
Checklist

Checklist of Mosses From Southern Part of Maliau Basin Conservation Area, Sabah, East Malaysia

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ABSTRACT. A total of 86 taxa in 40 genera and 20 families of mosses were collected from southern part of Maliau Basin Conservation Area, Sabah, Malaysia, during three separate expeditions held in 1996, 1999 and 2001. This represents about 15% of the reported mosses from Sabah. Two species are new records for Borneo, *Clastobryum cuculligerum* (Sande Lac.) Tixier and *Syrrhopodon parasiticus* (Brid.) Besch., while three are new to Sabah, *Leucobryum bowringii* Mitt., *Syrrhopodon sarawakensis* (Dixon) W.D.Reese and *Trismegistia korthalsii* (Dozy & Mol.) Broth.

INTRODUCTION

Maliau Basin Conservation Area is located at the Southern part of Sabah, East Malaysia in the northern part of Borneo Island. This area of 588.4 square km is the last major tracts of pristine rainforest in Borneo (Yayasan Sabah, 2003). It has become an attraction for researchers, both local and abroad, due to its unique biodiversity for the past two decades. The first collection of bryophytes from Maliau Basin was carried out by the late

Sukup Akin during a scientific expedition which was jointly organised by the Universiti Malaysia Sabah and various agencies in Sabah in May 1996 (Akin & Suleiman 1996). He had collected 62 specimens of bryophytes in the vicinity of Camel Trophy Camp (116°57' E, 4°43'N) from an altitude of 800 to about 1100 m a.s.l. Two mini expeditions were participated by the present authors in May 1999 and May 2001 at Agathis Camp (116°54' E, 4°41'N), foot of Maliau Basin, and along the trail towards the Camel Trophy Camp at southern part of Maliau Basin (Fig.1). A total of 652 specimens of bryophytes were collected from an altitude of 500 m to 1000 m a.s.l. during these expeditions. Among the collection were two new species, *Chaetomitrium maryatii* H. Akiyama & M. Suleiman and *Trismegistia maliauensis* H. Akiyama & M. Suleiman, that have been published earlier (Akiyama & Suleiman., 2001; Akiyama & Suleiman, 2003).

The most recent collection in Maliau Basin was done by Mohamed *et al.* (2006) at Eucalyptus Camp, north western part of Maliau Basin. They have collected 108 taxa of mosses from 900-1200 m a.s.l. during the expedition held in 2006.

Key words: Mosses, checklist, Maliau Basin, Sabah, Malaysia.

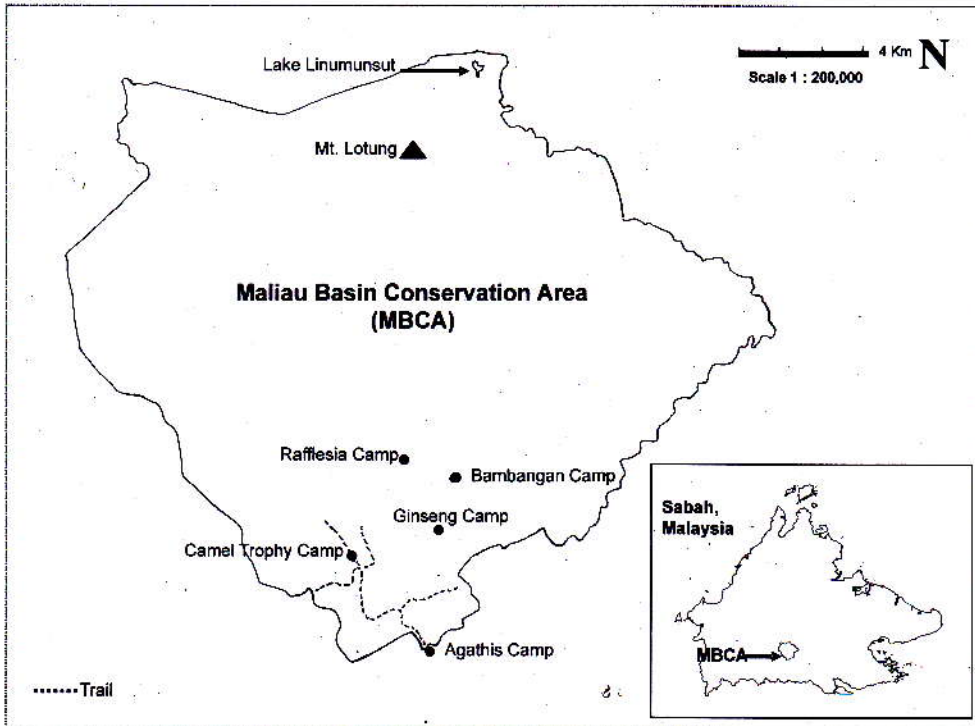


Figure 1. Map of Maliau Basin Conservation Area Showing the Study Site

This paper deals with the collection in 1996, 2000 and 2001. The specimens are deposited at BORH and HYO. An asterisk (*) indicates a species which is new to Sabah and double asterisks (**) for species new to Borneo. Collections with the prefix MB were collected by Sukup Akin.

Species checklist

SPHAGNACEAE

Sphagnum junghuhnianum Dozy & Molk.
On soil, 800-1100m, MB14.

Sphagnum perichaetiale Hampe
On soil, 800-1100m, MB38.

There are only two records of this species, so far, in Sabah (Eddy 1977; Menzel & Schultze-Motel 1991).

DIPHYSCIACEAE

Diphyscium mucronifolium Mitt.
On wet boulders at river bed, 450-600m, Akiyama Maliau-84, 516, 529, M.Suleiman 430, 432.

POLYTRICHACEAE

Pogonatum piliferum (Griff.) Mitt.
On soil, 500-600m, Akiyama Maliau-9, 580, M.Suleiman 557.

FISSIDENTACEAE

Fissidens ceylonensis Dozy & Molk.
On wet rock in a stream, 500m, Akiyama Maliau-528.

Fissidens crassinervis Sande Lac.
var. *crassivervis*
On clay soil, 500-600m, Akiyama Maliau-8, 118.

Fissidens crassinervis Sande Lac. var. *laxus* (Sull. & Lesq.) A.Eddy On termite nest and wet rock, 450-600m, Akiyama Maliau-63, M.Suleiman 440, 545.

Fissidens crenulatus Mitt. var. *elemeri* (Broth.) Z.Iwats. & Tad.Suzuki
On rock at streambed, 500-600m, Akiyama Maliau-78.

Fissidens crispulus Brid.
On wet and submerged boulders, 450m, M.Suleiman 431, 433, 434, 435, 436, 438, 440, 443.

Fissidens polypodioides Hedw.
On boulder and soil, 500-810m, Akiyama Maliau-29, 164.

Fissidens punctulatus Sande Lac.
On wet rock, 450m, M.Suleiman 437

DICRANACEAE

Campylopus comosus (Schwägr.) Bosch & Sande Lac.
On tree trunk, 800-1100m, MB225.
The only record of this species in Sabah was by Dixon in 1916.

Dicranoloma braunii (Müll. Hal.) Paris
On tree branch, 800-1100m, MB18.
The previous records of this species from Sabah was about 70 years ago (Dixon 1935; Bartram 1936).

Dicranoloma brevisetum (Dozy & Molk.) Paris
On tree trunk, 800-1100m, MB-23.

Microdus brasiliensis (Duby) Thér
On clay soil, 500-600m, Akiyama Maliau-10, 11.

Microdus miquelianus (Mont.) Besch.
On soil, 500m, Akiyama Maliau-504.
The only record of this species, which is common in disturbed sites, in Sabah was from Mt. Trus Madi (Suleiman & Edwards 2002).

LEUCOBRYACEAE

Leucobryum aduncum Dozy & Molk. var. *scalare* (Müll.Hal. ex M.Fleisch.) A.Eddy. On rock and tree stump, 450-870m, M.Suleiman 460, 536a.

Leucobryum arfakianum Müll.Hal. ex Geh.
On tree trunk, 800-1100m, MB12, MB77.

**Leucobryum bowringii* Mitt.
On rock, 870m, M. Suleiman 536b.
Recorded from Sarawak and Kalimantan Barat (Suleiman *et al.* 2006).

Leucobryum candidum (P.Beauv.) Wils.
On the base of tree trunk, 500-600m, Akiyama Maliau-16.

Leucobryum javense (Brid.) Mitt.
On tree trunks and roots and soil, 450-1100m, Akiyama Maliau-173, 545, M.Suleiman 453, 535, 541, MB39, MB60.

Leucobryum sanctum (Brid.) Hampe.
On rotten logs, tree trunks and roots, 450-600m, Akiyama Maliau-22, 27, M.Suleiman 451, 462, 465, 478, 479, 490, 528.

Octoblepharum albidum Hedw.
On tree stump, 450m, M.Suleiman 461.

SCHISTOMITRIACEAE

Schistomitrium apiculatum (Dozy & Molk.) Dozy & Molk. var. *apiculatum*
On soil and tree trunk, 800-1100m, MB16, MB67.

CALYMPERACEAE

Arthrocormus schimperi (Dozy & Molk.) Dozy & Molk.
On tree trunks, 450-600m, Akiyama Maliau-16, 97, M.Suleiman 452, 504.

Calymperes fasciculatum Dozy & Molk.
On trunk bases of trees and shrubs, 500-600m, Akiyama Maliau-72, 124, 126.

Calymperes lonchophyllum Schwägr. ssp. *lonchophyllum*

On trunks of trees and shrubs, 450-600m, Akiyama Maliau-21, M.Suleiman 448.

Calymperes strictifolium (Mitt.) Broth.

On tree trunk, 450m, M.Suleiman 459.

Leucophanes candidum (Schwägr.) Lindb.

On the base of tree trunk, 500-600m, Akiyama Maliau-17.

Leucophanes octoblepharoides Brid.

On branches of shrubs, tree trunks and rotten logs, 450-500m, Akiyama Maliau-573, M.Suleiman 450, 464, 517.

Mitthyridium repens (Harv.) H.Rob.

On branches of shrubs, tree roots, fallen logs and soil, 450-834m, Akiyama Maliau-57, 581, M.Suleiman 505, 531, 532, 553, 562.

Mitthyridium undulatum (Dozy & Molk.) H.Rob.

On tree and shrubs trunks and branches, 450-858m, Akiyama Maliau-14, 67, 98, 107, M.Suleiman 500, 501, 522, 533, 550, 577.

Mitthyridium wallisii (C.Müll.) H.Rob.

On fallen branch, 500-600m, Akiyama Maliau-66. This is the second record for this species for Sabah (M.A.M. Andi & Suleiman 2005).

Syrrhopodon albo-vaginatus Schwägr.

On rotten logs, 459-492m, M.Suleiman 509, 516.

Syrrhopodon confertus Sande Lac.

On fallen branch, tree trunks and rotten logs, 456-600m, Akiyama Maliau-118, 533, M.Suleiman 512, 515a, 554.

Syrrhopodon croceus Mitt.

On fallen branch, 500m, Akiyama Maliau-584, M.Suleiman 515b.

Syrrhopodon hispidissimus Dixon

On fallen branches and rotten log, 500-600m,

Akiyama Maliau-116, 532.

This rare species has only been reported once in Sabah (Suleiman & Edwards 2002), once in Sarawak (Menzel & Schultze-Motel 1990) and once in Kalimantan Timur (Menzel & Schultze-Motel 1990).

Syrrhopodon involutus Schwägr.

On fallen tree trunk, 500-1100m, Akiyama Maliau-60, MB-s.n.

Syrrhopodon muelleri (Dozy & Molk.) Sande Lac. var. *muelleri*

On tree and shrub trunks, 450-702m, Akiyama Maliau-52, 86, 125, 159, 535, M.Suleiman 498, 511, 563.

***Syrrhopodon parasiticus* (Brid.) Besch.

On branches of shrubs, 500m, Akiyama Maliau-92, 547.

This nearly pantropical species has previously been reported from the Philippines (Tan & Iwatsuki 1991; Ellis & Tan 1999).

Syrrhopodon prolifer Schwägr.

On soil and tree trunk, 500-1100m, Akiyama Maliau-51, M.Suleiman 537, 538, 547, MB142.

**Syrrhopodon sarawakense* (Dixon) W.D.Reese

On shrub trunk, 513m, M.Suleiman 530. This species is only found in Sarawak and Peninsula Malaysia (Dixon 1935; Reese 1987; Menzel & Schultze-Motel 1990).

Syrrhopodon spiculosus Hook.

On soil, 510-1100m, M.Suleiman 524, MB164b.

Syrrhopodon trachyphyllum Mont.

On rotten log, 690m, M. Suleiman 565.

RHIZOGONIACEAE

Pyrrhobryum latifolium (Bosch & Sande Lac.) Mitt.

On tree roots, trunks and rotten logs, 450-513m, M.Suleiman 454, 463, 491, 534.

Pyrrhobryum spiniforme (Hedw.) Mitt.

On rotten logs and base of tree trunks, 500-600, Akiyama Maliau-1, 112.

HYPNODENDRACEAE

Hypnodendron subspiniervium (Müll.Hal.)

A.Jaeger ssp. *arborescens* (Mitt.) Touw

On tree stump, trunks and branches, soil and rotten log, 444-1100m, Akiyama Maliau-28, 520, M.Suleiman 469, 493, 497, 571, 576, MB157.

ORTHOTRICHACEAE

Macromitrium ochraceum (Dozy & Molk.) Müll.Hal.

On tree trunks, 800-1100m, MB41, MB45, MB133.

PTEROBRYACEAE

Neolindbergia rugosa (Lindb.) M.Fleisch.

On base of tree trunk, 690m, Akiyama Maliau-163. This species has only been reported in Sabah for Borneo Island (Akiyama *et al.* 1991; Suleiman *et al.* 2006).

GAROVAGLIACEAE

Garovaglia compressa Mitt. var. *compressa*

On branches of shrubs, 444-600m, Akiyama Maliau-148, 552, 568, M.Suleiman 467, 568, 572, 574.

Garovaglia elegans (Dozy & Molk.) Bosch & Sande Lac.

On fallen branches and trunk of small trees and on fallen logs, 450-580m, Akiyama Maliau-162, 546, M.Suleiman 474, 492, 519.

METEORACEAE

Aerobryopsis wallichii (Brid.) M.Fleisch.

On branches and trunks of shrubs, fallen tree trunk and rotten branches, 450-1100m, Akiyama Maliau-30, 68, M.Suleiman 455, 494, MB6, MB95.

NECKERACEAE

Homaliodendron exiguum (Bosch & Sande Lac.) M.Fleisch.

On shrub trunk, 500-600m, Akiyama Maliau-119, 554.

Homaliodendron flabellatum (Sm.)

M.Fleisch.

On shrub trunk, 980m, Akiyama Maliau-181.

Neckeropsis gracilentata (Bosch & Sande Lac.) M.Fleisch.

On fallen branch, 500-600m, Akiyama Maliau-89.

Pinnatella mucronata (Bosch. & Sande Lac.)

M.Fleisch.

On trunk of shrubs, 450-600m, Akiyama Maliau-75, 154, 548, M.Suleiman 496.

DALTONIACEAE

Ephemeropsis tjibodensis Goeb.

On leaves of shrubs, 450-600m, Akiyama Maliau-96, 132, M.Suleiman 447.

HOOKERACEAE

Callicostella probaktiata (Müll. Hal.) Bosch & Sande Lac.

On moist and wet boulders at streambed, sometimes submerged, 450-600m, Akiyama Maliau-69, 137, 536, M.Suleiman 429.

Chaetomitrium leptopoma (Schwägr.) Bosch & Sande Lac.

On fallen log, 450m, M.Suleiman 473.

Chaetomitrium maryatii H.Akiyama & M.Suleiman

On branches of shrubs, 500m, Akiyama Maliau-111, 543, 576.

This species has been described based on the material collected at Maliau Basin (Akiyama & Suleiman 2001) and, so far, not known elsewhere.

Chaetomitrium orthorrhynchium (Dozy & Molk.) Bosch & Sande Lac.

On branches of shrubs, 500-600m, Akiyama Maliau-114, 570, 579.

Chaetomitrium setosum Broth. ex Dixon

On tree trunks and branches and logs, 450-492m, Akiyama Maliau-115, 142, 551, M.Suleiman 470, 518, 520.

THUIDIACEAE

Thuidium pristocalyx (Müll.Hal.) A.Jaeger var. *samoanum* (Mitt.) Touw

On tree trunks and shrub branches, 500-600m, Akiyama Maliau-100, 569.

SEMATOPHYLLACEAE

Acanthorrhynchium papillatum (Harv.) M.Fleisch.

On rotten log and tree trunk, 450-600m, Akiyama Maliau-4, 19, 24, 194, 526, 544, 561, 574, M.Suleiman 477, 506, 510, 527.

This species is common along the river in Agathis Camp.

Acroporium adpersum (Hampe) Broth.

On branches and leaves of shrubs, 450-600m, Akiyama Maliau-88, 121, 133, 134, M.Suleiman 444, 446, MB 219.

The only record of this species in Sabah was from the Crocker Range Park (Suleiman & Akiyama 2004).

Acroporium diminutum (Brid.) M.Fleisch.

On fallen log, 450m, Akiyama Maliau-346, M.Suleiman 472, 475.

Acroporium johannis-winkleri Broth.

On rotten log, 500-846m, Akiyama Maliau-120, M.Suleiman 551, 561.

Acroporium lamprophyllum Mitt.

On branches and trunk of trees and shrubs, 450-600m, Akiyama Maliau-25, 47, M.Suleiman 466, 525.

Acroporium rigens (Broth. ex Dixon) Dixon
On rotten log, 980m, Akiyama Maliau-179.

Acroporium rufum (Reinw. & Hornsch.) M.Fleisch.

On soil, 870m, M.Suleiman 539.

Acroporium secundum (Reinw. & Hornsch.) M.Fleisch.

On tree trunk, 500-600m, Akiyama Maliau-95, MB42.

This species has previously been recorded from Mt. Trus Madi (Suleiman & Edwards 2002).

Acroporium stramineum (Reinw. & Hornsch.) M.Fleisch.

On tree trunks and logs, 450-750m, M.Suleiman 559, 567.

***Clastobryum cuculligerum* (Sande Lac.) Tixier

On leaves, 450m, M.Suleiman 445.

This species has been reported from Peninsular Malaysia, Java and the Philippines (Fleischer 1915-1922; Bartram 1936; Mohamed & Tan 1988; Tan & Iwatsuki 1991).

Clastobryophilum bogoricum (Bosch & Sande Lac.) M. Fleisch.

On tree trunk, 500-600m, Akiyama Maliau-127.

Isocladiella surcularis (Dixon) B.C.Tan & Mohamed

On trunk of trees and small shrubs, 459-750m, Akiyama Maliau-160, 558, M.Suleiman 508, 560.

Papillidiopsis luxurians (Dozy & Molk.) W.R.Buck & B.C.Tan

On shrub and tree trunks and branches, 450-1100m, Akiyama Maliau-147, 152, 541, M.Suleiman 499, MB21, MB37, MB258.

The only record of this species in Sabah was 91 years ago (Dixon 1916).

Papillidiopsis ramulina (Thwaites & Mitt.)
W.R.Buck & B.C.Tan

On wet boulder, sometimes submerged, 450-600m, Akiyama Maliau-83, M.Suleiman 439, 514. The only record of this species in Sabah was by Dixon (1935).

Radulina elegantissima (M.Fleisch.)
W.R.Buck & B.C.Tan

On branch of fallen tree, 500-600m, Akiyama Maliau-104.

This species has previously been recorded from Mt. Trus Madi in Sabah (Suleiman & Edwards 2002).

Taxithelium kerianum (Broth.) Broth.

On leaves and branches of shrubs, 500-600m, Akiyama Maliau-74, 109, 123, 131, 553, 567.

Trichosteleum saproxylophilum (Müll.Hal.)
B.C.Tan & Ramsay

On shrub trunk, 500-600m, Akiyama Maliau-64, 195.

Trismegistia brachyphylla M.Fleisch.

On rotten log, tree trunks and boulders at streambed, 500-1100m, Akiyama Maliau-506, 511, 512, 537, MB-56, MB-83.

Second record for Sabah (Suleiman & Akiyama 2004).

Trismegistia calderensis (Sull.) Broth.

On tree trunk, 450m, M.Suleiman 503.

**Trismegistia korthalsii* (Dozy & Molk.)
Broth.

On tree trunks, bases and roots, rocks, rotten logs, soil, 450-870m, Akiyama Maliau- 5, 71, 90, 108, 175, 193, 502, 509, 513, 514, 517, 518, 522, 523, 525, 542, 549, 560, 562, 563, 564, 565, 572, 577, M.Suleiman 457, 449, 544, 546, 548, 552, 566.

The only record of this species in Borneo was from Sarawak (Brotherus 1928). It is common in Agathis Camp.

Trismegistia maliauensis H.Akiyama & M.Suleiman

On wet boulders, 550-600m, Akiyama Maliau-82, 141, 192, 506, 511, 512, 537.

This rheophytic species has been described based on the specimens collected at Maliau Basin (Akiyama & Suleiman 2003) and so far not known elsewhere.

Mastopoma pulchellum (Herzog) H.Akiyama

On trunks of shrubs, 500m, Akiyama Maliau-45, 113, 501, 507, 524, 575, 582, M.Suleiman 476, 578.

Akiyama (2006) proposed new combination for this pretty moss. It is very abundant on tree trunks along a river around Agathis Camp.

HYPNACEAE

Ctenidiadelphus plumularia (Müll.Hal.)
M.Fleisch.

On rotten log, 500-600m, Akiyama Maliau-54. This species has previously been reported from Mt. Kinabalu (Mohamed 1998).

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