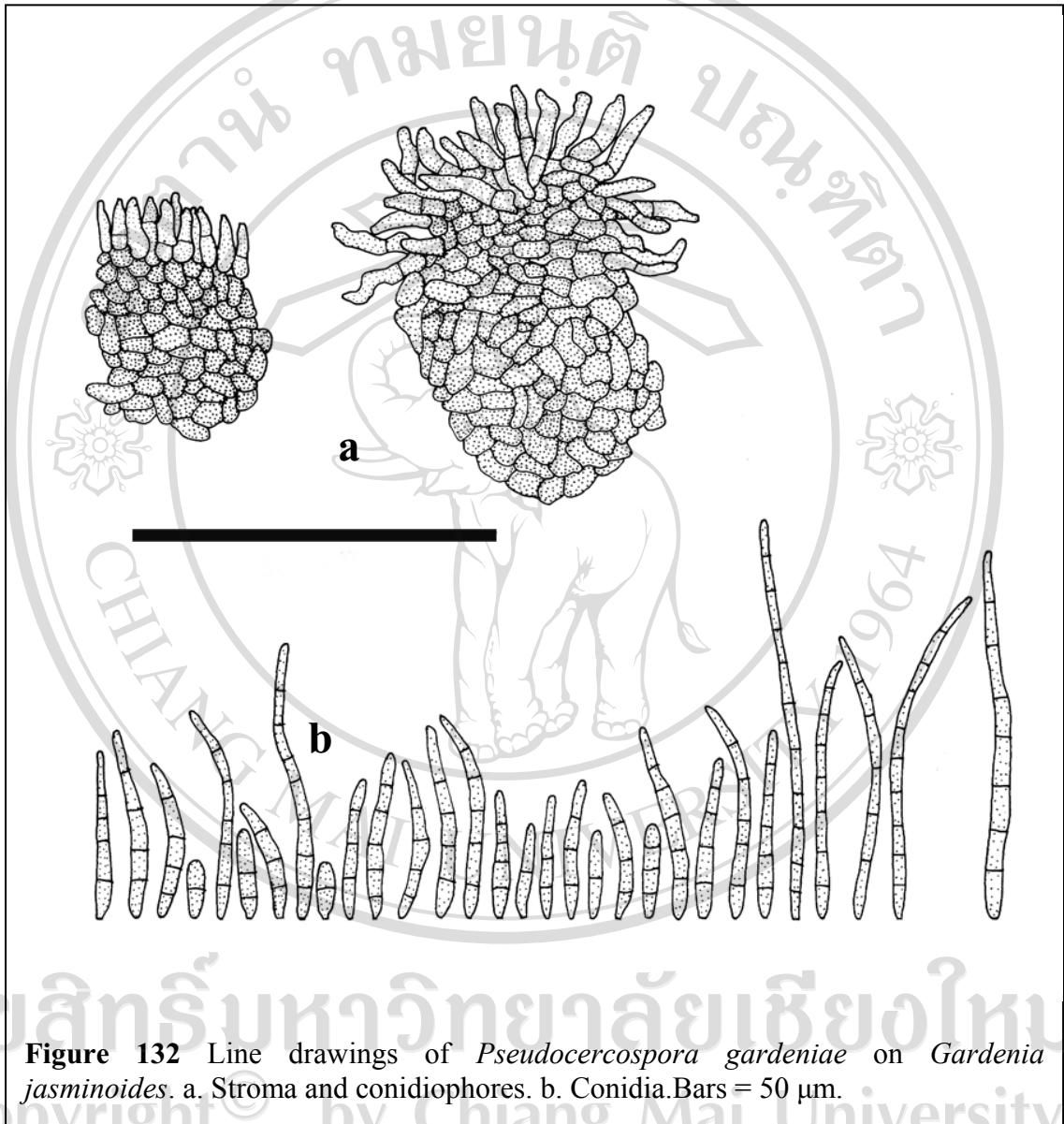


Figure 132 Line drawings of *Pseudocercospora gardeniae* on *Gardenia jasminoides*. a. Stroma and conidiophores. b. Conidia. Bars = 50 μ m.

Pseudocercospora mitracarpigena Meeboon, Hidayat, and To-anun, **sp. nov.**

(Figure 133)

Leaf spots 5-20 mm diameter, distinct, amphigenous, angular to irregular, scattered, dull brown, with dark margins, often limited by vein. *Caespituli* epiphyllous, effuse. *Stromata* (31) 28 ± 9.6 (35.5) μm diameter, intraepidermal, small to well-developed, composed of globular to angular, brown to dark brown cells, mycelium internal and external. *Conidiophores* (20.5) 36.5 ± 10.7 (54) \times (3) 4 ± 0.7 (5) μm , 8 to numerous in a loosely to densely fasciculate, 2-4-septate, arising from the upper part of stromata as well as external mycelium, pale yellowish-brown, straight, smooth, branched, slightly geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (55) 112.5 ± 28 (163) \times (2) 3 ± 0.5 (4) μm , solitary, filiform to long obclavate, 4-11-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the base with obtuse apex, hila unthickened and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Amphur San Sai, Tumbol Tumbol Mae Fag, on leaves of *Mitracarpus villosus* Cham. and Schltdl. (*Rubiaceae*), 3 August 2008, Jamjan Meeboon (BBH 23748: **holotype**).

Host: *Mitracarpus villosus* (*Rubiaceae*).

Distribution: Thailand (type locality).

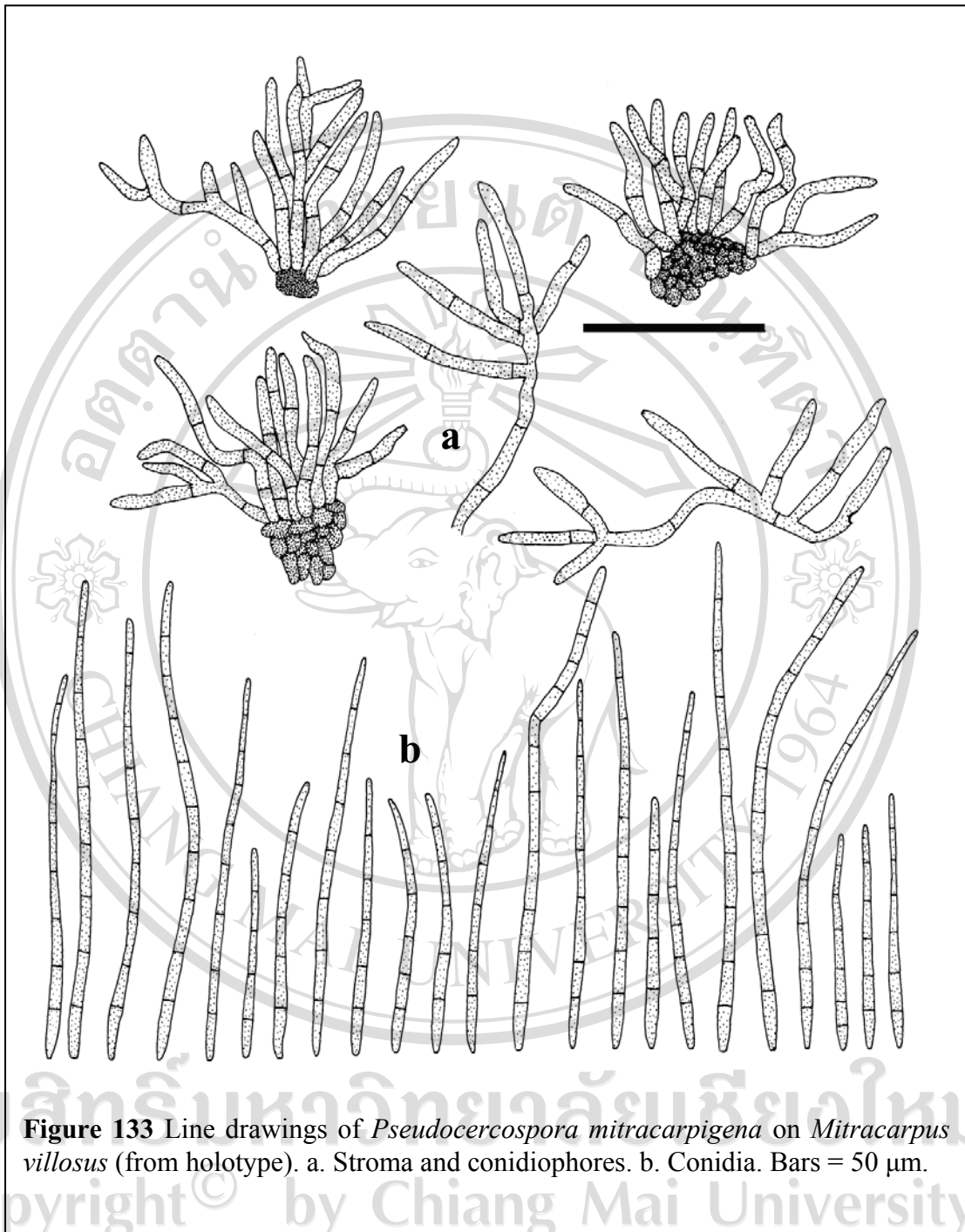


Figure 133 Line drawings of *Pseudocercospora mitracarpigena* on *Mitracarpus villosus* (from holotype). a. Stroma and conidiophores. b. Conidia. Bars = 50 μm .

Notes: Two *Pseudocercospora* species, viz, *P. borrieriae* (Ellis and Everh.) Deighton and *P. mitracarpicola* (J. M. Yen and Gilles) U. Braun and Crous, have been recorded associated with plant genus *Mitracarpus*. Crous and Braun (2003)

noted that *P. mitracarpicola* has a slightly conspicuous conidiogenous loci, and slightly thickened and darkened hila. This specimen is much closed to *P. borrieriae* due to branched conidiophores, but differs in having epiphyllous caespituli, shorter conidiophores ($20.5-54 \times 3-5 \mu\text{m}$ vs $35-220 \times 3-5.5 \mu\text{m}$ of *P. borrieriae*), and longer conidia ($55-163 \times 2-4 \mu\text{m}$ vs $30-90 \times 2.5-5 \mu\text{m}$ of *P. borrieriae*) with truncate base. Therefore, this study propose this specimen as a new species of *Pseudocercospora* from *Mitracarpus villosus*.

Family Rutaceae

Pseudocercospora angolensis (T. Carvalho and O. Mendes) Crous and U. Braun, *Sydowia* **55**: 301 (2003).

≡ *Cercospora angolensis* T. Carvalho and O. Mendes, *Bolm Soc. broteriana* **27**: 201 (1953).

≡ *Phaeoramularia angolensis* (T. Carvalho and O. Mendes) P. M. Kirk, *Mycopathologia* **94**: 177 (1986).

≡ *Pseudophaeoramularia angolensis* (T. Carvalho and O. Mendes) U. Braun, *Cryptog. Mycol.* **20**: 171 (1999).

(Figure 134)

Leaf spots 1-2 mm diameter, amphigenous, circular, angular to irregular, scattered, later coalescing to large spots, grayish-brown with blackish-brown border on the upper leaf surface, and pale greenish, indistinct border on the lower leaf

surface. *Caespituli* hypophyllous. *Stromata* (15) 44.5 ± 18.6 (60) μm diameter, substomatal to intraepidermal, distinct, small to well-developed, composed of dark brown. *Conidiophores* (40) 60.33 ± 10.52 (80) \times (2.5) 3 ± 0.3 (3.5) μm , 5 to numerous in a densely and divergent fasciculate, 1-4-septate, arising from the upper part of stromata, smooth, brown, simple, straight, slightly geniculate near the apex. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* (17) 58 ± 18.5 (75) \times (2) 2 ± 0.4 (3) μm , solitary, acicular to obclavate, 3-7-septate, straight or slightly curved, smooth, pale olivaceous, truncate at the basal end, with acute apex, hila unthickened and not darkened.

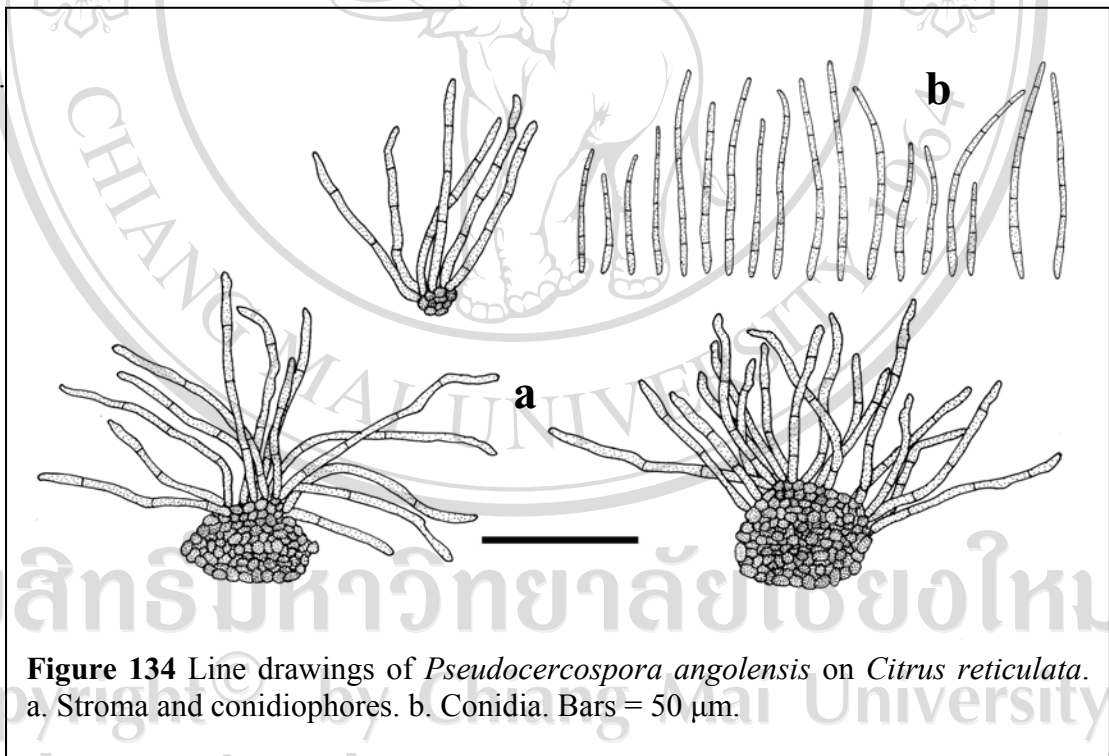


Figure 134 Line drawings of *Pseudocercospora angolensis* on *Citrus reticulata*.
a. Stroma and conidiophores. b. Conidia. Bars = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Amphur Sarapee, Tumbol Khua Mung, Farming area, on leaves of *Citrus reticulata* Blanco (*Rutaceae*), 1 March 2008, Jamjan Meeboon (BBH 23605).

Host: *Citrus sinensis*, *Citrus* spp. (*Rutaceae*) (Crous and Braun, 2003).

Distribution: Angola, Burundi, Cameroon, Central African Republic, Comoros, Congo, Ethiopia, Gabon, Gambia, Guinea, Ivory Coast, Kenya, Mozambique, Nigeria, Tanzania, Togo, Uganda, Yemen, Zambia, and Zimbabwe (Crous and Braun, 2003).

Notes: This specimen is the first record of *P. angolensis* from Thailand, and *C. reticulata* is reported here as a new host.

Family Saururaceae

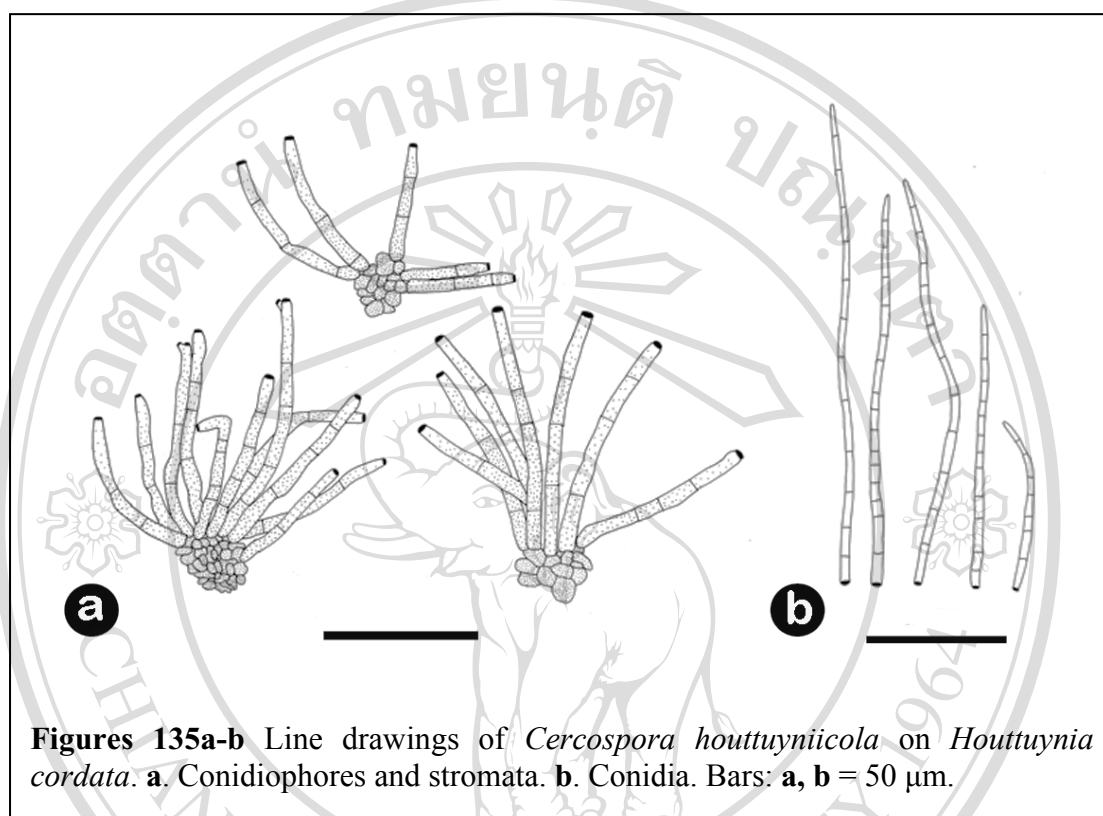
Cercospora houttuyniicola Goh and W. H. Hsieh, *Bot. Bull. Acad. Sin. Taipei* 30: 118 (1989).

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

(Figures 135a-b)

Leaf spots 5-25 mm diameter, amphigenous, clustered, irregular, dark brown to blackish, with dark reddish margin. *Caespituli* amphigenous. *Stromata* 13-43 μm diameter, substomatal, small, and composed of 5-6, globose to subglobose, brown to blackish brown cells. *Conidiophores* 47.5-176 \times 3-4.5 μm , 5-11 in a loosely fasciculate, 1-3-septate, arising through stomata, straight, cylindrical, smooth, brown at the base, and paler toward the apex, unbranched, mostly not geniculate, sometimes slightly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic, sympodially proliferating. *Conidiogenous loci* 2-3.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* 27-99 \times 2-5 μm , solitary, acicular, straight to curve

at the apex, hyaline, 7-12-septate, smooth, obconically truncate at the base, tapering toward a acute apex, hila 2-3 μm diameter, thickened, and darkened.



Figures 135a-b Line drawings of *Cercospora houttuyniicola* on *Houttuynia cordata*. **a.** Conidiophores and stromata. **b.** Conidia. Bars: **a, b** = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, on leaves of *Houttuynia cordata* Thunb. (*Saururaceae*), 6 December 2006, Ikumitsu Araki (CMU 27907); *ibid* 19 July 2007, Jamjan Meeboon and Iman Hidayat (BBH 23737).

Host: *Houttuynia cordata* (*Saururaceae*) (Goh and Hsieh, 1989; Meeboon *et al.*, 2007c).

Distribution: Taiwan and Thailand (Goh and Hsieh, 1989; Meeboon *et al.*, 2007c).

Notes: The first report of *C. houttuyniicola* from Thailand was made by Meeboon *et al.* (2007c).

Pseudocercospora houttuyniae (Togashi and Katsuki) Y. L. Guo and W. X. Zhao, *Acta Mycol. Sinica* **8**: 118 (1989).

≡ *Cercospora houttuyniae* Togashi and Katsuki, *Bot. Mag. Tokyo* **65**: 21 (1952).

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on diseased leaves of *Houttuynia cordata* Thunb. (*Saururaceae*), 21 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27959).

Host: *Houttuynia cordata* (*Saururaceae*) (Guo and Zhao, 1989; Meeboon *et al.*, 2007c).

Distribution: China, Japan, Taiwan, and Thailand (Guo and Zhao, 1989; Meeboon *et al.*, 2007c).

Notes: The first report of *P. houttuyniae* from Thailand was made by Meeboon *et al.* (2007c).

Literature: Guo *et al.* (1998, p. 318).

Family Solanaceae

Cercospora capsicigena Bhartiya, R. Dubey and S. K. Singh, *Indian Phytopathol.* **53**:

149 (2000).

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

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Capsicum annuum* var. *acuminatum* Fingerh. (*Solanaceae*), 21 November 2004, Jamjan Meeboon (CMU 27889).

Host: *Capsicum annuum* (*Solanaceae*) (Crous and Braun, 2003).

Distribution: India and Thailand (Crous and Braun, 2003).

Notes: From Thailand, Sontirat *et al.* (1980) reported *C. capsici* which is recently known as *C. physalidis* fide Crous and Braun (2003). This record is the first report of *C. capsicigena* from Thailand. Crous and Braun (2003) considered this species as *C. apii* s.lat.

Cercospora physalidis Ellis, *Amer. Naturalist* **16**: 810 (1882), *emend.* Braun and Melnik, *Trudy Bot. Inst. im V. L. Komarova* **20**: 79 (1997).

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

= *Cercospora solanicola* G. F. Atk., *J. Elisha Mitchell Sci. Soc.* **8**: 53 (1892).

= *Cercospora nicotianae* Ellis and Everh., *Proc. Acad. Sci. Philadelphia* **45**: 170 (1893).

= *Cercospora phyalidicola* Ellis and Barthol., *Erythea* **4**: 28 (1896).

= *Cercospora physalidicola* Speg., *Anales Mus. Nac. Buenos Aires* **3**: 342 (1899). (*nom. illeg.*)

= *Cercospora raciborskii* Sacc. and Syd., *Syll. Fung.* **16**: 1070 (1902).

= *Cercosporina physalidicola* Speg. *Anales Mus. Nac. Hist. Nat. Buenos Aires* **20**: 426 (1910).

- = *Cercosporina daturicola* Speg. *Anales Mus. Nac. Hist. Nat. Buenos Aires* **20**: 425 (1910).
- ≡ *Cercospora daturicola* (Speg.) Vassiljevsky, *Fungi imperfecti parasitici* **1**. *Hyphomycetes*: 247 (1937).
- ≡ *Cercospora daturicola* (Speg.) W. W. Ray, *Mycologia* **36**: 175 (1944).
- = *Cercospora capsici* Heald and W. A. Wolf, *Mycologia* **3**: 15 (1911).
- = *Cercospora abchasica* Siemaszko, *Izv. Severo-Kavkazsk. Muz.* **12**: 26 (1919).
- = *Cercospora melongenae* Welles, *Phytopathology* **12**: 63 (1922).
- = *Cercospora atropae* Kvashn., *Izv. Severo-Kavkazsk. Kraev. Stantsii Zashch. Rast.* **4**: 37 (1928).
- = *Cercosporina petuniae* Saito, *Trans. Tottori Soc. Agric. Sci.* **3**: 271 (1931).
- ≡ *Cercospora petuniae* (Saito) Chupp and A. S. Mull., *Ceiba* **1**: 176 (1950) (*nom. illeg.*).
- = *Cercospora petuniae* A. S. Mull. and Chupp, *Arq. Inst. Biol. Veg. Rio de Janeiro* **3**: 96 (1936) (*nom. inval.*).
- = *Cercospora petuniae* Sandu and Sarea, *Lucr. Sti. Inst. Agron.* **1962**: 94 (1962) (*nom. illeg.*).
- = *Cercospora petuniae* var. *brevipedicellata* Chidd., *Indian Phytopathol.* **12**: 120 (1960) (*nom. inval.*).
- (= *C. apii* s. lat.) (Figures 136; 137a-b; 138)

Leaf spots 2-15 mm diameter, amphigenous, irregular, brown to dark brown, pale at the center, with dark margin, limited by leaves vein. *Caespituli* amphigenous. *Stromata* 10.5-19 µm diameter, substomatal to intraepidermal, small, composed of

few globose to subglobose, brown-walled cells. *Conidiophores* 27.5-54 × 2.5-5.5 µm, 3-8 in a loosely to densely fasciculate, 1-3-septate, arising from stromata, straight to decumbent, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, strongly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 1.5-2.5 µm diameter, conspicuous, thickened, and darkened. *Conidia* 46.5-160 × 2-4 µm, solitary, obclavate to acicular, straight, slightly curved, hyaline, 7-15-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 1-2.3 µm diameter, thickened, and darkened.

Specimen examined: THAILAND, Phetchabun Province, Amphur Lom Sak, Num Nao National Park, on leaves of *Capsicum frutescens* L. (*Solanaceae*), 24 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27965); the same host, Chiang Mai Province, Amphur Sarapee, 28 November 2006, Jamjan Meeboon (CMU 28065); Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Capsicum annuum* L. (*Solanaceae*), 2 October 2005, Jamjan Meeboon (CMU 27938); Chiang Rai Province, Amphur Wiang Pa Pao, on leaves of *Capsicum annuum* var. *acuminatum* Fingerh (*Solanaceae*), 2 February 2008, Jamjan Meeboon (BBH 23602); Chiang Mai Province, Amphur Mae Taeng, on leaves of *Nicotiana tabacum* L. (*Solanaceae*), 6 February 2008, Jamjan Meeboon (BBH 23668); Chiang Mai Province, Amphur San Sai, Tumbol Mae Fag, on leaves of *Capsicum annuum* L. (*Solanaceae*), 3 August 2008, Jamjan Meeboon (BBH 23750); Chiang Mai Province, Chiang Mai University, Multiple Cropping Centre, on leaves of *Solanum nigrum* L. (*Solanaceae*), 1 August 2008, Jamjan

Meeboon (BBH 23612); Chiang Mai Province, Suthep-Pui National Park, on leaves of *Solanum verbascifolium* L. (*Solanaceae*), 25 July 2008, Jamjan Meeboon (BBH 23769).

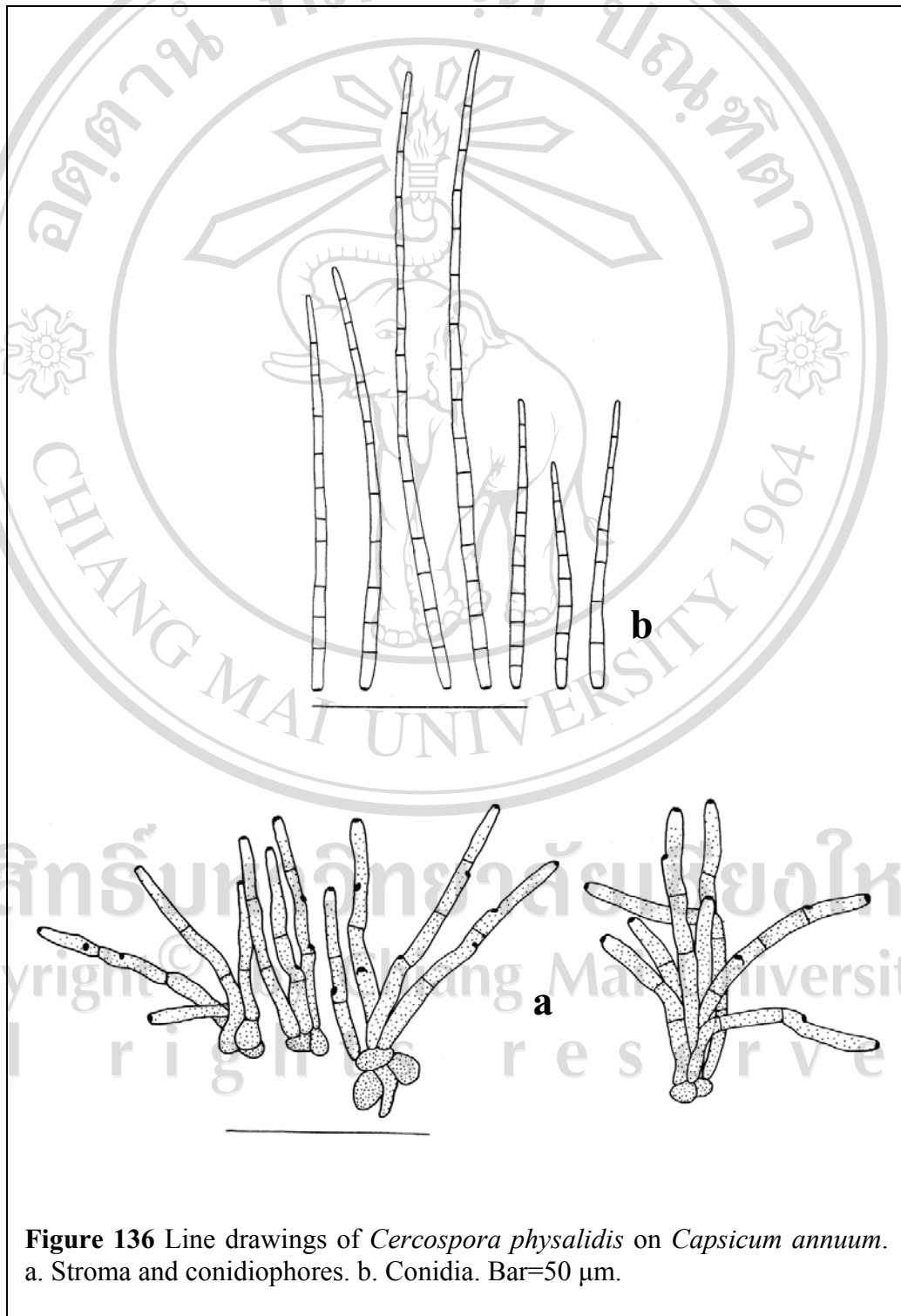
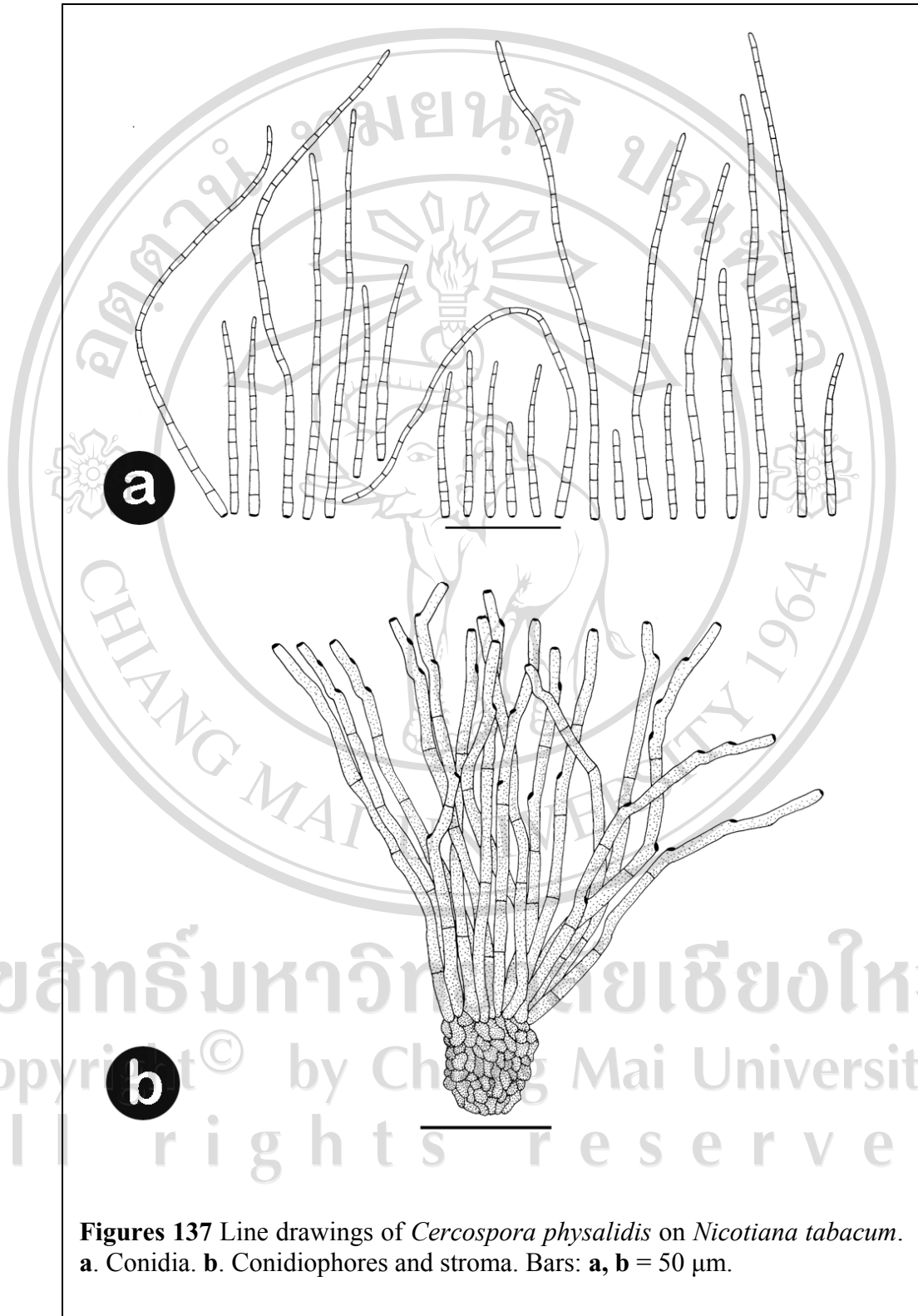


Figure 136 Line drawings of *Cercospora physalidis* on *Capsicum annuum*.
a. Stroma and conidiophores. b. Conidia. Bar=50 μ m.



Figures 137 Line drawings of *Cercospora physalidis* on *Nicotiana tabacum*.
a. Conidia. **b.** Conidiophores and stroma. Bars: **a, b** = 50 μ m.

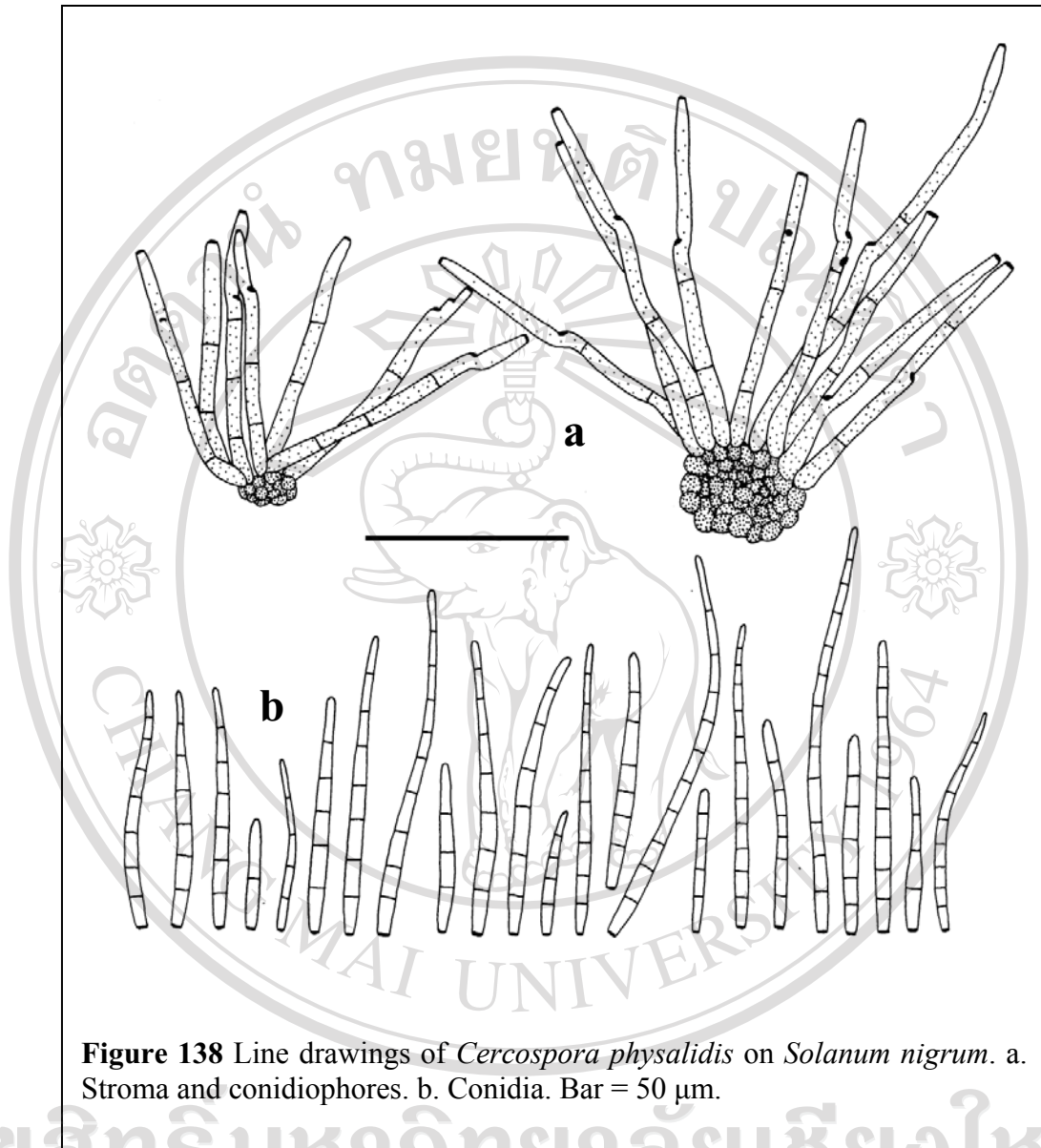


Figure 138 Line drawings of *Cercospora physalidis* on *Solanum nigrum*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Host: *Atropa bella-donna*, *Capsicum annuum*, *C. baccatum*, *C. frutescens*,
C. grossum, *Datura alba*, *D. arborea*, *D. fastuosa*, *D. metel*, *D. stramonium*,
D. suaveolens, *Hyoscyamus agrestis*, *H. niger*, *Lycopersicon esculentum*, *Nicandra*
physalodes, *Nicotiana repanda*, *N. rustica*, *N. tabacum*, *Petunia axillaris*, *P. hybrida*,
P. variabilis, *P. violacea*, *Petunia* sp., *Physalis alkekengi*, *P. angularata*, *P. franchetii*,

P. heterophylla, *P. hybrida*, *P. lanceolata*, *P. lobata*, *P. longifolia*, *P. minima*,
P. mollis, *P. parviflora*, *P. pubescens*, *P. subglabrata*, *P. variabilis*, *P. violacea*,
P. virginica, *P. viscosa*, *Physalis* sp., *Quincula lobata*, *Solanum aculeatum*,
S. aethiopicum, *S. incanum*, *S. laciniatum*, *S. luteum*, *S. melongena*, *S. nigrum*,
S. torvum, *S. tuberosum*, *S. xanthocarpum* (*Solanaceae*) (Crous and Braun, 2003).

Distribution: Worldwide where the host is cultivated, including including Afghanistan, American Samoa, Argentina, Armenia, Australia, Bangladesh, Barbados, Bhutan, Bolivia, Brazil, Brunei, Bulgaria, Cambodia, China, Colombia, Congo, Cuba, Cyprus, Dominican Republic, Egypt., El Salvador, Ethiopia, Fiji, French Antilles, Gabon, Gambia, Georgia, Germany Ghana, Guam, Guatemala, Guinea, Guayana, Haiti, Hong Kong, India, Indonesia, Iraq, Jamaica, Japan, Jordan, Kenya, Korea, Laos, Libya, Malawi, Malaysia, Mauritius, Mexico, Micronesia, Morocco, Myanmar, Nepal, New Caledonia, Nigeria, New Zealand, Pakistan, Palau, Panama, Papua New Guinea, Philippines, Puerto Rico, Romania, Russia (European part), Samoa, Seychelles, Sierra Leone, Singapore, Solomon Islands, Somalia, South Africa, Spain, Sri Lanka, Sudan, Suriname, Swaziland, Taiwan, Tanzania, Thailand, Tonga, Trinidad and Tobago, Uganda, Ukraine, U.S.A, Vanuatu, Venezuela, Virgin Islands, Wallis and Futuna Islands, Yemen, Zambia, and Zimbabwe (Crous and Braun, 2003).

Notes: The first record of this species from Thailand was made by Sontirat *et al.* (1980) as '*C. capsici* Heald and F. A. Wolf'. Crous and Braun (2003) considered this species as *C. apii* s.lat. *Capsicum frutescens* (bird chili) is an important crop in Thailand, and its 'leaf spot disease' caused by *C. capsici* is recognized as an important

disease in Thailand. *Solanum verbascifolium* is reported here as a new host of this pathogen.

Cercospora physalidis-angulatae J. M. Yen, *Cah. Maboké* **9**: 112 (1971).

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Physalis angulata* L. (*Solanaceae*), 2 October 2005, Jamjan Meeboon (CMU 27937).

Host: *Physalis angulata* (*Solanaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Distribution: Gabon and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2008).

Notes: *Cercospora physalidis-angulatae* was firstly reported from Thailand by Meeboon *et al.* (2008).

Cercospora puyana Sydow., *Ann. Mycol.* **37**: 431 (1939).

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่ (Figure 139)

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Leaf spots 1-9 mm diameter, amphigenous, scattered to confluent, subcircular to angular, initially appearing pale brown, later becoming greyish at the centre, with reddish brown or purplish brown margins. *Caespituli* amphigenous, chiefly hypophyllous. *Stromata* (24) $34.9 \pm 6.67(40.5)$ μm diameter, intraepidermal, well-developed, composed of globose to subglobose, brown to blackish brown cells.

Conidiophores (39.5) 56.5 ± 23.6 (127) \times (3) 3.5 ± 0.2 (4) μm , numerous in a densely fasciculate, slightly divergent, arising from stromata, 1-3-septate, simple, straight, erect to decumbent, smooth, pale yellow to pale brown, branched, subcylindrical, geniculate to sinuous. *Conidiogenous cells* integrated, terminal, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, darkened. *Conidia* (64) 119 ± 28.9 (165) \times (2) 3 ± 0.7 (5) μm , solitary, long obclavate to subacicular, 6-19-septate, straight, hyaline, smooth, base obconically truncate, with subacute apex, hila 2.5-3 2-3 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, Multiple Cropping Centre, on leaves of *Solanum indicum* L. (*Solanaceae*), 1 August 2008, Jamjan Meeboon (JM 108).

Host: *Solanum trachycypum* (*Solanaceae*) (Chupp, 1954).

Distribution: Ecuador (Chupp, 1954).

Notes: This species is distinct from plurivorous *C. apii* s. lat. in having well-developed stromata, branched conidiophores, and obconically truncate at the base of conidia (Chupp, 1954). Recently, about 10 species of *Cercospora* species non *C. apii* s. lat. have been recorded on plant genus *Solanum*, viz, *C. lanugiflori* Chupp and A. S. Mull., *C. nigri* var. *microspora* L. N. Bhardwaj and Y. S. Paul, *C. puyana*, *C. sciadophila* (Speg.) Chupp, *C. solanacea* Sacc. & Berl., *C. solani* Thüm., *C. solanigena* Bhartiya, R. Dubey & S.K. Singh (as “*solenigena*”), *C. solani-nigri* Chidd., *C. solani-tuberosi* Thirum., *C. venezuelae* var. *indica* Govindu and Thirum. (Crous and Braun, 2003). This specimen is much closed to *C. puyana* in having

amphigenous caespituli, branched conidiophores, and long obclavate conidia with obconically base truncate. This specimen is the first record of *C. puyana* from Thailand, and *Solanum indicum* is reported here as a new host of this fungus.

Literature: Chupp (1954, p. 548).

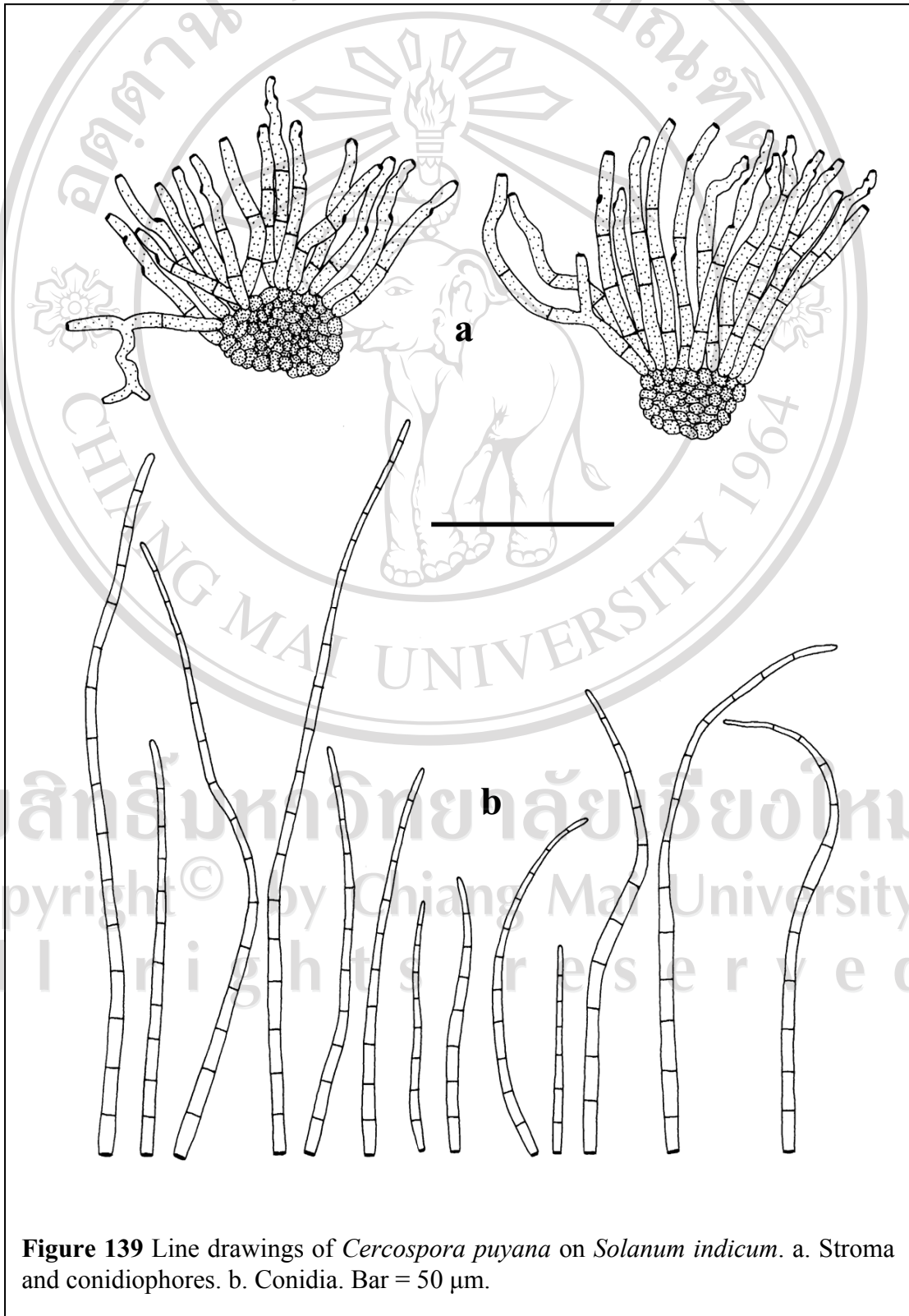


Figure 139 Line drawings of *Cercospora puyana* on *Solanum indicum*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Cercospora regia-flora Meeboon, Hidayat, and To-anun, **sp. nov.**

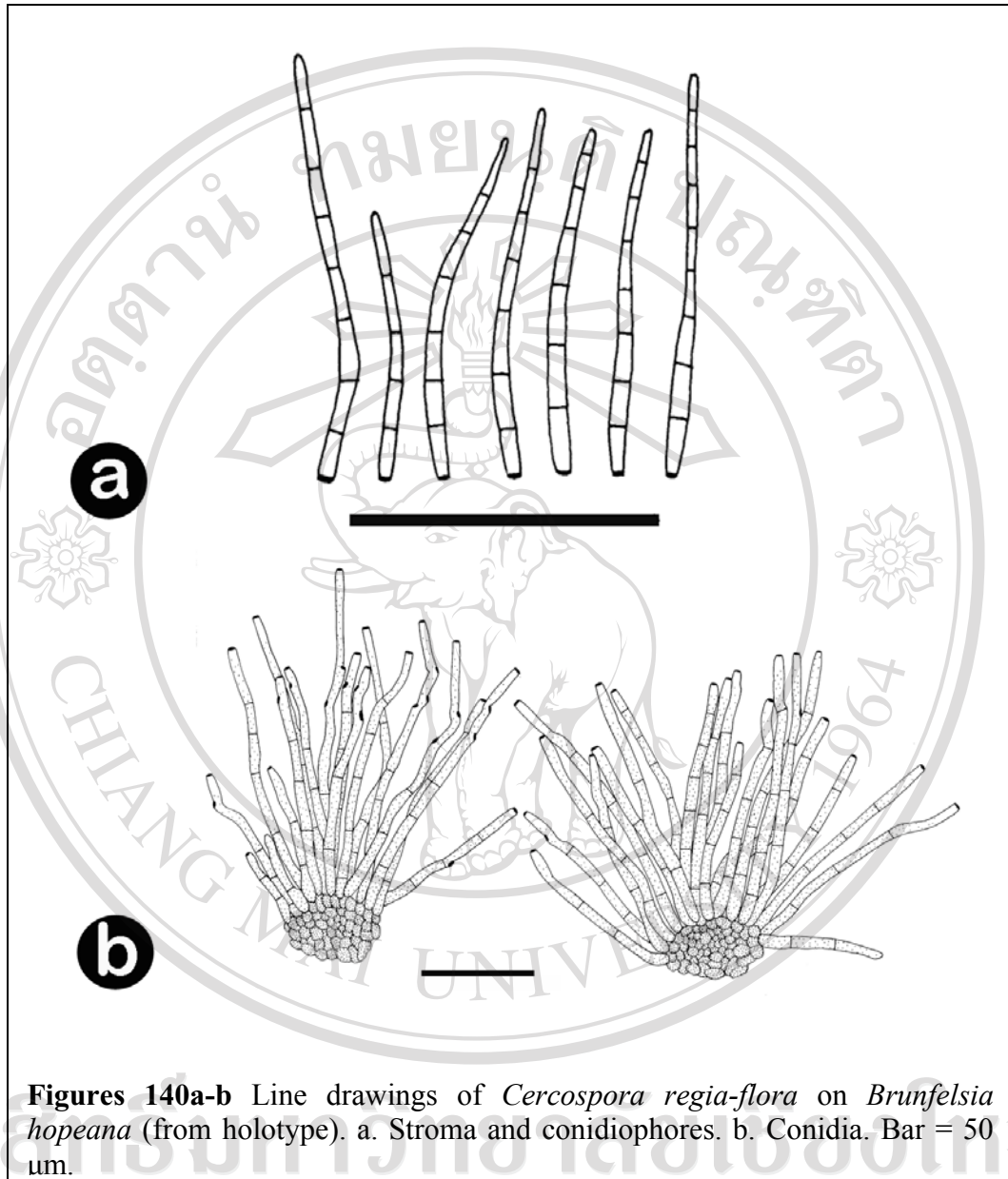
(Figures 140a-b)

Leaf spots 2-7 mm diameter, amphigenous, distinct, circular to angular, brown, sometimes forming larger symptoms, with indistinct margins. *Caespituli* epiphyllous. *Stromata* (32) 48.5 ± 10.6 (68) μm diameter, intraepidermal, well-developed, composed of globular to angular, brown to blackish brown cells. *Conidiophores* (34) 98.5 ± 28.8 (151) \times (2.5) 4 ± 0.6 (5.5) μm , numerous in a densely fasciculate, 2-5-septate, arising from stromata, simple, straight, erect to decumbent, smooth, pale yellow to pale brown, rarely branched, subcylindrical, strongly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, monoblastic to polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (45) 59 ± 9.1 (72) \times (2.5) 2.5 ± 0.2 (3) μm , solitary, filiform-narrowly obclavate, 4-8-septate, straight, hyaline, smooth, base obconically truncate, with subacute apex, hila 2-2.5 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Royal Flora, on leaves of *Brunfelsia hopeana* Benth. (*Solanaceae*), 27 July 2008, Jamjan Meeboon (BBH 23764: **holotype**).

Host: *Brunfelsia hopeana* (*Solanaceae*).

Distribution: Thailand (type locality)



Figures 140a-b Line drawings of *Cercospora regia-flora* on *Brunfelsia hopeana* (from holotype). a. Stroma and conidiophores. b. Conidia. Bar = 50 µm.

Notes: *Brunfelsia hopeana* is the tropical plant contains various alkaloids including hopeanin, an active alkaloid compound with medicinal properties.

Morphologically *Cercospora regia-flora* distinct to the plurivorous *C. apii* s. lat. in having well-developed stromata, numerous conidiophores in densely fasciculate and strongly geniculate, and filiorm-narrowly obclavate conidia with only a few septate

with obconically truncate base. This species distinct from other closely related *Cercospora* species in family *Solanaceae*, viz, *C. lanugiflori* Chupp and A. S. Mull., *C. nigri* var. *microspora* L. N. Bhardwaj and Y. S. Paul, *C. puyana* Syd., *C. sciadophila* (Speg.) Chupp, *C. solanacea* Sacc. and Berl., *C. solani* Thüm., *C. solanigena* Bhartiya, R. Dubey, S. K. Singh, *C. solani-nigri* Chidd, *C. solani-tuberosi* Thirum., and *C. venezuelae* var. *indica* Govindu and Thirum., due to having longer conidiophores with strong geniculation, and filiform-narrowly obclavate conidia with a few septate. Based on conidia morphology, this species is much closed to *C. solanigena*, but Crous and Braun (2003) noted the later species as uncertain due to young conidia assumption in the original description. *C. venezuelae* var. *indica* is another uncertain species within this group.

Cercospora solanacea Sacc. and Berl., *Atti Reale Ist. Veneto Sci. Lett. Arti VI*, 3: 721 (1885).

(Figure 141)

Leaf spots 15-30 mm diameter, amphigenous, angular, at first pale greenish to ochraceous, later brown to dark brown, finally with grayish brown centre, surrounded by a dark margin. *Caespituli* epiphyllous, ochre yellow, velvety. *Stromata* (19) 21.6 ± 2.1 (24) μm diameter, intraepidermal, well-developed, composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* (27) 59.5 ± 14.8 (79.5) \times (2) 3.5 ± 0.7 (4.5) μm , 5-7 in a densely fasciculate, 1-3-septate, arising from stromata, simple, straight, erect to decumbent, smooth, pale yellow to pale brown, not branched, subcylindrical, not geniculate. *Conidiogenous cells* integrated, terminal, holoblastic,

mostly monoblastic. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (30) 58 ± 13.6 (71.5) \times (3) 3 ± 0.3 (3.5) μm , solitary, narrowly obclavate, 3-6-septate, straight, hyaline, smooth, base obconically truncate, with subacute apex, hila 2-2.5 2-3 μm diameter, thickened and darkened.

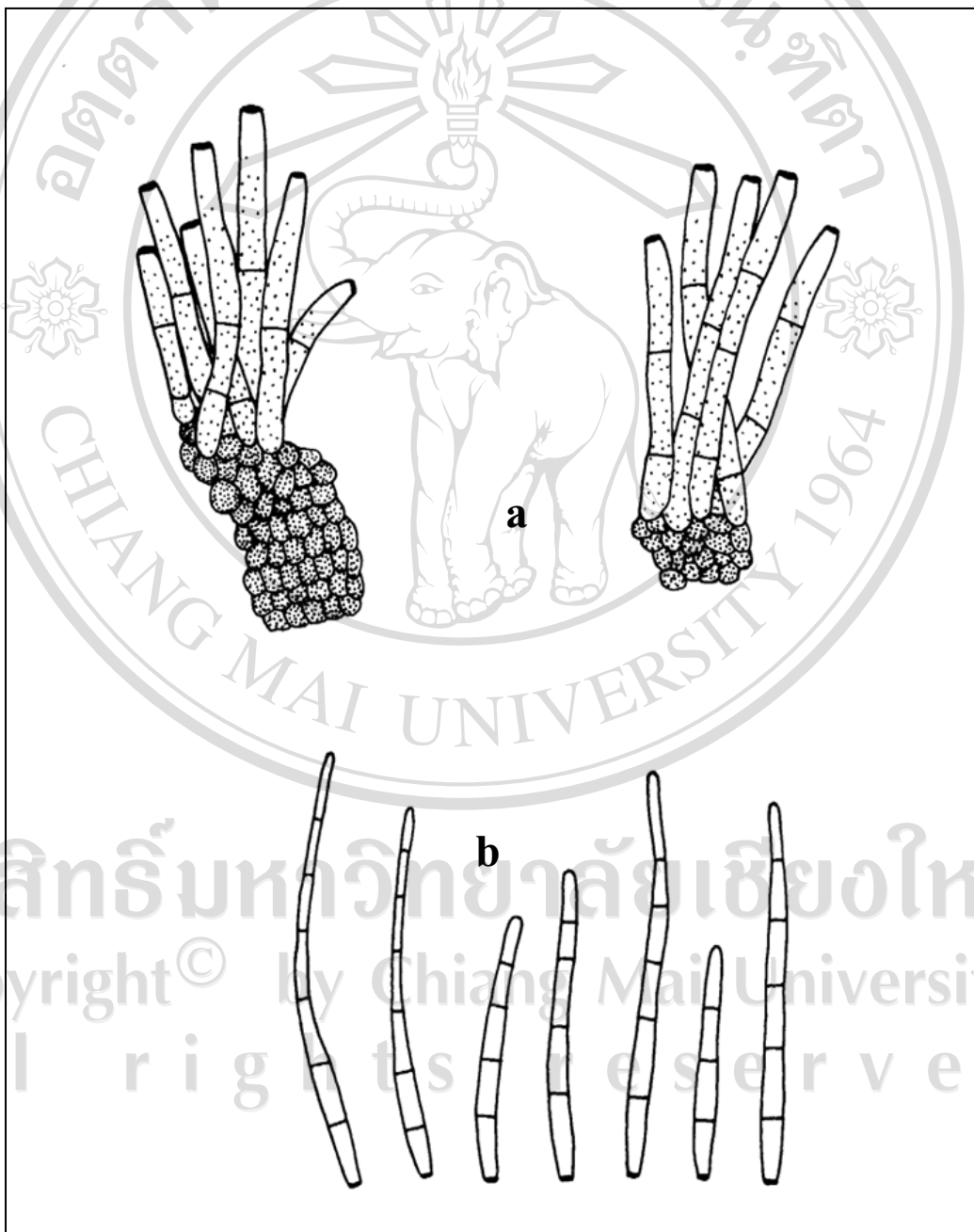


Figure 141 Line drawings of *Cercospora solanacea* on *Solanum torvum*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, Multiple Cropping Centre, on leaves of *Solanum torvum* Sw. (*Solanaceae*), 1 August 2008, Jamjan Meeboon (BBH 23719).

Host: *Solanum melongena*, *S. nigrum*, *S. verbascifolium* (*Solanaceae*) (Crous and Braun, 2003).

Distribution: Australia, China, India, Taiwan, and Venezuela (Crous and Braun, 2003).

Notes: This specimen is much closed to *C. lanugiflora* and *C. solanacea* based on epiphyllous caespituli, relatively short and not geniculate conidiophores, and cylindrical and short conidia with a few septate Chupp (1954). However, due to the status of *C. lanugiflora* is unclear (Crous and Braun, 2003); therefore, this specimen is assigned to *C. solanacea*. This specimen is the first record of *C. solanacea* from Thailand, and *Solanum torvum* is reported here as a new host of this fungus.

Literature: Chupp (1954, p. 549-550).

Passalora natrassii (Deighton) Crous and Braun, *CBS Biodiversity Research Series* 1: 461 (2003).

≡ *Mycovellosiella natrassii* Deighton, *Mycol. Pap.* 137: 17 (1974).

(Figure 142)

Leaf spots 3-10 mm diameter, amphigenous, scattered to confluent, subcircular to irregular darkish brown, chlorotic discolorations. *Caespituli* amphigenous. *Stromata* lacking. *Conidiophores* 5-25 × 3.5-7.5 μm, borne singly as lateral branches from the superficial secondary mycelium, 0-2 septate, straight to slightly curved, pale

olivaceous to olivaceous brown, slightly geniculate near the apex. *Conidiogenous cells* integrated, terminal, holoblastic, sympodially proliferating. *Conidiogenous loci* 1-1.5 μm diameter, minute, conspicuous, thickened, and darkened. *Conidia* 10-70 \times 4.5-7.5 μm , solitary to catenate, cylindric-obclavate to slightly obclavate, straight to substraight, pale olivaceous brown, slightly attenuated towards the apex, 1-6-septate, often mildly to constricted at the septa, hila 1-1.5 μm diameter, thickened, darkened, and slightly protuberant.

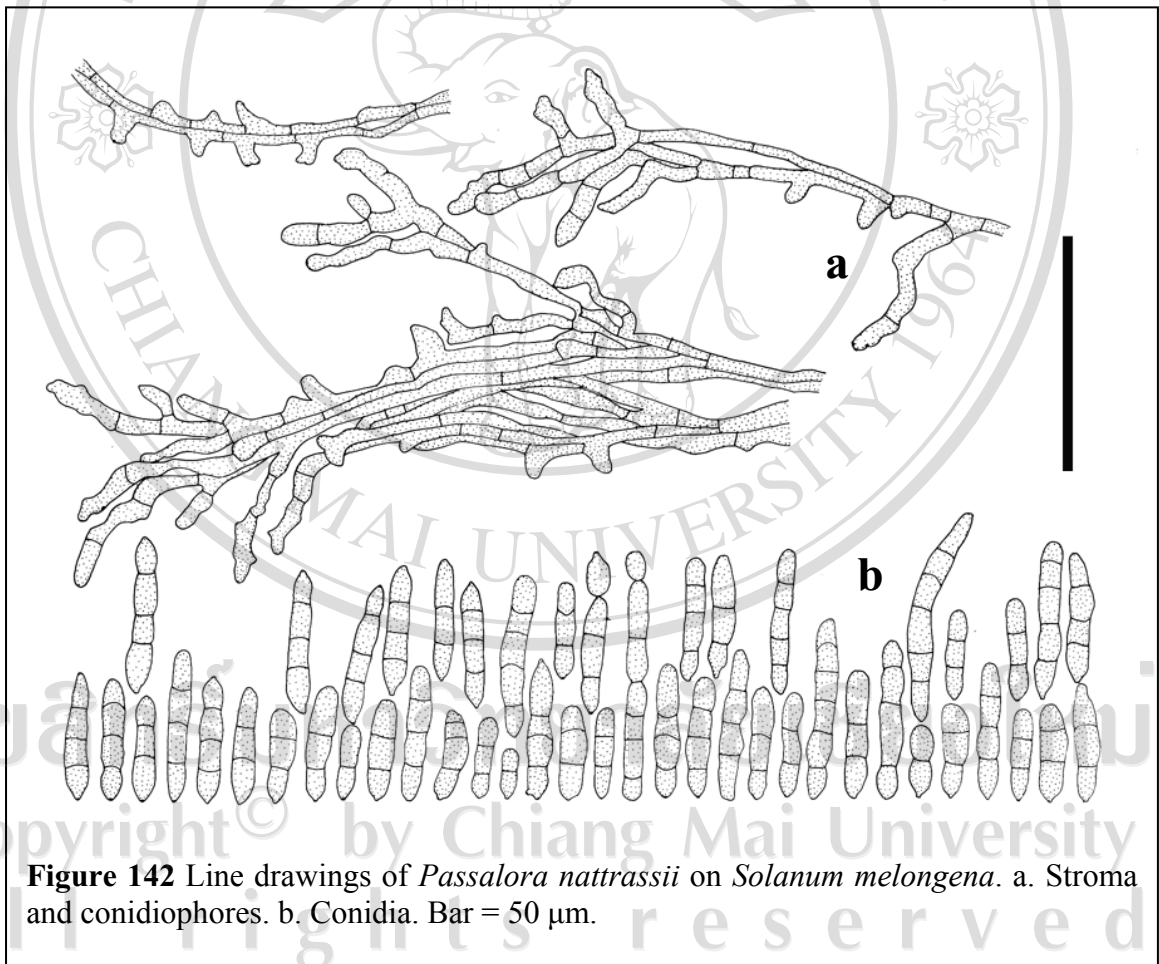


Figure 142 Line drawings of *Passalora nattrassii* on *Solanum melongena*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Amphur Chiang Dao, Huay Luek Royal Project, on leaves of *Solanum melongena* L. cultivar egg plant long-shaped) (*Solanaceae*), 6 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23666); *ibid* on *Solanum melongena* L. cultivar egg plant pear-shaped (*Solanaceae*), Jamjan Meeboon and Iman Hidayat (BBH 23665); Suthep-Pui National Park, on leaves of *Solanum trilobatum* L. (*Solanaceae*), 21 November 2004, Jamjan Meeboon (CMU 27919).

Host: *Solanum incanum*, *S. melongena*, *S. verbascifolium* (*Solanaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: China, Japan, Kenya, Korea, Nepal, Sabah, and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first record of *P. natrassii* from Thailand was made by Meeboon *et al.* (2007c).

Passalora tarrii (Deighton) U. Braun and Crous, *CBS Biodiversity Series* 1:397 (2003).

≡ *Mycovellosiella tarrii* Deighton, *Mycol. Pap.* 137: 20 (1974).

≡ *Cercospora deightonii* Chupp, *Monograph of Cercospora*: 538 (1954).

(Figures 143a-b)

Leaf spots 5-20 mm diameter, amphigenous, irregular, pale brown, only leaf decolorization, with dark green margin, numerous and scattered through the leaf surface. *Caespituli* amphigenous. *Stromata* lacking. *Conidiophores* 10-70 × 3.5-5 µm, non fasciculate, 0-2-septate, arising from secondary mycelium, straight, smooth,

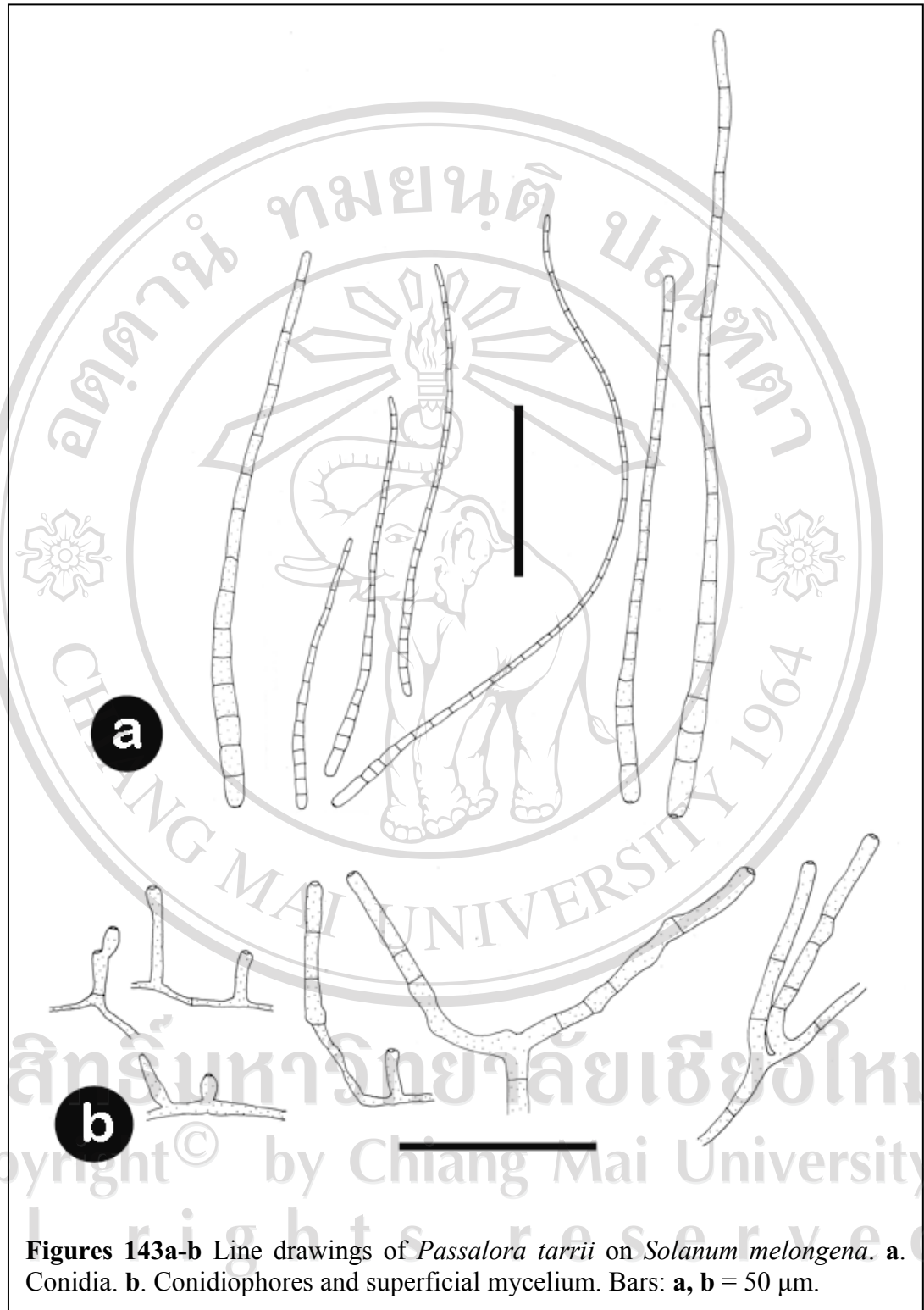
brown, and paler towards the apex, unbranched, cylindrical, slightly geniculate. *Conidiogenous cells* integrated, holoblastic, often monoblastic, terminal, sympodially proliferating. *Conidiogenous loci* 1.5-2 μm diameter, conspicuous, thickened, and mildly darkened. *Conidia* 157-591 \times 3-7 μm , solitary, obclavate to long cylindrical, straight, hyaline to subhyaline, multiseptate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 1-1.5 μm diameter, conspicuous, thickened, and slightly darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Sarapee, on leaves of *Solanum melongena* L. (*Solanaceae*), 12 September 2007, Jamjan Meeboon (BBH 23593).

Host: *Solanum cerasiferum*, *S. melongena* (*Solanaceae*) (Crous and Braun, 2003).

Distribution: India, Japan, Philippines, Sierra Leone, Sudan, Taiwan, and Togo (Crous and Braun, 2003).

Notes: This specimen is the first record of *P. tarrii* from Thailand.



Figures 143a-b Line drawings of *Passalora tarrii* on *Solanum melongena*. **a.** Conidia. **b.** Conidiophores and superficial mycelium. Bars: **a, b** = 50 μm .

Pseudocercospora daturina (J. M. Yen) Deighton, *Mycol. Pap.* **140**: 143 (1976).

≡ *Cercospora daturina* J. M. Yen, *Rev. Mycol.* **30**: 169 (1965).

(Figures 144a-b)

Leaf spots 10-20 mm diameter, amphigenous, solitary, scattered through the host surface, circular to subcircular, brown, sometimes paler at the center, with dark brown margins. *Caespituli* amphigenous. *Stromata* 18-30 μm diameter, intraepidermal, well-developed, composed of globose to subglobose, brown to dark brown cells. *Conidiophores* 21-78 \times 2-4 μm , 7-12 in a dense fascicles, 1-4-septate, arising from stromata, straight to decumbent, smooth, brown, and paler towards the apex, branched, slightly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 33-135 \times 2.5-4 μm , solitary, obclavate to filiform, straight to mildly curved, hyaline to subhyaline, 6-14-septate, smooth, obconically truncate at the base, with obtuse to subobtuse at the apex, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Datura alba* Nees (*Solanaceae*), 26 July 2007, Jamjan Meeboon and Iman Hidayat (BBH 23645).

Host: *Datura alba*, *D. stramonium* (*Solanaceae*) (Crous and Braun, 2003).

Distribution: India and Singapore (Crous and Braun, 2003).

Notes: Two species of *Pseudocercospora*, viz, *P. daturina* (J. M. Yen) Deighton and *P. jamaicensis* (Chupp) Deighton, have been recorded on plant genus *Datura*. Since the conidiophores of this specimen are branched; therefore, this specimen is not likely related to *P. jamaicensis* which is characterized by not branched conidiophores. On the other hand, *P. daturina* was described by Yen (1980) by having branched conidiophores. Therefore, we assigned this specimen to *P. daturina*. This specimen is the first record of *P. daturina* from Thailand.

Literature: Yen and Lim (1980, p. 174).

Pseudocercospora egenula (Syd.) U. Braun and Crous, *CBS Diversity Series* 1: 171 (2003).

≡ *Cercoseptoria egenula* Syd., *Ann. Mycol.* 33: 885 (1935).

≡ *Cercospora egenula* (Syd.) Chupp and Doidge, *Bothalia* 4: 885 (1948).

≡ *Paracercospora egenula* (Syd.) Deighton, *Mycol. Pap.* 144: 48 (1979).

= *Cercospora solani-melongenae* Chupp, *Bothalia* 4: 892 (1948).

(Figure 145)

Leaf spots 2-10 mm diameter, amphigenous, irregular, brown, only leaf decolorization, numerous and scattered through the leaf surface. *Caespituli* amphigenous. *Stromata* 22-147 µm diameter, intraepidermal, well-developed, globose to subglobose, brown to dark brown. *Conidiophores* 13-56 × 2-4 µm, 15-23 in a densely fasciculate, 0-2-septate, arising from stromata, straight to decumbent, smooth, pale brown, unbranched, cylindrical, non-geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous,

unthickened, and not darkened. *Conidia* 52-68 × 2.5-3.5 μm, solitary, obclavate to cylindrical, straight, hyaline to subhyaline, 4-10-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, with non-thickened, and not darkened hila.

Specimen examined: THAILAND, Chiang Rai Province, Amphur Wiang Pa Pao, Tumbol Wiang Ga Long, on leaves of *Solanum xanthocarpum* Schrad. (*Solanaceae*), 22 July 2007, Jamjan Meeboon (JM 109).

Host: *Solanum dubium*, *S. incanum*, *S. marginatum*, *S. melongena*, *S. panduraeforme* (*Solanaceae*) (Crous and Braun, 2003).

Distribution: China, Ethiopia, Fiji, Hing Kong, India, Indonesia, Japan, Kenya, Korea, Malawi, Malaysia, Mozambique, New Caledonia, Saudi Arabia, Seychelles, Somalia, South Africa, Sudan, Tanzania, Tonga, and U.S.A (Crous and Braun, 2003).

Notes: This specimen is the first record of *P. egenula* from Thailand, and *Solanum xanthocarpum* is reported here as a new host of this fungus.

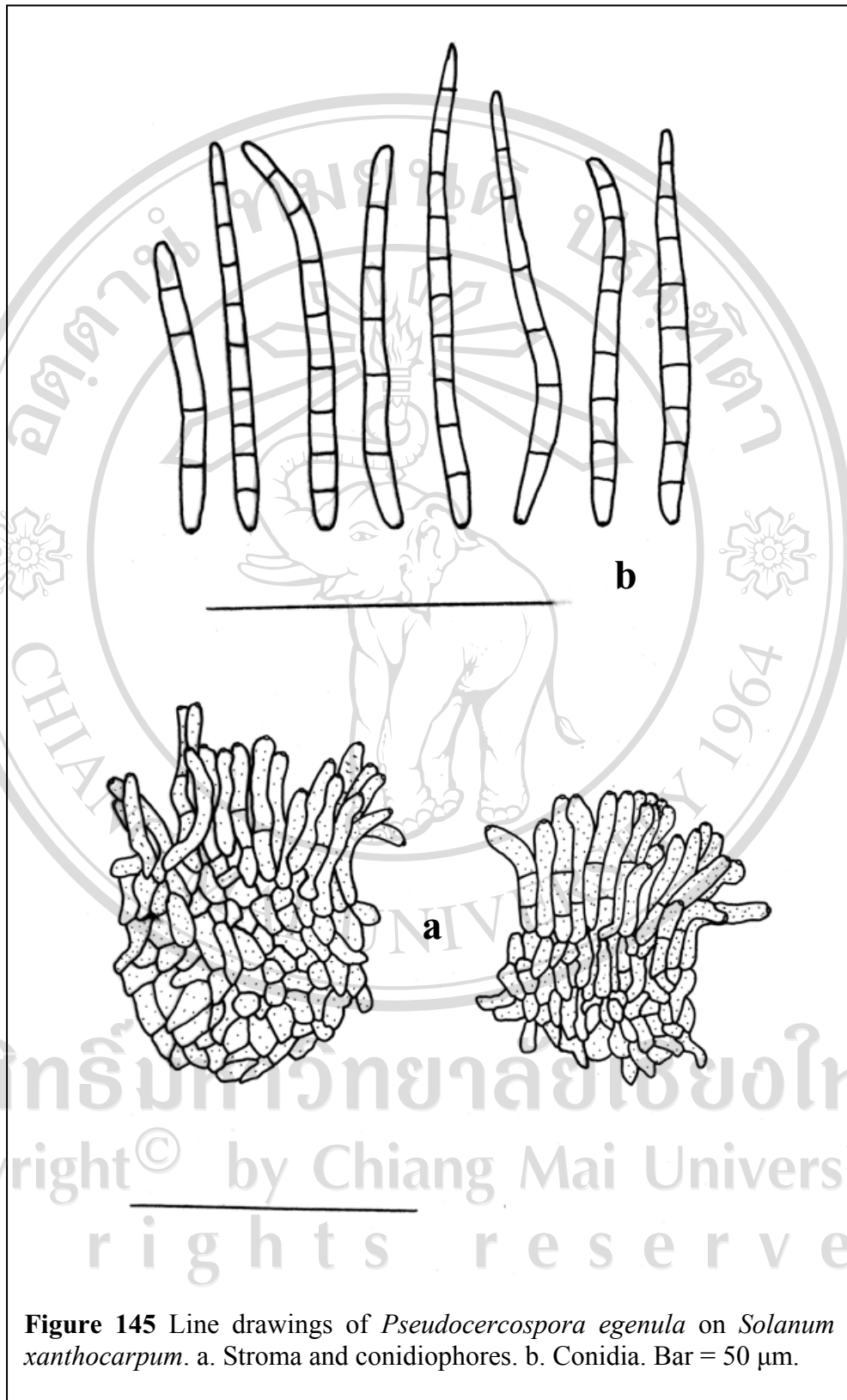


Figure 145 Line drawings of *Pseudocercospora egenula* on *Solanum xanthocarpum*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

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

≡ *Cercospora fuligena* Roldan, *Philipp. J. Sci.* **66**: 8 (1938).

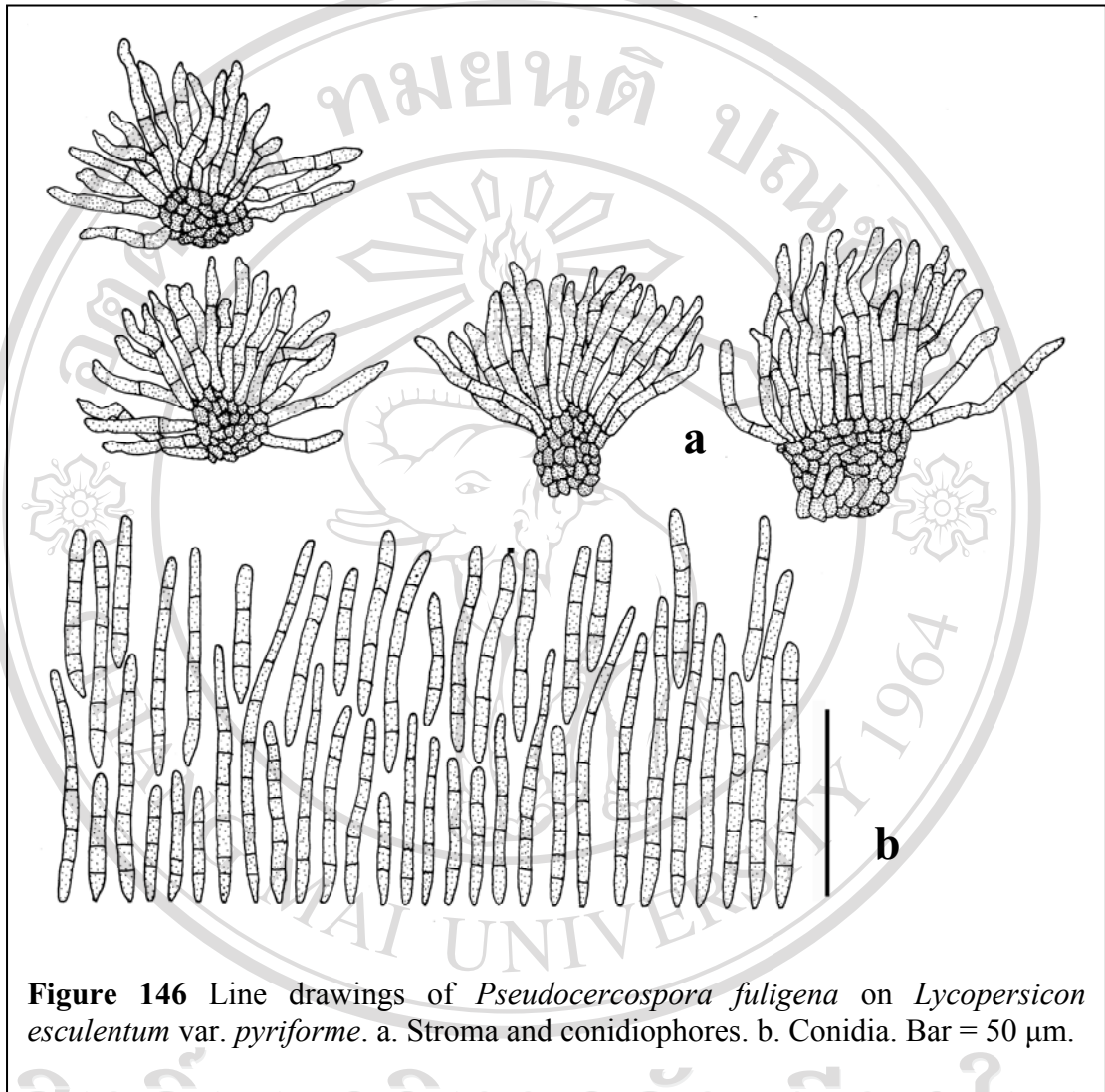
(Figure 146)

Leaf spots 1.5-7 mm in diameter, amphigenous, orbicular, often zonate, pale brown to dingy grey at center, with darker margin. *Caespituli* amphigenous. *Stromata* up to 37.5 µm in diameter, well-developed, composed of a few globose to subglobose, brown to dark brown cells. *Conidiophores* (34-) 40-70.5 (-174) × (2.5-) 3-4 µm, numerous, in a dense and divergent fascicles, 1-4-septate, straight, brown, paler towards the apex, uniform in width, not branched, slightly geniculate at the apex, with truncate apex. *Conidiogenous cells* integrated, terminal, holoblastic, mostly monoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* (26-)35.5-83(-99.5)×3-(4-)5 µm, hyaline or subhyaline, cylindric, 3-10-septate, straight to curved, smooth, truncate at the base, with subacute apex, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Doi Suthep-Pui National Park (latitude 18.48.00; longitude 98.56.00), on leaves of *Lycopersicon esculentum* var. *pyriforme* (Dunal) C. H. Müll. (*Solanaceae*), 5 February 2005, Jamjan Meeboon (CMU 27942).

Host: *Capsicum annuum*, *C. baccatum*, *C. chinense*, *C. frutescens*, *Lycopersicon chilense*, *L. chmielewskii*, *L. esculentum*, *L. glandulosum*, *L. parviflorum*, *L. pennellii*, *L. peruvianum*, *L. pimpinellifolium*, *Solanum indicum*,

S. melongena, *S. nigrum* (*Solanaceae*) (Crosu and Braun, 2003; Meeboon *et al.*, 2008).



Distribution: Widely distributed, including Australia, Bangladesh, Belau, Brazil, Brunei, Cambodia, Chile, China, Cook Islands, Cuba, Gabon, Gambia, Hong Kong, India, Ivory Coast, Japan, Malaysia, Mexico, Netherlands, Antilles, New Caledonia, New Zealand, Nigeria, Palau, Papua New Guinea, Philippines, Senegal, Solomon Islands, Somalia, Taiwan, Tanzania, Thailand, Togo, Uganda, U.S.A, Vanuatu, and Vietnam (Crosu and Braun, 2003; Meeboon *et al.*, 2008).

Notes: The first report of this species was published by Sontirat *et al.* (1980) as '*Cercospora fuligena* Roldan' on *Lycopersicon esculentum*. Meeboon *et al.* (2008) re-collected again and reported as '*Pseudocercospora fuligena*'.

Pseudocercospora solani-melongenicola W. H. Hsieh and Goh, *Cercospora and similar fungi from Taiwan*: 318 (1990).

≡ *Cercospora melongenae* Welles *sensu* Sawada, *Taiwan Agric. Res. Inst. Rept.* **85**: 115 (1943), non *C. melongenae* Welles, *Phytopath.* **12**: 63 (1922).

Specimen examined: THAILAND, Chiang Rai Province, Amphur Wiang Pa Pao, on leaves of *Solanum melongena* L. (*Solanaceae*), 18 November 2005, Jamjan Meeboon (CMU 27877).

Host: *Solanum melongena* (*Solanaceae*) (Crosu and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Taiwan and Thailand (Crosu and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first record of *P. solani-melongenicola* on *S. melongena* from Thailand was made by Meeboon *et al.* (2007c). The present determination of this species follows the publication of Hsieh and Goh (1990) who re-examined specimen of *C. melongenae* Welles from Taiwan, published by Sawada (1922), and described it as new species, *P. solani-melongenicola*.

Family Theaceae

Pseudocercospora ocellata (Deighton) Deighton, *Trans. Brit. mycol. Soc.* **88**: 390 (1987).

≡ *Cercoseptoria ocellata* Deighton, *Mycol. Pap.* **151**: 2 (1983).

≡ *Cercospora theae* Breda de Haan, in Chupp: 561 (1900).

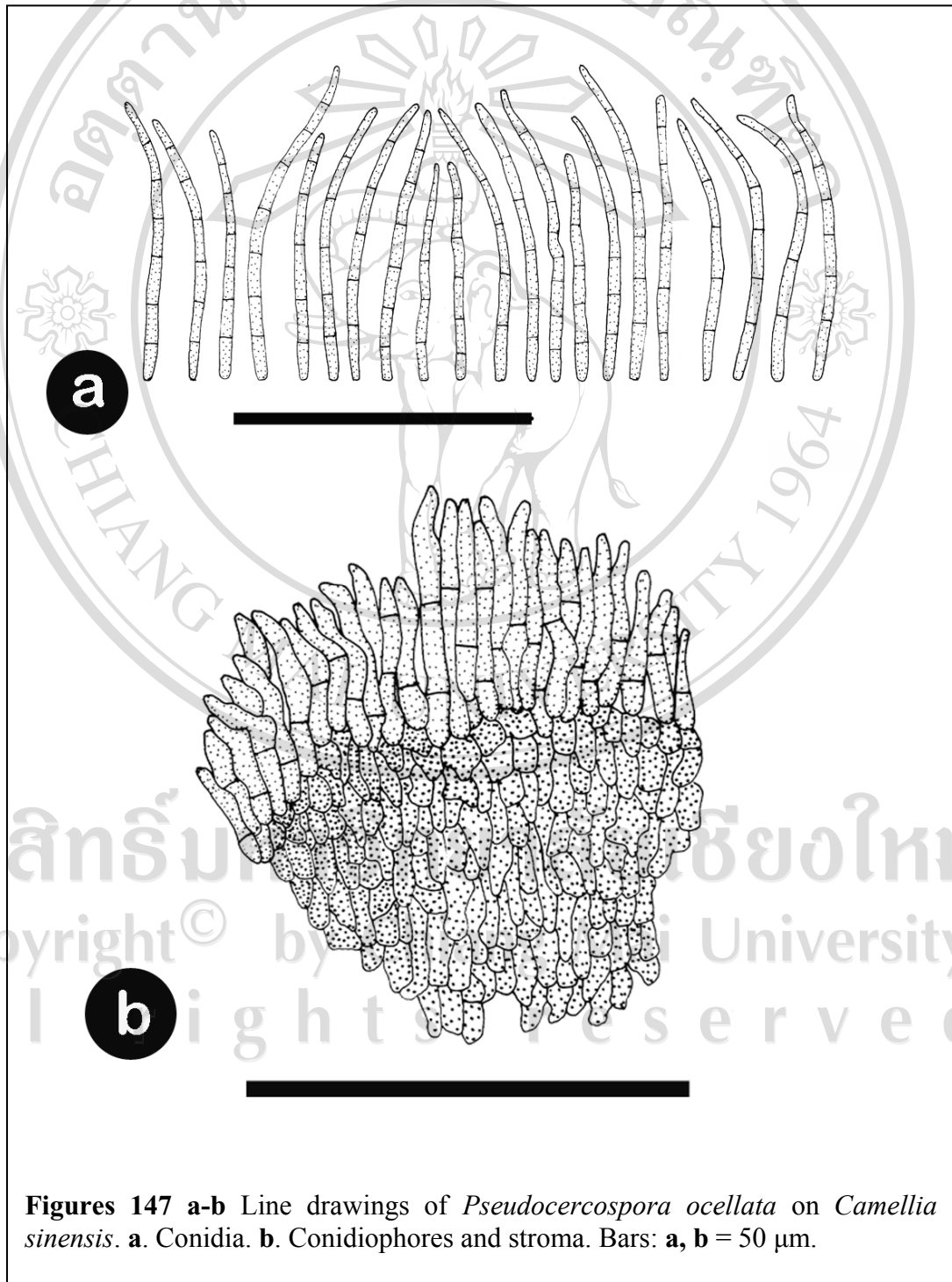
(Figures 147a-b)

Leaf spots 5-10 mm diameter, amphigenous, subcircular to irregular, light brown to brown, greyish white at the centre, with dark brown margin. *Caespituli* amphigenous. *Stromata* 50-85 µm diameter, substomatal, well-developed, and composed of globose to subglobose, brown to blackish brown cells. *Conidiophores* 14-53 × 2-3 µm, densely fasciculate, 0-2-septate, arising from stromata, straight to decumbent, smooth, pale brown, paler toward the apex, unbranched, slightly geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, sympodially proliferating. *Conidiogenous loci* inconspicuous, unthickened, and not darkened. *Conidia* 34-87 × 2-3 µm, solitary, acicular to cylindric, straight to mildly curved, subhyaline, 4-7-septate, smooth, truncate at the base, gradually tapering towards the apex, hila inconspicuous, unthickened, and not darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Samoeng, Pang Da Royal Project, on leaves of *Camellia sinensis* Kuntze (*Theaceae*), 7 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23620); *ibid* on *Camellia sinensis* var. *assamica* (BBH 23676).

Host: *Camelia drupifera*, *C. sinensis* (*Theaceae*) (Crous and Braun, 2003).

Distribution: Azerbaijan, Brazil, China, Ethiopia, Georgia, India, Indonesia, Italy, Japan, Kenya, Mauritius, Nepal, Nigeria, Pakistan, Peru, Russia, Sri Lanka, Taiwan, Tanzania, and U.S.A (Crous and Braun, 2003).



Notes: This specimen is the first record of *P. ocellata* from Thailand.

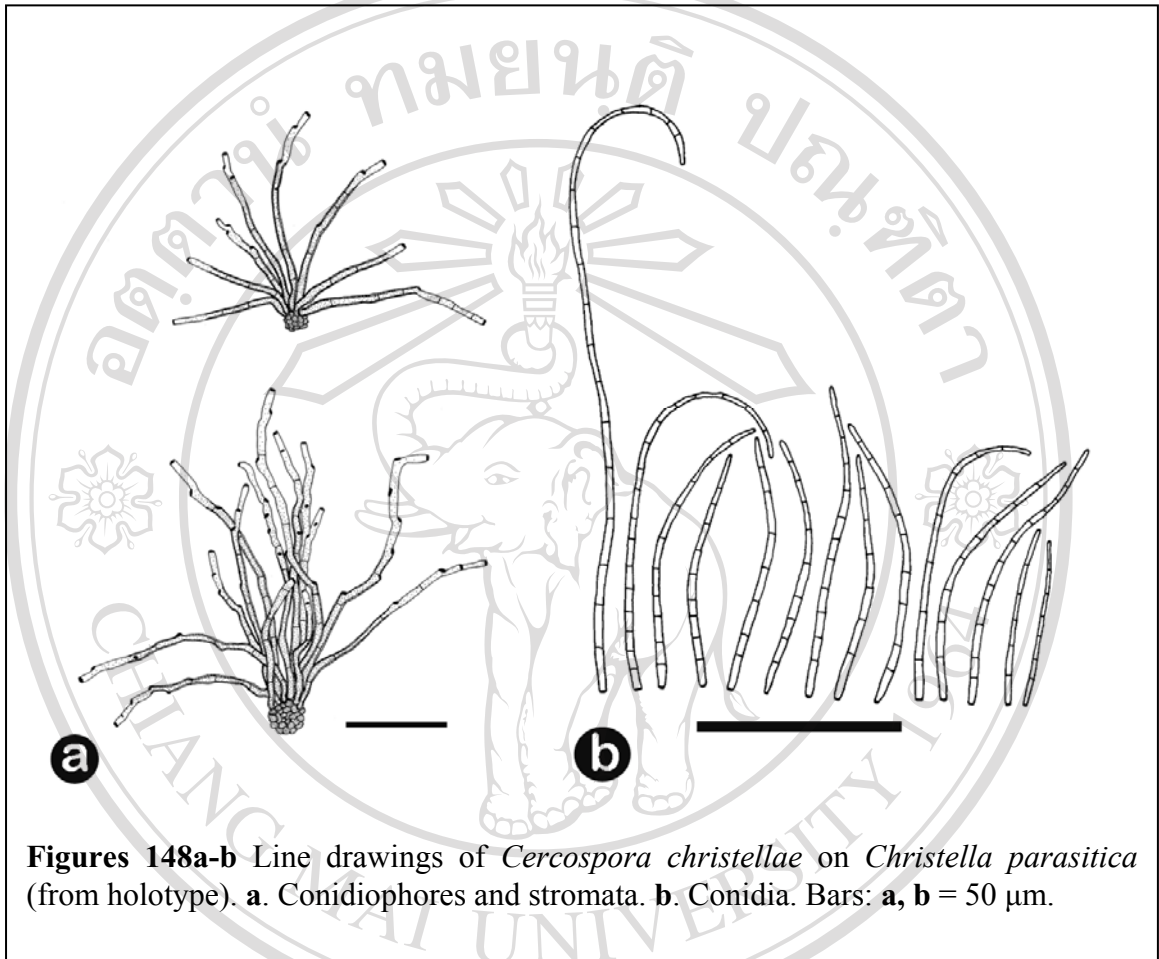
Family *Thelepteridaceae*

***Cercospora christellae* Meeboon, Hidayat, and To-anun, sp. nov.**

(Figures 148a-b)

Leaf spots 1.5-5 mm diameter, amphigenous, distinct, irregular, rarely orbicular, brown throughout, often whitish to paler at the center, often limited by leaf veins. *Caespituli* epiphyllous. *Stromata* (10) 12.7 ± 2.1 (16) μm diameter (n = 10), intraepidermal, well-developed, composed of 9-16 globose to subglobose, dark brown cells. *Conidiophores* (68.9) 220 ± 106.2 (413.3) \times (2.5) 4.5 ± 0.8 (4.9) μm (n = 30), 5-14 in a dense fascicles, cylindrical, arising through the plant epidermis, 3-13 septate, narrower toward the apex, straight to slightly sinuose or curved, smooth, brown at the base and paler towards the apex, unbranched, strongly geniculate throughout conidiophores. *Conidiogenous cells* (14.8) 24.7 ± 9.6 (49.2) \times (2.5) 4.1 ± 1.1 (4.9) μm (n = 30), pale brown, terminal or intercalary, holoblastic, polyblastic, integrated, proliferating sympodially. *Conidiogenous loci* (2) 2.8 ± 0.3 (3) μm diameter (n = 30), 1-3 per cell. protuberant, thickened, darkened. *Conidia* (35.8) 123.1 ± 53.4 (205.4) \times (1.2) 2.7 ± 0.8 (3.7) μm (n = 30), solitary, obclavate-filiform to acicular, straight to slightly curved, truncate to obconically truncate at base, acute to subobtuse at the apex, 3-17-septate, hyaline, smooth, hila (1.5) 1.8 ± 0.2 (2) μm diameter (n = 30), thickened, and darkened.

On PDA slow growing, smooth to folded, dark brown, white to smoke gray at the surface, producing red pigment in the medium.



Figures 148a-b Line drawings of *Cercospora christellae* on *Christella parasitica* (from holotype). **a.** Conidiophores and stromata. **b.** Conidia. Bars: **a, b** = 50 μm .

Specimen examined: THAILAND, Chiang Mai Province, Amphur Hang Dong, as weeds at citrus plantation, on living leaves of *Christella parasitica* (Linn.) Lévl. (*Thelypteridaceae*), 29 February 2008, Iman Hidayat (BBH 23574: **holotype**).

Host: *Christella parasitica* (*Thelypteridaceae*).

Distribution: Thailand (type locality).

Notes: This fungus was identified as *Cercospora s. str.* due to having pigmented conidiophores, thickened and darkened conidiogenous loci, and hyaline

filiform to scolecoid conidia (Crous and Braun, 2003). Recently, only four species of cercosporoid fungi have been recorded associated with the plants of family *Thelypteridaceae*, viz, *Cercospora abacopteridis* J. M. Yen and Lim (Yen and Lim, 1973), *C. cyclosori* Goh and W. H. Hsieh (Hsieh and Goh, 1990), *Pseudocercospora abacopteridicola* (J. M. Yen and Lim) J. M. Yen (Yen and Lim, 1980), and *Pseudocercospora phyllitidis* (H. H. Hume) U. Braun and Crous (Crous and Braun, 2003).

Cercospora cyclosori is currently classified as *C. apii* s. lat. based on the present concept of the cercosporoid fungi (Crous and Braun, 2003), but *C. christellae* distinct from the plurivorous *C. apii sensu lato* (Crous and Braun, 2003) by having epiphyllous caespituli, well-developed stromata, numerous and densely fasciculate conidiophores with strongly geniculate throughout, and conidia obclavate-filiform under natural condition with obconically truncate base and smaller hila (1.5-2 μm wide) (Figures 137a-b). Another species, *C. abacopteridis*, was described by Yen and Lim (1973) as having amphigenous symptom, hypophyllous caespituli, lacking of stromata, conidiophores solitary to 2-8 fasciculate (15-118 \times 4-5 μm), and conidia acicular to filiform (62-400 \times 2-4 μm). However, *C. christellae* is easily distinguishable from *C. abacopteridis* by its epiphyllous caespituli, well-developed stromata, and conidiophores in rich fascicles.

Family Tiliaceae

Cercospora apii Fresen., *Beitr. Mykol.* **3**: 91 (1863).

= *Cercospora penicillata* var. *apii* Fuckel, *Hedwigia* **2**: 132 (1863).

= *Cercospora apii* f. *dauci-carotae* Ellis and Everh., *N. Amer. Fungi*: 2482 (1890) (*nom. nud.*).

= *Cercospora levistici* Kvashnina, *Izv. Severo-Kavkazsk. Kraev. Stantsii Zashch. rast.* **4**: 38 (1928).

= *Cercospora apii* f. *Clerodendri* Sobers and Martinez, *Proc. Florida State Hort. Soc.* **79**: 433 (1966) [1967] (*nom. inval.*).

(Figure 149)

Leaf spots 15-30 mm diameter, amphigenous, circular or subcircular, pale greenish to ochraceous at young symptoms, later brown to dark brown, finally with grayish brown centre, surrounded by a dark margin. *Caespituli* amphigenous, ochre yellow, velvety. *Stromata* (19) 29.5 ± 8.7 (42.5) μm diameter, intraepidermal, small to well-developed, composed of globose to subglobose, brown to blackish brown cells.

Conidiophores (26) 59 ± 24.2 (100) \times (3.5) 4 ± 0.6 (5) μm , 3 to numerous in a loosely to densely fasciculate, 1-4-septate, arising from stromata, erect to decumbent, smooth, pale yellow to pale brown, simple, straight, subcylindrical, geniculate to sinuous.

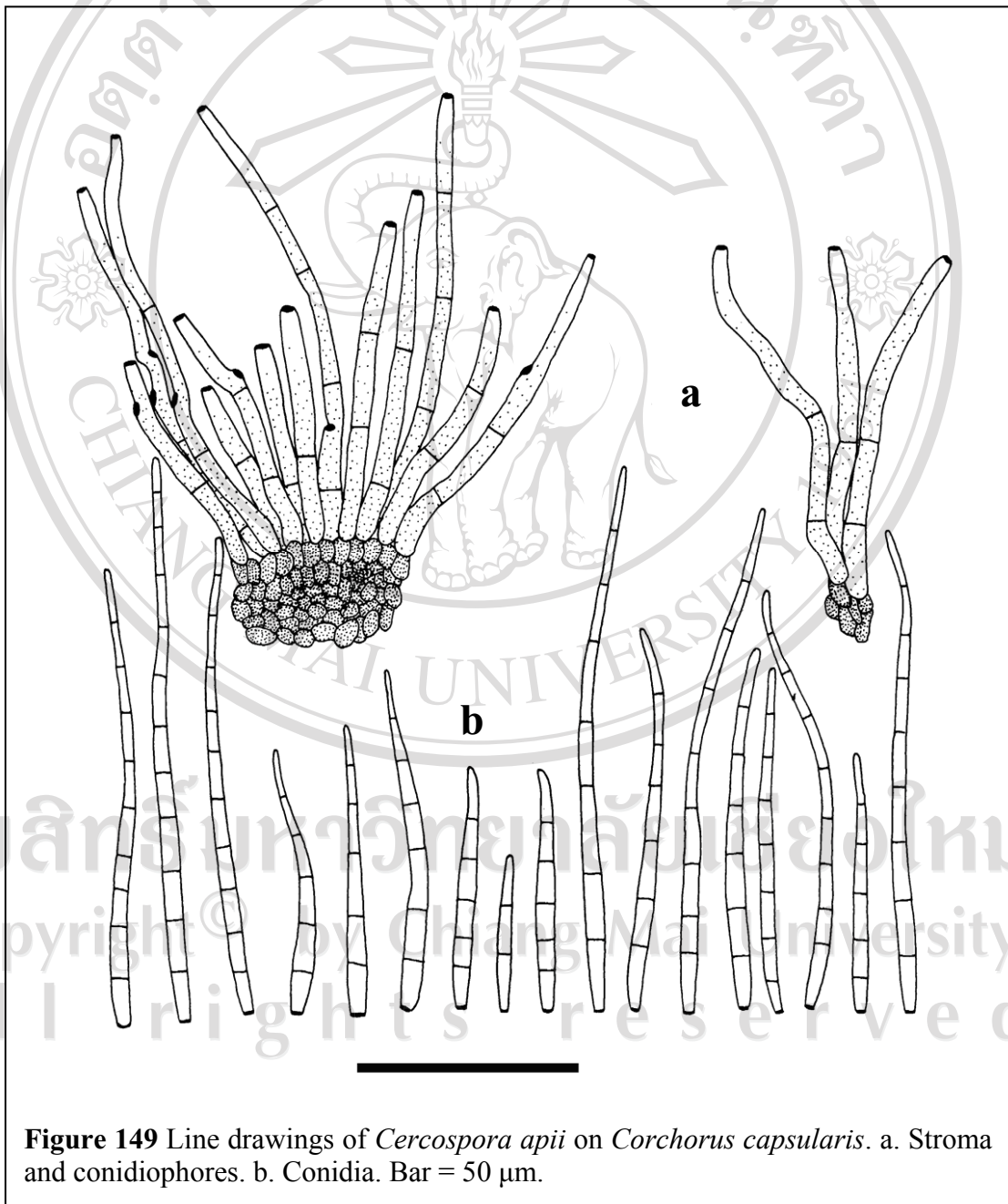
Conidiogenous cells integrated, terminal, holoblastic, mostly monoblastic, sympodially proliferating. *Conidiogenous loci* 2-3.5 μm diameter, conspicuous, thickened, and darkened. *Conidia* (50) 94 ± 48.7 (177) \times (3.5) 3.5 ± 0.3 (4) μm ,

solitary, narrowly obclavate to subacicular, straight, hyaline, 2-11-septate, smooth, apex subacute, base truncate, hila 2-3 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur San Sai, Tumbol Mae Jo, Farming area, on leaves of *Corchorus capsularis* L (*Tiliaceae*), 9 August 2008, Jamjan Meeboon (BBH 23701).

Host: *Abelmoschus esculenta*, *Aloysia virgata*, *Amaranthus* sp., *Anethum graveolens*, *Angelica dahurica*, *A. dawsonii*, *Annona odorata*, *Anthurium* sp., *Anthurus* sp., *Apium graveolens*, *A. sativum*, *Arracacia xanthorrhiza*, *Astilbe chinensis*, *Atkinsia cubensis*, *Bixa orellata*, *Cajanus cajan*, *Careya arborea*, *Carica papaya*, *Cedrela toona*, *Centella asiatica*, *Chamaechrista aeschynomenes*, *Chenopodium ambrosioides*, *Chondrilla juncea*, *Citrullus vulgaris*, *Clerodendrum fragrans*, *C. thomsoniae*, *Coleus hybridus*, *Coleus* sp., *Conioselinum benthamii*, *C. chinense*, *C. pacificum*, *C. tataricum*, *Coriandrum sativum*, *Crepis capillaris*, *Cucumis melo*, *Cucurbita pepo*, *Cyamopsis psoraloides*, *Daucus carota*, *Dichondra repens*, *Drejerella guttata*, *Droguetia debilis*, *Emilia sonchifolia*, *Emilia* sp., *Erucastrum arabicum*, *Eryngium foetidum*, *Euphorbia heterophylla*, *Foeniculum dulce*, *F. vulgare*, *Galinsoga parviflora*, *Gloriosa virescens*, *Hedychium coronarium*, *Heliotropium europaeum*, *Heliotropium* sp., *Hemigraphis* sp., *Hydrocotyle* sp., *Indigofera suffruticosa*, *Lablab purpureus*, *Lactuca canadensis*, *Laportea crenulata*, *Leonotis* sp., *Leonurus sibiricus*, *Levisticum* sp., *Limonium sinuatum*, *Limonium* spp., *Marlea begoniifolia*, *Modiola caroliniana*, *Momordica charantia*, *Myrrhis* sp., *Nicotiana tabacum*, *Oenanthe javanica*, *Papaver rhoeas*, *Pastinaca sativa*, *Petrea volubilis*, *Petroselinum crispum*, *P. hortense*, *Physalis* sp., *Plumbago capensis*,

P. rosea, *Pegostemon benghalensis*, *Premna mucronata*, *Pseucedanum graveolens*,
Rauwolfia serpentina, *Rinorea microdon*, *Ruellia* sp., *Schwenkia americana*, *Selinum*
gmelini, *Senna alata*, *Seseli indicum*, *Smyrniololium atrum*, *Spigelia anthelmia*,
Stellaria media, *Stigmaphyllon sagraeanum*, *Tabebuia serratifolia*, *Tagetes* sp.,
Wdelia paludosa, *Zinnia elegans* (Crous and Braun, 2003).



Distribution: Worldwide, including Australia, Austria, Azerbaijan, Bangladesh, Barbados, Brazil, Brunei, Bulgaria, Cambodia, Canada, Canary Islands, China, Colombia, Congo, Cuba, Czech Republ., Denmark, Dominican Republ., Egypt, El Salvador, France, Germany, Greece, Guatemala, Hong Kong, India, Indonesia, Iraq, Italy, Jamaica, Jordan, Kenya, Korea, Latvia, Lebanon, Libya, Lithuania, Mexico, Malaysia, Mauritius, Morocco, Myanmar, Nepal, Netherlands, New Caledonia, New Zealand, Morocco, Nepal, Nigeria, New Zealand, Panama, Papua New Guinea, Peru, Philippines, Poland, Puerto Rico, Romania, Russia, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Sudan, Suriname, Switzerland, Taiwan, Tanzania, Thailand, Togo, Trinidad, Tobago, Uruguay, U.S.A, Vanuatu, Venezuela, and Zimbabwe (Crous and Braun, 2003).

Notes: This specimen, *Corchorus capsularis*, is a new host of *C. apii*.

Family Verbenaceae

Cercospora apii Fresen., *Beitr. Mykol.* **3**: 91 (1863).

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

= *Cercospora apii* f. *dauci-carotae* Ellis and Everh., *N. Amer. Fungi*: 2482 (1890) (*nom. nud.*).

= *Cercospora levistici* Kvashnina, *Izv. Severo-Kavkazsk. Kraev. Stantsii Zashch. rast.* **4**: 38 (1928).

= *Cercospora apii* f. *clerodendri* Sobers and Martinez, *Proc. Florida State Hort. Soc.* **79**: 433 (1966) [1967] (*nom. inval.*).

(Figure 150)

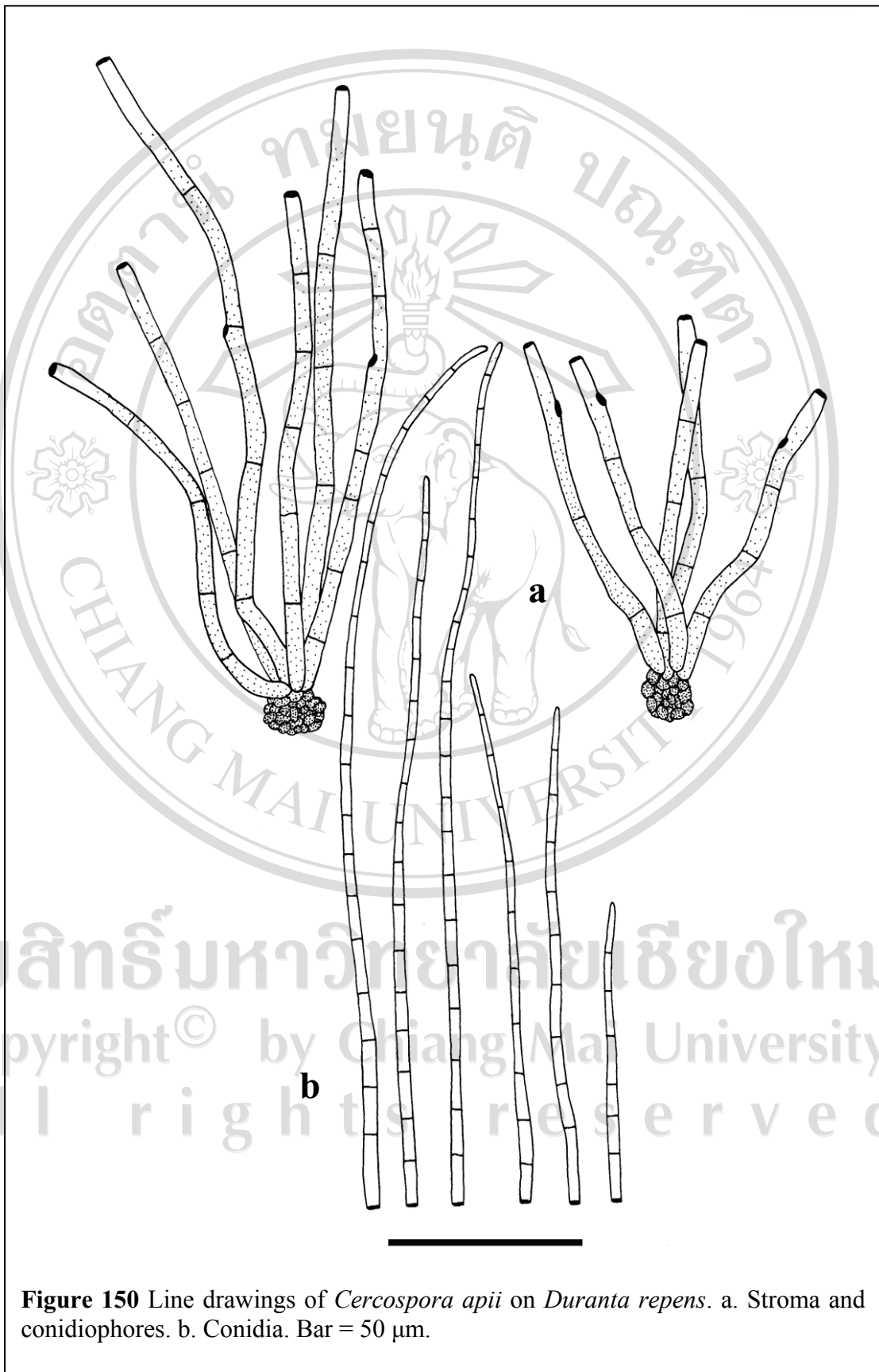


Figure 150 Line drawings of *Cercospora apii* on *Duranta repens*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Leaf spots amphigenous, dark to yellowish, only leaf decoloration on the host. *Caespituli* hypophyllous. *Stromata* (18) 21 ± 2.6 (25) μm diameter, small, composed of a few globose to subglobose, brown to dark brown cells. *Conidiophores* (109) 142 ± 34 (193.5) \times (3) 3.5 ± 0.6 (5) μm , 5-6 in a loosely fasciculate, 2-5-septate, arising from stromata, straight, smooth, brown at the base, and paler toward the apex, cylindrical, unbranched, mostly not geniculate. *Conidiogenous cells* integrated, terminal or intercalary, holoblastic, monoblastic or polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* (87) 203 ± 55.5 (300) \times (3) 3 ± 0.1 (3.5) μm , solitary, acicular, straight, hyaline, 6-21-septate, smooth, truncate at the base, tapering toward a subacute apex, hila 2-2.5 μm diameter, conspicuous, thickened, and darkened.

Specimen examined: THAILAND, Lamphun Province, Amphur Ban Hong, Farming area, on leaves of *Duranta repens* Linn. (*Verbenaceae*), 24 August 2008, Jamjan Meeboon (BBH 23697).

Host: *Abelmoschus esculenta*, *Aloysia virgata*, *Amaranthus* sp., *Anethum graveolens*, *Angelica dahurica*, *A. dawsonii*, *Annona odorata*, *Anthurium* sp., *Anthurus* sp., *Apium graveolens*, *A. sativum*, *Arracacia xanthorrhiza*, *Astilbe chinensis*, *Atkinsia cubensis*, *Bixa orellata*, *Cajanus cajan*, *Careya arborea*, *Carica papaya*, *Cedrela toona*, *Centella asiatica*, *Chamaechrista aeschynomenes*, *Chenopodium ambrosioides*, *Chondrilla juncea*, *Citrullus vulgaris*, *Clerodendrum fragrans*, *C. thomsoniae*, *Coleus hybridus*, *Coleus* sp., *Conioselinum benthamii*, *C. chinense*, *C. pacificum*, *C. tataricum*, *Coriandrum sativum*, *Crepis capillaris*, *Cucumis melo*, *Cucurbita pepo*, *Cyamopsis psoraloides*, *Daucus carota*, *Dichondra*

repens, *Drejerella guttata*, *Droguetia debilis*, *Emilia sonchifolia*, *Emilia* sp., *Erucastrum arabicum*, *Eryngium foetidum*, *Euphorbia heterophylla*, *Foeniculum dulce*, *F. vulgare*, *Galinsoga parviflora*, *Gloriosa virescens*, *Hedychium coronarium*, *Heliotropium europaeum*, *Heliotropium* sp., *Hemigraphis* sp., *Hydrocotyle* sp., *Indigofera suffruticosa*, *lablab purpureus*, *lactuca canadensis*, *laportea crenulata*, *Leonotis* sp., *leonurus sibiricus*, *Levisticum* sp., *Limonium sinuatum*, *Limonium* spp., *Marlea begoniifolia*, *Modiola caroliniana*, *Momordica charantia*, *Myrrhis* sp., *Nicotiana tabacum*, *Oenanthe javanica*, *Papaver rhoeas*, *Pastinaca sativa*, *Petrea volubilis*, *Petroselinum crispum*, *P. hortense*, *Physalis* sp., *Plumbago capensis*, *P. rosea*, *Pegostemon benghalensis*, *Premna mucronata*, *Pseucedanum graveolens*, *Rauwolfia serpentina*, *Rinorea microdon*, *Ruellia* sp., *Schwenkia americana*, *Selinum gmelini*, *Senna alata*, *Seseli indicum*, *Smyrnum olU.S.Atrum*, *Spigelia anthelmia*, *Stellaria media*, *Stigmaphyllon sagraeanum*, *Tabebuia serratifolia*, *Tagetes* sp., *Wdelia paludosa*, *Zinnia elegans* (Crous and Braun, 2003).

Distribution: Worldwide, including Australia, Austria, Azerbaijan, Bangladesh, Barbados, Brazil, Brunei, Bulgaria, Cambodia, Canada, Canary Islands, China, Colombia, Congo, Cuba, Czech Republ., Denmark, Dominican Republ., Egypt, El Salvador, France, Germany, Greece, Guatemala, Hong Kong, India, Indonesia, Iraq, Italy, Jamaica, Jordan, Kenya, Korea, Latvia, Lebanon, Libya, Lithuania, Mexico, Malaysia, Mauritius, Morocco, Myanmar, Nepal, Netherlands, New Caledonia, New Zealand, Morocco, Nepal, Nigeria, New Zealand, Panama, Papua New Guinea, Peru, Philippines, Poland, Puerto Rico, Romania, Russia, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Sudan, Suriname, Switzerland,

Taiwan, Tanzania, Thailand, Togo, Trinidad, Tobago, Uruguay, U.S.A, Vanuatu, Venezuela, and Zimbabwe (Crous and Braun, 2003).

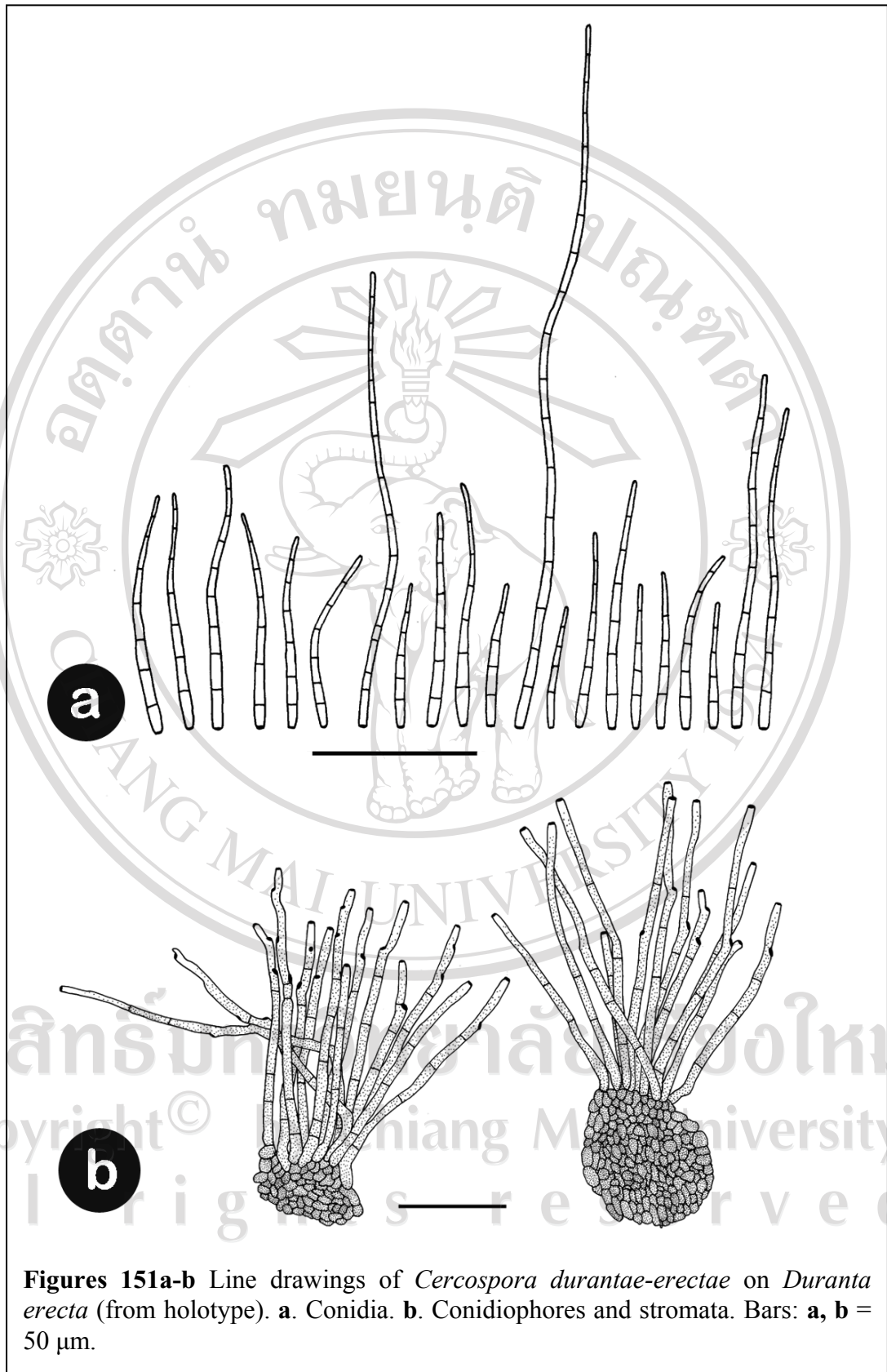
Notes: *Duranta repens* is reported here as a new host of *C. apii*.

***Cercospora durantae-erectae* Meeboon, Hidayat, and To-anun, sp. nov.**

(Figures 151a-b)

Leaf spots 2-5 mm in diameter, amphigenous, distinct, circular to subcircular, pale brown, centre greyish brown to greyish white, with dark brown margins. *Caespituli* amphigenous. *Stromata* 32-60 μm in diameter, small to well-developed, composed of globose to subglobose, brown to dark brown-walled cells. *Conidiophores* very variable in length, 61-185 \times 3-4.5 μm , 2-12 in a dense fascicules, 1-7-septate, emerging from stromata through the cuticle, pale olivaceous brown or sometimes paler towards the apex, straight to slightly curved, mostly strong geniculate. *Conidiogenous cells* integrated, terminal, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2.5-3 μm diameter, conspicuous, thickened, and darkened. *Conidia* 75-120 \times 2.5-4.5 μm , solitary, narrowly obclavate to acicular, straight to mildly curved, hyaline, 13-16-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 1-2.5 μm diameter, thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Chiang Dao, Huay Luek Royal Project, on leaves of *Duranta erecta* L. (*Verbenaceae*), 6 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23619: **holotype**).



Figures 151a-b Line drawings of *Cercospora durantae-erectae* on *Duranta erecta* (from holotype). **a.** Conidia. **b.** Conidiophores and stromata. Bars: **a, b** = 50 μm .

Host: *Duranta erecta* (Verbenaceae).

Distribution: Thailand (type locality).

Notes: In general, *Cercospora durantae-erctae* is distinct from other closely related taxa in having well-developed stromata, dense fascicles conidiophores with strong geniculation, and being recorded from plant genus *Duranta*. *Cercospora cardiostegiae* differs from this new proposed taxon due to catenate conidia, small to lacking stromata, hypophyllous caespituli, and shorter conidiophores. *Cercospora lantanae-indicaei* is distinct from the new proposed taxon in having small or lacking stromata and acicular and hyaline conidia (close to *C. apii s. lat.*). *Cercospora lippiae* and *C. pappilosa* differs in having small and lacking stromata, with slight geniculation, and indistinct conidia septation. *Cercospora verbenicola* is also distinct from the new proposed taxon due to branched conidiophores, small to lacking stromata, and indistinct conidial septation.

Table 5 Morphological comparison of *Cercospora duranta-erectae* with closely related species from the same host family (data from Chupp, 1954; Munjal *et al.*, 1959).

Characters	<i>Cercospora durantae-erectae</i>	<i>C. cardiostegiae</i>	<i>C. lantanae-indicae</i>	<i>C. lippiae</i>	<i>C. pappilosa</i>	<i>C. verbenicola</i>
Leaf spot	Distinct, circular to subcircular, amphigenous	Distinct, subcircular to irregular, amphigenous	Distinct, circular to irregular, amphigenous	Distinct, circular to irregular, amphigenous	Distinct, circular to irregular, amphigenous	Indistinct, amphigenous
Caespituli	Amphigenous	Hypophyllous	Amphigenous	Amphigenous	Amphigenous	Amphigenous, chiefly hypophyllous
Stromata	Well-developed, 32-60 μm in diameter	Lacking or small	Small	Small	Lacking to small, \pm 30 μm	Small to lacking, only a few globose and brown-walled cells

Table 5 (continued)

Characters	<i>Cercospora durantae-erectae</i>	<i>C. cardiospiae</i>	<i>C. lantanae- indicae</i>	<i>C. lippiae</i>	<i>C. papillosa</i>	<i>C. verbenicola</i>
Conidiophores	In a dense fascicles, unbranched, plainly geniculate, 61-185 × 3-4.5 μm	Non-fasciculate or 2-12 in fascicle, 1-2-mildly geniculate, 10-65 × 4-6.5 μm	Fasciculate, unbranched, mildly geniculate, uniform in color and width, 19.2-161.7 × 3.8-5.8 μm	Densely fasciculate, unbranched, 0-2- geniculate, 10-40 × 3-4.5 μm	Sometimes densely fasciculate, abruptly geniculation near the apex, 20-100 × 4-5 μm	Densely fasciculate, branched occasionally, multiseptate, geniculate, 5-35 × 4-7 μm
Conidia	Solitary, hyaline, septa 13-16, distinct, acicular, 75-120 × 2.5-4.5 μm	Catenulate, pale to olivaceous brown, septa 1-7, distinct, cylindrical-obclavate, 20-75 × 4-6 μm	Solitary, hyaline, septa acicular, 23.1-130.9 × 2-3.8 μm	Solitary, hyaline, indistinct, to multiseptate, acicular, 30-140 × 2-3 μm	Solitary, hyaline, indistinctly to multiseptate, acicular, 50-200 × 2.5-4 μm	Solitary, hyaline, cylindrical-acicular, multiseptate, 25-100 × 2.5-4 μm

Cercospora lantanae-indicae Munjal, Lall and Chona, *Indian Phytopathol.* **12**: 134 (1960) [1959].

= *Cercospora lantanae-camararum* R. C. Rayak and R. K. Rayak, *Curr. Sci.* **50**: 911 (1981) (*nom. illeg.*), homonym of *C. lantanae-camararum* J. M. Yen and Gilles (1973).

Specimen examined: THAILAND, Chiang Rai Province, Amphur Wiang Pa Pao, on leaves of *Lantana camara* L. (*Verbenaceae*), 18 November 2005, Jamjan Meeboon (CMU 27896).

Host: *Lantana camara*, *L. indica* (*Verbenaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: India and Thailand (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first record of *C. lantanae-indicae* from Thailand was made by Meeboon *et al.* (2007c). This species was previously only recorded from India (Munjal *et al.* 1959).

Cercospora tectonae F. Stevens (*tectoniae*), *Bernice P. Bishop Mus. Bull.* **19**: 155 (1925).

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

(Figure 152)

Leaf spots 2-14 mm in diameter angular to suborbicular, limited by leaves vein, confluent, brown to greyish brown or white at the centre, with a dark margin. *Caespituli* amphigenous, but chiefly epiphyllous. *Stromata* 8-41 µm diameters small to

medium, composed of a few globose to subglobose, brown to dark brown cells. *Conidiophores* (33.5-) 41-72 (-76) × 3-4 (-5) μm, in a loosely fasciculate, 1-5-septate, straight to decumbent, light brown to medium brown, paler towards the apex, geniculate at the apex. *Conidiogenous cells* integrated, terminal, holoblastic, polyblastic, sympodially proliferating. *Conidiogenous loci* 2-3 μm diameter conspicuous, thickened, and darkened. *Conidia* (31-) 38-63 (-96.5) × (2-) 2.5-3 μm, hyaline, acicular to obclavate-cylindric, 4-13-septate, straight to curved, truncate or obconically truncate at the base, with subacute apex, hila 2-2.5 μm diameter thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Chiang Mai University, Multiple Cropping Centre, on leaves of *Tectona grandis* L.f. (*Verbenaceae*), 1 December 2005, Jamjan Meeboon (CMU 27928).

Host: *Tectona grandis* (*Verbenaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: China, Indonesia, Taiwan, Thailand, Trinidad and Tobago, and U.S.A (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: Crous and Braun (2003) assigned this species to *C. apii* s.lat. The first record of *C. tectonae* from Thailand was made by Meeboon *et al.* (2007c).

Literature: Chupp (1954, p. 595).

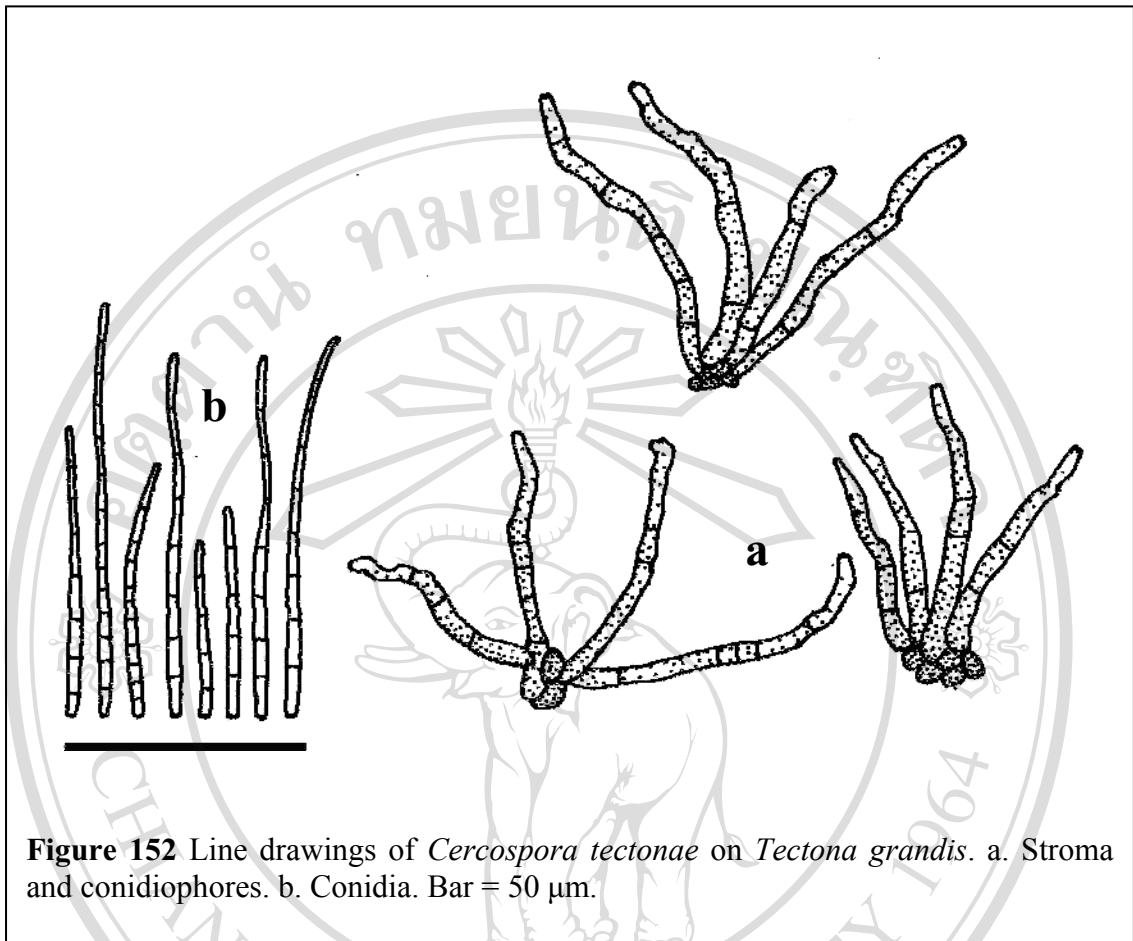


Figure 152 Line drawings of *Cercospora tectonae* on *Tectona grandis*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Pseudocercospora holmskioldiae C. Nakash. and Meeboon, *Fungal Diversity* 26: 261-263 (2007).

Mycobank: 510510

(Figure 153)

Maculis in foliis vivis, circularibus, angularibus vel irregularibus, dispersis, 3-23 mm diameter cinereo-brunneis, in epiphylllo margine atro-brunneis cinctis, in hypophyllo margine indistinctis, pallide viridulis cinctis. Stromatibus amphigenis, substmaicis vel intraepidermicis, atro-brunneis, 24-45 μm diameter hyphis internis et

externis, superficialibus praeditis. Conidiophoris laxe vel dense fasciculatis, ex cellulis stromatibus emergentis, vel solitariis, ex hyphis superficialibus oriundis, pallide olivaceo-brunneis, laevibus, rectis vel geniculatis, simplicibus, 10-23 × 2.5-3 μm. Locis conidiogenis inconspicuis, non incrassatis, non pigmentiferis. Conidiis solitariis, acicularibus vel obclavatis, rectis vel leniter curvatis, laevibus, ad apicem acutis, ad basim truncatis, hilis non incrassatis, pallide olivaceis, 3-7-septatis, 50-72 × 1.8-2.5 μm.

Etymology: holmskioldiae, derived from the genus name of the host plant.

Leaf spots 1-2 mm wide, circular, angular to irregular, scattered, later coalescing to large spots, 3-23 mm diameter grayish-brown with blackish-brown border on the upper leaf surface, and pale greenish, indistinct border on the lower leaf surface. *Caespituli* amphigenous. *Stromata* 24-45 μm diameter substomatal to intraepidermal, distinct, small to well-developed, dark brown, hyphae internal and external. *Conidiophores* 10-23 × 2.5-3 μm, loosely to densely fasciculate, arising from the upper part of stromata as well as external hyphae, smooth, pale olivaceous-brown, simple, straight or geniculate. *Conidiogenous loci* inconspicuous, unthickened, not darkened. *Conidia* 50-72 × 1.8-2.5 μm, solitary, acicular to obclavate, straight or slightly curved, 3-7-septate, smooth, pale olivaceous, with unthickened and truncate basal end, tip acute.

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Holmskioldia sanguinea* Retz. (*Verbenaceae*), 21 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27952: **holotype**).

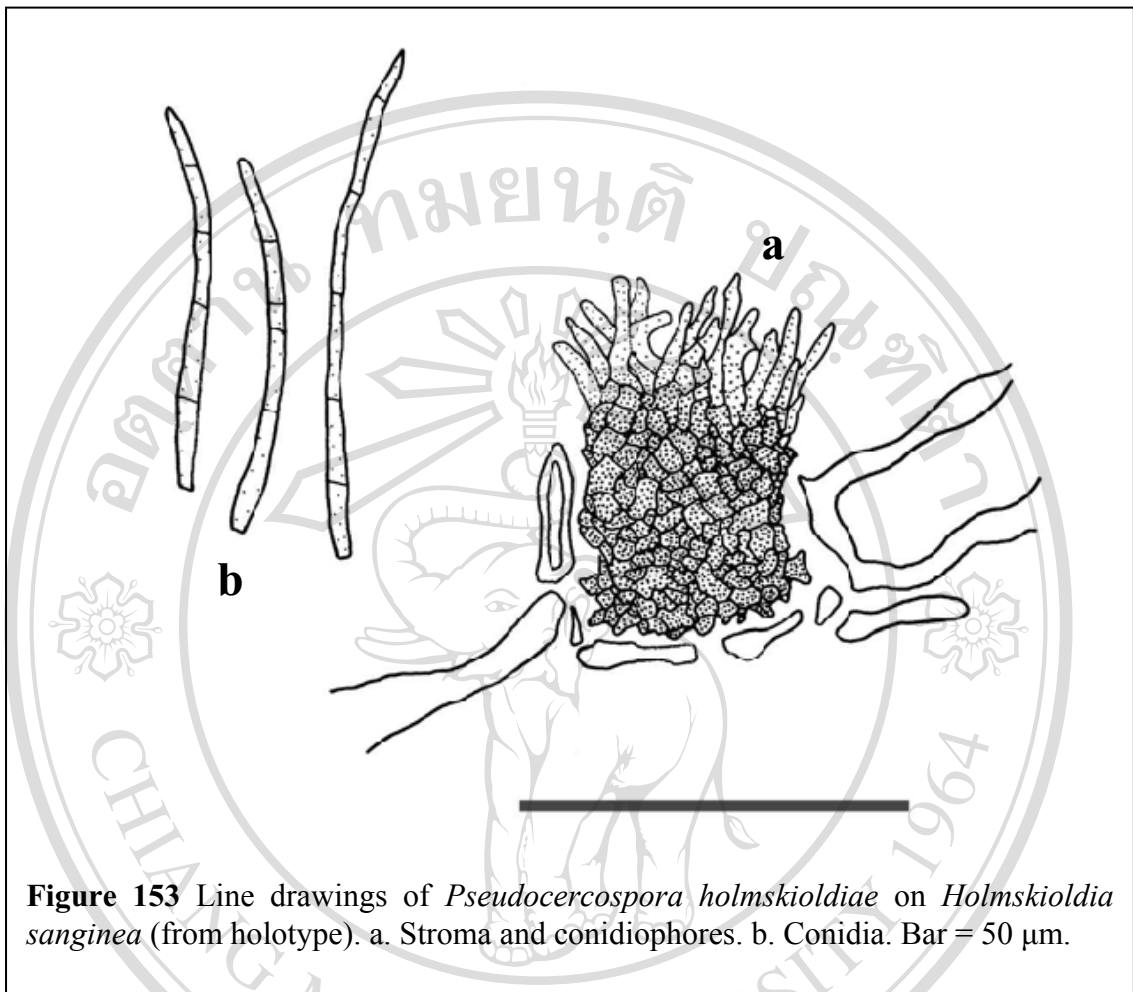


Figure 153 Line drawings of *Pseudocercospora holmskioldiae* on *Holmskioldia sanguinea* (from holotype). a. Stroma and conidiophores. b. Conidia. Bar = 50 μ m.

Host: *Holmskioldia sanguinea* (Verbenaceae).

Distribution: Thailand (type locality).

Notes: On the plant genus *Holmskioldia*, *Cercospora holmskioldiae* Lall and Gill (Lall and Gill, 1963) is recognized as a species of *Cercospora* (Crous and Braun, 2003). In this survey, *C. holmskioldiae* is also observed on the same specimen as *P. holmskioldiae*. However, *P. holmskioldiae* is easily distinguishable from *C. holmskioldiae* by having well-developed stromata, superficial hyphae with solitary conidiophores and, above all, unthickened conidiogenous loci and conidial hila, and pigmented, narrow conidia.

Pseudocercospora viticicola (J. M. Yen and Lim) J. M. Yen, *Gard. Bull., Singapore* **33**: 190 (1980).

- ≡ *Cercospora viticicola* J. M. Yen and Lim, *Cah. Pacifique* **17**: 104 (1973).
- = *Cercospora viticis* Ellis and Everh., *J. Mycol.* **3**: 18 (1887).
- ≡ *Pseudocercosporella viticis* (Ellis and Everh.) B. K. Gupta and Kamal, *Indian Phytopathol.* **42**: 388 (1989).
- ≡ *Pseudocercospora viticicola* U. Braun, *Mycotaxon* **48**: 296 (1993).
- = *Cercospora viticis* Sawada, *Rep. Gov. Agric. Res. Inst. Taiwan* **87**: 90 (1944).
- ≡ *Pseudocercospora viticis* Goh and W. H. Hsieh, *Trans. Mycol. Soc. R. O. C.* **4**: 11 (1989).
- = *Cercospora viticis-quinatae* J. M. Yen, *Bull. Soc. Mycol. France* **93**: 158 (1979).
- ≡ *Pseudocercospora viticis-quinatae* (J. M. Yen) J. M. Yen, *Bull. Soc. Mycol. France* **94**: 388 (1979).
- = *Pseudocercospora viticigena* J. M. Yen, A. K. Kar and B. K. Das, *Mycotaxon* **16**: 68 (1982).

Specimen examined: THAILAND, Chiang Mai Province, Suthep-Pui National Park, on leaves of *Vitex quinata* (Lour.) Will. (*Verbenaceae*), 21 November 2004, Chiharu Nakashima and Jamjan Meeboon (CMU 27964).

Host: *Aegiphila* sp., *Vitexagnus-castus*, *V. altissima*, *V. cannabifolia*, *V. chinensis*, *V. divaricata*, *V. negundo*, *V. parviflora*, *V. pubescens*, *V. quinata*, *V. trifolia* (*Verbenaceae*) (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Distribution: Brazil, China, Cuba, India, Japan, Philippines, Puerto Rico, Singapore, Taiwan, Thailand, U.S.A, and Virgin Islands (Crous and Braun, 2003; Meeboon *et al.*, 2007c).

Notes: The first record of this species from Thailand was made by Meeboon *et al.* (2007c).

Family Zingiberaceae

Cercospora alpiniicola S. Q. Chen and P. K. Chi (*alpinicola*), *Journal of South China Agricultural University* **11**: 57 (1990b); also in Chi, *Fungal Diseases of Cultivated Medicinal Plants in Guangdong Province*: 33 (1994).

(Figure 154)

Leaf spots 2-13 mm diameter amphigenous, distinct, circular to irregular, pale olivaceous brown at the center, sometimes discoloration forming surrounding the margin. *Caespituli* amphigenous. *Stromata* 12.5-19 μm diametersmall, substomatal to intraepidermal, composed of a few globose to subglobose, brown-walled cells.

Conidiophores 48.5-100 \times 4.5-6.5 μm , 3-8 in a loosely to densely fasciculate, 1-3-septate, arising from stromata, straight, smooth, brown at the base, and paler toward the apex, unbranched, cylindrical, strongly geniculate. *Conidiogenous cells* integrated, holoblastic, terminal, polyblastic, sometimes monoblastic, sympodially proliferating.

Conidiogenous loci 1.3-2.8 μm diameterconspicuous, thickened, and darkened.

Conidia 39.5-162 \times 3.5-5.5 μm , solitary, obclavate to acicular, straight, slightly

curved, hyaline, 4-11-septate, smooth, obconically truncate at the base, tapering toward a subacute apex, hila 2-2.5 μm diameter thickened and darkened.

Specimen examined: THAILAND, Chiang Mai Province, Amphur Sanpatong, Tambol Mae Win, Bahn Mae Sapok, Mae Sapok Royal Project, on leaves of *Alpinia purpurata* K. Schum, (*Zingiberaceae*), 8 February 2008, Jamjan Meeboon and Iman Hidayat (BBH 23684).

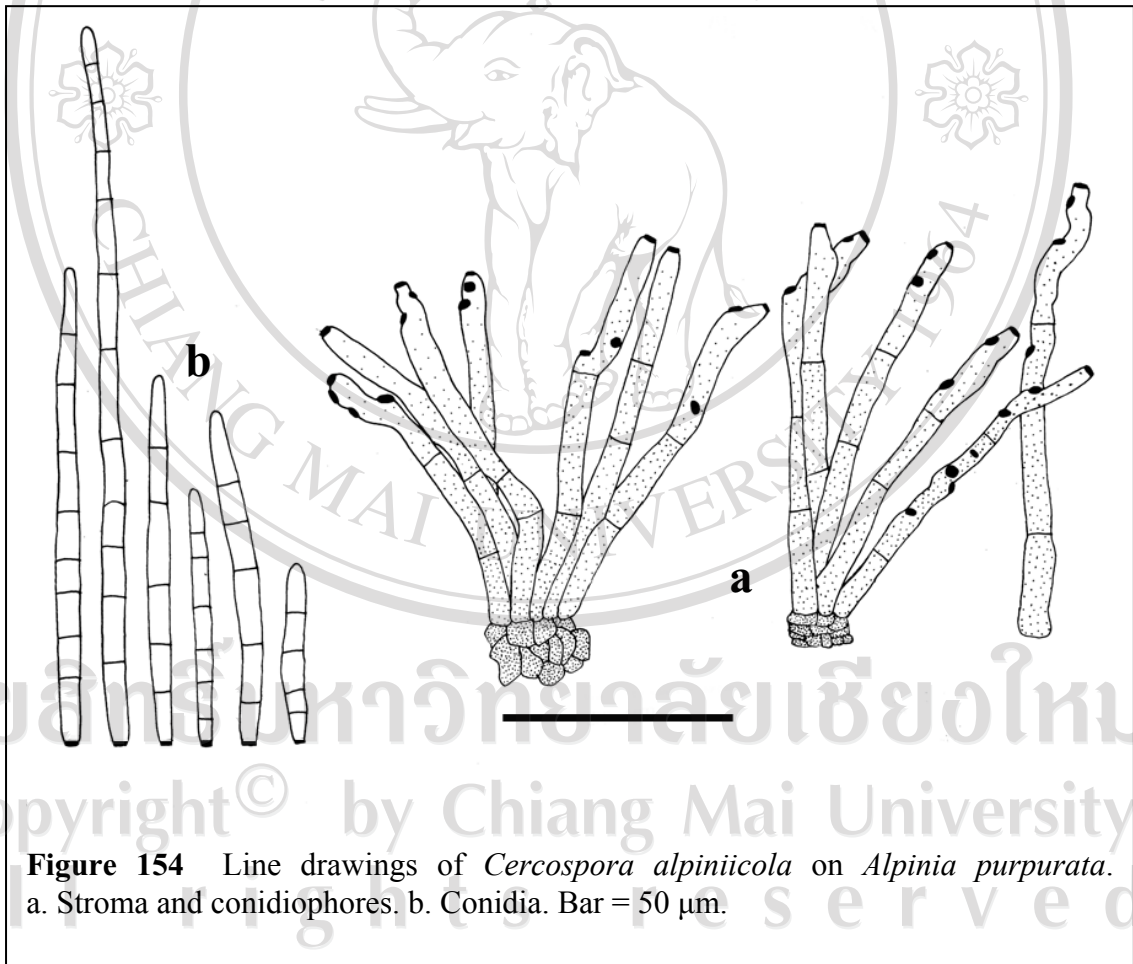


Figure 154 Line drawings of *Cercospora alpiniicola* on *Alpinia purpurata*. a. Stroma and conidiophores. b. Conidia. Bar = 50 μm .

Host: *Alpinia oxyphylla* (*Zingiberaceae*) (Chen and Chi, 1990b).

Distribution: China (Chen and Chi, 1990b).

Notes: This specimen is the first record of *C. alpiniicola* from Thailand, and *A. purpurata* is reported in this study as a new host of this fungus.

2.4. References

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