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Additional lichen records from Indonesia and Malaysia 5. Lichens from Maliau Basin, Sabah, Malaysia

Laily B. Din, A. Latiff and Ikram M. Said
Faculty of Science and Technology, Universiti Kebangsaan Malaysia,
43600 UKM Bangi, Malaysia

John A. Elix
School of Chemistry, Building 33,
Australian National University, Canberra, ACT 0200, Australia

Abstract: *Cladonia floerkeana, Parmotrema pseudonilgherrense, Pertusaria umbricola, Phaeographis ceratoides, Pseudocyphellaria homalosticta* and *Sticta weigelii* are reported as new to Malaysia.

Maliau Basin Conservation Area is located in south-central Sabah on the island of Borneo. It is a rugged and uninhabited forested area with steep slopes up to 1500 m in elevation. The basin (*c.* 390 square kilometres in area) is drained by a series of radiating tributaries of the Maliau River. For the most part, the vegetation comprises tropical submontane dipterocarp forest, but that intergrades into heath forest at higher elevations. In this paper, we report on 24 lichens collected from Maliau Basin, six of which are new records for Malaysia.

The following is common to all specimen citations: *Malaysia*: • Sabah: Maliau Basin, Eucalyptus Camp, 4°52′18″N, 106°49′35″E, *c.* 1000 m, ix.2006 (CANB, UKM). Only information on microhabitat and the collector's number are noted in addition.

1. ***Cladonia floerkeana*** Flörke, *De Cladon.*: 99 (1828)
This species was previously known from North, Central and South America, Europe and Australasia (Ahti 2000). It is characterized by podetia with a mostly or totally corticated surface, sometimes with rather sparse, granulose soredia, incised esorediate squamules, bright red discs, and the presence of rhodocladonic acid (minor), barbatic acid (minor), didymic acid (major), and thamnolic acid (minor). A detailed description is given in Ahti (2000) and Archer (1992).

SPECIMEN EXAMINED
• on soil in submontane rainforest, *L.B. Din MBS 9*.

2. ***Parmotrema pseudonilgherrense*** (Asahina) Hale, *Mycotaxon* **5**: 441 (1977)
This species was previously known from East, South and West Africa, India, Nepal, Korea, Australia (Elix 1994) and mainland China (Chen *et al.* 2005). It is characterized by the large, loosely adnate, coriaceous thallus, the marginally and submarginally sorediate lobes that become revolute, the maculae on the upper surface, and alectoronic acid and α-collatolic acid in the medulla. A detailed description is given in Elix (1994).

SPECIMEN EXAMINED
• on tree in submontane rainforest, *L.B. Din MBS 24A, 36*.

3. ***Pertusaria umbricola*** A.W.Archer & Elix in A.W.Archer, *Biblioth. Lichenol.* **69**: 158 (1997)
Previously, this species was known only from Australia and Papua New Guinea (Archer 1997). It is characterized by the corticolous, isidiate thallus and the presence of protocetraric acid. A detailed description is given in Archer (1997, 2004).

SPECIMEN EXAMINED
• on tree in submontane rainforest, *L.B. Din MBS 25*.

4. ***Phaeographis ceratoides*** (Vain.) Zahlbr., *Cat. Lich. Univ.* **2**: 365 (1923)
This species was previously known from Australia, Norfolk Island, the Philippines and Indonesia (Archer 2006). It is characterized by the repeatedly branched, thin, black, immersed lirellae, the very small, 4-locular ascospores and by the absence of lichen compounds. A detailed description is given in Archer (2006).

SPECIMEN EXAMINED
• on tree in submontane rainforest, *L.B. Din MBS 14*.

5. ***Pseudocyphellaria homalosticta*** Vain., *Philipp. J. Sci.* sect. C, **8**: 117 (1913)
Previously known from the Philippines and the south-west Pacific [Fiji, Raratonga and the Marquesas] (Galloway 1994), the species is distinguished by a white medulla, a green photobiont and white pseudocyphellae on both upper and lower surfaces and characteristically also at the margins of the lobes, and the marginal and occasionally laminal, terete isidia that can become dorsiventral, flattened phyllidia. The Malaysian material contained tenuiorin (major), methyl gyrophorate (minor), gyrophoric acid (minor), 7β-acetoxyhopane-22-ol (major), hopane-15α,22-diol (major), and hopane-7β,22-diol (trace). A detailed description is given in Galloway (1994).

SPECIMEN EXAMINED
• on tree in submontane rainforest, *L.B. Din MBS 26*.

6. ***Sticta weigelii*** (Ach.) Vain., *Acta Soc. Fauna Fl. Fennica* **7**: 189 (1890)
A widespread species in tropical and temperate regions (Galloway 2001), this species is distinguished by a cyanobacterial photobiont, irregular, clustered, rosette-forming lobes with densely isidiate margins, and isidia densely developed in patches or continuously over the upper surface. It has a dark red-brown or grey-brown upper surface and a dark brown to black, thickly tomentose lower surface with scattered, round to irregular, white cyphellae deeply immersed in the tomentum, and lacks lichen substances. A detailed description is given in Galloway (2001).

SPECIMEN EXAMINED
• in submontane rainforest, *L.B. Din MBS 17*.

Other Species Collected
The following species were also collected from Maliau Basin: *Bunodophoron formosanum* (Zahlbr.) Wedin, *Cladonia adspersa* Mont. & Bosch, *C. didyma* (Fée) Vain., *Coccocarpia dissecta* Swinscow & Krog, *C. erythroxyli* (Spreng.) Swinscow & Krog, *C. glaucina* Kremp., *Lobaria pseudopulmonaria* Gyeln., *Ocellularia* sp., *Parmotrema acrotrychum* (Kurok.) Streim., *P. cristiferum* (Taylor) Hale, *P. gardneri* (C.W.Dodge) Hale, *P. mellissii* (C.W.Dodge) Hale, *Pertusaria velata* (Turner) Nyl., *Physma byrsaeum* (Ach.) Müll.Arg., *Pseudocyphellaria gilva* (Ach.) Malme, *Relicina circumnodata* (Nyl.) Hale, *R. palmata* Elix, *Siphula decumbens* Nyl. and *Usnea baileyi* (Stirt.) Zahlbr.

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