
New lichens from Thailand, mainly microlichens from Chiang Mai

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Results from collecting trips in Chiang Mai and other Provinces of Thailand are reported here. Excluding new species described here the paper includes about 300 species new to Thailand, six of which are first records for the Northern Hemisphere of species described from Australia or Papua New Guinea. A few species are reported here for the first time since their original description, such as *Bacidiopsis orizabana*, which was known only from Mexico, but is here reported from Thailand and Taiwan. Concentration on specific groups of crusts led to the identification of three yellow crusts which are usually found sterile. One was identified as the pycnidial form (with stalked pycnidia) of *Piccolia conspersa*. The others are described below as *Pyrrhospora luminescens* Aptroot & Wolseley, *Rinodina citrinisidiata* Aptroot & Wolseley (also reported from Yunnan, China). A pantropical lichen with an unusual hyphomycetous anamorph, superficially resembling a mould, is described as *Bacidina penicillata* Aptroot, Cáceres, Lücking & Sparrius. Two common, usually sterile isidiate crusts were found with fruiting bodies; *Platythecium dimorphodes* and *Gassicurtia clathrisidiata* Aptroot described below. The following further species are described as new to science: *Bactrospora inspersa* Aptroot, *Brigantiaea lobulatisidiata* Aptroot, *Enterographa inthanonensis* Sparrius, *Haematomma parda* Aptroot, *Hypoflavia crustosa* Aptroot, *Pyrenula aurantiopileata* Aptroot, *Pyrrhospora fuscisidiata* Aptroot & Wolseley and *Triclinum sorediatum* Aptroot & Sparrius. The new combinations *Lopezaria isidiza* (Makhija & Nagarkar) Aptroot & Sipman and *Malcolmiella aurigera* (Fée) Aptroot are made, and the combination *Phaeographopsis indica* (Patw. & Nagarkar) Sipman & Aptroot is validated.

Key words: *Bacidina*, *Bactrospora*, *Brigantiaea*, *Enterographa*, *Gassicurtia*, *Haematomma*, *Hypoflavia*, lichens, new species, *Pyrenula*, *Pyrrhospora*, *Rinodina*, *Triclinum*, Thailand

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Introduction

Chiang Mai is the most popular province in northern Thailand for travellers and botanists alike, due to its agreeable climate and the accessibility of many natural areas, including the highest mountain in Thailand Doi Inthanon, and Doi Suthep the mountain adjacent to Chiang Mai city. Both mountains are National Parks and have provided many new botanical species and records and lichens are no exception. The first lichenological exploration of Doi Suthep was made in 1904 by Hosseus (species reported by Vainio, 1921), and more recently by Sato (1962) who also explored Doi Inthanon with Osaka City University (Wolseley & Aguirre-Hudson, 1991). Wolseley and Aguirre Hudson were based at Chiang Mai University from 1990-1994 during a project on lichens in Thailand at the BM that produced a Bibliography of SE Asian Lichenology (Aguirre-Hudson and Wolseley, 1994), a checklist of species recorded in Thailand (Wolseley *et al.*, 2002) and papers on ecology and distribution of lichens in forest types (Wolseley *et al.*, 1997a, b; Wolseley, 1997). Further records are found in Nakanishi *et al.* (2001). and Saipunkaew *et al.* (2005). During the last authors research in Thailand sites were visited in other provinces including Lamphun, Lampang and Uthai Thani, and a few sites in N. P.s further east in Loei and Petchabun and other provinces and sites in the south of Thailand in Khiri Khan Province. These specimens have been worked on and identified over a period of time at the Natural History Museum by Homchantara *et al.* (2002), Jariangprasert (2002, 2003), Saipunkaew and other collaborators, of which unpublished material is presented here. New microlichen species for Thailand are described by Sparrius and Saipunkaew (2005) and Sparrius *et al.* (2006). However a systematic investigation of the microlichens has now been made possible by a visit to the Natural History Museum from the first author in December 2005.

These records are combined with others from specimens collected by the first three authors in Chiang Mai Province during two short trips in 2002 and 2004 when they intensively sampled a few localities. These included national parks, a tea plantation, an almond garden and even the ancient moated brick city wall of Chiang Mai city.

Regions in the monsoon tropics have been rather poorly recorded by lichenologists so that many of the lichens reported here are new records for Thailand, and species that are new to science are formally described.

The present paper reports taxa from various different taxonomical and ecological groups, with emphasis on corticolous crustose lichens from Northern Thailand. Yet, it is far from complete: specimens of several genera (e.g. *Arthonia*, *Opegrapha*) remain largely unidentified, from other genera (e.g. *Cratiria*, *Diorygma*, *Fissurina*, *Graphis*, *Hemithecium*, *Malcolmiella*,

Phyllopsora) only a small proportion of the material was identified, and new species belonging to some selected genera (e.g. *Cryptothecia*, *Lithothelium*, *Traponora*) will be treated separately in forthcoming papers. The Parmeliaceae is another conspicuous and large family in Thailand that will be treated separately in another paper (see Louwhoff *et al.*, 2002).

Material and methods

Materials were studied with dissecting and compound microscopes (Olympus BX50), and selected specimens were subjected to spot tests or thin layer chromatography HPTLC. In the catalogue below principle collectors are abbreviated. Collecting sites from which many specimens were gathered are indicated by a short name. Where only the name of a mountain, together with the altitude is given, it usually concerns a precise location, because only one access road is in existence. In general, only a few representative specimens are cited. Sites where Wolseley *et al.* collected during the research project are described in Wolseley and Aguirre-Hudson 1997a or given below. Where lichen distribution is correlated with forest type (Wolseley and Aguirre-Hudson 1997b) the vegetation type is given using a descriptive name following the above publications.

Collectors and institutions

| | |
|-----|---|
| A | leg. A. Aptroot, specimens in ABL & CMU |
| ABL | Herbarium Adviesbureau voor Bryologie en Lichenologie, Soest |
| AJW | leg. B. Aguirre-Hudson, P.W. James & P.A. Wolseley, specimens in BM |
| AW | leg. B. Aguirre-Hudson & P.A. Wolseley, specimens in BM |
| B | Herbarium Botanischer Garten und Botanisches Museum, Berlin |
| BM | Herbarium Natural History Museum, London |
| CMU | Herbarium Biology Dept., University, Chiang Mai |
| JW | leg. P.W. James & P.A. Wolseley, specimens in BM |
| L | leg. L.B. Sparrius, specimens in hb. Sparrius & CMU |
| S | leg. H.J.M. Sipman, specimens in B & CMU |
| W | leg. P.A. Wolseley, specimens in BM |
| WA | leg. P.A. Wolseley & B. Aguirre-Hudson, specimens in BM |

All other collectors are written out in full; their collections are in BM.

Collecting sites visited by Wolseley, Allen and others

Chiang Mai Province, Chiang Dao Wildlife Sanctuary was surveyed for lichens by D.Allen and S. Gardner for Chiang Mai University during November and December 1995. Sites are given with species. Specimens are at CMU herbarium and duplicates in the BM.

Chiang Mai Province, Doi Suthep-Pui N. P. was the site of a research project between 1990-1994. Sites visited during this project are listed in Wolseley and Aguirre-Hudson (1997a). Specimens are in the BM and duplicates are available at CMU.

Chiang Mai Province, Doi Inthanon N. P. was also included in the research project and sites are listed in the above publication. Specimens are in the BM and duplicates are available at CMU.

Uthai Thani Province, Huay Kha Khaeng Wildlife Sanctuary, was visited twice during the research project and sites in this extensive reserve are listed in the above publication.

Lampang Province, Doi Khun Tan N. P., 18°25'N 99°14'E, alt. 800-1000m.

Prachuab Khiri Khan, Khiri Khan coastal scrub on limestone was visited on 4-5 February 1993.

Satun Province, Thaleban N. P., lowland rain forest visited briefly in March 1993.

Petchabun Province, Nam Nao N. P., 16°52'N 101°38'E, alt. 800m Lowland evergreen forest, 4 May 1994.

Loei Province, Phu Rua N. P., 17°30'N 101°25'E, evergreen forest and montane savanna on sandstone between 900-1200m, 4-5 May 1994.

Collecting sites visited by Aptroot, Sipman (2002 only) and Sparrius

Doi Suthep forest: Doi Suthep-Pui N. P., Chiang Mai Prov., Doi Suthep slope, 18°48'17"N 98°54'43"E, alt. 1100 m, in *Manglietia garrettii* secondary forest in valley, 12 October 2002.

Doi Suthep garden: Doi Suthep-Pui N. P., Chiang Mai Prov., Doi Suthep slope, 18°48'17"N 98°54'43"E, alt. 1100 m, on *Cinchona pubescens* bark in medicinal herb garden, 12 October 2002.

Doi Suthep ridge: Doi Suthep-Pui N. P., Chiang Mai Prov., Doi Suthep, San Khu summit, 18°48'56"N 98°53'41"E, alt. 1500 m, in montane oak forest on ridge, 13 October 2002.

Chiang Mai City wall: Chiang Mai Prov., Chiang Mai, N side of old city wall, near Hua Lin corner, 18°47'44"N 98°58'42"E, alt. 900 m, on brick, 13 October 2002.

MRC: Chiang Mai Prov., Mushroom Research Centre along road to Pae, 19°07'11"N 98°44'01"E, alt. 750-800 m, in *Camellia* garden in forest remnants, 1-3 July 2004.

New Waterfall: Chiang Mai Prov., New Waterfall off road to Pae, 19°09'25"N 98°41'30"E, alt. 500-600 m, along stream in forest remnants, 2 July 2004.

Tung Joaw: Chiang Mai Prov., Tung Joaw trail off road to Pae, 19°08'24"N 98°38'17"E, alt. 800-900 m, in *Prunus* garden and in *Castanopsis* forest remnants, 30 June 2004.

Results

Sites were established in Chiang Mai Province at Doi Suthep and Doi Inthanon N. P.s, and in Uthai Thani Province in Huay Kha Khaeng wildlife sanctuary during 1990-1994 when epiphytic lichens were sampled during several visits by Wolseley and Aguirre Hudson (1997a,b). During this period epiphytic species were sampled on a research project to investigate the effects of fire on epiphytic lichen communities and species richness. Macrolichens were identified to species but many microlichens were not identified at the time. During this period other sites were visited briefly in other provinces and

some collections made. These collections have now been worked on and the results are included in this paper. In contrast the first three authors sampled a great range of substrata from trees in parks and primary or secondary forests to boulders along a stream and man-made objects such as shrines and the ancient brick city wall of Chiang Mai City.

A few aquatic (submerged) lichens were found on the stream boulders, belonging to the genera *Staurothele* and *Verrucaria*, but the species could not be identified, nor could it be ascertained that they are undescribed. Foliicolous lichens (species growing on living leaves) occur here and there, especially in the vicinity of streams, where the air humidity is markedly enhanced. Species composition and number vary greatly from site to site. The habitat that appeared the most diverse in terms of species numbers and yielded the highest number of new species (described below) was to our surprise a plantation of *Cinchona* trees surrounded by dense rather disturbed evergreen forest where trunks are in deep shade. The stunted trees were in open well-lit conditions within Doi Suthep National Park where humidity is high at 1100 m altitude providing an ideal substrate for lichens. In order to get an idea not only about the α -diversity (the number of species in the area), but also of the β -diversity (the distribution of the species over the trees), some relevés were made in two different areas.

In Doi Suthep forest, the lichens of several *Manglietia garrettii* trees in a research plot in a secondary forest were each separately noted (Table 1). The trees were small and could be climbed so that an almost complete inventory was undertaken. Several other ecological groups of fungi (litter fungi, endophytes) have been studied on these specific trees as well (Promputtha *et al.*, 2002; 2005). The trees are also marked for future investigations. Table 1 shows that the number of species on these trees is low, but that there exists considerable variation between the individual trees, suggesting that the total number of species on this tree species in this forest can be considerable, and that these young trees might be incompletely colonized by their potential lichen flora. It also gives an idea of the percentage of identifiable versus unidentifiable species in such an environment.

On the grounds surrounding the Mushroom Research Centre, a shade tea area that is planted under the cover of remnants of the original forest, 10 permanent plots of 10 × 10 m were set up by us in 2004. In these plots, the fungal succession will be followed. On these plots all epiphytic and foliicolous lichens were noted, on the small shrubs as well as on the bark of the large trees. The upper part of the large trees was out of reach. Some plots contained one or two such trees, others not. The results are shown in Table 2. The foliicolous

lichens are shown in Table 3. They are absent in most plots, but occur in plots 3, 5 and 6 near the stream.

Table 1. Lichens on 10 *Manglietia garrettii* trees in forest adjacent to the King's Palace, Doi Suthep N.P.

| Taxa | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|------|---|---|----|
| <i>Crocynia gossypina</i> | t | | t | | | | | | | t |
| <i>Cryptothecia</i> cf. <i>granularis</i> | | | | | | | b | | | b |
| <i>Cryptothecia</i> sp. | | t | | | | | | | | |
| <i>Fissurina incrustans</i> | | t | | | | | | | | |
| <i>Fissurina insculpta</i> | | t | | | | | b | | t | |
| <i>Graphis</i> sp. | t | | | | t | t | t | | t | t |
| <i>Leptogium cyanescens</i> | | | t | | | | | | | |
| <i>Malcolmiella granifera</i> | | | | | | | b | | | |
| <i>Malcolmiella</i> cf. <i>hypomela</i> | | b | t | | t | | | | t | t |
| <i>Myriotrema olivaceum</i> | | t | | | | | | | | |
| <i>Myriotrema subconforme</i> | | t | | | | | | | | t |
| <i>Ocellularia papillata</i> | | | | t | | | | | | |
| <i>Opegrapha varia</i> | | b | | | | | | t | | |
| <i>Opegrapha</i> sp. | | | | | | | l | | | |
| <i>Phyllopsora</i> cf. <i>corallina</i> | | | t | | | | | | | |
| <i>Phyllopsora furfuracea</i> | | | | t | t | | | | | |
| <i>Porina distans</i> | | | t | | | | b | | | |
| <i>Porina epiphylla</i> | | | | | | | l | | l | |
| <i>Porina mastoidea</i> | | | t | | | | | | | t |
| <i>Porina rufula</i> | | l | | | | | l | | | l |
| <i>Porina tetracerae</i> | t | b | | | | | b, t | t | t | t |
| <i>Porina virescens</i> | | | | | | | | | l | |
| <i>Porina</i> sp. | t | | | | | | | | | |
| <i>Psoroglaena cubensis</i> | | | | | | t | | | | |
| <i>Pyrenula acutalis</i> | t | | t | | | t | t | t | t | t |
| <i>Pyrenula aspistea</i> | | | | t | | | b | | | |
| <i>Strigula nemathora</i> | | l | | | | | l | | l | l |
| <i>Strigula</i> sp. | | l | | | | | l | | | l |
| <i>Tricharia vainioi</i> | | l | | | | | | | | |
| <i>Thelotremataceae</i> , isidiate | | | | t | | | b | | | |
| <i>Thelotremataceae</i> , sorediate | | | | | | | b | | t | |
| pycnidiate crust. | t | | | | t | | | | | |
| sorediate crust | | | | | | | t | | | |
| sterile green crust | t | | | | | | | | | |
| sterile grey crust | | | | | t | | | | | |
| total number of species per tree | 7 | 8 | 7 | 4 | 5 | 3 | 11 | 3 | 6 | 8 |

b = on branch, l = on leaf, t = on trunk

Table 2. Occurrence of corticolous lichens in 10, 10 × 10 m plots at the Mushroom Research Centre.

| Species | | | | | | | | | |
|------------------------------------|---|---|---|---|---|---|---|---|----|
| <i>Agonimia tristicula</i> | | | | | 6 | | | | |
| <i>Anthracotheceium globiferum</i> | | 3 | 4 | 5 | | 7 | | | |
| <i>Arthonia cinnabarina</i> | | | | 5 | | | | | |
| <i>Arthonia cf elegans</i> | | 3 | | | | | | | |
| <i>Arthonia sp.</i> | | | 4 | | | | | | |
| <i>Aspidothelium fugiens</i> | | | | 5 | | | | | |
| <i>Brigantiaea tricolor</i> | | 3 | | | | | | | |
| <i>Bulbothrix goebelii</i> | 1 | 3 | | 5 | 6 | | | | |
| <i>B. isidiza</i> | | 3 | | 5 | | | | | |
| <i>Byssoloma subdiscordans</i> | | | | 5 | | | | | |
| <i>Calopadia sp.</i> | | | | | 6 | | | | |
| <i>Catinaria sp.</i> | | | 4 | | | | | | |
| <i>Celothelium aciculiferum</i> | | 3 | | | | | | | |
| <i>Chiodecton minutulum</i> | | | 4 | | | | | | |
| <i>C. natalense</i> | | | 4 | | | | | | |
| <i>Chrysothrix xanthina</i> | | | 4 | | | | | | |
| <i>Coccocarpia erythroxyli</i> | | | | 5 | 6 | | | | |
| <i>C. palmicola</i> | | | | | 6 | | 8 | | |
| <i>Coenogonium subluteum</i> | | | | 5 | | | | | |
| <i>Cratiria melanochlora</i> | | | | 5 | | | | | |
| <i>Crocynia pyxinoides</i> | | 3 | | 5 | 6 | 7 | 8 | | 10 |
| <i>Cryptothecia cf. granularis</i> | 1 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <i>C. cf. linearis</i> | | | 4 | 5 | | | 8 | 9 | 10 |
| <i>C. cf. subnidulans</i> | 1 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <i>Dichosporidium boschianum</i> | | | | | 6 | | 8 | | |
| <i>Diorygma hieroglyphicum</i> | 1 | | | | | | | | |
| <i>D. pruinsum</i> | | | | 5 | 6 | | | | |
| <i>Dirinaria applanata</i> | | | | 5 | | | | | |
| <i>D. picta</i> | 1 | 3 | 4 | 5 | 6 | 7 | | | 10 |
| <i>Echinoplaca sp.</i> | | | | 5 | 6 | | | | |
| <i>Fissurina dumastii</i> | | 3 | | 5 | | | | | 10 |
| <i>F. incrustans</i> | | | | | 6 | | | 9 | 10 |
| <i>F. quadrispora</i> | | 3 | | | | | | | |
| <i>F. radiata</i> | | | | | | 7 | | | |
| <i>F. rufula</i> | | | | | | 7 | | | |
| <i>Graphis acharii</i> | | | | | 6 | | | | |
| <i>G. dussii</i> | | 3 | 4 | 5 | 6 | | | 9 | 10 |
| <i>G. pavoniana</i> | | | | 5 | | | | | |
| <i>G. proserpens</i> | | | | | 6 | | | | |
| <i>G. subcinerea</i> | | | | | | 7 | | | |
| <i>G. spec.</i> | | | | | 6 | | | | |
| <i>Gyalideopsis sp.</i> | | 3 | | 5 | 6 | | | | |
| <i>Haematomma collatum</i> | | | 4 | 5 | | | | | |

Table 2 continued. Occurrence of corticolous lichens in 10, 10 × 10 m plots at the Mushroom Research Centre.

| Species | | | | | | | | | |
|------------------------------------|---|---|---|--|---|---|---|---|----|
| <i>Heterodermia comosa</i> | | | | | 5 | | | | |
| <i>H. diademata</i> | | | | | 5 | | | | 10 |
| <i>H. galactophylla</i> | | | | | | 6 | | | |
| <i>H. japonica</i> | | 3 | | | 5 | 6 | | | |
| <i>H. obscurata</i> | | 3 | | | 5 | | | | |
| <i>H. podocarpa</i> | | | | | 5 | 6 | | | |
| <i>Laurera megasperma</i> | | 3 | | | 5 | 6 | | | 9 |
| <i>Lecanora helva</i> | | 3 | | | | | | | |
| <i>Lecanora tropica</i> | | | 4 | | | | | | |
| <i>L. sp. c. sor.</i> | | | | | | 6 | | | |
| <i>Leptogium austroamericanum</i> | | 3 | | | 5 | 7 | | | 10 |
| <i>L. cochleatum</i> | | | | | 5 | 6 | 7 | 8 | 10 |
| <i>L. corticola</i> | 1 | | | | 5 | | | | |
| <i>L. cyanescens</i> | | | | | | | 7 | | |
| <i>L. denticulatum</i> | | | | | 5 | | | | |
| <i>L. marginellum</i> | | | | | | | | 8 | |
| <i>Letrouitita transgressa</i> | 1 | | | | | | | | 9 |
| <i>Malcolmiella granifera</i> | 1 | 3 | 4 | | | 6 | | | 10 |
| <i>M. microspora</i> | | | | | 5 | | | | 10 |
| <i>M. sp.</i> | 1 | | | | | | | | 9 |
| <i>Megalospora tuberculosa</i> | | | | | | 6 | | | |
| <i>Megalotremis pustulata</i> | | | | | | | | 8 | |
| <i>Myelochroa aurulenta</i> | | | | | | 6 | | | |
| <i>M. irrugans</i> | | | | | 5 | | | | |
| <i>Myriotrema terebratulum</i> | | | | | 5 | 6 | | | |
| <i>Normandina pulchella</i> | | | | | | 6 | | | |
| <i>Ocellularia cf. polillensis</i> | | | | | | 6 | | | |
| <i>Opegrapha sp.</i> | | 3 | 4 | | | | 7 | | |
| <i>Parmelinella wallichiana</i> | 1 | | | | 5 | 6 | | | 10 |
| <i>Parmotrema corniculans</i> | | 3 | | | 5 | | | | |
| <i>P. cristiferum</i> | 1 | | 4 | | 5 | 6 | 7 | | 10 |
| <i>P. rampoddense</i> | | 3 | | | 5 | 6 | | | |
| <i>P. tinctorum</i> | | 3 | 4 | | 5 | 6 | | | |
| <i>Pertusaria subpertusa</i> | | 3 | 4 | | 5 | | | | |
| <i>P. subventosa</i> | | 3 | | | | | | | |
| <i>P. velata</i> | | | | | 5 | | | | |
| <i>Phaeographis leiogrammodes</i> | | | 4 | | 5 | | | | |
| <i>Phaeographopsis indica</i> | | | | | | | 7 | | |
| <i>Phyllopsora buettneri</i> | | | | | | | | 8 | |
| <i>P. furfuracea</i> | | | | | | | | 8 | |
| <i>P. cf. kiiensis</i> | | | 4 | | 5 | 6 | | 8 | |
| <i>Physcia atrostriata</i> | | | | | | 6 | | | |
| <i>Platythecium colliculosum</i> | | 3 | | | | 6 | 7 | | |

Table 2 continued. Occurrence of corticolous lichens in 10, 10 × 10 m plots at the Mushroom Research Centre.

| Species | | | | | | | |
|------------------------------------|---|---|---|---|---|---|------|
| <i>Porina distans</i> | | 3 | | 5 | | 8 | 10 |
| <i>P. mastoidea</i> | | | | | 6 | 7 | 9 |
| <i>P. tetracerae</i> | | 4 | | | | | |
| <i>Protoparmelia isidiata</i> | | | | | 6 | | 10 |
| <i>Pseudocyphellaria clathrata</i> | | | | | 6 | | |
| <i>Pyrenula anomala</i> | | 4 | 5 | | | | |
| <i>P. aspistea</i> | | 4 | | | 7 | | 9 |
| <i>P. concatervans</i> | | 3 | 4 | | 6 | 7 | 9 10 |
| <i>P. mamillana</i> | 1 | 3 | 4 | 5 | 6 | 7 | 9 10 |
| <i>P. oleosa</i> | 1 | | | | | | |
| <i>Pyxine coralligera</i> | | 4 | 5 | 6 | | | 10 |
| <i>P. schmidtii</i> | | 4 | | | | | |
| <i>Relicina planiuscula</i> | | | | 5 | | | |
| <i>Rimelia clavulifera</i> | | | | 5 | 6 | 7 | |
| <i>Sarcographa labyrinthica</i> | | 4 | 5 | | | | |
| <i>Sarcographina glyphiza</i> | | 4 | | | | | |
| <i>Triclinum sorediatum</i> | | | | | 6 | 7 | |
| <i>Sticta cf. weigelii</i> | | | | | 6 | | |
| <i>Tricharia vainioi</i> | | | | 5 | 6 | | |
| <i>Trypethelium tropicum</i> | | | | 5 | 6 | | |
| <i>Tylophoron moderatum</i> | | 4 | | | | | |
| <i>Usnea cf. dasaea</i> | | 3 | | 5 | 6 | | |

New species to Thailand or to science*Abconditella delutula* (Nyl.) Coppins & H. Kilius

Chiang Mai Prov., New Waterfall: A 61404 on rock along stream.

Until recently, this species, and even the whole genus was unknown from the tropics. However, this species turns out to be widespread in the tropics, and was recently also found by the first author in similar environments in Costa Rica and Vietnam (Aptroot and Sparrius, 2006).

Aderkomyces armatus (Vězda) Lücking, Sérus. & Vězda

Chiang Mai Prov., MRC: A 61462, L 8665 on *Camellia* leaves.

Agonimia pacifica (Harada) Diederich

Chiang Mai Prov., New Waterfall: A 61497 on soil along track.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum, Khao Kiew, 1150 m: AW 5048 p.p., 7 January 1993 on bark.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Yu Yi, 1200 m: W & Kanjanavit 4179, 25 February 1992 on bark.

Table 3. Lichens on leaves in 10*10 m plots at the Mushroom Research Centre
C = on *Camellia* leaves.

| Species | | | | | | |
|---------------------------------------|----|---|----|---|----|---|
| <i>Aderkomyces armatus</i> | | | | | 6C | 6 |
| <i>Asterothyrium microsporum</i> | 3C | 3 | 5C | 5 | 6C | 6 |
| <i>Asterothyrium pittieri</i> | | 3 | | | 6C | |
| <i>Aulaxina quadrangula</i> | | | 5C | | 6C | 6 |
| <i>Calenia aspidota</i> | 3C | 3 | 5C | | 6C | 6 |
| <i>Byssoloma leucoblepharum</i> | | 3 | | | | |
| <i>Calopadia fusca</i> | | | | | 6C | |
| <i>Calopadia puiggarii</i> | | | 5C | 5 | 6C | 6 |
| <i>Echinoplaca leucotrichoides</i> | 3C | 3 | 5C | 5 | 6C | 6 |
| <i>Fellhanera bouteillei</i> | | 3 | | | 6C | 6 |
| <i>Gyalectidium caucasicum</i> | | | 5C | 5 | | |
| <i>Phyllogyalidea epiphylla</i> | | | | | | 6 |
| <i>Lasioloma arachnoideum</i> | | | | 5 | 6C | |
| <i>Psorotheciopsis patellarioides</i> | | 3 | | | 6C | 6 |
| <i>Porina nitidula</i> | | 3 | | | | |
| <i>Porina rufula</i> | | 3 | | | | |
| <i>Porina trichothelioides</i> | | | | 5 | | |
| <i>Sporopodium flavescens</i> | | | | | | 6 |
| <i>Sporopodium leprieurii</i> | | | 5C | 5 | 6C | |
| <i>Sporopodium xantholeucum</i> | | | 5C | 5 | 6C | 6 |
| <i>Strigula antillarum</i> | 3C | 3 | 5C | | 6C | |
| <i>Strigula concreta</i> | | | | 5 | | |
| <i>Strigula nitidula</i> | | | 5C | | 6C | |
| <i>Tricharia vainioi</i> | | | 5C | 5 | 6C | 6 |

Agonimia papillata (O.E. Erikss.) Diederich & Aptroot

Chiang Mai Prov., Doi Suthep-Pui N.P., ridge: A 55242 on *Fagaceae* bark.

Agonimia tristicula (Nyl.) Zahlbr.

Chiang Mai Prov., MRC: A 61320 on bark.

Chiang Mai Prov., Tung Joaw: A 61208 on *Castanopsis* bark.

Chiang Mai Prov., Doi Suthep-Pui N. P., 1550m: AW 1672 on bark in montane oak forest, 27 Feb. 1993.

Amandinea efflorescens (Müll. Arg.) Marbach

Chiang Mai Prov., Doi Suthep ridge: A 55232 on bark.

Chiang Mai Prov., Doi Suthep-Pui N. P., Wat Palad, 650m: JW 2643 on bark in dry dipterocarp forest, 30 January 1993.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, , 200 m: WA 3985, 19 January 1992 on *Shorea siamensis* in dry dipterocarp savanna.

Amandinea extenuata (Müll. Arg.) Marbach

Chiang Mai Prov., Doi Inthanon N. P., Karen village 1300 m: WA 1829, 4035, 4038 in 1991, 1992, 1993, on bark in Tropical Mixed Deciduous Forest.

Uthai Thani Prov., Khao Nang Rum, 400 m: WA 3963, 14 January 1992 in dry dipterocarp forest on *Dipterocarpus tuberculatus*.

Amandinea melaxanthella (Nyl.) Marbach

Ko Phangan: Hensen, August 1992 (ABL) on palms.

Amandinea placodiomorpha (Nyl.) Marbach

Ko Phangan: Hensen, August 1992 (ABL) on palms.

Anisomeridium adnexum (Müll. Arg.) R.C. Harris

Chiang Mai Prov., Doi Chiang Dao, 2000 m: Allen 525, 30 January 1996 (BM) on bark.

Anisomeridium consimile (Vain.) R.C. Harris

Doi Suthep, forest adjacent King's Palace, 1550 m: WA 3786, 18 December 1991 on *Anneslea fragrans* bark.

Anisomeridium polypori (Ellis & Everh.) M.E. Barr

Chiang Mai city wall: A 55191 on brick.

This cosmopolitan species is usually found on dry, overhanging bark, but occasionally grows on rock, especially brick.

Anisomeridium subprostans (Nyl.) R.C. Harris

Chiang Mai Prov., Mae Soi ridges, 1000 m: WA 5736 on 16 December 1991 on bark in oak/pine forest.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 400 m: WA 3784, 3785, 15-17 January 1991, respectively on *Oparusa villosa* and *Canarium subulatum* bark.

Anisomeridium tamarindi (Fée) R.C. Harris

Prachuab Khiri Khan, Khiri Khan, 2 m: AJW 2031, 7 February 1993 on coastal shrub.

Anthracothecium columellatum (Vain.) Zahlbr.

Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, 790 m: Allen 70, 15 October 1995 (BM) on bark.

Chiang Mai Prov., Doi Inthanon N. P., near summit, 2434 m: WJ & Svasti 2434, 2 February 1993 on fallen branch by roadside.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 400 m: WA 3765 on 12 January 1992 on bark in dry dipterocarp forest.

Anthracothecium globiferum (Eschw.) Müll. Arg.

Chiang Mai Province, MRC: A 61329 on bark.

Arthopyrenia cinchonae (Ach.) Müll. Arg.

Chiang Mai Province, Doi Suthep-Pui N.P., 1550 m: WA 5724, 19 December 1991 on *Fagaceae*.

Aspidothelium cinerascens Vain.

Uthai Thani Prov., Khao Nang Rum, Khao Kiew, 500 m: WA 3771, 7 January 1992 on *Vatica cinerea* bark; Same locality, 400 m: AJW 2766, 12 February 1993 on *Quercus kerrii* bark.

Aspidothelium fugiens (Müll. Arg.) R. Sant.

Chiang Mai Prov., MRC: A 61318 on bark.

Asterothyrium microsporium R. Sant.

Chiang Mai Prov., MRC: A 61443, L 8667 on *Camellia* leaves.
Chiang Mai Prov., New Waterfall: L 8684 on leaves of shrub.

Asterothyrium pittieri Müll. Arg.

Chiang Mai Prov., MRC: A 61477 on *Camellia* leaves.
Chiang Mai Prov., New Waterfall: A 61495h on leaves.

Astrothelium eustomum (Mont.) Müll. Arg.

Chiang Mai Prov., MRC: A 61384 on bark.

Astrothelium galbineum Kremp.

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6693, 4 May 1994 on bark in evergreen forest.

Astrothelium variolosum (Ach.) Müll. Arg.

Chiang Mai Province, Doi Suthep-Pui N.P., 1600 m: WA 6694, 7 December 1991 on *Castanopsis* bark near the chedi.

Aulaxina quadrangula (Stirt.) R. Sant.

Chiang Mai Prov., MRC: A 61446, L 8666 on *Camellia* leaves.

Bacidia heterochroa (Müll. Arg.) Zahlbr.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Kiew 1250 m: WA 3952, 24 January 1992 on bark in montane oak forest.

Chiang Mai Province, Chiang Dao Wildlife Sanctuary: Allen L715, L716, 2 October 1996 (BM) on bark.

Chiang Mai Province, Doi Suthep-Pui N. P., 1600 m: WA 3942, 20 December 1991 on bark in montane oak forest.

Chiang Mai Province, Doi Inthanon N. P., Karen forest, 960m; W3160.

Khiri Khan Province, Prachuab Khiri Khan, 2m: AJW 2418, 4 February 1993 on bark in coastal scrub.

Bacidia medialis (Nyl.) de Lesd.

- Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum, 650 m: WA 3947, 7 January 1992 on bark in dry dipterocarp forest.
- Doi Suthep-Pui N.P. headquarters, 1050 m: AW 1642, 27 March 1993 on bark in montane oak forest.
- Chiang Mai Province, Doi Inthanon N. P., Karen forest, 900m: WA, 2 December 1991 on bark in tropical mixed deciduous forest.
- Lampang Province, Wiang Kosai N.P. headquarters: W & Boonpragob 5079 15 February 1992 on bark.
- Khiri Khan Province, Prachuab Khiri Khan, 2m: AJW 2571, 6 February 1993 on bark in coastal scrub.

Bacidina penicillata Aptroot, Cáceres, Lücking & Sparrius, **sp. nova** Fig. 1
Mycobank 501221

Type: Chiang Mai Prov., Doi Suthep slope, alt. 1100 m, on tree in *Manglietia garrettii* secondary forest in valley. *L.B. Sparrius 7156*, 13 October 2002 (CMU, holotype; ABL, hb. Sparrius, isotype).

Bacidina thallo viridigranulato conidiophoris hyphoideis, conidiis magnis bifusiformibus verrucosis.

Thallus corticolous, consisting of minute, shiny, rather regular, hemispherical to elongated, pale to dark green, corticated granules of c. 50-100 μm diam on a rather continuous, dark brown, arachnoid hypothallus, that extends beyond the thallus for c. 1 mm, covering an area of up to 4 cm diam. *Algae* chlorococcoid, cells c. 4-6 μm . *Apothecia* rare, sessile, round to irregular, pale cream to greyish cream, 0.3-0.5 mm diam, in section hyaline. *Excipulum* of radially arranged cells, filled with hyaline crystals, lumina c. 4-6 μm . *Asci* of *Lecanora*-type. *Paraphyses* simple, tips c. 3 μm wide. *Ascospores* 8/ascus, hyaline, acicular, 32-37 \times 1.5-2.5 μm . Anamorph always present, integrated in, but vertically extruding from the thallus; conidiomata c. 0.1 mm wide and up to 0.2 mm high. Internal structure of the conidiophore *Aspergillus*-like, consisting of radial (best seen with the dissecting microscope) chains of conidia. *Conidia* greyish brown, 1-2-septate, strongly constricted at the septa and thus halter-shaped, agglutinated in chains, resembling beads, 5.5-6.5(-7.5) \times 2.5-3 μm , verruculose.

Additional material seen. BRAZIL: Pernambuco, Lücking & Cáceres 07-55 (F, anamorph only), 07-56 (F, anamorph and teleomorph). COSTA RICA: Heredia: La Selva Protection Zone, La Selva Biological Station (Cordillera Volcánica Central Conservation Area), Volcánica Central Ridge, 55 km N of San Jose, trail behind laboratory (Sendero Oriental), 84° 03' W, 10° 26' N, 50 m, lowland rainforest zone, closed primary forest, on bark (lower trunk) of Leguminosae, 15 June 2002, Lücking 15010a (F, anamorph). Puntarenas: Corcovado N. P., Sirena Section, Sirena Biological Station (Osa Conservation Area), Osa Peninsula, 160 km SSE of San José and 50 km WSW of Golfito, trail to beach S of station (Sendero Los Naranjos), 83° 35' W, 8° 29' N, sea level, lowland coastal rainforest zone, coastal secondary forest and closed secondary vegetation on sandy soil, on bark (lower trunk), 7 April 2003, Buck 44130 (INB, NY, teleomorph). PAPUA NEW GUINEA: Madang Prov., Balek

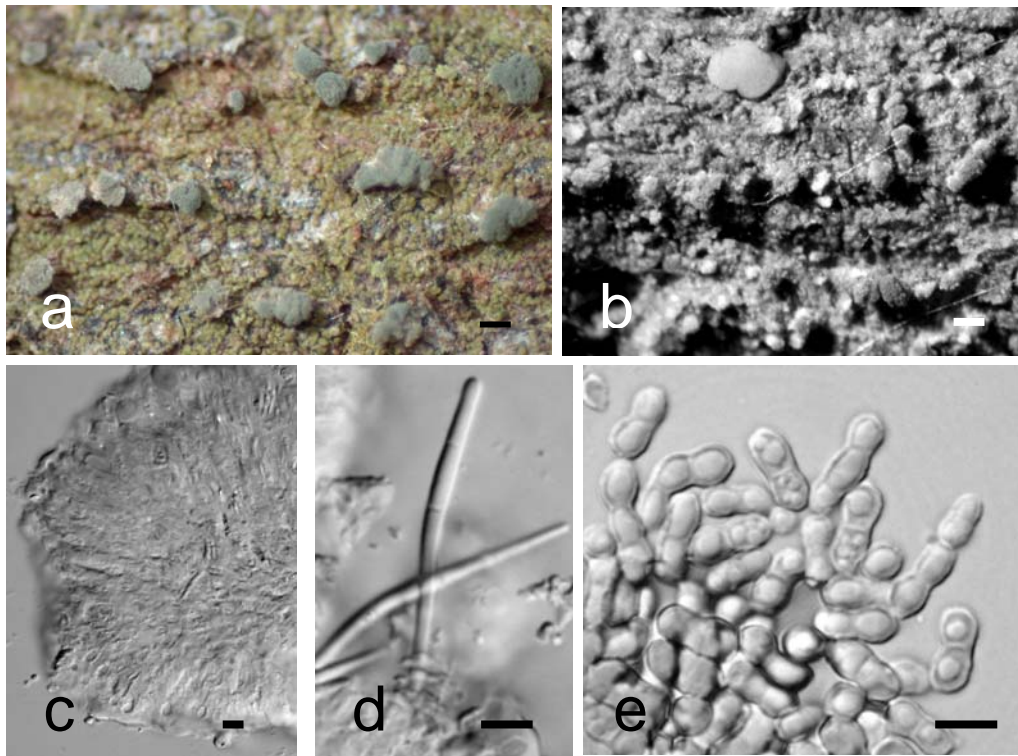


Fig. 1. *Bacidina penicillata*. **a.** Habitus with conidiomata. **b.** Habitus with ascomata. **c.** Section through excipulum. **d.** Ascospores. **e.** Conidia. Bars: a,b = 0.1 mm; c-e = 5 μ m.

Wildlife Sanctuary, 15 km S of Madang, on tree bark, 3 November 1995, Aptroot 36851 (ABL, anamorph only).

This species looks as if moulded by a *Penicillium*. However, the conidia are characteristic and not otherwise known, and they are always associated with the same thallus. Thalli of this structure are not otherwise known. This species has long been known to us and we now finally describe it as ascomata have been found on it two times now (in Thailand and Brazil), even on different continents. The species is so characteristic that it can be recognized without a microscope; the material from all over the tropics agrees in every detail.

Bacidina squamellosa S. Ekman

Petchabhun Prov., Nam Nao N. P., 880 m: W & Kanjanavanit 6695, 3 May 1994 on bark in evergreen forest.

Bacidiopsora orizabana (Vain.) Kalb

Chiang Mai Province, Chiang Dao Wildlife Sanctuary, 1600m: Allen 494, 29 January 1996 (BM) on bark.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum, 460 m: AJW 2705, 11 February 1993 on bark.

These are the first records from the palaeotropics for this species. It is apparently more widespread, as it was also found in TAIWAN: Nantou Co., Meifeng, 2050 m, A 52339, 10 October 2001 on *Symplocus*.

Bacidiopsora squamulosula (Nyl.) Kalb

Chiang Mai Prov. Doi Suthep-Pui N.P., 1050m: AW 1630, 27 February 1993 on bark in montane oak forest.

Bactrospora inspersa Aptroot, **sp. nova**

Fig. 2

Mycobank 501222

Type: Thailand, Chiang Mai Prov., Doi Suthep N. P., San Khu chedi site, 99°54'E, 18°49'N, alt. 1600 m, on *Castanopsis* bark. P.A. Wolseley & B. Aguirre-Hudson 3903, 20 December 1991 (BM, holotype, ABL, isotype).

Bactrospora excipulo minimo, *epithecio fusco*, *hymenio dense oleoso*, *ascosporis acuminatis septemseptatis*.

Thallus corticolous, mostly endophloeodal, film-like, white to cream-coloured. Photobiont *Trentepohlia*. *Prothallus* a thin, dark brown line surrounding the thallus. *Ascomata* round, sessile, solitary, 0.25–0.5 mm. diam.; disc black to brown, not pruinose; margin thin, not crenate. Thalline margin absent. *Excipulum* 20–25 µm wide, brown-black in section. Hypothecium dark brown, 15–20 µm tall, KI+ deep blue, KOH–. *Hymenium* hyaline, densely inspersed with numerous oil droplets, 80–120 µm tall. *Paraphysoids* 0.8 µm wide, apices much irregularly swollen, branched and anastomosed. Epithecium 5–10 µm tall, dark brown, K–. *Asci* 80–100 × 12–15 µm, cylindrical, 8-spored, of *Bactrospora*-type. *Ascospores* acicular, (55-)65–80 × 4.0–5.0 µm, 7(–)9-septate, of *Patellarioides*-type, lower end tapering, with a 1 µm wide gelatinous perispore. *Conidiomata* not observed. Chemistry: Thallus C–, KOH–, PD–, UV–; no secondary compounds found (tlc).

This is the first species of the genus with a densely inspersed hymenium. It is furthermore characterized by the combination of a thin excipulum and tapering ascospores. Surprisingly, this is already the third species in the genus recently described from Thailand (see Sparrius *et al.*, 2006); the area is apparently a hot spot for the group.

Baeomyces fungoides (Sw.) Ach.

Chiang Mai Province, Doi Inthanon N.P., 2450 m: AW 1618, 7 March 1993 on roadside mosses near summit.

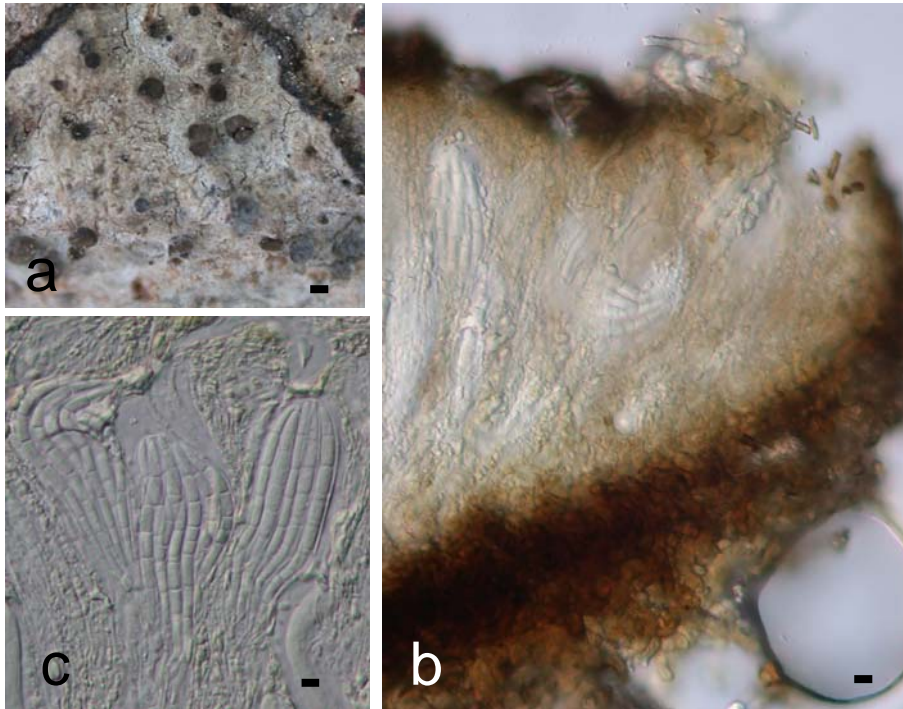


Fig. 2. *Bactrospora dispersa*. **a.** Habitus. **b.** Section through excipulum. **c.** Ascospores. Bars: a = 0.1 mm; b = 5 μ m.

Bathelium degenerans (Vain.) R.C. Harris

Uthai Thani prov., Khao Nang Rum, 400-460 m: WA 6006, AW 3696, January 1991 on *Strychnos* bark in dry dipterocarp forest.

Bathelium madreporiforme (Eschw.) Trevis.

Chiang Mai Province, Doi Suthep ridge: A 55236 on *Fagaceae* bark, Doi Suthep garden: S 48527 on *Cinchona pubescens* bark
 Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum research station, 460 m: AJW 2705, 11 February 1993 on bark in Dry Dipterocarp Forest.
 Lampang Province, Teak Improvement Centre, 350m and Ban Mae Kha 900m: W Boonpragob 4813, 4812 on bark in nursery and in evergreen forest.

Brigantiaea lobulatisidiata Aptroot, **sp. nova**

Figs 3a-c

Mycobank 501223

Type: Thailand, Chiang Mai Prov., Doi Suthep N. P., San Khu chedi site, 99°54'E, 18°49'N, alt. 1600 m, on bark in montane oak forest. *P.W. James & P.A. Wolseley 1677*, 31 February 1993 (BM, holotype, ABL, isotype).

Brigantiaea thallo microphyllino cylindrico-isidiato, apotheciis nigris rubrodiscis.

Thallus corticolous, corticate, entirely composed of squamules, covering an area of up to 3 cm diam. *Squamules* greyish green, mostly convex, partly ascending, elongate, entire or usually branched, c. 0.2–0.4 mm diam., originating singly and hardly overlapping or fusing. *Isidia* regularly dispersed, on nearly all squamules, cylindrical, unbranched, slanting to upright, c. 0.08 mm thick, 0.2–0.5 mm long. *Apothecia* sessile, black, marginate, with red pruina. *Excipulum* black outside, in section largely brown, composed of radially arranged, conglutinated cells of $5\text{--}10 \times 3\text{--}5 \mu\text{m}$. *Hypothecium* dark brown, c. 20 μm high. *Hymenium* not interspersed, c. 80–100 μm high. *Epihymenium* red brown, with red crystals, c. 10 μm high, KOH+ magenta. *Ascospores* muriform, mostly degenerated, 1/ascus, c. $50\text{--}65 \times 10\text{--}15 \mu\text{m}$. *Pycnidia* unknown. Chemistry: zeorin (tlc); thallus KOH-, UV-; apothecia pruina KOH+ magenta.

This is the second species in the genus with isidia, and also the second species with lobules, but the first to combine these features. It would key to *B. lobulata* F.J. Walker & Hafellner in Hafellner (1997), but it has been compared with isotype material as well as with material from Papua New Guinea, and it has much tinier lobules, and a different chemistry (and colour).

Buellia aethalea (Ach.) Th. Fr.

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6696, 5 May 1994 on sandstone.

Buellia ocellata (Flot.) Körb.

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6736, 5 May 1994 on sandstone.

Buellia subdisciformis (Leigt.) Vain.

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6698, 5 May 1994 on sandstone.

Byssolecania fumosonigricans (Müll. Arg.) R. Sant.

Chiang Mai Prov., New Waterfall: A 61495d on leaves.

Byssoloma subdiscordans (Müll. Arg.) R. Sant.

Chiang Mai Prov., Doi Suthep Pui N.P. medicinal garden: S 48501 on

Cinchona pubescens bark.

Chiang Mai Prov., MRC: A 61304 on bark.

Chiang Mai Prov., Tung Joaw: A 61168 on *Prunus* bark.

Calenia aspidota (Vain.) Vězda

Chiang Mai Prov., MRC: A 61471, L 8661, 8668 on *Camellia* leaves.

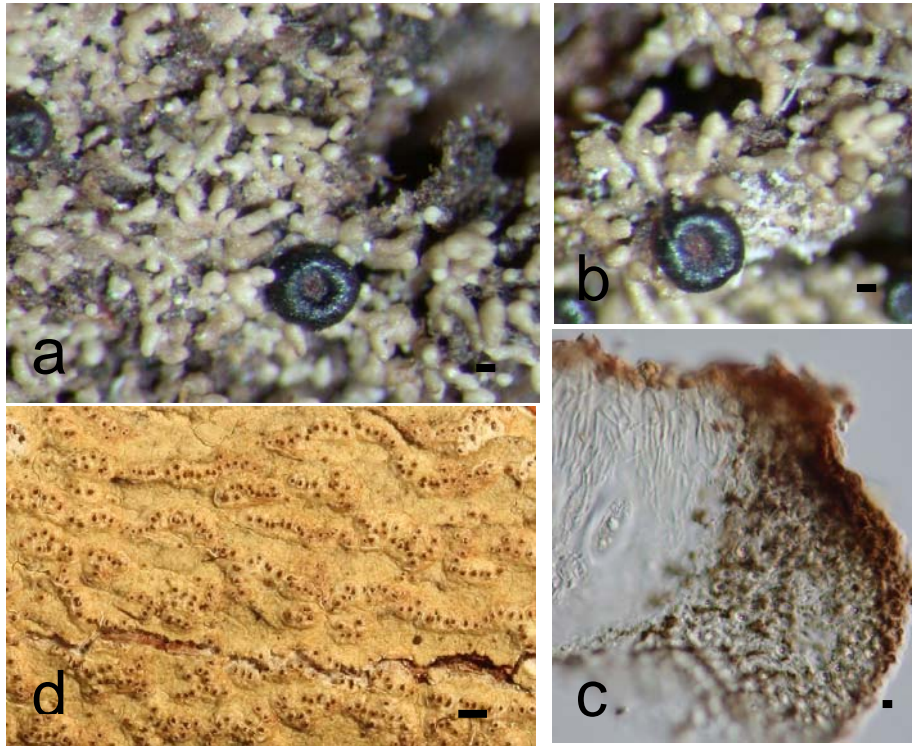


Fig. 3a-c. *Brigantiaea lobulatisidiata*. **a.** Habitus. **b.** Section through excipulum. **c.** Ascospores. **d.** *Enterographa inthanonensis*, habitus. Bars: a-c = 0.1 mm; d = 5 μ m.

Calicium adaequatum Nyl.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, archaeological site, 370 m:
AJW 2667, 13 February 1993 on *Shorea siamensis* bark.

Calicium diploellum Nyl.

Doi Suthep garden: A 55324 on *Cinchona pubescens* bark.

Calicium hyperelloides Nyl.

Doi Suthep, Wat Palad, 650 m: WA 3998, 4005, November 1991 on *Dipterocarpus tuberculatus* bark.

Calopadia puiggarii (Müll. Arg.) Vězda

Chiang Mai Prov., MRC: A 61459, L 8659 on *Camellia* leaves.
Chiang Mai Prov., New Waterfall: A 61495c on leaves.

Calopadia subcoerulescens (Zahlbr.) Vězda

Chiang Mai Prov., Doi Suthep Pui N.P., medicinal garden: A 55296 on *Cinchona pubescens* bark (the muriform ascospores forming ascoconidia).

Caloplaca cinnabarina (Ach.) Zahlbr.

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6699, 6712, 5 May 1994 on sandstone.

Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth.

Chiang Mai Prov., Doi Suthep Pui N.P., ridge: A 55341A on rock.

Caloplaca inconnexa (Nyl.) Zahlbr.

Chiang Mai Prov., Chiang Dao Wildlife Sanctuary: Allen 371, 1995 (BM) on limestone.

An unexpected species, which however is in full agreement with European material and equally grows as a parasite on a *Verrucaria*.

Caloplaca pulicarioides Aptroot

Prachuab Khiri Khan, Wah Kor, 2 m: AJW 2566, 7 February 1993 on bark in coastal scrub.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum research station, 700 m: W 1046, 11 January 1991 on bark in dry evergreen forest.

This recently described species (Aptroot and Seaward, 1999) turns out to be rather widespread in coastal regions in the palaeotropics.

Candelariella reflexa (Nyl.) Lettau

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6697, 3 May 1994 on *Aporusa* bark.

Carbacanthographis amicta (Nyl.) Staiger & Kalb

Chiang Mai Prov., Doi Suthep-Pui N.P., 1550 m: WA 4432, 19 December 1991 on bark in montane oak forest.

Carbacanthographis candidata (Nyl.) Staiger & Kalb

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum research station, 400 m: WA 4484, 14 January 1992 on *Shorea obtusa* in dry dipterocarp forest.

Carbacanthographis marcescens (Fée) Staiger & Kalb

Doi Suthep forest: S 48549, 48556 on *Manglietia garrettii* bark

Uthai Thani Prov., Kapou Kapiang, 500 m: AJW 2812, 14 February 1993 on bark in dry evergreen forest.

Celothelium aciculiferum (Nyl.) Vain.

Chiang Mai Prov., MRC: L 8642 on twig of shrub.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Kiew, 1150m: WA 3796 in montane oak forest.

Chiodecton leptosporum Müll. Arg.

Chiang Mai Prov., Doi Suthep-Pui N.P.: L 7086, S 48638 on *Cinchona pubescens* bark.
Chiang Mai Prov., Doi Suthep-Pui N.P., 1550-1600m; WA 4062, 4064, 4066, 1649 on bark in montane oak forest.

Chiodecton mucorinum Zahlbr.

Chiang Mai Prov., Doi Suthep-Pui N.P., 680-1550 m: JW 2652, 30 January 1993 & WA 4085, 28 November 1991, on bark.

Coccotrema porinopsis (Nyl.) Yoshim.

Chiang Mai Prov., Doi Suthep-Pui N.P., Doi Suthep, 640-1600 m: AW 2012b, 25 March 1993 in dry dipterocarp forest & WA 4629, 21 December 1991, on *Vaccinium* bark in montane oak forest.

Coenogonium dilucidum (Kremp.) Kalb & Lücking

Chiang Mai Prov., New Waterfall: A 61495 on leaves.

Coenogonium subluteum (Rehm) Kalb & Lücking

Chiang Mai Prov., MRC: A 61276 on bark.

Collema fasciculare Sommerf. var. *microcarpum* (Müll. Arg.) Degel.

Chiang Mai Prov., Doi Suthep Pui N.P., ridge: A 55244, L 7106 on *Fagaceae* bark.

Collema furfuraceum (Arnold) Du Rietz

Chiang Mai Prov., Doi Suthep Pui N.P., ridge: A 55223 on *Fagaceae* bark.

Collema leptaleum Tuck. s.s.

Chiang Mai Prov., MRC: A 61300 on bark.

Uthai Thani Prov., Khao Nang Rum, 460 m: AJW 2445, 11 February 1993 on bark in dry evergreen forest.

Chiang Mai Prov., Doi Suthep-Pui N.P., 1600 m: WA 4182, 8 December 1991, on *Castanopsis* bark.

Lampang Prov., Doi Khun Tan N.P., 1000m: W & Boonpragob 11 January 1993 on bark in montane evergreen forest.

Collema leptaleum var. *bilosum* (Mont.) Degel.

Uthai Thani Prov., Khao Nang Rum, 460 m: AW 1417, 1485, 1488, 1490, 8-15 January 1992 on bark in dry dipterocarp forest.

Chiang Mai Prov., Doi Suthep-Pui N.P., 1550 m: WA 4167, 28 November 1991, on bark in montane oak forest.

Collema pulcellum var. *subnigrescens* (Müll. Arg.) Degel.

Chiang Mai Prov., Doi Suthep ridge: A 55224 on *Fagaceae* bark.

Chiang Mai Prov., Doi Inthanon N. P., 900 m: WA 4178, 5605, 30 November 1991 on *Dipterocarpus tuberculosus* bark.

Collema rugosum Kremp.

Chiang Mai Prov., Doi Inthanon N. P., 900 m: WA 4164, 25 November 1991 on bark in dry evergreen forest.

Uthai Thani Prov., Khao Nang Rum, 400 m: AJW 2489b, 12 February 1993 on bark in dry dipterocarp forest. Also in evergreen forest at Yu Yi and Kapou Kapiang.

Khiri Khan Prov., Khiri Khan, 2 m.: AJW 2420, 5 February 1993 on coastal scrub.

Cratiria amphorea (Eckfeldt) Marbach

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Yu Yi, 1000 m: W & Kanjanavanit 3989, 26 January 1992 on bark in secondary forest near station headquarters.

Cratiria lauricassiae (Fée) Marbach

Chiang Mai Prov., Doi Inthanon N. P., 900 m: JW 1834e, 2 February 1993 on *Strychnos* bark in pine dipterocarp forest.

Cratiria melanochlora (Kremp.) Marbach

Chiang Mai Prov., MRC: A 61315 on bark.

Cratiria obscurior (Stirt.) Marbach & Kalb

Chiang mai Province, Doi Suthep garden: A 55280, 55302 & 55306 on *Cinchona pubescens* bark.

Uthai Thani Prov., Khao Nang Rum, 400 m: AJW 2773, 12 February 1993 on *Lithocarpus lindleyanus* bark in dry dipterocarp forest.

Cratiria rutilans Marbach

Chiang Mai Prov., MRC: A 61390 on bark.

Chiang Mai Prov., Tung Joaw: L 8593 on *Prunus* bark.

Cratiria rutilantoides Marbach

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum, 370 m: WA 3964, 22 January 1992 on *Mangifera* bark in dry evergreen forest.

Lampang Province, Doi Khun Tan N.P., 800m: W & Boonpragob 6741 on bark in dry dipterocarp forest.

Cresponea leprieurii (Mont.) Egea & Torrente

Chiang Mai Prov., Doi Suthep-Pui N.P., 680m & 1550 m: WA 3899, 3900b, 25 November and 19 December 1991 in evergreen forest.

Cresponea proximata (Nyl.) Egea & Torrente

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Kiew, 1150m: AJW 3896, 15 February 1993 on bark in montane evergreen forest.

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6700, 3 May 1994 on bark.

Petchabunh Prov. Nam Nao N.P., 900m: W & Kanjanavanit 6706 on bark in evergreen forest.

Crocynia gossypina (Sw.) A. Massal.

Chiang Mai Prov., Doi Suthep_Pui N.P.: A 55105, 55122 & 55158, L 7082 on *Manglietia garrettii* bark.

Chiang Mai Prov., Doi Inthanon N. P., 2590 m: AJW 2019, 7 March 1993 on bark near summit bog.

Uthai Thani Prov., Yu Yi, 1000 m: W 1441, 26 February 1992 on bark in evergreen forest.

Petchabunh Prov. Nam Nao N.P., 900m: W & Kanjanavanit 6706 on bark in evergreen forest.

Cryptolechia subincolorella (Nyl.) D. Hawksw. & Dibben

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, 450m: W 4632, 9 January 1991 on bark in dry dipterocarp forest.

Cryptothecia granularis Sipman

Chiang Mai Prov., Doi Suthep N.P, Doi Suthep ridge: A 55210 on bark.

Chiang Mai Prov., MRC: A 61403 on bark.

Chiang Mai Prov., Doi Suthep N.P., 1550 m: WA 4063, 18 December 1991, on bark in montane oak forest.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Kiew, 1250 m: WA 4076, 24 January 1992 on bark in montane oak forest.

Cryptothecia philippinum (Vain.) G. Thor

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum research station, 370 m: WA 4122, 28 January 1992 on bark in dry evergreen forest.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Yu Yi, 1000 m: W & Kanjanavanit 4126, 26 January 1992 on bark in secondary forest near station headquarters.

Cryptothecia scripta G. Thor

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum, 460 m: WA 4248, 12 January 1992 on *Diospyros ferrea* bark.

Chiang Mai Prov., Doi Suthep-Pui N.P., 1500 m: AW 1661, 27 March 1993, on bark in montane oak forest.

Cryptothelium sepultum (Mont.) A. Massal.

Chiang Mai Prov., Doi Suthep-Pui N.P., 1550 m: W 6703, 19 December 1991 on bark in montane oak forest.

Loei Prov., Phu Rua N. P., 1300 m: W & Kanjanavanit 6702, 5 May 1994 on bark in montane oak forest.

Dimelaena tenuis (Müll. Arg.) H. Mayrhofer & Wippel

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6705, 5 May 1994 on sandstone.

Diorygma hieroglyphicum (Pers.) Staiger & Kalb

Chiang Mai Prov., MRC: A 61286, L 8623 on bark.

Chiang Mai Prov., Tung Joaw: A 61172, L 8601 on *Prunus* bark.

- Diorygma junghuhnii* (Mont. & Bosch.) Kalb, Staiger & Elix
Chiang Mai Prov., Doi Suthep-Pui N.P., forest adjacent King's Palace, 1550 m: WA 4302, 4304, 19 December 1991 on bark.
- Diorygma pruinatum* (Eschw.) Kalb, Staiger & Elix
Chiang Mai Prov., MRC: A 61356, L 8675 on bark.
- Diorygma reniforme* (Fée) Kalb, Staiger & Elix
Chiang Mai Prov., Doi Suthep-Pui N.P., forest adjacent King's Palace, 1550 m: WA 4303, 19 December 1991 on bark.
- Diploschistes actinostomus* (Pers.) Zahlbr.
Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6707, 4 May 1994 on sandstone
- Dirinaria confluens* (Fr.) D.D. Awasthi
Chiang Mai Prov., Doi Suthep ridge: S 48604 on *Fagaceae* bark.
Chiang Mai Prov., Doi Suthep-Pui N.P., chedi site, 1600 m: WA 4382, 20 December 1991 on bark in montane oak forest.
- Dirinaria papillulifera* (Nyl.) D.D. Awasthi
Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum, 460 m: W 2466, 11 February 1993 on bark in dry dipterocarp forest.
- Dirinaria purpurascens* (Vain.) B.J. Moore
Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: A 55200 on *Cinchona pubescens* bark.
Chiang Mai Prov., Doi Suthep-Pui N.P., San Khu, 1600 m: WA 5606, 7 December 1991 on bark in oak/pine forest.
- Echinoplaca leucotrichoides* (Vain.) R. Sant.
Chiang Mai Prov., MRC: A 61445, L8664 on *Camellia* leaves.
- Endocarpon pallidulum* (Nyl.) Nyl.
Chiang Mai city wall: A 55260, S 48597 on brick.
- Endohyalina circumpallida* (H. Magn.) Marbach
Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: S 48506a on *Cinchona pubescens* bark.
- Enterographa anguinella* (Nyl.) Redinger
Uthai Thani Prov., Khao Nang Rum, 460 m: WA 4389, 13 January 1992 on *Vatica cinerea* bark.
Prachuab Khiri Khan, Wah Kor: AJW 2565, 7 February 1993 on bark in coastal scrub

***Enterographa inthanonensis* Sparrius, sp. nova**

Fig. 3d

Mycobank 501224

Type: Thailand, Chiang Mai Prov., Doi Inthanon N. P., Karen village, 99°34'E, 18°33'N, 1330 m alt., on bark in broad-leaved forest. *B. Aguirre-Hudson & P.A. Wolseley 3409*, 2 December 1991 (BM, holotype).

Enterographa ascomatibus punctiformibus in stromatibus linearibus, ascosporis 3-septatis, thallo acidum norsticticum continente.

Thallus up to over 5 cm in diam., smooth, cream-coloured, water-absorbing, 50–100 µm thick and up to 200 µm thick in the pseudostromata. *Photobiont Trentepohlia. Prothallus* thin, dark brown. *Upper algae-free medulla* 10–20 µm thick, of densely interwoven hyphae. *Medulla* white, with abundant oxalate crystals of 10–15 µm diam. *Ascomata* punctiform, 0.04–0.10 mm diam., disc dark brown to black, not pruinose. *Thalline margin* c. 0.1 mm wide, level with the ascomatal disc but raised above the thallus, forming linear, often forked pseudostromata of 0.4–0.5 × 1.0–3.0 mm. *Excipulum* 10–15 µm wide, orange-brown in section, KOH+ green. *Hypothecium* straw to orange-brown, not carbonized, 15–20 µm high, KOH+ green. *Hymenium* hyaline, 60–80 µm high. *Paraphysoids* c. 1.0 µm wide, apices not widened, irregularly branched and anastomosing. *Epithecium* 10–20 µm tall, orange-brown, with crystals of c. 0.5 µm diam., KOH+ green. *Asci* 60–80 × 12–15 µm, cylindrical-clavate, 8-spored, *Opegrapha*-type. *Ascospores* acicular-fusiform, 40–45 × 2.5–3.0 µm, 3-septate, perispore < 1 µm wide. *Conidiomata* not observed. *Chemistry:* norstictic acid, thallus C–, KOH+ yellow to red (developing red needle-shaped crystals in sections), PD–, UV+ cream-coloured.

This species is very similar in appearance to the pantropical *Enterographa subserialis*, but in the new species the thallus has a more yellow-brown tinge, the apothecium pigments are KOH+ green, the ascospores are consistently 3-septate, and the thallus does not contain psoromic acid. As in *E. subserialis*, no conidia have been found. Three-septate *Enterographa* species are likely to be confused with *Chiodecton*, from which they differ by the non-carbonized hypothecium, the smooth thallus surface, the thick-walled ascospores and *Opegrapha*-type asci.

***Enterographa subserialis* (Nyl.) Redinger**

Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 680 m: WA 4393 p.p., 21 November 1991 on *Shorea obtusa* bark in dry dipterocarp forest.

***Enterographa tropica* Sparrius**

Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 680 m: WA 4393 p.p., 21 November 1991 on *Shorea obtusa* bark in dry dipterocarp forest.

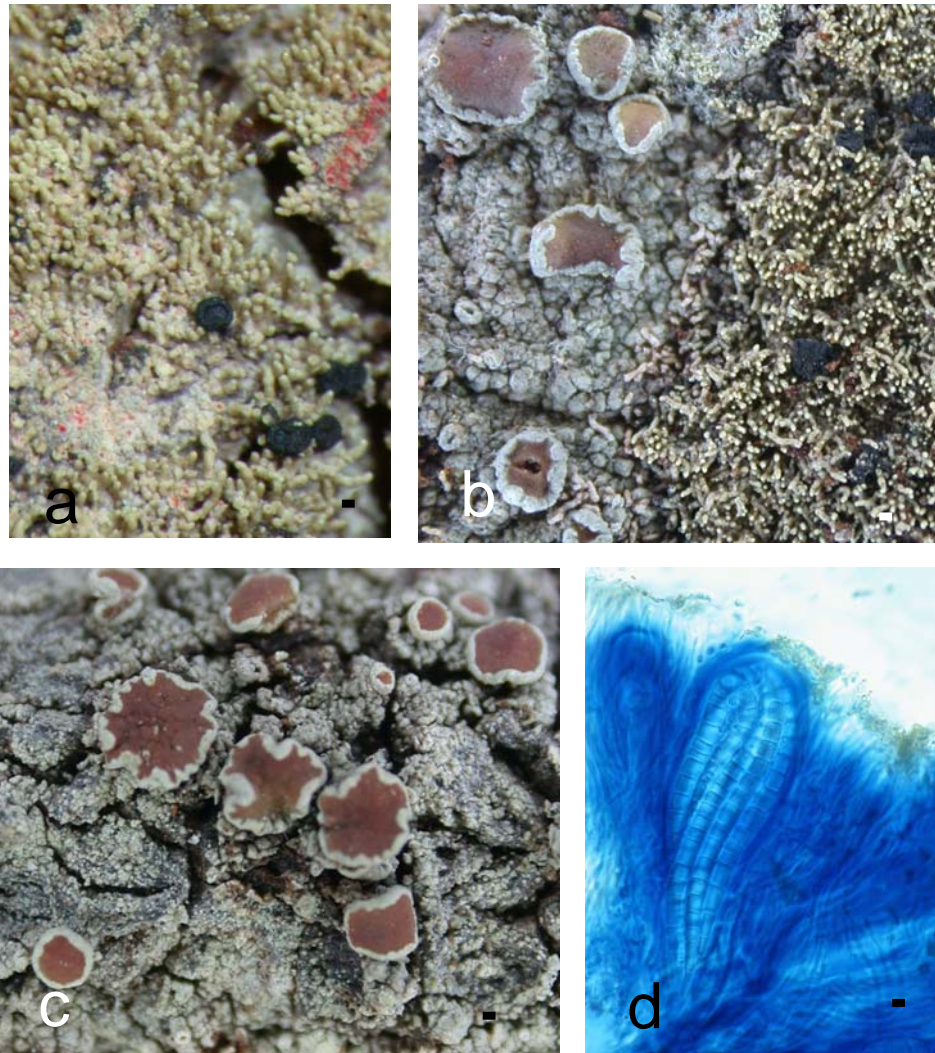


Fig. 4a-b. *Gassicurtia clathriformata*, habitus. **b-d.** *Haematomma parva*. **b-c.** Habitus. **d.** Ascospores. Bars: a-c = 0.1 mm; d = 5 μ m.

Eremothecella calamicola Syd. & P. Syd.

Chiang Mai Prov., New Waterfall: A 61495e on leaves.

Eschatogonia prolifera (Mont.) R. Sant.

Petchabhun Prov., Nam Nao N. P., 900 m: W & Kanjanavanit 6708, 4 May 1994 on bark in evergreen forest.

Eugeniella micrommata (Kremp.) Lücking, Sérus. & Kalb

Chiang Mai Prov., Doi Suthep-Pui N.P., forest adjacent Kings palace, 1550 m: JW 2502, 31 January 1993 on tree.

A corticolous record of this usually foliicolous species.

Fellhanera bouteillei (Desm.) Vězda

Chiang Mai Prov., MRC: A 61457, L 8669 on leaves.

Fellhanera fuscata (Müll. Arg.) Vězda

Chiang Mai Prov., New Waterfall: A 61495a on leaves.

Fissurina dumastii Fée

Chiang Mai Prov., New Waterfall: L 8686 on bark.

Chiang Mai Prov., Tung Joaw: A 61259 on *Castanopsis* bark.

Fissurina incrustans Fée

Chiang Mai Prov., Doi Suthep-Pui N.P., forest: A 55113 on *Manglietia garrettii* bark.

Chiang Mai Prov., Doi Suthep-Pui N.P., ridge: S 48635 on *Fagaceae* bark.

Chiang Mai Prov., MRC: A 61383, L 8622 on bark.

Fissurina inquinata C. Knight & Mitt.

Chiang Mai Prov., Tung Joaw: A 61234 on bark.

Fissurina insculpta Mont.

Chiang Mai Prov., Doi Suthep-Pui N.P., forest: A 55111 & 55144 & 55149 & 55153 on *Manglietia garrettii* bark.

Fissurina quadrispora Kalb

Chiang Mai Prov., MRC: A 61291 on bark.

Fissurina radiata Mont.

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: A 55189 on *Cinchona pubescens* bark.

Chiang Mai Prov., MRC: A 61427 on bark.

Fissurina rubiginosa (Fée) Staiger

Chiang Mai Prov., Doi Suthep-Pui N.P., ridge: A 55194 on *Fagaceae* bark.

Fissurina rufula (Mont.) Staiger

Chiang Mai Prov., MRC: A 61333 on bark.

Gassicurtia chermesina (Kalb) Marbach

Chiang Mai Prov., Doi Suthep-Pui N.P., ridge: L 7097 on *Pinus* bark.

Chiang Mai Prov., Doi Inthanon N.P., Karen village, 1300 m: WA 4038, 17 November 1991, on bark in pine/oak forest.

***Gassicurtia clathrisidiata* Aptroot, sp. nova**

Fig. 4a-b

Mycobank 501225

Type: Thailand, Chiang Mai Prov., Doi Suthep N. P. in medicinal garden at alt. 1100 m, on *Cinchona pubescens* bark. A. Aptroot 55292 = H.J.M. Sipman 48506c, 13 October 2002 (B, holotype; ABL, CHM, isotypes).

Gassicurtia thallo ochraceo dense cylindrico-isidiato, medulla sanguinea.

Thallus corticolous, slightly shiny, corticate, smooth, pale ochraceous grey, with bright red spots due to dense pockets of red crystals in the medulla, covering an area of up to 3 cm diam, surrounded by a c. 0.4 mm wide line of black hypothallus. *Isidia* covering much of the thallus, ochraceous yellow, shiny, cylindrical, slightly tapering, mostly simple, c. 0.1 mm diam., up to 0.7 mm long. *Apothecia* sessile, round to wavy, saucer-shaped, 0.3-0.9 mm diam. *Disc* black, shiny, flat to convex, without pruina. *Apothecium* margin prominent, raised above the disc, black, shiny, c. 0.1 mm wide. *Excipulum* black outside, in section largely dark brown, pale brown inside. *Hypothecium* dark brown, c. 50 µm high. *Hymenium* not interspersed, grey to aeruginose, c. 80-100 µm high. *Epihymenium* brown, without crystals, c. 15 µm high, KOH-negative. *Ascospores* 8/ascus, ellipsoid, 1-septate, brownish black, 8-11 × 3-3.5 µm, not ornamented. Chemistry: lobaric acid (tlc); red pigment in medulla KOH+ purple (an anthraquinone), medulla UV+ white.

Additional material seen: Doi Suthep N. P., forest adjacent King's palace, 1550 m: WA 4046, 4047, December 1991, on *Anneslea fragrans*.

This species is the first *Gassicurtia* with isidia, black apothecia and a red medulla. *Gassicurtia elizae* (Tuck.) Marbach (Marbach 2000) may be its closest relative, but has red apothecia.

***Graphis acharii* Fée**

Chiang Mai Prov., MRC: A 61319 on bark.

***Graphis albidolivens* (Vain.) Zahlbr.**

Chiang Mai Prov., Doi Suthep-Pui N.P., forest: A 55100, 55128A & 55135 on *Manglietia garrettii* bark.

***Graphis dussii* Vain.**

Chiang Mai Prov., MRC: A 61297, L 8650 on bark.

Chiang Mai Prov., Tung Joaw: A 61260 on *Castanopsis* bark.

***Graphis glaucescens* Fée**

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: A 55339 on *Cinchona pubescens* bark.

***Graphis intricata* Fée**

Chiang Mai Prov., New Waterfall: L 8681 on bark.

Graphis lumbricina Vain.

Chiang Mai Prov., Tung Joaw: A 61171 on *Prunus* bark.

Graphis pavoniana Fée

Chiang Mai Prov., MRC: A 61407, L 8632 on bark.

Chiang Mai Prov., Tung Joaw: A 61165 on *Prunus* bark.

Graphis proserpens Vain.

Chiang Mai Prov., Tung Joaw: A 61251, L 8674, 8676 on *Castanopsis* bark.

Graphis subcinerea Staiger

Chiang Mai Prov., MRC: A 61428 on bark.

Gyalectidium caucasicum (Elenk. & Woron.) Vězda

Chiang Mai Prov., MRC: A 61458 on *Camellia* leaves.

Gyalidea luzonensis (Kalb & Vězda) Aptroot & Lücking

Doi Suthep ridge: A 55341 on rock

Chiang Mai Prov., MRC: A 61352, L 8688 on soil of road bank

Chiang Mai Prov., New Waterfall: A 61498 on soil of road bank

Gyalideopsis altamirensis Lücking & Umaña

Doi Suthep, San Khu, 1600 m: WA 4634, 4635, 4636, 4637, 4638, 21 December 1991
on bark of *Anneslea fragrans* and *Vaccinium* sp.

An unexpected record for this species which was just described from
Costa Rica (Lücking *et al.*, 2006). The specimens are identical with
the Costa Rican material, but for the paler apothecia.

Gyalideopsis lambinonii Kalb

Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 680 m: WA 3772, 25 November
1991 on bark in dry dipterocarp forest.

Gyalideopsis vainioi Kalb & Vězda

Chiang Mai Prov., Doi Suthep-Pui N.P.: W 502, 16 December 1988 on bark.

Gymnographa heterospora (Nyl.) Staiger

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum, 460 m:
AJW 2738, 4088 and 5909, January & February 1992 & 1993, all on *Vatica cinerea*
bark in dry evergreen forest.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum research
station, 460m: WA 5907 on bark of *Vatica cinerea* in dry evergreen forest.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Kapou Kapiang, 500 m: AJW
1902, 14 February 1993. Also found on a climber in dry evergreen forest and in dry
dipterocarp forest.

***Haematomma parda* Aptroot, sp. nova**

Fig. 4b-d

Mycobank 501226

Type: Thailand, Chiang Mai Prov., Doi Suthep N. P. in medicinal garden, alt. 1100 m, on bark of *Cinchona pubescens*. A. Aptroot 55301 = H. J. M. Sipman 48532, 13 October 2002 (B, holotype; ABL, CHM, isotypes).

Haematomma apotheciis fuscis ascosporis saepe submuriformibus.

Thallus corticolous, slightly shiny, minutely verrucose to unevenly rimose, whitish to bluish or greenish grey, covering an area of up to 3 cm diam., surrounded by a c. 0.1 mm wide, black hypothallus line. *Apothecia* sessile with strongly constricted base, seemingly stalked, round to somewhat angular, saucer-shaped, 0.3-1.3 mm diam. *Disc* pale- to medium brown, dull, flat to a bit convex, without pruina. *Apothecium* margin prominent, raised above the disc, often crenate, at least at the inner side, whitish grey, shiny, c. 0.2 mm wide. *Hymenium* not interspersed, c. 80-100 µm high, with thin paraphyses. *Epithymenium* straw-coloured, densely filled with crystals, c. 5 µm high, KOH-. *Asci* of *Haematomma*-type, with 8 bundled and spiralled ascospores. *Ascospores* fusiform, sigmoid, pointed, with c. 14-17 transverse septa and occasionally 1 or 2 longitudinal septa, 55-75 × 5-7.5 µm. Chemistry: atranorin, 2 unidentified substances (tlc); thallus KOH+ yellow.

This is the first species of *Haematomma* in the current, restricted sense with brown rather than red apothecia (Staiger and Kalb, 1995). Moreover, it is one of the very few species with at least partly submuriform ascospores. It is externally indistinguishable from a true *Lecanora*, e.g. *L. tropica* Zahlbr., and specimens of this species may be still hidden among the unidentified tropical material of this genus in herbaria.

One of the unknown substances is probably a placodiolic acid derivate (spot dark greybrown after charring, in Rf classes A6, B6 and C6). The second, in Rf classes A2, B5 and C2, stains weakly after charring, and is UV+ orange; it may be related to the usual, red pigments of the genus.

It grows together with abundant *Haematomma persoonii* (Fée) A. Massal. in Doi Suthep N. P. A 55282 & L 7091 on *Cinchona pubescens* bark in a medicinal garden. These specimens deviate from normal *H. persoonii* in that the thalli are partly sorediate, with regular, rounded soralia. This is not regarded here as a species character, because such soralia are often present on only part of the thallus, just like on e.g. *Lecidella elaeochroma* (Ach.) M. Choisy. Recent molecular studies have shown that many presumed species pairs with sorediate and non-sorediate species are in fact single species in which soredia are inconstantly formed

Haematomma rufidulum (Fée) A. Massal.

Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 650 m: WA 3388, 3392, 3394, 12-14 November 1991 on bark of *Shorea obtusa* and *Quercus kerrii* and *Anneslea fragrans* respectively, in dry dipterocarp forest.

Chiang Mai Prov., Doi Inthanon N.P., Mae Chaem valley, 900 m: WA 3395 30 November 1991 on *Quercus kerrii* in dry dipterocarp forest.

Hafellia curatellae (Malme) Marbach

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: S 48507 on *Cinchona pubescens* bark.

Hafellia demutans (Stirt.) Pusswald

Chiang Mai Prov., Chiang Dao, Huai Mae Goch, 1860 m: Allen 608, 2 January 1996 (BM), on bark.

Hafellia rechingeri (Zahlbr.) Marbach

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, archaeological site, 370 m: AJW 2669, 4051, 13 February 1993 on *Shorea siamensis* bark in dry dipterocarp savanna.

Lamphun Prov. Doi Khun Tan N.P., 600m: W & Boonpragob 6740, 11 January 1993 on bark in dry dipterocarp forest.

Heterocyphelium leucampyx (Tuck.) Vain.

Chiang Mai Prov., Doi Suthep-Pui N.P.: S 48591 on *Cinchona pubescens* bark

In the available sample 3-septate spores dominate, which are similar to the single such spore in Fig. 14F of Tibell (1984), with constrictions at the septa and much smaller, paler, slightly dislocated terminal cells; they measure ca. $14 \times 7 \mu\text{m}$. Some ascomata have a stromatic look as Fig. 24C (Tibell, 1984).

Heterodermia antillarum (Vain.) Swinscow & Krog

Chiang Mai Prov., Doi Suthep-Pui N.P., Doi Suthep ridge: A 55218, S 48611 on *Fagaceae* bark.

Heterodermia comosa (Eschw.) Follmann & Redón

Chiang Mai Prov., MRC: A 61359 on bark.

Heterodermia flabellata (Fée) D.D. Awasthi

Chiang Mai Prov., Doi Suthep-Pui N.P., Doi Suthep ridge: S 48631 on *Fagaceae* bark.
Chiang Mai Prov., MRC: L 8627 on bark.

Heterodermia galactophylla (Tuck.) Trevis.

Chiang Mai Prov., MRC: A 61331 on twigs.

Heterodermia isidiophora (Vain.) D.D. Awasthi

Chiang Mai Prov., Doi Inthanon N. P., Mae Cham road, 900 m: WA 4780, 4 December 1991 on *Shorea obtusa* bark in Pine /dipterocarp forest.

Heterodermia japonica (K. Satô) Swinscow & Krog

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden : A 55188 on *Cinchona pubescens* bark.

Chiang Mai Prov., Doi Suthep-Pui N.P., Doi Suthep ridge: A 55214, S 48625 on *Fagaceae* bark.

Chiang Mai Prov., MRC: A 61277 on bark.

Heterodermia obscurata (Nyl.) Trevis.

Chiang Mai Prov., Doi Suthep-Pui N.P., Doi Suthep ridge: A 55226, L 7103 on *Fagaceae* bark.

Chiang Mai Prov., Doi Suthep-Pui N.P., MRC: A 61269 on bark.

Chiang Mai Prov., Tung Joaw: A 61169 on *Prunus* bark.

Heterodermia podocarpa (Bél.) D.D. Awasthi

Chiang Mai Prov., MRC: A 61430 on twigs.

Chiang Mai Prov., Tung Joaw: A 61166 on *Prunus* bark.

Hymenelia lacustris (With.) M. Choisy

Chiang Mai Prov., Doi Suthep-Pui N.P., Doi Suthep ridge: A 55222 on rock.

Hyperphyscia granulata (Poelt) Moberg

Uthai Thani Prov., Khao Nang Rum, 460 m: W 2750a, 2757, 11 February 1993 on rough bark in tropical mixed deciduous forest.

Hypoflavia crustosa Aptroot, **sp. nova**

Fig. 5a-b

Mycobank 501227

Type: Thailand, Chiang Mai Prov., Doi Suthep N.P., in forest adjacent King's palace, 99°53'E, 18°49'N, alt. 1550 m, on *Anneslea fragrans* bark. *P.A. Wolseley & B. Aguirre-Hudson 6709*, 22 December 1991 (BM, holotype, ABL, isotype).

Hypoflavia thallo crustoso verrucoso flavomedullosa, apotheciis aspectu Cratiriae, excipulo flavomedullosa.

Thallus corticolous, whitish grey, c. 0.2 mm thick, verrucose, the verrucae finely granular, covering an area of up to 3 cm diam, with a c. 0.1 mm wide, black hypothallus line. *Medulla* ochraceous yellow, in KOH unchanged and pigment not soluble. *Apothecia* turbinate, round to lobate, 0.4-1.6 (-2.5) mm diam. *Disc* black, dull, flat, without pruina. *Apothecium* margin black, level with the disc, c. 0.1 mm wide. *Excipulum* black outside, vividly chrome-yellow inside. Yellow pigment in the hyphae, not crystalline, in KOH darker yellow and dissolving. *Hypothecium* black, c. 25-40 µm high. Hymenium not inspersed, c. 80-100 µm high. *Epithymenium* brown, consisting of paraphyse

tips, without crystals, c. 5 μm high, KOH-. *Ascospores* 8/ascus, but often only 5-6 maturing, brown, 17-20 \times 6-7 μm , septum dark brown, wall c. 1 μm thick, a bit rounded in the angle between the wall and the septum. Chemistry: two different unidentified yellow pigments; one in the thallus and one in the excipulum (tlc); thallus UV-, KOH-.

Additional material seen: Doi Suthep N.P. San Khu chedi site, 99°54'E, 18°49'N, alt.1600 m; JW 2004, 31 January 1993; same N.P., Wat Palad, alt. 600 m W 1252, 16 December 1988 on bark in dry dipterocarp forest.

This is the third species in the recently described genus *Hypoflavia* Marbach (2000), a segregate from *Buellia*. The two species known so far share the internal apothecium structure with e.g. a bright yellow hypothecium, but both are aberrant in the squamulose thallus. The new species has a perfectly regular thallus for a *Buellia s. lat.* and looks like a common *Cratiria*.

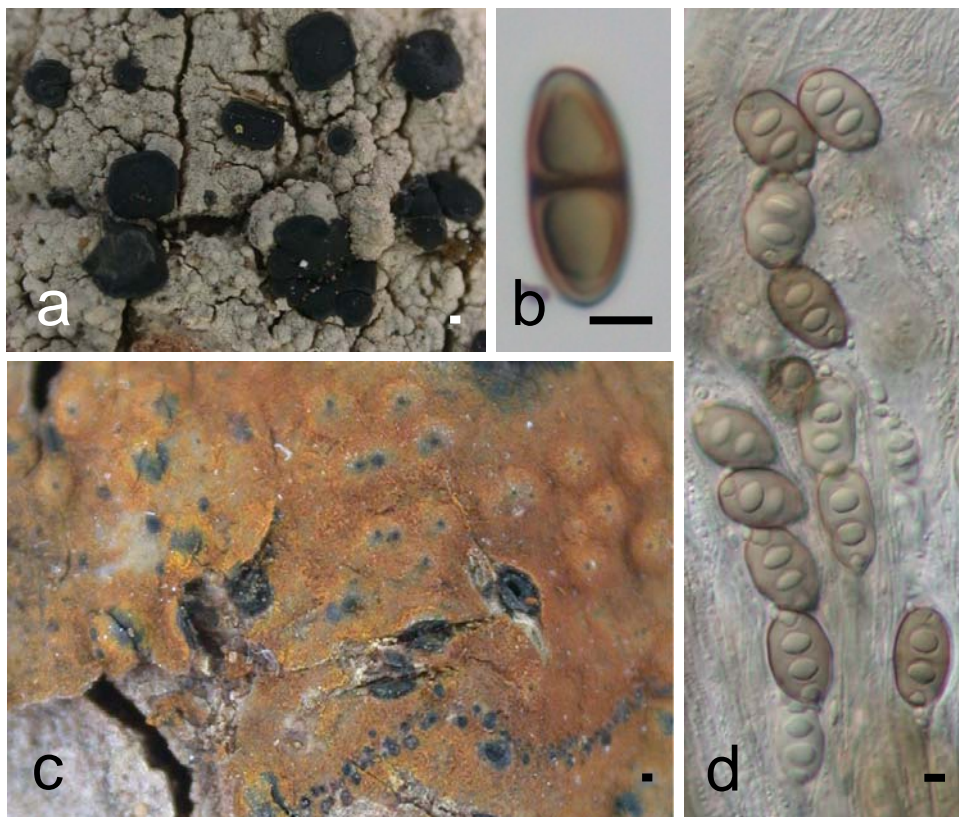


Fig. 5a-b. *Hypoflavia crustosa*. **a.** Habitus. **b.** Ascospore. **c-d.** *Pyrenula aurantiopileata*. **c.** Habitus. **d.** Ascospores. Bars: a,c = 0.1 mm; b,d = 5 μm .

Julella lactea (A. Massal.) M.E. Barr

Prachuab Khiri Khan, Khiri Khan, 2 m: AJW 2049, 5 February 1993 on coastal scrub.

Laurera indica Upreti & Amar Singh

Lamphun Prov., Doi Khun Tan N.P., 850 m: W & Svasti 6710, 23 April 1994 on bark in dry dipterocarp forest.

Lecanactis flavisedella (Nyl) Tehler

Chiang Mai Prov., Doi Suthep-Pui N.P., 680 m: WA 3905, 3907, 25 November 1991 on bark in dry evergreen forest.

Lecanactis platygraphoides (Müll. Arg.) Zahlbr.

Chiang Mai Prov., Doi Suthep-Pui N.P., 680 m: JW 2655a, 30 January 1993 on bark in tropical mixed deciduous forest.

New to the Northern Hemisphere.

Lecanactis subfarinosa (Knight) Hellbom

Chiang Mai Prov., Doi Suthep-Pui N.P., 1600 m: WA 4018, 20 December 1991 on *Castanopsis armata* bark in montane oak forest.

New to the Northern Hemisphere. The specimen differs slightly from previously described material by the inspersed hymenium.

Lecanora achroa Nyl.

Chiang Mai Prov., Doi Suthep-Pui N.P., 1550 m: WA 4884, 22 December 1991, on bark in montane oak forest.

Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, 1860m: Allen L607, 2 January 1996 (BM) on bark in montane oak forest.

Lecanora caesiorubella Ach.

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: A 55186, 55334, L 7922, S 48517 on *Cinchona pubescens* bark.

Chiang Mai Prov., Doi Suthep-Pui N.P., 1000m: WA 4914, 16 December 1991, on bark in pine/oak forest.

Lecanora casuarinophila Lumbsch

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 1250 m: WA 4868, 23 January 1992 on bark in burned pine/oak forest. Same site 500m: W1156 in dry dipterocarp forest.

Lecanora ecoronata Vain.

Chiang Mai Prov., Doi Suthep-Pui N.P. Doi Suthep ridge: S 48675, on bark.

Lecanora flavidorufa Hue

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: L 7112 on *Cinchona pubescens* bark.

Chiang Mai Prov., MRC: L 8628 on twigs.

Chiang Mai Prov., Tung Joaw: A 61159 on *Prunus* bark.

Chiang Mai Prov., Doi Suthep-Pui N.P., San Khu, 1600m : WA 4934-7, December 1991 on bark in montane oak forest.

Chiang Mai Prov., Doi Inthanon N.P., Karen village 960m : W3163, 18 March 1993 in evergreen forest.

Lecanora flavoviridis Kremp.

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6711, 4 May 1994 on sandstone.

Lecanora helva Stizenb.

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: A 55310 & L 7113, 8083 on *Cinchona pubescens* bark.

Chiang Mai Prov., Tung Joaw: A 61258 on *Castanopsis* bark.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 460 m: AJW 2748, 10 February 1993 on bark in dry evergreen forest.

Lecanora insignis Degel.

Chiang Mai Prov., Doi Inthanon N. P., 2000 m: W & Svasti 3139, 13 March 1993 on bark in high altitude savanna.

Lecanora phaeocardia Vain.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 400 m: WA 4865, 17 January 1992 on *Shorea obtusa* bark

Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 650 m: WA 4873, 20 November 1991, on bark in dry dipterocarp forest.

Lecanora pseudistera Nyl.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, archaeological site, 200 m: AJW 2681, 13 February 1993 on granite boulder.

Lecanora subimmersa (Fée) Vain.

Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 650 m: JW 2602c, 30 January 1993 on granite.

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6712, 4 May 1994 on sandstone.

Lecanora vainioi Vänškä

Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 640 m: JW 2602c, 30 January 1993 on granite in dry dipterocarp forest.

Lecanora tropica Zahlbr.

Chiang Mai Prov., MRC: A 61405, L 8568 on bark.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, archaeological site, 200 m:
AW 5903 on *Shorea siamensis* in dry dipterocarp forest. Same site, Khao Nang
Rum, 500m: W4916 on bark in dry dipterocarp forest.

Lepraria usnica Sipman

Chiang Mai City wall: S 48594 on brick.

Leprocollema novacaledonicum A.L. Sm.

Prachuab Khiri Khan Prov., Khiri Khan, 2 m: AJW 2027, 7 February 1993 on coastal
shrub.

Uthai Thani Prov., Khao Nang Rum, Khao Kiew, 1150 m: AW 5048 p.p., 7 January
1993 on bark.

New to the Northern Hemisphere. Although never reported since its
description, this species has recently been found to be widespread on tropical
coasts, and was e.g. collected by the first author in Costa Rica and the
Galapagos, and by M. R. D. Seaward on the Seychelles. This identification was
kindly suggested by Matthias Schultz. Unfortunately, the type specimen packet
(in BM) is currently empty.

Leptogium austroamericanum (Malme) Dodge

Doi Suthep forest: L 7115 on *Manglietia garrettii* bark.

Chiang Mai Prov., MRC: A 61360 on bark.

Leptogium corticola (Taylor) Tuck.

Chiang Mai Prov., MRC: A 61281 on bark.

Leptogium pedicellatum P.M. Jørg.

Chiang Mai Prov., Doi Inthanon N.P., 2500 m: W 378, 14 December 1988 on bark in
moss forest.

Leptogium phyllocarpum (Pers.) Mont.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 450 m: AW
3738, 8 January 1992 on bark in dry dipterocarp forest.

Letrouitia corallina (Müll. Arg.) Hafellner

Chiang Mai Prov., Doi Inthanon N. P., Karen village 950 m: WA 5040, 2 December
1993 on bark in evergreen forest.

Lithothelium obtectum (Müll. Arg.) Aptroot

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Kiew, 500 m: AJW 2548
p.p., 15 February 1993 on bark in evergreen forest.

Chiang Mai Prov., Doi Suthep-Pui N.P., Observation station, 900m : AW 6737, 24 November 1991 in evergreen forest.
Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, 1600m: Allen L 491 (BM) on bark in deciduous forest.
Chon Buri Prov., Khao Kheio, 500m: Champion 1456, 26 January 1971, on bark.

Lobaria japonica (Zahlbr.) Asah.

Chiang Mai Prov., Doi Suthep N.P., ridge: L 7120 on *Fagaceae* bark.

Lopezaria isidiza (Makhija & Nagarkar) Aptroot & Sipman, **comb. nov.**

Mycobank 501228

Basionym: *Megalospora isidiza* Makhija & Nagarkar, Current Science 50: 823, 1981;
Catinaria isidiza (Makhija & Nagarkar) Sipman.
Chiang Mai Prov., Doi Inthanon N.P., Karen forest, 1300 m: WA 4930, 2 December 1991 on bark in evergreen forest.

Lopezaria versicolor (Fée) Sipman

Lampang Prov., Doi Khun Tan N. P., 600 m: W & Svasti 3222, 13 March 1993 on bark in dry dipterocarp forest.

Malcolmiella aurigera (Fée) Aptroot, **comb. nov.**

Mycobank 501229

Basionym: *Lecidea aurigera* Fée, Essai Crypt. Ecorc. Offic.: 106, 1824.
Chiang Mai Prov., Doi Suthep-Pui N.P., 680-1500m : AW 4040,4957,5938 November & December 1991 in various forest types.
Chiang Mai Prov., Doi Inthanon N. P., Karen village forest 900-1300 m: W 3210,WA 4033, 4974, 5949 and 4057 in evergreen forest.
Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, 785 m : Allen L72, 15 October 1995 (BM) in lowland evergreen galley forest.
Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 460-1250 m: WA 4938, 4054, January 1991 on *Vatica cinerea*, *Pterocarpus* and bark of other trees in various forest types.

Widespread in this large site at stations including Kapou Kapiang and Yu Yi.

Malcolmiella granifera (Ach.) Kalb & Lücking

Chiang Mai Prov., Doi Suthep N.P., forest: A 55123, 55143, S 48559, 48574a on *Manglietia garrettii* bark.
Chiang Mai Prov., Doi Suthep N.P., medicinal herb garden: A 55317 on *Cinchona pubescens* bark.
Chiang Mai Prov., MRC: A 61293 on bark.
Chiang Mai Prov., Tung Joaw: A 61183 on *Prunus* bark.
Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 680-1550 m: AW 4977,5933, 5935, 5936 November & December 1991 in dry evergreen forest.
Chiang Mai Prov., Doi Inthanon N.P., Karen village forest, 1300 m: W 5948 in evergreen forest.

Fungal Diversity

Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, 1800 m : Allen L588, 852, October 1996 (BM) in mixed deciduous forest.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 460-1250 m: WA 2721, 3009, 4951 in January & February 1992 & 1993.

Widespread in this large site.in evergreen forests.

Malcolmiella vinosa (Eschw.) Kalb & Lücking

Chiang Mai Prov., Doi Suthep Pui N.P., 1550 m: WA 4980, 19 December 1991 on bark in montane oak forest.

Mazosia phyllosema (Nyl.) Zahlbr.

Chiang Mai Prov., Doi Suthep Pui N.P., New Waterfall: A 61495i on leaves.

Megalaria laureri (Th. Fr.) Hafellner

Chiang Mai Prov., Doi Suthep Pui N.P., San Khu chedi, 1600 m: AW 1667, 31 January 1993 on bark in montane oak forest.

Megalospora coccodes (Bél.) Sipman ssp. *nigrescens* (Müll. Arg.) Sipman

Chiang Mai Prov., Doi Suthep-Pui N.P., ridge: A 55209, S 48671 on *Fagaceae* bark.

Megalotremis biocellata Aptroot

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal herb garden: A 55344 on *Cinchona pubescens* bark.

Chiang Mai Prov., Doi Suthep-Pui N.P., forest adjacent King's Palace, 1550 m: WA 3782, 19 December 1991 on bark.

Chiang Mai Prov., Doi Inthanon N.P., Karen forest, 1300 m: AW 6742, 2 December 1991 in evergreen forest.

Chiang Mai Prov., MRC: A 61302 on bark.

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, archaeological site, 200 m: WA 3776, 3777, 3779, 19 January 1992 on *Shorea siamensis* bark.

Lamphun Prov., Doi Khun Tan N.P., 850m: W 6715, 23 April 1994 in dty dipterocarp forest.

New to the Northern Hemisphere. So far only known from the type from Australia (Aptroot, 1991). Apparently not uncommon in Thailand.

Megalotremis pustulata Aptroot

Chiang Mai Prov., MRC: A 61341 on bark.

So far only known from New Guinea and Indonesia. This characteristic species has not been reported since its description (in Aptroot *et al.*, 1997), probably because it has been widely overlooked, as it is usually sterile.

Milospium planorbis Aptroot & Sipman

Chiang Mai Prov., Doi Suthep-Pui N.P.: S 48636 on *Fagaceae* bark.

This is the first report of this unusual lichenized hyphomycete species after its recent description from Hong Kong (Aptroot and Sipman, 2001).

Mycocalicium americanum (R. Sant.) Tibell

Chiang Mai Prov., Doi Inthanon N.P., 900 m: WA 4002, 30 November 1991 on *Dipterocarpus tuberculosus* bark.

Chiang Mai Prov., Doi Inthanon N.P., Mae Soi valley, 900 m: W 6716, on *Mangifera caloneura* in riverine forest.

Mycomicrothelia fumosula (Zahlbr.) D. Hawksw.

Uthai Thani Prov., Khao Nang Rum, 400 m: WA 3774, 14 January 1992, on *Aporosa villosa* bark.

Mycomicrothelia hemisphaerica (Müll. Arg.) D. Hawksw.

Uthai Thani Prov., Khao Nang Rum, 400 m: WA 3775, 17 January 1992, on *Shorea obtusa* bark.

Mycomicrothelia miculiformis (Müll. Arg.) D. Hawksw.

Petchabhun Prov., Nam Nao N.P., 880 m: W & Kanjanavit 6717, 3 May 1994, on bark in evergreen forest.

Mycomicrothelia subfallens (Müll. Arg.) D. Hawksw.

Chiang Mai Prov., Doi Inthanon N.P., Mae Cham road, 950 m: WA 3773, 17 November 1991 on *Gluta usitata* bark in pine dipterocarp forest.

Mycoporum compositum (A. Massal.) R.C. Harris

Chiang Mai Prov., Doi Suthep garden: A 55307 on *Cinchona pubescens* bark.

Myeloconis erumpens P.M. McCarthy & Elis.

Petchabhun Prov., Nam Nao N. P., 700 m: W & Kanjanavit 6718, 4 May 1994, on bark in evergreen forest.

Myriotrema fluorescens Hale

Chiang Mai Prov., Doi Suthep-Pui N.P..Doi Suthep ridge: S 48661 on *Fagaceae* bark.

Nadvornikia hawaiiensis (Tuck.) Tibell

Chiang Mai Prov., MRC: A 61349 on wood.

Chiang Mai Prov., Doi Suthep-Pui N.P. headquarters, 1050 m: AW 1625, 27 February 1993 on bark in montane oak forest.

Ocellularia lirelliformis (Tuck.) Hale

Chiang Mai Prov., Doi Suthep-Pui N.P.: S 48590 on *Manglietia garrettii* bark.

Ocellularia thelotremoides (Leight.) Zahlbr.

Chiang Mai Prov., Doi Suthep-Pui N.P.: forest: S 48572, 48585, 48587 on *Manglietia garrettii* bark.

Ochrolechia africana Vain.

Chiang Mai Prov., Doi Suthep-Pui N.P., 1550 m: AWJ 2530, 23 February 1993 on *Vaccinium* bark.

Opegrapha gyrocarpa Flot.

Uthai Thani Prov., Huay Kha Kaeng N.P., Khao Nang Rum, 370 m: WA 6000, 28 January 1992 on *Tiliaceae* bark.

The material is sterile, but fully agrees with corticolous material of this species from Europe.

Peltigera pindarensis D.D. Awasthi & M. Joshi

Chiang Mai Prov., Doi Inthanon N.P., 2000 m: W 384, 14 December 1988 on soil.

It grows together with an unidentified *Peltigera*.

Peltula obscurans (Nyl.) Gyeln.

Chiang Mai Prov., Chiang Mai city wall: A 55258 on brick.

Pertusaria amara (Ach.) Nyl.

Chiang Mai Prov., Doi Chiang Dao Wildlife Sanctuary, 1000m: Gardner 688, 2nd September 1996 on bark in semi-evergreen forest. Also collected on Doi Suthep near the King's Palace.

Pertusaria buloloensis A.W. Archer, Elix & Streim.

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: L 7134 on *Cinchona pubescens* bark.

Chiang Mai Prov., Doi Suthep-Pui N.P., ridge: S 48633 on *Fagaceae* bark.

Pertusaria cicatricosa Müll. Arg.

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: A 55318 on *Cinchona pubescens* bark.

Pertusaria patellifera A.W. Archer

Chiang Mai Prov., Tung Joaw: A 61209 on *Castanopsis* bark.

Pertusaria pertusella Müll. Arg.

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: S 4821 on *Cinchona pubescens* bark.

Pertusaria subventosa Malme

Chiang Mai Prov., MRC: A 61369 on bark.

Chiang Mai Prov., Tung Joaw: A 61205 on *Castanopsis* bark.

Pertusaria velata (Turn.) Nyl.

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: A 55179, S 48537 on *Cinchona pubescens* bark.

Chiang Mai Prov., Tung Joaw: A 61220 on *Castanopsis* bark.

Phaeographis intricans (Nyl.) Vain.

Chiang Mai Prov., Doi Suthep Pui N.P., MRC: A 61373 on bark.

Doi Chiang Dao Wildlife Sanctuary, 780m: Gardner L111, 18th October 1995 on bark in dry dipterocarp forest on limestone.

Phaeographis kalbii Staiger

Lamphun Prov., Doi Khun Tan N. P., 600 m: W & Boonpragob 3292, 11 January 1993 on bark.

Chiang Mai Prov., Doi Suthep-Pui N.P., 1600 m: WA 4508, 20 December 1991 on *Vaccinium* bark.

Phaeographis leiogrammodes (Kremp.) Müll. Arg.

Chiang Mai Prov., MRC: A 61308, L 8655 on bark.

Phaeographopsis indica (Patw. & Nagarkar) Sipman & Aptroot, **comb. nov.**

Mycobank 501230

Basionym: *Phaeographis indica* Patw. & Nagarkar, Biovigyanam 5: 137, 1979.

The combination is here validated, as it was first invalid because the basionym page was given as an interval in Aptroot *et al.* (1997).

Chiang Mai Prov., MRC: A 61335 on bark.

Phaeophyscia limbata (Poelt) Kashiw.

Chiang Mai Prov., Doi Suthep-Pui N.P., ridge: A 55199 on *Fagaceae* bark.

Phlyctella uncinata (Stirt.) Müll. Arg.

Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, Huai Mae Goch, 1500 m: Allen 458, 26 January 1996 (BM) on bark in montane oak forest.

New to the Northern Hemisphere.

Phyllogyalidea epiphylla (Vězda) Lücking & Aptroot

Chiang Mai Prov., MRC: A 61467 on leaves.

Physcia atrostriata Moberg

Chiang Mai Prov., MRC: A 61364 on bark.

Physcia integrata Nyl.

Chiang Mai Prov., Chiang Dao Wildlife Sanctuary: Allen 296, 3 November 1995 (BM) on bark.

Phyiscidia cylindrophora (Taylor) Hue

Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Kapou Kapiang, Khlong Plou, 500 m: AJW 1871f, 14 February 1993 on bark in semi evergreen forest.
Petchabhun Prov., Nam Nao N. P., 800 m: W & Kanjanavit 6719, 4 May 1994 on bark.

Phyiscidia squamulosa Tuck.

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: S 48567 on *Cinchona pubescens* bark.

First palaeotropical record for this species known so far from the Neotropics only (Kalb and Elix, 1995).

Phyiscidia wrightii (Tuck.) Tuck.

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavit 6720, 4 May 1994 on bark in evergreen forest.

Piccolia conspersa (Fée) Hafellner

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: A 55338 on *Cinchona pubescens* bark.

Doi Suthep ridge: AW 5077*, 21 December 1991 & A 55192 on *Fagaceae* bark.

Chiang Mai Prov., MRC: A 61314 on bark.

Chiang Mai, 32 km W of Hot, 800 m: Champion 1440 on *Glypterocarpus obtusifolius* bark.

The specimens marked with * contain no apothecia, but stalked pycnidia up to c. 0.5 mm high, with ellipsoid conidia of c. $1 \times 2 \mu\text{m}$. The identity of this rather regularly found yellow crust was revealed by co-chromatography.

Placynthium nigrum (Huds.) Gray

Chiang Mai Prov., Chiang Dao, Doi Luang, 1850 m: Allen 324 p.p., 3 November 1995 (BM) on limestone.

Platythecium allosporellum (Nyl.) Staiger

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Kapou Kapiang, 520 m: WA 4611, 30 January 1992 on bark in mixed deciduous forest.

Platythecium colliculosum (Mont.) Staiger

Chiang Mai Prov., MRC: A 61290 on bark.

Tak Prov., Ton Krabakyai N.P.: W 513, 18 December 1988 on bark.

Platythecium dimorphodes (Nyl.) Staiger

Chiang Mai Prov., Doi Suthep-Pui N.P., 1550 m: WA 4662, 19 December 1991 on bark in montane oak forest.

The material is richly fertile and bears numerous stout, up to 3 mm long isidia, which were reported from this species before, but not found in the material studied by Staiger.

Platythecium grammitis (Fée) Staiger

Satun Prov., Thaleban N. P., Wang Pra, 460 m: W & David 3329, 26 March 1993 on bark in savanna forest.

Platythecium leiogramma (Nyl.) Staiger

Chiang Mai Prov., Doi Suthep-Pui N.P., San Khu chedi , 1600 m: WA 4558, 21 December 1991 on bark in montane oak forest.

Polychidium stipitatum Vězda & W.A. Weber

Chiang Mai Prov., Doi Inthanon N. P., summit, 2500 m: AW 5052, 3 December 1991 on fallen twigs below moss forest.

Polymeridium albidum (Müll. Arg.) R.C. Harris

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavit 6721, 4 May 1994 on dry bark.

Polymeridium catapastum (Nyl.) R.C. Harris

Chiang Mai Prov., Doi Inthanon N. P., 960 m: W 3191, 18 March 1993 on bark in Karen village forest.

Chiang Mai Prov., Mae Saman, 1000 m: Champion 1434, 13 January 1971 on *Glyptocarpus obtusifolius*.

Porina distans Vězda & Vivant

Chiang Mai Prov., Doi Suthep-Pui N.P.: A 55119 & 55142 on *Manglietia garrettii* bark in montane oak forest; Doi Suthep-Pui N.P., medicinal garden: A 55322 on *Cinchona pubescens* bark.

Porina eminentior (Nyl.) P.M. McCarthy

Chiang Mai Prov., Doi Inthanon N. P.: AW 3663, 2 December 1993 on *Castanopsis* bark.

Porina guentheri (Flot.) Zahlbr.

Chiang Mai Prov., Doi Suthep-Pui N.P., forest: A 55165A & L 7918 on brick of small shrine.

Porina nitidula Müll. Arg.

Chiang Mai Prov., MRC: A 61442 on leaves.

Porina trichothelioides R. Sant.

Chiang Mai Prov., MRC: A 61454 on leaves.

Porina ulceratula Zahlbr.

Chiang Mai Prov., Tung Joaw: A 6186 on rock along stream.

Protoparmelia isidiata Diederich, Aptroot & Sérus.

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: S 48520 on *Cinchona pubescens* bark.

Same locality: Hensen, July 1986, on *Cinchona pubescens* bark (ABL). Also at Wat Palad, 650m: WA 4954 on bark in dry dipterocarp forest.

Same Province, MRC: A 61316 on bark, Tung Joaw: A 61211 on *Castanopsis* bark.

Uthai Thani Prov., Khao Nang Rum, 400 m: AJW 2774 on *Lithocarpus lindleyanus*, WA 5191 on *Shorea obtusa*, and Pitchay (BM) 4985 on *Dipterocarpus tuberculosus* bark, all in dry dipterocarp forest in 1992 and 1993.

Lamphun Province, Doi Khun Tan N.P., 850m: W & Boonpragob 6723, on bark in dry dipterocarp forest.

The material from Doi Suthep medicinal garden is richly fertile, while most specimens seen by me have isidia and apothecia, but rarely ascospores. In deviation from the protologue, it has 16 ascospores in the ascus. Interestingly, these ascospores do not bear the remarkable polar cilia characteristic of many species of *Protoparmelia* (Brodo and Aptroot, 2005).

Protoparmelia pulchra Diederich, Aptroot & Sérus.

Chiang Mai Prov., Tung Joaw: A 61223 on *Castanopsis* bark.

Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 680 m: W 5065, 5069 20 November 1991 on bark in dry dipterocarp forest. Same N.P., San Khu, 1600m: WJ 5068 29th January 1993 on bark in montane oak forest.

Uthai Thani Prov., Khao Nang Rum, 460 m: AJW 2682 10 February 1993 on bark in dry dipterocarp forest.

Lampang Prov., Doi Pae Luang, Ban Mae Kha, 900m: W&Boonpragob 5906 on bark in mixed evergreen forest.

New to the Northern Hemisphere. This species was described, together with the previous one, from Papua New Guinea (Aptroot *et al.*, 1997). Unlike the previous one, it has never been reported from another country.

Pseudocyphellaria clathrata (De Not.) Malme

Chiang Mai Prov., MRC: A 61421 on bark.

Pseudocyphellaria junghuhniana (Müll. Arg.) D.D. Awasthi

Chiang Mai Prov., Doi Inthanon N. P., 2590 m: W & Svasti 3089, 12 Mar 1993 on bark.

Pseudopyrenula diluta (Fée) Müll. Arg.

Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: A 55180 & 55287 on *Cinchona pubescens* bark.

Its variety *degenerans* was previously reported from Thailand, but this is another species, *viz.* *P. subnudata* Müll. Arg.

Psoroglaena cubensis Müll. Arg.

Chiang Mai Prov., Doi Suthep-Pui N.P., forest: A 55134 on *Manglietia garrettii* bark.

Psoroma sphinctrinum (Mont.) Nyl.

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavanit 6723, 4 May 1994 on bark in evergreen forest.

Psorotheciopsis patellarioides (Rehm) R. Sant.

Chiang Mai Prov., MRC: A 61472, L 8670 on *Camellia* leaves.

Punctonora nigropulvinata Aptroot

Uthai Thani Prov., Khao Nang Rum, 400 m: WA 2705, 18 January 1992 on *Shorea obtusa* bark in dry dipterocarp forest.

New to the Northern Hemisphere. This is the first time this species (and genus) has been seen after its description from Papua New Guinea (Aptroot *et al.*, 1997). Its small size suggests that it is rather overlooked than restricted to a specific area or habitat.

Pyrenula acutalis R.C. Harris

Chiang Mai Prov., Doi Suthep N.P., forest: A 55106, 55117, 55133, 55151 on *Manglietia garrettii* bark.

Uthai Thani Prov., Khao Nang Rum, 460 m: WA 6724, on bark in dry evergreen forest.

Pyrenula aurantiopileata Aptroot, **sp. nova**

Fig. 5c-d

Mycobank 501231

Type: Thailand, Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, alt. 1133 m, on bark on open ridge. *D. Allen 430*, 2 December 1995 (BM, holotype, ABL, isotype).

Pyrenula thallo aurantiaco ascosporis luminibus apicalibus leptotunicatis.

Thallus corticolous, corticate, brown but covered by a layer of reddish pruina, covering an area of up to 2 cm diam., surrounded by a c. 0.2 mm wide, black hypothallus line. *Ascomata* erumpent, black, but covered with the same reddish pruina except for a punctiform black ostiole, without clypeus, flattened, c. 0.4-0.7 mm wide, c. 0.3-0.5 mm high. *Hamathecium* IKI+ blue, heavily interspersed. *Ascospores* 3-septate, grey, 19-22 × 10-12 μm, lumina rather rounded, apical lumina directly against the outer wall at the tips (*pseudobufonia*-type). *Pycnidia* present near the margin of the thallus, black, conidia not observed. Chemistry: thallus KOH-, UV-; pruina KOH+ magenta, UV+ orange; an anthraquinone (tlc).

This species is characterized by a conspicuous redbrown thallus colour and ascospores of the *pseudobufonia*-type, i.e. with the terminal lumina directly bordering the outer wall at the tips. *Pyrenula* species with a red thallus are rare, and none is described with this characteristic type of ascospores.

Pyrenula concatervans (Nyl.) R.C. Harris

- Chiang Mai Prov., MRC: A 61299 on bark.
Chiang Mai Prov., Doi Suthep-Pui N.P., forest adjacent King's Palace, 1550 m: WA 5722 on bark in montane oak forest. Also at Wat Palad: WA 5717 & 5722.
Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, 770 m: Allen 69, 81, 17 October 1995 (BM) on bark in heavily disturbed forest.
Lampang Prov. Teak Improvement Centre, 350m: W 5748 13 February 1992 on bark in teak plantation.
Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, HKK river, 300 m: W & Kanjanavanit 5764 on 27th January 1992 on bark in mixed deciduous forest.

Pyrenula cuyabensis (Malme) R.C. Harris

- Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Kapou Kapiang, 500 m: AJW 1887, 14 February 1993, on bark in dry evergreen forest.

Pyrenula laii Aptroot

- Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 460 m: WA 6725, 12 January 1992 on *Vatica cinerea* bark.
Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, 1140 m: Allen 7, October 1995 (BM) on liana in mixed montane oak forest.

Pyrenula lineatostroma Aptroot

- Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Kapou Kapiang, 500 m: AJW 2989, 15 February 1993, on bark in dry evergreen forest.

Pyrenula macularis (Zahlbr.) R.C. Harris

- Chiang Mai Prov., Doi Chiang Dao Wildlife Sanctuary, 1590 m: Allen 269, 2 November 1995 (BM) on bark.
Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, Khao Kiew, 1250 m: AW 3692, 24 January 1992, on bark in montane evergreen forest.
Khiri Khan Prov. Kiri Khan coastal scrub, 2 m: AJW 2414 on 5 February 1993 on maritime scrub.

Pyrenula mamillana (Ach.) Trevis.

- Chiang Mai Prov., Doi Suthep N.P., forest: S 48548, 48586 on *Manglietia garrettii* bark.
Doi Suthep N.P., forest adjacent King's Palace, 1550 m: WA 5720 on 7 December 1991 in montane oak forest.
Chiang Mai Prov., Doi Chiang Dao Wildlife Sanctuary, Ban Miang, Kun Ga, 1040 m: Allen 714, 2 October 1996 (BM) on bark in mixed evergreen forest.
Chiang Mai Prov., MRC: A 61404 on bark.
Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 370 m: AJW 2460, 3063, 5762 in January & February 1992/3 on bark in dry evergreen forest.
Yala Prov. Than To Banglang N.P. 460 m: W & David 3356, on bark in seasonal rainforest.

Pyrenula massariospora (Starbäck) R.C. Harris

Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, Ban Ming Kun Ga, 700 m: Allen 765, April 1996 (BM) on bark.

Lampang Prov., Wiang Kosai N.P.: W 5747, 12 February 1992 on vine.

Pyrenula microcarpa Müll. Arg.

Chiang Mai Prov., Doi Suthep N.P., forest adjacent King's Palace, 1550 m: WA 127-10, 128-6, 19 December 1991 on bark.

Pyrenula montana Aptroot

Chiang Mai Prov., Doi Suthep N.P., San Khu, 1600 m: WA 5735, 7 December 1991 on bark in oak/pine forest.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 400 m: WA 5776, 18 January 1992 on bark in dry dipterocarp forest; same Wildlife Sanctuary at Khao Kiew 1150 m: A 6758 23 January 1992; Yu Yi station 1200 m: W & Kanjanavanit 5708 in montane evergreen forest and at other sites in HKK.

New to the Northern Hemisphere, so far known from the mountains in Papua New Guinea, where it is common.

Pyrenula oleosa R.C. Harris

Chiang Mai Prov., MRC: A 61284 on bark.

Pyrenula pileata Vain.

Chiang Mai Prov., Doi Suthep N.P., forest adjacent King's palace forest, 1550 m: WA 5694 on bark in montane oak forest.

Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, near Ban Miang Kun Ga, 1000 m: Gardner 687 on 2 September 1996 (BM) on bark in semi-evergreen forest dominated by *Dipterocarpus costatus*.

Chiang Mai Prov., Doi Inthanon N.P., summit 2565 m: W 399c on bark in moss forest.

Chiang Mai Prov., Tung Joaw: A 61202 on *Castanopsis* bark.

Lampang Prov., Ban Mae Kha, 800m: W & Boonpragob 6762 on 7 February 1992, on bark in evergreen forest.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 400 m: WA 6755 on 20 January 1992 on bark in *Dipterocarpus tuberculatus* canopy.

Pyrenula quassiaecola (Fée) Fée

Chiang Mai Prov., Doi Suthep N.P., ridge: A 55248 on *Fagaceae* bark.

Chiang Mai Prov., Tung Joaw: A 61206, L 8608 on *Castanopsis* bark.

Pyrenula rockii Zahlbr.

Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, Ban Pu To, 700 m: Allen 707, 2 April 1996 (BM) on bark.

Pyrenula rubrostoma R.C. Harris

Chiang Mai Prov., Doi Suthep N.P., forest adjacent King's palace, 1550 m: AW 6763 on bark in montane evergreen forest.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 450-500 m: WA 6726, 6727, January 1992 on *Vatica cinerea* bark in dry evergreen forest.

Pyrenula santensis (Nyl.) Müll. Arg.

Chiang Mai Prov., Doi Chiang Dao Wildlife Sanctuary, 1600 m: Allen 492, 29 January 1996 (BM) on bark.

Pyrenula subferruginea (Malme) R.C. Harris

Chiang Mai Prov., Queen Sirikit Botanical Garden, 500 m: W 471, 15 December 1988 on bark.

Chiang Mai Prov., Doi Chiang Dao Wildlife Sanctuary, 1640-1860 m: Allen 354, 7 November 1995 and 498, 542, January 1996 (BM) on bark in mixed evergreen deciduous forest.

Pyrgidium montellicum (Beltr.) Tibell

Chiang Mai Prov., Doi Suthep N.P., ridge: A 55235 on *Fagaceae* bark.

Loei Prov., Phu Rua N. P., 1210 m: W & Kanjanavit 6728, 5 May 1994 on bark in evergreen forest.

Pyrrhospora fuscisidiata Aptroot & Wolseley, **sp. nova**

Fig. 6a-c

Mycobank 501232

Type: Thailand, Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Khao Nang Rum, 99°18'E, 15°29'N, alt. 500 m, on bark in dry dipterocarp forest. *P.A. Wolseley 1166*, 14 January 1991 (BM, holotype).

Pyrrhospora thallo pallide fusco, dense isidiato, apotheciis fuscis immarginatis.

Thallus corticolous, pale grey-brown, a bit shiny, covering an area of up to 10 cm diam., surrounded by a c. 0.2 mm wide, black hypothallus line. *Isidia* numerous, pale grey-brown with brown tips, shiny, cylindrical, unbranched, slanting to upright, c. 0.15 mm thick, 0.4-0.8 mm long. *Apothecia* sessile, round, 0.5-0.9 mm diam. *Disc* brown, glossy, convex, without pruina. *Apothecium margin* hardly prominent to evanescent. *Excipulum* brown, consisting of radially arranged, conglutinated cells of c. 2 µm diam. *Hypothecium* brown, c. 30 µm high. *Hymenium* anastomosing, not interspersed, c. 80 µm high. *Epihymenium* brown-orange due to orange crystals, c. 10 µm high, KOH-. *Ascospores* 8/ascus, fusiform, straight, 15-17 × 3-4 µm, without gelatinous sheath, without cilia. Chemistry: atranorin, zeorin, protocetraric acid and 3 fatty acids at Rf 2-3 (tlc); thallus UV-, KOH+ yellow, C-, KC-.

This is the first *Pyrrhospora* with a brownish, isidiate thallus (Hafellner 1993). It is similar to *Protoparmelia isidiata* Diederich, Aptroot & Sérus., but differs in the immarginate apothecia and the chemistry. In addition there are no cilia on the ascospores, a characteristic of all *Protoparmelia* species and even

some currently classified in *Ramboldia* (Brodo and Aptoot 2005). This and the next species are not closely related to each other or to the type of the genus and may eventually end up in different genera. This species is most closely related to *P. bhutanensis*, with which it shares the brown thallus and large, glossy brown apothecia.

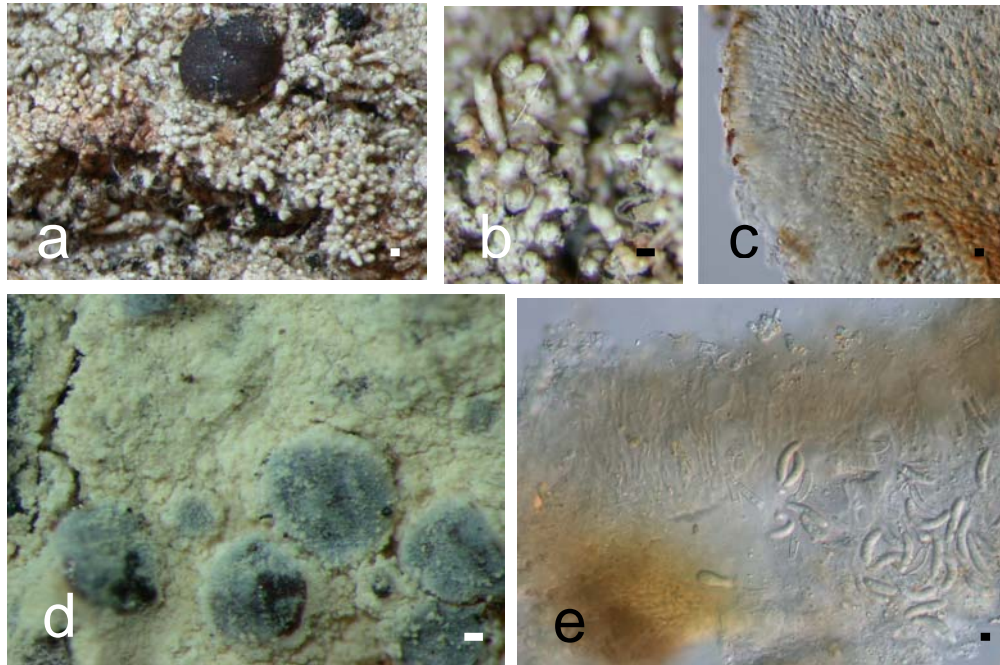


Fig. 6a-c. *Pyrrhospora fuscisidiata*. **a.** Habitus. **b.** Isidia. **c.** Section through excipulum. **d-e** *Pyrrhospora luminescens*. **d.** Habitus. **e.** Ascospores. Bars: a,b,d = 0.1 mm; c,e = 5 μ m.

***Pyrrhospora luminescens* Aptroot & Wolseley, sp. nova**
Mycobank 501233

Fig. 6d-e

Type: Thailand, Chiang Mai Prov., Doi Suthep N. P., San Khu, 99°54'E, 18°49'N, alt. 1600 m, on bark in montane oak forest. *P.A. Wolseley & B. Aguirre-Hudson 4981*, 22 December 1991 (BM, holotype; ABL, isotype).

Pyrrhospora thallo flavo dense sorediato, acidum lichexanthonicum continente, apotheciis plumbeis pruinosis.

Thallus corticolous, totally covered by pale custard yellow, farinose soredia, covering an area of up to 10 cm diam., surrounded by a c. 0.2 mm wide, black hypothallus line. *Apothecia* sessile, round, 0.3-0.9 mm diam. *Disc* black, dull, flat, with a thick layer of white pruina. *Apothecium* margin hardly prominent to evanescent, level with the disc, c. 0.1 mm wide, often becoming

covered with soredia. *Excipulum* in section largely orange-brown, pale brown inside. *Hypothecium* hyaline, c. 50 μm high. *Hymenium* anastomosing, not interspersed, c. 80-100 μm high. *Epithymenium* straw-coloured, without crystals, c. 15 μm high, KOH-. *Ascospores* 8/ascus, fusiform, curved, 20-23 \times 4-5 μm , surrounded by a 1 μm wide gelatinous sheath. Chemistry: lichexanthone (tlc); thallus vividly UV+ yellow, KOH-, C-, KC-.

Additional material seen: Uthai Thani, Khao Nang Rum, 99°18'E, 15°29'N 370 m: WA 4923, 29 January 1992 on *Vatica cinerea* in seasonal evergreen forest; Lamphun Prov., Doi Khun Tan N. P., 850 m: W & Svasti 6729, 99°14'E, 18°25'N, 23 April 1994 on bark.

This is the first *Pyrrhospora* with a yellow, completely sorediose thallus (Hafellner, 1993). It grows side by side with the common pantropical species *Pyrrhospora russula* (Ach.) Hafellner, which also contains lichexanthone, but has red apothecia and lacks soredia. This and the preceding species are not closely related to each other or to the type of the genus and may eventually end up in different genera. This species is probably most related to *P. querneae*, with which it shares the sorediate thallus with xanthonenes and the small, dark, blackish apothecia.

Pyxine coralligera Malme

Chiang Mai Prov., Doi Suthep N.P., San Khu chedi, 1600 m: AW 5876, 5868, 20/21 December 1991 on bark in montane oak forest.

Chiang Mai Province, Doi Inthanon N. P.: W 408a, 14 December 1988, on bark.

Chiang Mai Prov., MRC: A 61312, L 8654 on bark.

Chiang Mai Prov., Tung Joaw: A 61261 on *Castanopsis* bark.

Lampang Province, Doi Khun Tan N. P., 800 m: W & Boonpragob 6760. 23 April 1994 on bark in dry dipterocarp forest.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 400-1150 m: WA 6639, 6638 January 1992; same reserve, Kapou Kapiang AJW 1907, 1933, 1955a 10-14 February 1993.

Loei Province, Phu Rua N. P., 900 m: W & Kanjanavanit 6759, 5 May 1994 on sandstone in open savanna area., 4-5 May 1994.

Reported by Vainio, but later cited as a synonym of *P. retirugella* Nyl. (syn. *P. consocians*), which also occurs in Thailand. Together with the next species and with *P. schmidtii* Vain., which was originally described from Thailand, these are the most common species there.

Pyxine cylindrica Kashiw.

Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 650-680 m: WA 4327, 4360, 4361 11-14 November 1991 on bark in dry dipterocarp and dry evergreen forest.

Chiang Mai Province, Doi Inthanon N. P., Mae Cham Rd, 900 m: W 4343, 4 December 1991, on bark in pine dipterocarp forest.

Chiang Mai Province, Doi Suthep N.P., Mae Sa, 300 m: Champion 1401, 11 January 1971 on rock near river.

Chonburi Prov., Khao Kheio, c. 500 m: Champion 1467, 26 January 1971 on forest tree.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 460 m: W 1945, 11 February 1993 on bark in dry dipterocarp forest.

Pyxine daedalea Krog. & R. Sant.

Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, 1105 m: Gardner 176, 22 October 1995 on bark in pine-dipterocarp forest.

Pyxine farinosa Kashiw.

Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 650 m: WA 6634, 14 November 1991 on *Shorea obtusa* in dry dipterocarp forest.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 460 m: W 2761, 2449, 11 February 1993 on bark in dry evergreen forest.

Pyxine obscurascens Malme

Chiang Mai Prov., Doi Suthep N.P., Wat Palad, 650 m: WA 2601a, 15 November 1991 on granite in dry dipterocarp forest.

Pyxine petricola Nyl.

Chiang Mai Prov., Tung Joaw: A 61152 on *Prunus* bark.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Archaeological site, 200 m: AJW 3084, 30 January 1993 on granite in dry dipterocarp savanna.

Pyxine sorediata (Ach.) Mont.

Chiang Mai Prov., Doi Suthep N.P., ridge: A 55193, S 48610 on *Fagaceae* bark.

Chiang Mai Province, Doi Inthanon N. P., Mae Cham Rd, 900 m: AW 5810, 1 December 1991, on bark in dry dipterocarp forest; same N.P., summit bog, 2500 m: W and Svasti 3123 on bark in high altitude savanna.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, valley plot, 370 m: AJW 2457, 12 February 1993 on *Vatica cinerea* in mixed deciduous forest.

Yala Prov., Than To Banglang N.P., 500 m: W & David, 2457, 25 March 1993 on bark in seasonal rainforest.

Pyxine subcinerea Stirt.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 370 m: AW 5874, 22 January 1991 on *Mangifera* bark in dry evergreen forest.

Relicina planiuscula (Kurok.) Hale

Chiang Mai Prov., MRC: A 61357 on bark.

Rinodina citrinisidiata Aptroot & Wolseley, **sp. nova**
Mycobank 150124

Fig. 7

Type: Thailand, Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 99°18'E, 15°29'N, alt. 400 m, in dry dipterocarp forest on *Shorea obtusa* bark. *B. Aguirre-Hudson, P.W. James & P.A. Wolseley 3018*, 12 February 1993 (BM, holotype, ABL, isotype).

Rinodina corticola, thallo citrinoflavo, isidiis concoloris vestito, ascosporis typo *Pachysporaria*.

Thallus corticolous, pale to vivid yellow, continuous, covering an area of up to 3 cm diam., without or with a c. 0.1 mm wide, black hypothallus line. *Isidia* numerous, globose to mostly cylindrical, yellow with brownish tips, unbranched, c. 0.05 mm wide, c. 0.1-0.3 mm high. *Apothecia* innate, round, 0.3-0.6 mm diam. *Disc* black, dull, flat, without pruina. *Apothecium* margin hardly differentiated from the thallus to evanescent, level with the disc, c. 0.1 mm wide. *Excipulum* in section pale, with or without algae. *Hypothecium* hyaline to pale brown, c. 20 µm high. *Hymenium* not interspersed, c. 80-100 µm high. *Epihymenium* brown, consisting of paraphyse tips, without crystals, c. 5 µm high, KOH-. *Ascospores* 8/ascus, brown, 23-27 × 10-12 µm, with rounded to somewhat angular (postmature hart-shaped) lumina which are much smaller than the cells (*Pachysporaria*-type). Chemistry: thiomelin (tlc); thallus UV+ pink, KOH-, C-, KC+ orange.

Additional material seen: Same locality as the type, nos. 2686, 5896, 5897, 5898 on *Shorea obtusa* bark.

Huay Kha Khaeng Wildlife Sanctuary, 99°18'E, 15°34'N, alt. 200 m: AW 5902, 5904, 19 January 1992 on *Shorea obtusa* bark in dry dipterocarp savanna.

Chiang Mai Prov., Doi Inthanon N. P., near information office at 900 m: AW 5888, 5889, 30 November 1991 on *Shorea obtusa* and *Dipterocarpus tuberculatus* bark respectively in dry dipterocarp forest.

Doi Suthep, 99°56'E, 18°48'N, alt. 600 m: W 1219, 19 January 1991 on bark in dry dipterocarp forest.

CHINA: Yunnan Prov., Xishuangbanna, Menglun, Tropical Botanical Garden, alt. 550 m: A 57064, 31 October 2002 on *Cocos nucifera* bark.

This bright citrine-yellow, corticolous *Rinodina* belongs undoubtedly to the *thiomela*-group, of which the corticolous species *R. lepida* (Nyl.) Müll. Arg. is rather frequent in Tropical America, and saxicolous taxa in Tropical Asia and Australasia. It is the first isidiate yellow *Rinodina* to be described. The species seems to be quite frequent and widespread (hence the record from China), and was indeed regularly found sterile before it was recognized to be a *Rinodina*.

Rinodina neglecta Aptroot

Chiang Mai Prov., Doi Suthep N.P., Wat Palad, 650 m: WA 5885/6, 15 November 1991 on *Shorea obtusa* in dry dipterocarp forest.

Chiang Mai Province, Doi Inthanon N. P., Mae Cham Rd, 900 m: AW 5810, 1 December 1991, on *Quercus kerrii* in dry dipterocarp forest.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 400 m: AW 5893, 5900, 17 January 1992 on *Dipterocarpus tuberculatus* bark; frequent in other sites in this reserve where fire occurs.

Prachuab Kiri Khan, Kiri Khan, coastal scrub, 2 m: AJW 2035, 7 February 1993, on *Anacardiaceae*.

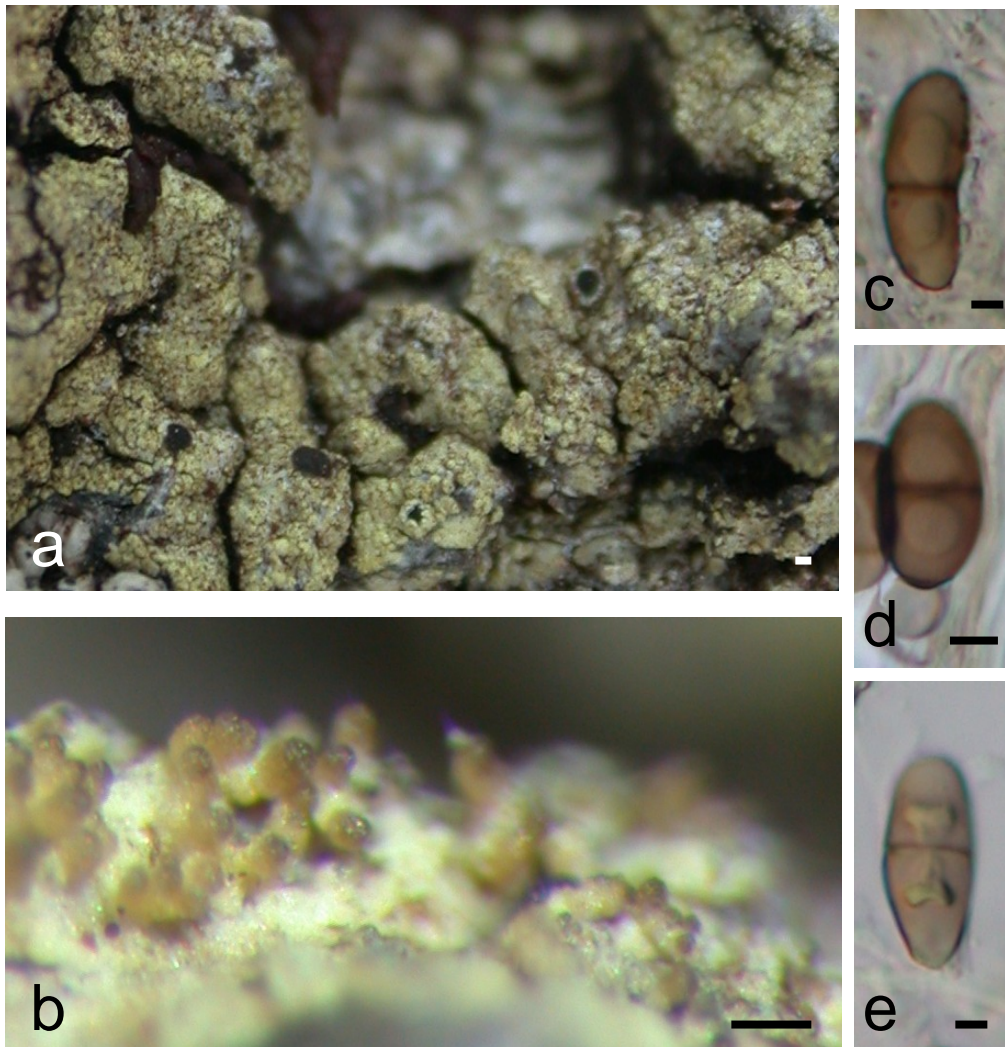


Fig. 7. *Rinodina citrinisidiata*. **a.** Habitus. **b.** Isidia. **c-e.** Ascospores. **e.** Postmature. Bars: a,b = 0.1 mm; c-e = 5 μ m.

Rinodina oxydata (A. Massal.) A. Massal.

Chiang Mai Prov., Doi Suthep N.P., ridge: A 55230 on rock.

Rinodina thiomela (Nyl.) Müll. Arg.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 1250 m: W & Onsar 5905, 23 January 1992 on bark in montane oak forest.

Sarcographa cinchonarum Fée

Chiang Mai Prov., Doi Inthanon N. P., Karen village forest, 960 m: W 3165, 18 March 1993 on bark in evergreen forest.
Khiri Khan Prov., Khiri Khan, 2 m: AJW 2047, 5 February 1993 on coastal scrub.

Sarcographa heteroclita (Mont.) Zahlbr.

Satun prov., Thaleban N. P., Wang Pra, 460 m: W & David 3344, 26 March 1993 on bark in open savanna forest.

Sarcographa labyrinthica (Ach.) Müll. Arg.

Yala prov., Than To Banglang N.P., 460 m: W & David 3358, 25 March 1993 on bark in seasonal rainforest.

Sarcographa tricososa (Ach.) Müll. Arg.

Chiang Mai Prov., Doi Suthep N.P., medicinal garden: L 7141 on *Cinchona pubescens* bark
Prachuab Khiri Khan, Khiri Khan, 2 m : AJW 2557, 7 February 1993 on an epiphyte in coastal scrub

Sarcographina glyphiza (Nyl.) K. Singh & D.D. Awasthi

Chiang Mai Prov., Doi Suthep N.P., medicinal garden: S 48508, 48525 on *Cinchona pubescens* bark.
Chiang Mai Prov., MRC: A 61298, L 8625, 8645 on bark.

Schistophoron tenue Stirt.

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 1250 m: WA 5913, 22 January 1992 on bark in dry evergreen forest.

Sculptolumina japonica (Tuck.) Marbach

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, Khao Kiew, 1150 m: Aguirre-Hudson 4055, 23 January 1992 on bark in montane oak forest.
Same reserve, Huay Kha Khaeng Archaeological site, 200 m: WA 3983, 21 January 1992 on *Shorea siamensis* bark in dry dipterocarp forest.

Septotrapelia triseptata (Hepp) Aptroot

Chiang Mai Prov., Doi Inthanon N. P., roadside near summit, 2500 m: JW 1685, 3 February 1993 on roadbank.

Septotrapelia triseptata (Hepp) Aptroot, **comb. nov.**; basionym: *Lecidea triseptata* Hepp, in Zollinger, System. Verzeichn.: 5. 1854. This combination was made recently, but a validation is needed, as one and the same description served for the new genus and its type. This is allowed, but only when this is the only species accepted in the genus, which was not the case. Therefore the following validations are also needed: *Septotrapelia* Aptroot & Chaves, **gen. nov.**, Genus *Pilocarpacearum* apotheciis *Trapeliopsis similis*, *ascosporibus*

triseptatibus. *Species typicus* *Septotrapelia glauca* Aptroot & Chaves. *Septotrapelia glauca* Aptroot & Chaves, **sp. nov.**, *Septotrapelia thallo microphyllino glauco pruinoso*. Type: COSTA RICA, Prov. Guanacaste, Volcán Tenorio National Park, outside Reserve along access road, alt. 700 m, 84°59'W, 10°43'N, on volcanic boulders in pasture, 15 March 2004, *Aptroot* 60426 (INB–holotype, ABL, F–isotypes). Full description in Aptroot *et al.* (2006).

Sporopodium flavescens (R. Sant.) Vězda
Chiang Mai Prov., MRC: A 61460 on leaves.

Sporopodium leprieurii Mont.
Chiang Mai Prov., MRC: A 61449, L 8658, 8673 on *Camellia* leaves.

Sporopodium xantholeucum (Müll.Arg.) Zahlbr.
Chiang Mai Prov., MRC: A 61473, L 8660, 8663 on *Camellia* leaves.

Stigmatochroma epimarta (Nyl.) Marbach
Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 460 m: AJW 2694, 10 February 1993 on fallen branches.

Stigmatochroma metaleptodes (Nyl.) Marbach
Chiang Mai Prov., MRC: L 8636 on bark of broad-leaved tree.
Chiang Mai Prov. Doi Suthep-Pui N.P., medicinal garden: L 7152, on bark of *Cinchona pubescens*.

Strigula antillarum (Fée) R. Sant.
Chiang Mai Prov., MRC: A 61479, L 8672 on *Camellia* leaves.

Strigula concreta (Fée) R. Sant.
Chiang Mai Prov., MRC: A 61452 on leaves.

Strigula nemathora Mont.
Chiang Mai Prov., Doi Suthep-Pui N.P., forest: A 55107, 55146 p.p., 55145, 55154, 55163 on *Manglietia garrettii* leaves.

Strigula nitidula Mont.
Chiang Mai Prov., MRC: A 61447 on *Camellia* leaves.

Strigula phaea (Ach.) R.C. Harris
Chiang Mai Prov., Doi Suthep-Pui N.P., New Waterfall: L 8678, 8683 on bark.
Chiang Mai Prov., Tung Joaw: A 61257 on *Castanopsis* bark.
Yala Prov. Than To Banglang N.P., 460m: W & David 3360, on bark in seasonal rainforest.

Tephromela atra (Huds.) Hafellner

- Chiang Mai Prov. Doi Suthep-Pui N.P., medicinal garden: A 55299, 55343 & L 7144 on *Cinchona pubescens* bark. Same N.P.; San Khu chedi, 1600m: JW1616 & WA 4344, 31 Januar 1993 and 21 December 1991.
- Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, 1105 m: Gardner 173, 22 October 1995 on fallen canopy branch.
- Chiang Mai Prov., Doi Inthanon N. P., near summit, 2000 m: W & Svasti, 13 March 1993 on bark in high altitude savanna.
- Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 450 m: WA 4994, 9 January 1992 on *Eugenia cumini* bark in dry dipterocarp forest.
- Lampang Province, Doi Khun Tan N. P., 600 m: W & Boonpragob 3247, 11 January 1993 on *Shorea* sp bark in dry dipterocarp forest.

Thecaria quassiicola Fée

- Chiang Mai Prov., Doi Suthep-Pui N.P., medicinal garden: A 55288 on *Cinchona pubescens* bark.
- Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Yu Yi, 1000 m: W & Kanjanavanit 4659, 26 January 1992 on bark in secondary forest.

Tomasellia eschweileri (Müll. Arg.) R.C. Harris

- Chiang Mai Prov., MRC: A 61365 on bark .
- Chiang Mai Prov., Doi Suthep-Pui N.P., forest adjacent King's Palace, 1550 m: WA 3790, 22 December 1991 on *Anneslea fragrans* bark.

Topeliopsis darlingtonii A. Frisch & Kalb

- Chiang Mai Prov., Doi Suthep-Pui N.P., forest adjacent King's Palace, 1550 m: WA 4997, 19 December 1991 on bark.
- Chiang Mai Prov., Doi Inthanon N. P., summit, 2500 m: JW 1686 p.p., 2 February 1993 on bark.
- New to the Northern Hemisphere. This species was only recently described from Australia.

Trapelia coarctata (Sm.) M. Choisy

- Chiang Mai Prov., Doi Suthep-Pui N.P., New Waterfall: A 61490 on rock along road.

Trapelia subconcolor (Anzi) Hertel

- Chiang Mai Prov., Doi Inthanon N. P., 2000 m: JW 1830, 2 February 1993 on roadside bank.

Trapeliopsis viridescens (Schrad.) Coppins & P. James

- Chiang Mai Prov., Doi Suthep-Pui N.P., 1600 m: WA 5998, 5999, 21 December 1991 on *Castanopsis diversifolia* and *Vaccinium* bark respectively.
- An unexpected record, the first one for a tropical region.

Traponora asterella Aptroot

Chiang Mai Prov., Doi Suthep-Pui N.P., Wat Palad, 650 m: WA 3967, 12 November 1991 on *Dipterocarpus obtusifolius* bark in dry dipterocarp forest.

New to the Northern Hemisphere. This is the first time this species has been seen after its description from Papua New Guinea. Further, so far undescribed species of this genus are regularly found on branches in the tropics, including Thailand, but will be treated in a separate paper. It suggests that it is rather overlooked than restricted to a specific area or habitat.

Triclinum cinchonarum Fée

Uthai Thani Prov., Huay Kha Kaeng Wildlife Sanctuary, Kapou Kapiang, 500 m: AJW 2872, 14 February 1993 on bark.

This species was never reported since its description in 1838, at least not under this name. See above for a discussion and the description of a second species in the genus.

Triclinum solediatum Aptroot & Sparrius, **sp. nova**

Fig. 8

Mycobank 501235

Type: Thailand, Uthai Thani Prov., Huay Kha Khaeng Wildlife Sanctuary, Kapou Kapiang, 99°18'E, 15°29'N, alt. 500 m, on bark. *B. Aguirre-Hudson, P.W. James & P.A. Wolseley 2817*, 14 February 1993 (BM-holotype; ABL-isotype).

Triclinum thallo distincto soledioso, soraliis capitatis.

Thallus corticolous, corticate, composed of squamules on a continuous layer of black, felty hypothallus that extends beyond the thallus for c. 0.4 mm, covering an area of up to 3 cm diam. *Squamules* greyish green, mostly convex, partly ascending, rounded to elongate, entire or branched, c. 0.2–0.5 mm diam., originating singly and hardly overlapping or fusing, attached with hyaline, branched rhizoids of c. 5 µm diam. to the hypothallus. *Soralia* regularly dispersed but largest in the central part of the thallus, covering entire squamules, round, yellowish-white, c. 0.4–0.8 mm diam., with farinose soredia. *Thallus* c. 60–90 µm thick, filled with algae except for the cortex; upper cortex c. 10 µm thick. Algae chlorococcoid, cells mostly globose, c. 5–7 µm diam. *Apothecia* sessile, orange-brown, marginate, in section hyaline. Excipulum consisting of conglutinated cells. *Ascospores* needle-shaped, indistinctly (1-)3-septate, 30–25 × 0.8–1.2 µm. *Pycnidia* unknown. Chemistry: atranorin, divaricatic acid and zeorin (in e.g. the type) or protocetraric acid only (tlc); thallus and soredia KOH+ yellow, UV-.

Additional material: Tung Joaw: A 61242, L 8607 on bark.

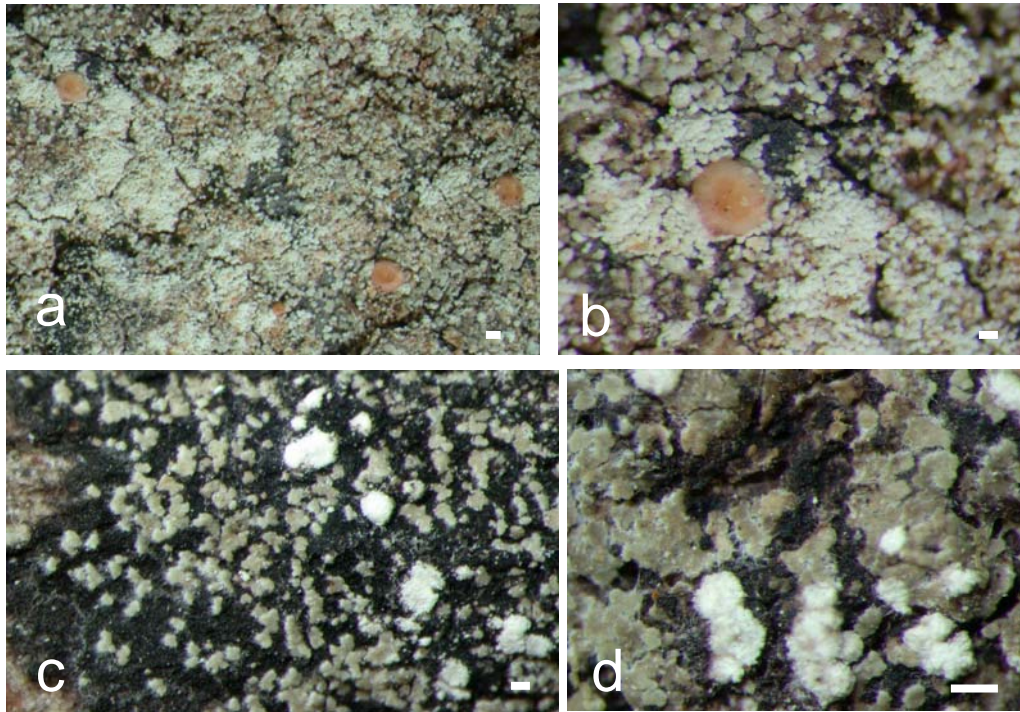


Fig. 8. *Triclinum solediatum*. **a-b.** Type. **c-d.** Tung Joaw material. Bars: a-d = 0.1 mm.

This is only the second species attributed to this genus, for which, according to Jørgensen (2003), *Triclinum* is the correct, older name to replace *Squamacidia* Brako. It is characteristic of this genus, and differs mainly by the presence of soredia from *Triclinum cinchonarum* Fée (syn. *Squamacidia janeirensis* (Müll. Arg.) Brako), which was found in the same area. It shows an overlap in chemistry, as our material of *Triclinum cinchonarum* was morphologically indistinguishable from some of Buck's specimens identified by Brako, but was found to consistently contain atranorin and divaricatic acid, with zeorin as a regular accessory, thus representing a new chemical race of *Triclinum cinchonarum*. The Tung Joaw material of *Triclinum solediatum* contains protocetraric acid.

Trypethelium aeneum (Eschw.) Zahlbr.

Loei Province, Phu Rua N. P., 900 m: W & Kanjanavanit 6759, 5 May 1994 on bark.

Satun prov., Thaleban N. P., Wang Pra, 460 m: W & David 3330, 26 March 1993 on bark.

Trypethelium cinereorosellum Kremp.

Chiang Mai Prov., Doi Suthep-Pui N.P., Doi Suthep, 1600 m: AW 3695, 20 December 1991 on bark.

Trypethelium nitidiusculum (Nyl.) R.C. Harris

Satun prov., Thaleban N. P., Wang Pra, 460 m: W & David 3328, 26 March 1993 on bark.

Uthai Thani prov., Huay Kha Kaeng Wildlife Sanctuary, Khao Nang Rum, 460 m: AW 3698, 12 January 1991 on *Vatica cinerea* bark.

Trypethelium subnitidiusculum Makhija & Patw.

Chiang Mai Prov., Doi Suthep-Pui N.P., forest adjacent King's Palace, 1550 m: WA 6734, 19 December 1991 on bark in montane oak forest.

Tylophoron protrudens Nyl.

Chiang Mai Prov., Doi Suthep-Pui N.P., Doi Suthep ridge: S 48665 on *Fagaceae* bark.

Verrucaria baldensis Massal.

Chiang Mai Prov., Chiang Dao Wildlife Sanctuary, Doi Luang, 1850 m: Allen 324 p.p., 3 November 1995 (BM) on limestone.

Verrucaria muralis Ach.

Chiang Mai Prov., Chiang Mai city wall: A 55253 on brick.

Vezeadaea stipitata Poelt & Döbbeler

Chiang Mai Prov., Doi Suthep-Pui N.P., Doi Suthep ridge: A 55217 on rock.

Chiang Mai Prov., New Waterfall: A 61499 on soil along track.

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