

## MOSSES OF SAYAP-KINABALU PARK, SABAH

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### ABSTRACT

*No other locality in Borneo has been as heavily bryologised as Mount Kinabalu. Touw ( 1978) lists 323 species, from Kinabalu out of 649 species reported for Borneo. However there are a number of localities on Kinabalu which due to their inaccessibility, have not been visited by bryologists. One such locality is Sayap. 15km south-east of Kota Belud (6.5 °N 116.S °E.) which was visited by the author between 3 June 1992 and 8 June 1992. All the specimens are deposited at the Universiti Malaya Herbarium (KLU). A total of 106 species of mosses were collected of which ten species are new to Borneo, eleven new to Sabah and seventeen new to Kinabalu. The status of the species are denoted by the symbols below.'*

\* New to Kinabalu

d New to Sabah

+ New to Borneo

### CHECKLIST OF SPECIES

#### FISSIDENTACEAE

*Fissidens crenulatus* var. *elmeri* Mitt.

Alt. 950m, trail parallel to Sg. Kemantis, on tree near waterfall (shade). No. 4509a. 3 June 1992.

*Fissidens javanicus* Dozy et Molk.

Alt. 870m., Sg. Wariu trail, moist shaded forest near stream, on tree. No. 4689d. 8 June 1992.

#### DITRICHACEAE

+*Ditrichum flexifolium* (Hook.) Hampe.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on exposed soil. No. 4562. 4 June 1992.

#### DICRANACEAE

*Dicranoloma blumii* (Nees. ) Ren.

Ah. 1700m, Tepising trail along Minodtuhan river, moist shaded forest, on log. No. 4641a. 5 June 1992.

Alt. 1130m., Minodtuhan trail along ridge, relatively dry, on humus in forest. No. 4647;  
Alt. 1140m., on base of tree No. 4662. 6 June 1992.

*Dicranoloma brevisetum* (Dozy & Molk.) Par.

Alt. 900m., Sg Wariu trail to Gua Melayu, wet forest, on tree. No. 4554a. 4 June 1992

Alt. 1080-1100m., Tepisung trail along Minodtuhan river, moist shaded forest. on log. No. 4628b; on tree. No 4628c. 5 June 1992.

Alt. 1100m. Minodtuhan trail along ridge, relatively dry, on base of tree. 4661; Alt 1120m., on base of shrub. No 4663b. 6 June 1992

\**Dicranoloma reflexum* (C. Mull.) Ren.

Alt. 860m, Sg. Wariu trail to Gua Melayu. wet forest, on fallen tree (fresh) No. 45sOb. 4 June 1992.

Alt 1100m., Minodtuhan trail along ridge, relatively dry, on rotten log. No. 4655. 6 June 1992

*Dicranella setifera* (Mitt.) Jaeg.

Alt. 870m., Sg Wariu trail to Gua Melayu, wet forest, on exposed soil. No. 4860; on wet soil bank, No. 4564, 4578. 4 June 1992.

*Leucoloma molle* (C.Mull.) Mitt.

Alt. 900m, Sg. Wariu trail to Gua Melayu, wet forest, on tree, No 4554b; Alt 870m, on rotten log in shade, No. 4568; Alt 900m, on fall tree branch. No 4572b. 4 June 1992

Alt 1080m., Tepisung trail along Minodtuhan river, moist shaded forest, on branches of tree No 4609b; Alt 980m. pendulous, 2m., aboveground. No 4638; Alt 1700m., on log. No 4641e. 5 June 1992.

Alt. 1210m, Minodtuhan trail along ridge, relatively dry, on tree. No. 4667a. 6 June 1992.

Alt 870m., Sg Wariu trail, moist shaded forest, near stream, on fallen tree. No 4687d, 4692d; on fallen log. No 4693. 8 June 1992

## LEUCOBRYACEAE

*Cladopodanthus pilifer* Dozy & Molk.

Alt. 870m., Sg, Wariu trail, on bark of tree. No. 4591b. 4 June 1992.

*Exostratum blumei* (Nees ex Hampe.) Ellis.

Alt 860m., trail parallel to Sg Kemantis, on stump in shade No 4520. 3 June 1992.

Alt. 910m., Sg. Wariu trail to Gua Melayu, wet forest. on tree in shade. No. 4576. 4 June 1992

Alt. 1080m., Tepisung trail along Minodtuhan river, moist shaded forest, underface of rock No. 4611b; on base of tree. No. 4612a. 5 June 1992.

*dExostratum sullivantii* (Dozy & Molke.) Ellis.

Alt. 870m, trail parallel to Sg. Kemantis, on tree, in wet area. No. 4534. 3 June 1992.

This is the first report of this species for Sabah and the second for Borneo. Ellis (1985) reported a single collection from East Kutai, Balikpapan peak in Kalimantan.

*Leucobryum javense* (Brid.) Mitt.

Alt. 980m, Tepisung trail along Minodtuhan river, moist shaded forest, on base of tree. No. 4625. 5 June 1992.

\**Leucophanes octoblepharoides* Brid.

Alt. 1120m., Minodtuhan trail along ridge, relatively dry, on base of shrub. No. 4663a. 6 June 1992.

\**Schistomitrium mucronifolium* (C.Mull.) Fleisch.

Alt. 870m., Sg. Wariu trail to Gua Melayu, wet forest, on tree 5m. above ground. No. 4546; on bark of tree. No 4591a. 4 June 1992.

Alt. 1300m., Minodtuhan trail along ridge, relatively dry, on tree. No 4656b; Alt. 1140m., on tree in shade. No. 4657. 6 June 1992.

#### CALYMPERACEAE

*Calymperes fasciculatum* Dozy & Molke.

Alt. 1000m., Tepisung trail along Minodtuhan river, moist shaded forest, on tree in shade. No. 4620. 5 June 1992.

Alt. 1200m., Minodtuhan trail along ridge, relatively dry, on tree in shade. No. 4642. 6 June 1992.

*Calymperes lonchophyllum* Schwaegr.

Alt. 870m., trail parallel to Sg. Kemantis, on moist buttress near river. No. 4517. 3 June 1992.

Alt. 870m., Sg. Wariu trail to Gua Melayu, wet forest, on bark of tree. No. 4549b. 4 June 1992.

Alt. 870m., Sg. Wariu trail, moist shaded forest near stream, on rocks and trees No. 4678b; on soil, wet slope. No. 4683. 8 June 1992.

*Calymperes motleyii* Mitt.

Alt. 300m., on tree No. 3695. 7 June 1992

*Calymperes serratum* A. Braun ex C.Mull.

Alt. 870m., trail parallel to Sg. Kemantis, on moist shaded log. No 4521.3 June 1992.

\**Mitthyridium flavum* (C.Mull.) Robins.

Alt 1080m, Tepisung trail along Minodtuhan river, moist shaded forest, on tree. No. 4636.  
5 June 1992.

\**Mitthyridium jungquilianum* (Mitt.) Robins.

Alt. 1140m., Minodtuhan trail along ridge, relatively dry, on bark, 2m. above ground. No  
4668b. 6 June 1992.

\**Mitthyridium luteum* (Mitt.) Robins.

Alt. 860m., Minodtuhan trail along ridge, relatively dry, on tree 4m above ground. No.  
4658; Alt. 990m., on bark of tree. No. 4664b. 6 June 1992.

*Syrrhopodon albidus* Thwaites & Mitt.

Alt. 1210m., Minodtuhan trail along ridge, relatively dry, on rotten log. No 4654b; Alt.  
1240m., on moist humus, shaded No. 4669b. 6 June 1992.

*Syrrhopodon confertus* Lac.

Alt. 1000m., Tepisung trail along Minodtuhan river, moist shaded forest, Sg. Mulatok  
Besar, on base of tree. No. 4615a. 5 June 1992.

*Syrrhopodon croceus* Mitt.

Alt. 1300m., Minodtuhan trail along ridge, relatively dry, on base of tree. No. 4666. 6  
June 1992.

*Syrrhopodon gardneri* (Hook.) Schwaegr.

Alt. 860m., trail parallel to Sg Kemantis, on tree, 2m. above ground. No. 4519. 3 June  
1992.

Alt. 1260m., Minodtuhan trail along ridge, relatively dry, on tree. No. 4643. 6 June 1992.

*Syrrhopodon japonicus* (Besch.) Broth.

Alt. 980m., Tepisung trail along Minodtuhan river, moist shaded forest. on base of tree.  
No. 4612b. 5 June 1992.

Alt. 1100m., Minodtuhan trail along ridge, relatively dry, on base of tree in shade. No.  
4652. 6 June 1992.

*Syrrhopodon muelleri* Dozy & Molk.

Alt. 870m., trail parallel to Sg. Kemantis, on base of tree. No. 4529. 3 June 1992.

*Syrrhopodon trachyphyllus* Mont.

Alt. 1230m, Minodtuhan trail along ridge, relatively dry, on tree base. No. 4653. 6 June  
1992.

*Syrrhopodon tristichus* Nees ex Schwaegr.

Alt. 870m., Sg. Wariu trail to Gua Melayu, wet forest, on shrub. No. 4570; Alt. 990m., on tree. No. 4579a. 4 June 1992.

Alt. 1080-1100m., Tepisung trail along Minodtuhan river, moist shaded forest, Sg. Mulatok Besar, on base of tree. No. 4615; Alt. 980m., on tree in shade. No. 4624; Alt. 1000m., on tree 1m. above ground. No. 4626b. 5 June 1992.

Alt. 990m., Minodtuhan trail along ridge, relatively dry, on tree. No. 4664c. 6 June 1992.

## BRYACEAE

*Brachymenium nepalense* Hook.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on fauen branches, Minotok trail. No. 4558;

Alt. 870m., on fallen tree No. 4585b. 4 June 1992.

## MNIACEAE

+*Orthomnion elimbatum* (Nog.) T. Kop.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on fallen tree. No. 4555a. 4 June 1992.

*Plagiomnium integrum* (Bosch. & Lac.)  
T. Kop.

Alt. 900m., trail parallel to Sg. Kemantis, on rock near stream. No. 4540a; Alt. 870m., on moist roots in semi-shade near river. No. 4513. 3 June 1992.

Alt. 900m., trail parallel to Sg. Kemantis, on wet rocks. No. 4541g. 3 June 1992.

Alt. 1080m., Tepisung trail along Minodtlihan river, moist shaded forest, on rock near stream. No. 4606, 4607, 4637a. 5 June 1992.



*Plagiomnium integrum*

*Plagiomnium succulentum* (Mitt.) T. Kop.

Alt. 960m, trail parallel to Sg Kemantis, on wet rocks near waterfall No 4538. 3 June 1992.

## RHIZOGONIACEAE

*Pyrrhobryum spiniforme* (Hedw.) Mitt.

Alt. 870m, trail parallel to Sg Kemantis, on tree in wet area No 4534b. 3 June 1992.

Alt. 1080-1100m., Tepisung trail along Minodtuhan river, moist shaded forest, on log No 4628c, 4641b. 5 June 1992.

Alt. 1280m, Minodtuhan trail along ridge, relatively dry, on tree No. 4644a. 6 June 1992

## HYPNODENDRACEAE

*Hypnodendron dendroides* (Brid. ) Touw.

Alt 900m, Sg. Wariu trail to Gua Melayu, wet forest, on wet rock near stream, shaded, No. 4665; Alt. 870m., No. 4599. 4 June 1992.

Alt. 980m, Tepisung trail along Minodtuhan river, moist shaded forest, on fallen log. No. 4630, 4628f. 8 June 1992.

Alt. 870m., Sg. Wariu trail, moist shaded forest near stream, on rocks. No. 4678. 8 June 1992

*Hypnodendron milnei* Mitt.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on fallen tree near stream, No. 4581. 4 June 1992

Alt. 870m., Sg Wariu trail moist shaded forest near stream, on wet fallen tree. No 4692c. 8 June 1992.

*Hypnodendron subspininervium* (C. Mull.) Jaeg.

Alt. 1100m., Tepisung trail along Minodtuhan river, moist shaded forest, Sg. Mulatok Besar, on base of shrub. No. 4617. 5 June 1992.

Alt 1100m., Minodtuhan trail along ridge, relatively dry, on tree base in shade No 4648. 6 June 1992.

Alt. 870m, Sg Wariu trail moist shaded forest near stream, on fallen tree. No. 4687e. 8 June 1992

## ORTHOTRICHACEAE

*Macromitrium blumii* Nees ex Schwaegr.

Alt. 870m., trail parallel to Sg. Kemantis, on tree 5m above No 4544a. 3 June 1992.

\**Macromitrium cuspidatum* Hamp.

Alt. 860m., Sg. Wariu trail, on fallen tree No. 4550c. 4 June 1992.

*Macromitrium ochraceum* (Dozy & Molk.)  
C. Mull.

Alt. 900m., Sg. Wariu trail to Gua Melayu,  
wet forest, on fallen tree, exposed. No.  
4577, No. 4592 4 June 1992.



*Macromitrium ochraceum*

#### RACOPILACEAE

*Racopilum spectabile* Reinw. et Hornsch.

Alt. 860m., on moist rock near waterfall (Park Hdgrtn). No. 4500. 2 June 1992

Alt 900m., trail parallel to Sg. Kemantis, on wet rocks. No. 4541b. 5 June 1992.

Alt. 1080m., Tepisung trail along Minodtuhan river, moist shaded forest, on wet rocks,  
shaded. No. 4627a. 5 June 1992.

Alt. 880m., Minodtuhan trail along ridge, relatively dry, on rocks of river wariu. No.  
4659. 6 June 1992.

#### MYURACEAE

*Oedicladium rufescens* (Reinw. & Hornsch.) Mitt.

Alt. 1160m., Minodtuhan trail along ridge, relatively dry, on tree branch. No. 4659. 6 June  
1992.

#### PTEROBRYACEAE

*Garovaglia elegans* (Doz. & Molk.) Bosch & Lac.

Alt. 870m., trail parallel to Sg. Kemantis, on fallen tree. No 4522, 4535c. 3 June 1992.

Alt. 900m., Sg. Wariu trail to Gua Meiyu, wet forest, on fallen tree branch (wet &  
shaded). No. 4572a; on tree. No. 4595. 4 June 1992.

#### METEORACEAE

*Aerobryidium aureo-nitens* (Schwaegr.) Broth.

Alt. 860m., Sg. Wariu trail to Gua Melayu, wet forest, on tree 5m. above ground. No.  
4580c. 4 June 1992.

*Aerobryidium crispifolium* (Broth, et Geh.) Fleisch. ex Broth.

Alt 870m., trail parallel to Sg. Kemantis, on wet rocks in stream, No. 4525a; on fallen twig, in shade No. 4535a; on wet rocks No. 4541d. 3 June 1992.

Alt 860m., Sg. Wariu trail to Gua Melayu, wet forest, on tree 5m above ground No. 4580b; on branches of tree, 2m above ground No 4595a. 4 June 1992.

Alt 870m, Sg. Wariu trail, moist shaded forest near stream, on fallen branches of tree, 3m. above. No. 4686a. 8 June 1992.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on branches of tree, 2m. above ground. No. 4593c, 4594. 4 June 1992.

This species is very prominently displayed everywhere in Sayap. The tetrastichous arrangement of the leaves and the long pendulous festoons are very distinctive characters for this species.

*Aerobryopsis wallichii* (Brid.) Fleisch.

Alt.1210m., Minodtuhan trail along ridge, relatively dry, on shrub No 4645. 6 June 1992.

Alt 870m, Sg. Wariu trail, moist shaded forest near stream, on wet fallen tree. No. 4692b. 8 June 1992.

*Barbella enervis* (Thwait. & Mitt.) Fleisch ex Broth.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on branches of tree, 2m. above ground. No 4593b. 4 June 1992.

Alt. 870m., trail parallel to Sg. Kemantis, on fallen twig, in shade. No 4535e. 3 June 1992.

\**Barbella flagellifera* (Card.) Nog.

Alt. 870m., Sg. Wariu trail, moist shaded forest near stream, on living twig. No. 4681a. 8 June 1992.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest on fallen branch of tree. No. 4545. 4 June 1992.

*Floribundaria floribunda* (Doz. et Molk.) Fleisch.

Alt. 900m., trail parallel to Sg. Kemantis, on fallen leaves near stream, wet. No. 4526b;

Alt. 870m., on fallen twig, in shade, No. 4535b. 3 June 1992.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on branches of tree, 2m. above ground. No. 4593a. 4 June 1992.

Alt. 860m., Sg. Wariu trail, moist shaded forest near stream, on tree base. No. 4673; Alt. 870m., on fallen tree. No. 4678b, 4692c. 8 June 1992.

*Floribundaria pseudofloribunda* Fleisch.

Alt. 1080m., Tepisung trail along Minodtuhan riveh moist shaded forest, on shrub. No. 4631.5 June 1992.

*Meteorium buchananii* (Brid) Broth

Alt. 860m., Sg. Wariu trail to Gua Melayu, wet forest, on fallen tree (fresh). No. 4550a; on tree 5m. above ground. No 4580a. 4 June 1992.

*Meteorium subpolytrichum* (BeSch.) Broth.

Alt. 900m., trail parallel to Sg. Kemantis, on wet rocks. No. 4541c. 3 June 1992.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on fallen twig. No. 4574a. 4 June 1992.

*Papillaria fuscescens* (Hook.) Jaeg.

Alt. 870m., Sg. Wariu trail, moist shaded forest near stream, on wet fallen tree, No. 4692a. 8 June 1992.

## NECKERACEAE

*Calypothecium urvilleanum* (C.M.) Broth.

Alt. 870m., trail parallel to Sg. Kemantis, on wet rocks in stream. No. 4525b. 3 June 1992.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on fallen tree. No. 4555b. 4 June 1992.

Alt. 870m, Sg. Wariu trail, moist shaded forest near stream, on tree. No. 4679; on a small tree near river No. 4694. 8 June 1992.

*Himantocladium loriforme* Fleisch.

Alt. 860m., Sg. Wariu trail, moist shaded forest near stream, on tree base. No. 4674b. 8 June 1992.

*Himantocladium plumula* (Nees.) Fleisch.

Alt. 860m., trail parallel to Sg. Kemantis, on tree near river, shaded. No 4504; Alt. 870m., on tree bark, 1 m, above ground. No. 4526b. 3 June 1992

Alt. 870m., Sg. Wariu trail, moist shaded forest near stream, on buttress. No. 4677; on rocks and trees. No. 4678. 8 June 1992.

*Homaliodendron crassinervium* Ther.

Alt. 870m., trail parallel to Sg. Kemantis, on wet rocks in stream No. 4525c. 3 June 1992.

*Homaliodendron flabellatum* (S.M) Fleisch.

Alt. 870m., trail parallel to Sg. Kemantis, on tree bark, 1m. above ground. No. 4526c. 3 June 1992.

Alt. 1080-1100m., Tepisung trail along Minodtuhan river, moist shaded forest, on tree near stream No. 4619a, 4619c. 5 June 1992.

*Homaliodendron microdendron* (Mont.) Fleisch.

Alt. 1000m., Sg. Wariu trail to Gua Melayu, wet forest, on shrub. No. 4551, 4 June 1992.

Alt. 870m., Sg. Wariu trail, moist shaded forest near stream, on tree. No 4688. 8 June 1992.

*Neckeropsis lepineana* (Mont.) Fleisch.

Alt. 860m., trail parallel to Sg. Kemantis, on twig near stream, No. 4518; Alt. 920m., on fallen tree. No 4542, 3 June 1992.

Alt 900m., Sg. Wariu trail to Gua Melayu, wet forest. on tree No 4571; on branches of tree, 2m. above ground. No. 4595b. 4 June 1992.

Alt. 870m., Sg. Wariu trail, moist shaded forest near stream, on tree. No. 4675. 8 June 1992.

*Pinnatella anacamptolepis* (C.M.) Broth.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on fallen twig. No. 4574c; on fallen tree No. 4585a. 4 June 1992.

*Pinnatella kuehliana* (Bosch et Lac.) Fleisch.

Alt. 1080-1100m., Tepisung trail along Minodtuhan river, moist shaded forest, on tree near stream. No. 4619b. 5 June 1992.

## HOOKERIACEAE

*Actinodontium ascendens* Schwaegrichen.

Alt. 1000m., Tepisung trail along Minodtuhan river, moist shaded forest, on exposed rotten twig. No. 4634. 5 June 1992.

*Callicostella papillata* (Montagne) Mitten.

Alt. 870m, trail parallel to Sg Kemantis, on fallen wet log. No. 45 11. 3 June 1992.

Alt 860m, Minodtuhan trail along ridge, relatively dry, on rotten log near river. No. 4650. 6 June 1992.

*Callicostella prabaktiana* (C.M.) Bosch & Lac.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on rotten log. No. 4600. 4 June 1992.

*Calypstrochaeta microblasta* (Broth.) Tan & Robinson.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on rock in ephemeral stream, partly shaded. No. 4567. 4 June 1992.

*Calypstrochaeta remotifolia* (C. Mull.) Iwats., Tan & Touw.

Alt. 870m., trail parallel to Sg. Kemantis, on wet fallen log in shade No. 4507b; on wet rock in shade. No. 4537. 3 June 1992.

Alt 1010m, Tepisung trail along Minodtuhan river, moist shaded forest, on wet rock. No. 4621, 5 June 1992.

*Chaetomitrium leptopoma* (Schwaegr.) Bosch & Lac.

Alt. 860m., trail parallel to Sg Kemantis, on fallen twig near river No. 4648, 3 June 1992.

Alt. 900m, Sg Wariu trail to Gua Melayu, wet forest, on branches on tree, 2m. above ground. No. 4593d; on leaf, No. 4584, 4 June 1992.

Alt 870m, Sg Wariu trail, moist shaded forest near stream, on living twig. No. 4681b; on wet fallen tree No 4692e, 8 June 1992.

*Chaetomitrium orthorrhynchum* (Dozy & Molk.)

Alt. 870m., trail to Sg Kemantis. on shrub in moist shaded area. No 4501; Alt 900m, on fallen leaves near stream, wet. No. 4526a. 3 June 1992.

Alt 900m., Sg. Wariu trail to Gua Melayu, wet forest, on twig near stream. No. 4575. 4 June 1992.

Alt. 1300m, Minodtuhan trail along ridge, relatively dry, on base of tree. No 4649, 6 June 1992

Alt 870m. Sg Wariu trail, moist shaded forest near stream, on fallen tree No 4687c; on fallen branches of tree, 3m above No 4686b, 8 June 1992.

*Cyclodictyon blumeanum* (C.M.) O. Kuntze.

Alt 860-920m., on rock near stream, semi-shaded. No 4502, 3 June 1992.

*Distichophyllum angustifolium* Dix.

Alt 860-920m., Sg. Kemantis trail on wet rotten log. No. 4515b, 3 June 1992.

*Distichophyllum cirratum* (Ren. et Card.) Fleisch.

Alt. 980m., Tepisung trail on rotten log No 4610c, 8 June 1992.

*Distichophyllum iwatsukii* Nog.

Alt. 980m., Tepisung trail along Minodtuhan river moist shaded forest. on rotten log. No. 4610b, 5 June 1992.

*Distichophyllum kinabaluense* Nog. et Iwats.

Alt. 960m., trail parallel to Sg. Kemantis, on constantly wet rotten log (shade) No 4515, 3 June 1992.

*+Distichophyllum malayense*

Damanhuri &amp; Mohamed.

Alt. 870m, trail parallel to Sg.

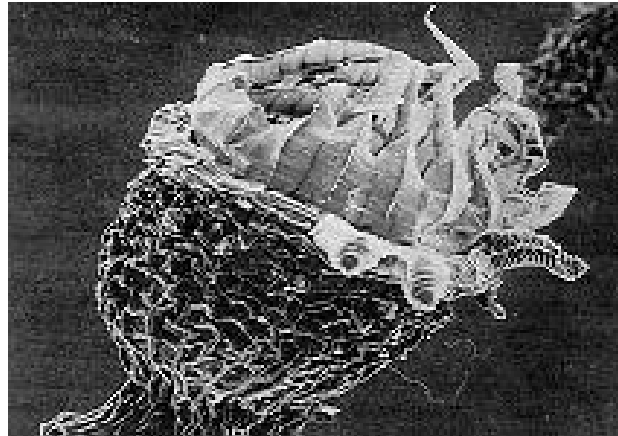
Kemantis, on wet, fallen log in shade.

No 4507a, 3 June 1992.

Alt. 980m., Tepisung trail, on rotten  
log near river. No. 4610a, 8 June 1992.

Notes: This is the first record of this species from Borneo. The type specimen which was collected from Genting Highlands was described sterile. The Sayap specimens have numerous sporophytes and they are described below:

Seta 5-6 mm long, spinuliferous, spines up to 40 m long; calyptra campanulate, brown, pilose, laciniate at base. Capsule dark brown, suberect, theca ovoid-cylindric, up to 0.7 mm long, exothecial cells smooth; operculum rostrate; exostome with wide median furrow, cross-striolate below, endostome as high as exostome, finely papillose, basal

*Distichophyllum malayense*

membrane as high as segment, segments keeled. Spores 10-12 m in diameter, yellow. When this species was first described, Damanhuri and Mohamed (1986) expressed apprehension as to its generic status due to the absence of sporophyte material. The sporophytic characters ascertain that it is a *Distichophyllum* and not *Distichophyllidium* as suggested by the gametophytic characters.

*Distichophyllum mittenii* Bosch & Lac.

Alt. 1020m., Tepisung trail along Minodtuhan river, moist shaded forest, Sg. Mulatok Besar, on rotten log. No. 4605. 5 June 1992.

*Distichophyllum nigricaulae* Mitt.

Alt. 890m., trail parallel to Sg. Kemantis, on wet rock. No. 4514. 3 June 1992.

Alt. 1080m., Tepisung trail along Minodtuhan river, moist shaded forest, river bank, on soil. No. 4614; Alt. 1100m, on shaded soil. No. 4639. 5 June 1992.

*Distichophyllum osterwaldii* Fleisch.

Alt. 870m., trail parallel to Sg. Kemantis, on wet rock. No. 4512, 3 June 1992.

Alt. 870m., Sg. Wariu trail, moist shaded forest near stream, on wet rock in shade. No. 4691, 8 June 1992.

*Distichophyllum tortile* Dozy & Molk. ex Bosch & Lac.

Alt. 870m., trail parallel to Sg. Kemantis, on moist log, partly shaded. No. 4539, 3 June 1992.

## HYPOPTERYGIACEAE

*Cyathophorella spinosa* (C.m.) Fleisch.

Alt 940m., Sg. Wariu trail to Gua Meiayu, wet forest, on base of shrub, shade. No. 4586, 4 June 1992.

+*Hypopterygium aristatum*. Bosch & Lac.

Alt. 870m., Sg. Wariu trail to Gua Melayu, wet forest. on bark of tree. No. 459Sa, 4 June 1992.

*Hypopterygium tenellum* C.M.

Alt. 960m, trail parallel to Sg. Kemantis, on wet rock near waterfall. No. 4523, 3 June 1992.

*Lopidium trichocladon* (Bosch. & Lac.) Fleisch.

Alt. 860m., Sg. Wariu trail, moist shaded forest near stream, on tree base. No. 4674a, 8 June 1992.

## FABRONIACEAE

+*Fabronia curvirostris* Doz. & Molck.

Alt. 1080m., Tepisung trail along Minodtuhan river, moist shaded forest, on rock near river. No. 4601c, 5 June 1992.

## THUIDIACEAE

*Pelekium velatum* Mitt.

Alt. 980m., Tepisung trail along Minodtuhan river, moist shaded forest, on rock in ephemeral stream. No. 4635a, 5 June 1992.

*Thuidium glaucinoides* Broth.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on tree No. 4583, 4 June 1992.

Alt. 1080m, Tepisung trail along Minodtuhan river, moist shaded forest, on wet rocks. No. 4637b, 5 June 1992.

*Thuidium glaucinum* (Mitt.) Jaeg.

Alt. 1300m., Minodtuhan trail along ridge, relatively dry, on base of tree. No.4651b, 6 June 1992.

*Thuidium lejeuneoides* Nog.

Alt. 900m, trail parallel to Sg. Kemantis, on wet rocks. No. 4541e, 3 June 1992

*Thuidium meyenianum* (Hamp.) Doz. et Molk

Alt 900m. Sg. Wariu trail to Gua Melayu. wet forest, on rocks near stream No 4556 4  
June 1992

#### BRACHYTHECIACEAE

+*Brachythecrum buchanani* (Hook.) Jaeg.

Alt. 990m, Sg Wariu trail to Gua Melayu. wet forest, on rock near stream. No 4588,4587,  
4 June 1992

*Rhynchostegium celebicum* (Lac.) Jaeg.

Alt 860m., trail parallel to Sg. Kemantis, on rock near stream, semi shaded No 4802a, 3  
June 1992.

Alt. 870m., Sg Wariu trail, moist shaded forest near stream, on wet rocks. No. 4682. 8  
June 1992

#### SEMATOPHYLLACEAE

+*Papillidiopsis malesiana* Buck & Tan.

Alt 1140m, Minodtuhan trail along ridge, relatively dry, on bark, 2m aboveground. No.  
4668a. 6 June 1992.

+*Rhapidostichum piliferum* (Broth) Broth.

Alt 1160m., Minodtuhan trail along ridge, relatively dry, on tree branch.

Alt 1210m, on tree. No. 4670, 6 June 1992.

*Sematophyllum saproxylophilum* (C.M.) Fleisch.

Alt 860m, trail parallel to Sg. Kemantis, on base of tree near river shaded No 4503, 3 June  
1992.

*Trismegistia lancifolia* (Harv.) Broth

Alt. 1700m., Tepisung trail along Minodtuhan river, moist shaded forest, on log No  
4641c, 5 June 1992.

#### HYPNACEAE

+*Ctenidiadelphus* cf. *plumularia* (C Mull.) Fleisch.

Alt 950m. trail parallel to Sg Kemantis, on tree near waterfall (shade) No. 4509, 3 June  
1992.

Alt 870m, Sg Wariu trail, moist shaded forest near stream, on tree No 4689c, 8 June  
1992.

*Ectropothecium buitenzorgii* (Bel.) Jaeg.

Alt. 1080m., Tepisung trail along Minodtuhan river, moist shaded forest, on rock near river No. 4601b; near stream. No. 4608. 5 June 1992

*Ectropothecium falciforme* (Doz & Molk.) Jaeg.

Alt 900m, Sg Wariu trail to Gua Melayu, wet forest on rocks near stream, partly shaded No. 4557; on fallen twig. No 4574b. 4 June 1992.

Alt. 1000m., Tepisung trail along Minodtuhan river, moist shaded forest, on tree, 1m. above ground. No. 4626a. 5 June 1992.

+*Ectropothecium ferrugineum* (C. Mull.) Jaeg.

Alt. 900m., trail parallel to Sg. Kemantis, on rock near stream. No. 4540b, 4541b, 3 June 1992.

Alt. 900m., Sg Wariu trail to Gua Melayu, wet forest, on rocks near stream No. 4573a. 4 June 1992.

*Leucomium aneurodictyon* (C.Mull.) Jaeg.

Alt. 860m., trail parallel to Sg. Kemantis, on wet rock near river. No. 4510, 3 June 1992.

+*Trachythecium micropyxis* (Broth.) Bartram.

Alt. 870m., trail parallel to Sg Kemantis, on tree bark 1m above ground. No 4526a, 3 June 1932.

Alt 870m, Sg Wariu trail to Gua Melayu, wet forest, on bark of tree No. 4549c, 4 June 1992.

## DIPHYSCIACEAE

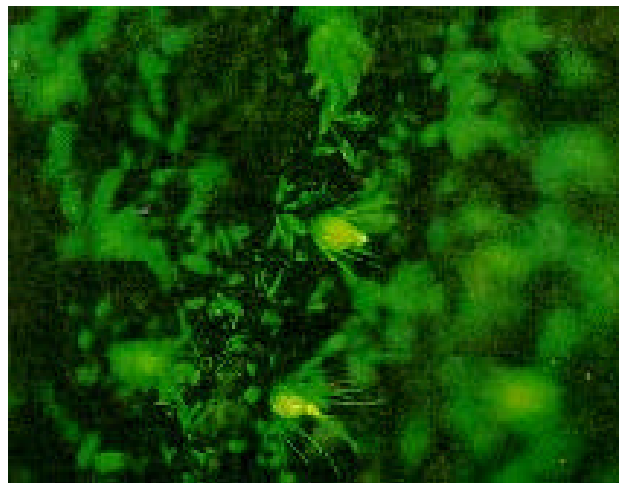
*Diphyscium involutum* Mitt.

Alt. 870m., trail parallel to Sg. Kemantis, on wet rock, partly shaded. No. 4524a, 4624b, 3 June 1992.

Alt. 900m., Sg. Wariu trail to Gua Melayu, wet forest, on wet rock. No 4S65. 4June 1992

Alt. 1020m., Tepisung trail along Minodtuhan river, moist shaded forest. on moist shaded rock. No. 4622 Alt. 1080m., No. 4627b, 5 June 1992.

Alt. 980m, Minodtuhan trail along ridge, relatively dry, Sg. Lumutuk, on wet rock. No. 4660. 6 June 1992.



*Diphyscium involutum*

## POLYTRICHACEAE

*Pogonatum iwatsukii* Touw.

Alt. 870m, trail parallel to Sg Kemantis, on wet rock near parth(shaded). No. 4516. 3 June 1992.

This is the second report of this rare species from this area.

*Pogonatum macrophyllum* Doz. et Molk.

Alt. 1080m., Tepisung trail along Minodtuhan river, moist shaded forest, on soil in shade No. 4603,4628a. 5 June 1992

*Pogonatum piliferum* (Dozy & Molk.) Touw.

Alt. 860m., Sg. Wariu trail to Gua Melayu, wet forest, on exposed soil bank. No. 4566. 4 June 1992.

## DAWSONIACEAE

*Dawsonia beccarii* Broth & Geh.

Alt. 1080m, Tepisung trail along Minodtuhan river, moist shaded forest, on rock near river. No. 4601 a, 5 June 1992.

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