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Short Report

Database of bryophytes and their ecological parameters in the CMU Herbarium

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Introduction

Chiang Mai University (CMU) Herbarium was originally established in July 1987 at the Faculty of Pharmacy, Chiang Mai University by James F. Maxwell. This herbarium, with over 10,000 specimens of vascular plants and about 40 bryophytes, was discontinued in late 1991. Maxwell subsequently joined the Biology Department, Faculty of Science in March 1992 and developed another collection which now (July 2008) has nearly 30,000 specimens of vascular plants. The Bryophyte Section was started by Dr. Kanya Santanachote in 1999 and has 2,350 specimens.

Bryology Studies in Thailand

The first bryophytes collected in Thailand were from Koh Chang (Chang Island), Trat Province during 1899-1902. V. F. Brotherus [1] prepared a list of Bryales which included 44 species, 18 of which were new species. F. Stephani [2] identified the Hepaticae which had 17 species, 4 of which were new to science. Stephani and Brothereus identified the Hepaticae collected by Hosseus [3] which had 4 new species, on the summits of Doi Sutep-Pui, Chiang Mai during 1904-05. Dixon [4] provided the first list of Thai mosses which consisted of 220 species. The information for most entries comprised the location, elevation, basic habitat, date of collection, and overall distribution. The collections of Dr. A.F.G. Kerr, who collected extensievely in Thailand, were included. Tixier and

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Smitinand [5] provided a detailed list of bryophytes in the Forest Herbarium, Bangkok, which included location, elevation, habit, habitat, and overall geographical distribution. No notes concerning sporophyte or gametophyte stages, abundance, and microhabitats were provided. A concise checklist of Thai bryophytes was published by Sornsamran and Thaithong in 1995 [6]. This book includes the location and publication report information for each species. All other information concerning habitat, elevation, etc. is excluded. He [7] has provided the most recent and reliable list of mosses for Thailand. This essential reference also includes illustrations, references, distributions in Thailand and Asia, elevations, as well as Thai specimens and the herbaria they were deposited in. A total 52 families, 192 genera, 620 species, and 30 subspecific taxa are presented. Lai et al. [8] compiled a list of Thai liverworts and hornworts, which, unfortunately, lacks ecological information. There are 37 families, 90 genera, and 386 species included in this vital publication.

The database presented here (Appendix 1) is the first of its kind for Thai bryophytes. It follows a general format which has been adopted by the CMU Herbarium [9,10]. Forest types and habitats are according to Maxwell [11].

Summary

The Bryophyte Section has more than 2,350 specimens, and is identified into 60 families, 135 genera, 272 species, 4 subspecies, and 9 varieties (Table 1).

Table 1. Bryophytes in the CMU Herbarium

Class	Families	Genera	Species	Sub-species	Var-ieties
Bryopsida	35	94	194	1	9
Hepaticopsida	22	37	69	2	0
Anthocerotosida	3	4	9	1	0
Total	60	135	272	4	9

Acknowledgements

We would like to thank Prof. Benito C. Tan and Sutchit Manachit for not only collecting many specimens with accurate notes, but also helping in identification. J. F. Maxwell, curator of the CMU Herbarium, is thanked for suggesting, encouraging, and providing constant assistance in the preparation of this database.

References

1. V. F. Brotherus, “Bryales”, in J. Schmidt, “Preliminary report on the flora of Koh Chang III”, *Bot. Tids.*, **1901**, *24*, 61-71.
2. F. Stephani, “Hepaticae”, in J. Schmidt, “Preliminary report on the flora of Koh Chang V”, *Bot. Tids.*, **1902**, *24*, 175-178.

3. C. Hosseus, "Die botanischen ergebnisse meiner expidition nach Siam", *Bot. Centralb. Beih.*, **1911**, *2*, 361-363.
4. H. S. Dixon, "Moss flora of Siam", *J. Siam Soc. Nat. Hist. Suppl.*, **1932**, *9*, 1-51.
5. P. P. Tixier and T. Smitinand, "Checklist of the moss collection in the Forest Herbarium, Royal Forest Herbarium, Bangkok", *Nat. Hist. Bull. Siam Soc.*, **1966**, *21*, 161-195.
6. R. Sornsamran and O. Thaithong, "Bryophytes in Thailand", Office of Enviromental Policy and Planning, Ministry of Science, Technology, and Environment, Bangkok, **1995**, 234 pp.
7. S. He, "An annotated checklist of the mosses of Thailand", Missouri Botanical Garden, USA, **2006**, 320 pp.
8. M. J. Lai, R. L. Zhu, and S. Chantanaorpint, "Liverworts and hornworts of Thailand: an updated checklist and bryofloristic accounts", *Ann. Bot. Fennici*, **2008**, *45*, 321-341.
9. J. F. Maxwell, "Annotated enumeration the vascular flora of Doi Sutep-Pui National Park, Part III", in J. F. Maxwell and S. Elliott, "Vegetation and vascular flora of Doi Sutep-Pui National Park, northern Thailand", *Thai Studies in Biodiversity*, **2001**, *5*, 59-154.
10. J. F. Maxwell, "Vegetation of Doi Tung, Chiang Rai Province, Northern Thailand", *Maejo Int. J. Sci. Tech.*, **2007**, *1*, 10-63.
11. J. F. Maxwell, "A synopsis of the vegetation of Thailand", *Nat. Hist. J. Chulalongkorn U.*, **2004**, *4*, 19-29.

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Appendix 1. Database of bryophytes and their ecological parameters in the CMU Herbarium

Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Bryopsida Sphagnaceae *Sphagnum cuspidatulum* C. Muell.	ac	pe	ter	4	egf	2,556	o,m,c	gr	?	ja-dc	Wong.703	g	ak
Sphagnum luzonense Warnst.	ac	pe	ter	3	egf	1,284	o,s,m	gr	?	ja-dc	Wong295	g	pk
Sphagnum perichaetiale Hampe	ac	pe	ter,emr	3	dof	525	o,m	ss	?	ja-dc	Maxw. B186	g	na
Sphagnum robinsonii Warnst.	ac	pd	epl	3	mxf	1,500	o,s,m	gr	?	ja-dc	Korn.270	g	dl
Archidiaceae *Archidium* sp.	ac	a	ter	4	mxf	730	o,d	gr	?	ja-dc	Prin.27	g	mt
Diphysciaceae *Diphyscium* sp.	ac	pe	epl	2	egf	2,500	s,m	gr	?	ja-dc	San.0515	g	ak
Fissidentaceae *Fissidens aereolatus* Griff.	ac,cuc, ere	pd	ter	4	egf	2,500	s,m	gr	ag-dc	ja-dc	Wong.304,313,314,3217 64,765	g,s	kp,pk
Fissidens anomalus Mont.	ac	pd	cor	4	egf	1,636-2,560	s,m	gr	?	ja-dc	Wong.273,290,709,712,7 49	g	ak,kp, dp
Fissidens backettii Mitt.	ac,cuc, inc	a	ter	2	mxf	1,100-1,300	s,m	gr	jl-oc	ja-dc	Wong.150,155,338,339,3 40,342	g,s	pk,ml, dp
Fissidens bryoides Hedw. subsp. *schmidii* (C. Muell.) Nork.	ac	pd	epl	3	egf	1,355	s,m	gr	jl-nv	ja-dc	Korn.195	g,s	ck
Fissidens ceylonensis Dozy & Molk.	ac,cuc, ere	pd	ter, epl, cor	5	mxf	730-850	o,d, s, m	gr	jn-oc	ja-dc	Prin.41,83,108, Polb.17,51,79,Man.11,20 3,228	g,s	mt,so

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Fissidens crassinervis Lac. var. *laxus* (Sull. & Lesq.) Eddy	ac,cuc, ere	pd	ept	3	mxf,egf	1,010	s,m	gr	ag-dc	ja-dc	San.209	g,s	dp
Fissidens crenulatus Mitt. var. *elmeri* (Broth.) Z. Iwats & Suzuki	ac	a	ter,cor	1	dof,mxf	1,100	o,d	gr	?	ja-dc	Wong.173,181,405,553,612,644	g	pp,cd, nn,dp, ky
Fissidens crispulus Brid. var. *crispulus* Musc.	ac,cuc, ere	pd	ter	5	mxf,egf	730-1,360	s,m	gr	jn-oc	ja-dc	Prin.42,59,61,89, Polb.3,16,39,63, Prom.24,Korn.242	g,s	mt,ck
Fissidens crispulus Brid. var. *robinsonii* (Broth.) Z. Iwats.& Z.-H.Li	ac,cuc, ere	pd	ter, cor	3	mxf	730	s,m	gr	?	ja-dc	Prin.46,69,77, Polb.30,40,66, Prom.22	g,s	mt
Fissidens flaccidus Mitt.	ac	pd	ter	3	mxf	850	o,m	gr	?	ja-dc	Man.172,173	g	so
Fissidens gangdongensis Z. Iwats. & Z. H. Li	ac	a	ter,cor	3	mxf	1,100-1,300	o,m	gr	?	ja-dc	Wong.158,303,310,330	g	pk,ml
Fissidens geminiflorus Dozy & Molk.	ac	ped	epl	3	mxf,egf	730-1,360	s,m	gr	?	ja-dc	Prom.3,28,63,Korn.255	g	mt,ck
Fissidens hollianus Dozy & Molk.	ac,cuc, ere	pd	ter	4	mxf	570-2,500	dof,mxf, egf	gr,ls	jl-oc	ja-dc	Wong.206-209,216,217,221,428440,623,748	g,s	ky,kp, pp,dp, cd
Fissidens incognitus Gang.	ac,cuc, ere	a	ter	1	mxf	730	s,m	gr	?	my-dc	Prin.21,38	g,s	mt
Fissidens javanicus Dozy & Molk.	ac	pd	ter	3	mxf,egf	1,300	s,m	gr	?	ja-dc	Wong.331	g	pk
Fissidens microcladus Thw. & Mitt.	ac	a	cor	3	dof,mxf, egf	350-1,300	o,s,d	g	?	ja-dc	Wong.178,270,271,309,389,391,398,401	g	php, cmu,nl,pk
Fissidens nobilis Griff.	ac	pd	emr, rhe,ter	2	mxf,egf	730-1,355	s,m	gr	?	ja-dc	Prin.71, Prom.1,36, Man.42,Korn.75,100,104,154,156, 184,193,244	g	mt,so, ck

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Fissidens pellucidus Hornsch.	ac	a	ter	2	mxf	730-850	s, m	gr	oc-ja	my-sp	Prin.33,Man.311,314	g,s	mt
Fissidens semperfalcatus Dix.	ac	a	ter	2	mxf	730	s,m	gr	?	my-sp	Prin.44,Polb.31,67	g	mt
Fissidens serratus C. Muell.	ac	a	ter	2	mxf,egf	1,300-2,556	s,m	g	?	ja-dc	Wong.154,336,436,437,438,440	g	pk,dp, ak
Fissidens subbryoides Gang.	ac,cuc, ere	a	ter	2	dof,mxf	570-1,300	o,m	gr	jl-nv	my-dc	Polb.40,41,78,Wong.193, 339,438	g,s	mt,ky, dp,pk
Fissidebs taxifolius Hedw.	ac,cuc, inc	pd	ter,epl	3	egf	1,360	s,m	gr	oc-dc	ja-dc	Korn.74,218,234,244,245	g,s	ck
Fissidens virens Thw. & Mitt.	ac	a	ter	1	mxf	1,200	o,m	gr	?	ja-dc	Wong.162	g	ml
Fissidens zollingeri Mont.	ac,cuc, ere	a	ter	3	dof,mxf, egf	30-1,380	s,m	gr	?	my-sp	Prin63,Polb.34,77,Korn. 223,Maxw.B178	g,s	mt,ck,mk
Ditrichaceae *Ditrichum heteromallum* (Hedw.) Britt.	ac,cuc, ere	pd	epi	3	egf	1,685	s,m	gr	sp-dc	ja-dc	San.192	g,s	dp
Garckea flexuosa (Griff.) Margard. & Nork	ac,cuc, ere	pd	ter	4	mxf,egf	730-1,685	o,d	gr	jn-oc	ja-dc	Prin.49,65,109 Polb.4,15,47,73, Man.151,155,195,216,219, San.200,349	g,s	mt,so, dp
Garckea phaseoides C. Muell.	ac,cuc, ere	pd	ter	3	egf	1,300	s,m	gr	sp-dc	ja-dc	Maxw.B126	g,s	dn
Trematodon sp.	ac	pd	ept	3	mxf	680	s,d	gr	?	ja-dc	San.344	g	dp
Dicranaceae *Brothera leana* (Sull.) C. Muell.	ac	pd	epi	3	egf	1,685	s,m	gr	?	ja-dc	San.150	g	dp
Campylopodium sp.	ac	pd	ept,ter	3	egf	1,300-1,685	s,m	gr	?	ja-dc	San.265,Maxw.B126	g	dp,dn

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Campylopus aureus Bosch *et* Lac.	ac	pd	epi	3	egf	1,030	s,m	gr	?	ja-dc	San.216	g	dp
Campylopus ericoides (Griff.) Jaeg.	ac	pd	ter	4	mxf	730-850	o,d	gr	?	ja-dc	Prin.60,86, Polb.42,64, Man.72,118,236,247	g	mt,so
Campylopus hemitrichius (C. Muell.) Jaeg.	ac	pd	cor	2	egf	1,325	s,m	gr	?	ja-dc	Wong.64	g	km
Campylopus subluteus (Mitt.) Jaeg.	ac	pd	ept	3	dof	500	s,m	gr	?	ja-dc	San.201	g	dp
Dicranella sp.	ac,cuc, ere/inc	pd	ept,ter	3	egf,da	1,550-1,685	s,m	gr	sp-dc	ja-dc	San.4,87,Schw.3	g,s	dp,akh
Dicranodontium uncinatum (Harv.) Jaeg.	ac	pd	ram	3	egf	2,500	s,m	gr	?	ja-dc	San.054/2	g	ak
Dicranoloma fragile (Hook.) Broth.	ac	pd	cor	3	def,egf	1,325-1,685	o,s,m	gr	?	jn-oc	Korn.324,325,326,382,385,386,Wong.65,San.97,125,133,135,156,224	g	sk,km, dp
Leucoloma mittenii Fleisch.	ac,cuc, ere	pd	ter, cor	3	mxf,egf	730-1,325	s,m	gr	ag-nv	ja-dc	Prin.70,Man.27,37,107,130,334,Wong.66,Maxw. B193	g,s	mt,so, km,ky
Microdus sp.	ac	pd	ept,ter	3	egf,mxf	1,320-1,050	s,m	gr	sp-dc	ja-dc	San.180,Maxw.B161	g,s	dp,mm
Wilsonniella decipens (Mitt.) Alst.	ac,cuc, ere	pd	ter	3	dof	700	o,m	gr	ag-dc	ja-dc	Prin.137	g,s	hk
Leucobryaceae *Leucobryum aduncum* Dozy & Molk. var. *scalare* C. Muell. *ex* Fleisch.) Eddy	ac,cuc, inc/hor	ped	cor, ram, lig	4	mxf,def	730-1,685	o, s, d, m	gr	jn-nv	ja-dc	Polb.9,11,21,52,Korn.256,397,400,402,Man.27,35,61,62,63,65,68,Wong.68,San.136,Maxw.B58,60,137,158,165,192	g,s	mt,sk, so,ck, km,dp,nk,dg,dh,st,ppl

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Leucobryum candidum (P. Beauv.) Wils.	ac,cuc, hor	pd	epi	3	egf	1,030-1,295	s,m	gr	?	ja-dc	San.217,231	g	dp
Leucobryum juniperoideum (Brid.) C. Muell.	ac,cuc,inc/hor	pd	epi	3	egf	1,685	s,m	gr	ag-dc	ja-dc	San.103	g,s	dp
Leucobryum microleucophanoides Dix. *ex* A. Johnson	ac,cuc,inc/hor	pd	cor,ram	3	egf	1,300	s,m	gr	sp-dc	ja-dc	Maxw.B129	g,s	dn
Ochrobryum kurzianum Hampe	ac,cuc, mit,ere	pd	cor, ram	3	dof,mxf, egf	30-1,325	o,d,s,m	gr,ss	jl-dc	ja-dc	Polb.6,12,22,59, Prin.4,Maxw.B,136,184	g,s	mt,mk,km
Octoblepharum albidum Hedw.	ac,cuc, ere	pd	epl, cor, ram, lig	4	dof,mxf, def	30-1,685	o, s, d, m	gr	jn-nv	ja-dc	Polb.13,23,60, Prom.25, Prin.32,68,Korn.121,389, 390,Man.35,44,49,61,65, Wong.69,San.137,145,272Maxw.B48,109,135,188 ,Tips.12,Teps.12	g,s	mt,sk, so,ck, km,dp,ak, mk,kbk,ppl
Calymperaceae *Calymperes afzelii* Sw.	ac	a	ter, epl, cor	2	mxf	730	s,m	gr	?	my-dc	Prin.2,20,58, Prom.26	g,gm	mt
Calymperes moluccense Schwaegr.	ac	pd	cor	3	egf (swamp)	75	o,m	ls	?	ja-dc	Maxw.B154	g	kk
Calymperes palisotii Schwaegr.	ac	pd	cor	3	mxf	830	o,s	gr	?	ja-dc	Man. 70,130	g,gm	so
Syrrhopodon armatus Mitt.	ac	pd	cor,ram	2	mxf	850	o,s	gr	?	ja-dc	Man.48	g,gm	so
Syrrhopodon gardneri (Hook.) Schwaegr.	ac	pd	cor	3	egf	1,325-1,685	s,m	gr	?	ja-dc	Wong.63,San.145	g	km,dp
Syrrhopodon tjibodensis Fleisch.	ac	pd	epi	3	egf	1,685	s,m	gr	?	ja-dc	San.136	g	dp

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Syrrhopodon spiculosus var. *patens* (Dix.) A. Eddy	ac	pd	ram	3	egf	2,500	s,m	gr	?	ja-dc	San054/1	g	ak
Syrrhopodon subconfertus Broth.	ac	pd	cor	3	def	1,600	o	gr	?	ja-dc	Korn.394,395	g	sk
Pottiaceae *Barbula consanguinea* (Thwaites & Mitt.) Jaeg.	ac,cuc, ere	a	ter	3	mxf	730	o, m	gr	jn-oc	ap-dc	Prin.53, Polb.27,65,80	g,s	mt
Barbula javanica Dozy & Molk.	ac,cuc, ere	pd	ept	3	egf	1,685	s,m	gr	sp-oc	ja-dc	San.117	g,s	dp
Barbula pseudo-ehrenbergii Fleisch.	ac,cuc, ere	pd	ept	3	mxf	660	s,m	gr	sp-dc	ja-dc	San.205	g,s	dp
Hyophila involuta (Hook.) Jaeg.	ac,cuc, ere	pd	ter, epl	5	mxf,egf	730-1,685	o, s, d, m	gr	jn-oc	ja-dc	Prin.11,14,78,80,87,92 Polb.10,20,32,72, Prom..6,19,58,Man.59,18 3,184,Korn.185,220,257, Maxw.B 8,149,156,169	g,s	mt,so, ck,dp,dt, pn
Hyophila rosea R.S. Williams	ac	pd	ter, epl	3	mxf	730	s, m	gr	?	ja-dc	Prin.74,93	g	mt
Oxystegus sp.	ac	pd	epi	3	egf	1,585	s,m	gr	?	ja-dc	San.141	g	dp
Pseudosymblepharis angustata (Mitt.) Chen	ac,cuc, ere	pd	epi	3	egf	1,685	s,m	gr	oc-dc	ja-dc	San.110	g,s	dp
Trichostomum brachydontium (Brunch.) *ex* C. Muell.	ac,cuc, ere	pd	ept	3	egf	1,685	s,m	gr	sp-nv	ja-dc	San.83	g,s	dp
Trichostomum sp.	ac	pd	ter, epl, cor	3	mxf,def	730-1,600	o, s, d, m	gr	?	ja-dc	Prin.1,5,6,13,14,15, Korn.396	g	mt,sk

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Weissia platystegia (Dix.) Eddy	ac,cuc, im	pd	ter,epl	2	mxf	850	o,d	gr	ag-dc	ja-dc	Man.276	g,s	so
Funariaceae *Entostodon* sp.	ac,cuc, ere	pd	ter	3	mxf,egf, sg	1,550-1,595	s,m	ls	jl-nv	ja-dc	Allen23,Schw.1	g,s	cd,akh
Funaria hygrometrica Hedw.	ac,cuc, hor	pd	ter	3	dof,mxf, egf	350-1,825	o,d,s,m	gr	sp-dc	ja-dc	Man.40,San.123,280,346 ,357,Maxw.B5170,79,10 4,111,144, 191	g,s	so,dp,nk, js,cd,sl,bd, ppl
Physcomitrium pyriforme (Hedw.) Hampe.	ac,cuc, ere	pd	ter	3	urb	330	o,m	gr	jl-dc	ja-dc	Prin.142,Maxw.B90	g,s	cmu,bsk
Splachnaceae *Tayloria indica* Mitt.	ac,mit, ere	pd	epl,ter	3	mxf,egf	1,225-1,500	o,s,m	ls,gr	ag-dc	ja-dc	Allen21,Maxw.B98	g,s	cd,dk
Bryaceae *Brachymenium acuminatum* Harv.	ac	pd	ter	3	egf	1,250	s,m	gr	?	ja-dc	San.059	g	ml
Brachymenium nepalense Hook.	ac,cuc, ere	pd	epi,epl, ter	3	egf	1,500-1,685	s,m	gr	jl-nv	ja-dc	San.101,239,Char.55,Ma xw.B 6,49,67,142,166	g,s	dp,dt,ml,pp l
Brachymenium ochianum Gang.	ac,cuc, ere	pd	epi,cor, lig	3	mxf,egf	1685-1,825	s,m	gr	?	ja-dc	Wong.188,Maxw.B120	g	dp,kj
Brachymenium systylium (C. Muell.) Jaeg.	ac,cuc, ere	pd	ter	3	egf	1,675	s,m	gr	ag-dc	ja-dc	Palee27	g,s	dp
Brachymenium sp.	ac,cuc, ere	pd	ter	3	egf	1,500	s,m	ls	sp-dc	ja-dc	Maxw.B168	g,s	dt
Bryum argenteum Hedw.	ac,cuc, pen	pd	ept	3	egf	1,685	s,m	gr	jl-dc	ja-dc	San.121	g,s	dp
Bryum ausstrale Hampe.	ac,cuc, pen	pd	ept	3	gra	1,800	o,c	ls	ag-dc	ja-dc	Allen87	g,s	cd
Bryum billardieri Schwaegr.	ac,cuc, pen	pd	epi	3	egf	1,685	s,m	gr	jl-dc	ja-dc	San.96	g,s	dp

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Bryum capillare L. *ex* Hedw.	ac,cuc, hor	pd	epi	3	egf	1,685	s,m	gr	ag-dc	ja-dc	San.219	g,s	dp
Bryum coronatum Schwaegr.	ac,cuc, ere,pen	pd	ter, epl	4	urb,dof, mxf,egf	350-2,500	o, m,d, h	gr	jl-nv	ja-dc	Prin.123,Polb.1,18,43,71 ,Prom.23,29Man.114,187 ,214,246,San.199,348,Pa le1101,Maxw.B56,102,3 29,Watt.11,Tunr.3,Makt. 5	g,s	mt,so,mk,h k,wk,cd,ak, cmu,wh,pn g
Bryum russulum Broth.	ac	pd	ter	3	egf	1,685	s,m	gr	?	ja-dc	Prin.141	g,bf	dp
Bryum sandei Dozy & Molk.	ac,culc, inc/hor	pd	ter	3	mxf,egf	1,800	s,m	gr	ag-dc	ja-dc	Allen89	g,s	cd
Mniobryum cf. *ludwigii* (Schwaegr.) Loesk.	ac	pd	ter	2	da,def	1,400	o,m	gr	?	ja-dc	Prin.148	g,gm	ppl
Pohlia sp.	ac,cuc, inc	pd	ept	3	dof,mxf	680	o,d	gr	?	ja-dc	San.347	g	dp
Rhodobryum giganteum (Schwaegr.) Par.	ac,cuc, hor/pen	pd	epi, ter,cor	3	egf	1,320-1,685	s,m	gr	ag-dc	ja-dc	San.142,143,Maxw.B65, 99,147	g,s	dp,pn
Mniaceae *Plagiomnium maximowiezii* (Lindb.) T. Kop.	ac,cuc, hor/pen	pd	epi	3	egf	1,685	s,m	gr	jl-dc	ja-dc	San.154,155	g,s	dp
Plagiomnium succulentum (Mitt.) T.J. Kop.	ac,cuc, hor	pe	emr,sub, ter, epl, cor, ram	4	mxf,egf	730-1,375	s,m,c	gr	ag-dc	ja-dc	Prin.111, Prom.2,Korn.97,176,194, Maxw.8	g,s	mt,ck,dt
Plagiomnium rhynchophorum (Hook.) T.J. Kop.	ac,cuc, hor/pen	pd	ter,epl	3	egf	1,355	s,m	gr	oc-dc	ja-dc	Korn.9	g,s	ck
Rhizogoniaceae *Rhizogonium spiniforme* (Hedw.) Bruch.	ac,mit, inc/hor	pd	ter,epl	4	egf	725-1,319	o,s,m	gr,ss	jn-dc	ja-dc	Wong.308,Maxw.B123, 143,180	g,s	pk,ky

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Bartramiaceae *Philonotis secunda* (Dozy & Molk.) Bosch & Sande Lac.	ac	ped	rhe,ter, epl	4	mxf	730	o,s,m	gr	?	ja-dc	Prin.10,23,57	g	mt
Philonotis speciosa (Griff.) Mitt.	ac	pd	ter	3	dof	350	o,m	gr	?	ja-dc	Makt.2		wh
Philonotis aff. *thaitesii* Mitt.	ac,cuc, ere	pd	ter	3	da	1,700	o,d	gr	jl-nv	ja-dc	Schw.5	g,s	di
Philonotis sp.	ac,ere	pd	ept	3	mxf,egf	670-1,250	o,s,m	gr	?	ja-dc	San.10,208	g	dp
Erpodiaceae *Erpodium biseriatum* (Austin) Austin	pl	pd	cor,ram	3	mxf	730	s,m	gr	jl-nv	ja-dc	Prin.67	g,s	mt
Erpodium mangiferea C. Muell.	pl	pd	cor,ram	4	urb,da	330	o,d,m,	gr	jn-oc	ja-dc	Prin.139	g,s	cmu
Othotrichaceae *Groutiella tomentosa* (Hornsch.) Wijk. & Marg.	ac,mit, ere	pd	cor	3	egf	1,325	s,m	gr	ag-dc	ja-dc	Wong.73	g,s	km
Macromitrium densum Mitt.	ac,mit, ere	pd	cor,ram	3	mxf	870	o,d	gr	oc-dc	ja-dc	Man.67,69	g,s	so
Macromitrium nepalense(Hook. & Grev.) Schwaegr.	ac,mit, ere	pd	cor	3	egf	1,325-1,675	s,m	gr	jl-dc	ja-dc	Wong.74,Palee27	g,s	km,dp
Macromitrium turgidum Dixon	ac,mit, ere	pd	cor	4	def	1,520-1,600	o,s,m	gr	jn-nv	ja-dc	Korn.341-350,San.273,Maxw.148	g,s	sk,dp,pn
Macromitrium zollingeri Mitt. *ex* Dozy & Molk.	ac	pd	cor,ram	3	dof	30	o,m	ss	?	?	Maxw. 2,B179	g	mk
Macromitrium sp.	ac,mit, ere	pd	cor,ram	3	egf	1,350	s,m	gr	ag-dc	ja-dc	Maxw.B92,94	g,s	dk

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Zygodon novoguinensis Bartr.	ac,mit, ere	pd	ept	3	dof,mxf	670	o,m	gr	sp-dc	ja-dc	San.207	g,s	dp
Rachittheciaceae *Rachitthecium perpusillum* (Thwaites & Mitt.) Broth.	ac,mit, ere	pd	cor,ram	3	egf	1,650	s,m	gr	sp-dc	ja-dc	Maxw.B71	g,s	dp
Racopilaceae *Racopilum cuspidigerum* (Schwaegr.) Aongstr.	pl,cuc, ere	pd	cor	3	def,egf	1600-1,685	o,s,m	gr	sp-dc	ja-dc	Korn.391,393,San.110,226,242	g,s	sk,dp
Racopilum orthocarcarpum Wils. *ex* Mitt.	pl,cuc, hor	pd	cor,ram	3	mxf,egf	730-1,658	s,m	gr	sp-dc	ja-dc	Prin.62,San.100,109,182, 187, 194,196,Maxw.68,160,164	g,s	mt,dp,dt,dn
Racopilum sp.	pl	pd	cor	3	egf	775	s,m	ss	?	ja-dc	Maxw.B176	g	ky
Hedwigiaceae *Bryowijkia ambigua* (Hook.) Nog.	pl,im	pd	epi	3	egf	1,685	s,m	gr	jl-dc	ja-dc	San.157	g,s	dp
Trachypodaceae *Trachypodopsis serrulata* (P. Beauv.) Fleisch. var. *crispatula* (Hook.) Zanten	pl	pd	epl,cor	3	egf	1,355-2,500	s,m	gr	?	ja-dc	San.057/1	g	ak
Trachypus bicolor Reinw. & Hornsch.	pl,cuc, ere	pd	epi	3	egf	1,685	s,m	gr	oc-dc	ja-dc	San.98	g,s	dp
Myuriaceae *Myurium rufescens* (Reinw. & Hornsch.) Fleisch.	pl,cuc, ere	pd	epi	3	egf	1,260-1,685	s,m	gr	ag-dc	ja-dc	San.99,102,055	g,s	dp,ml
Pterobryaceae *Pterobryopsis divergens* (Mitt.) Nog.	pl	pd	epi	4	egf	2,200	s,m	ls	?	ja-dc	Allen157	g	cd

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Oedicladium rufescens (Reinw. & Hornsch.) Mitt.	pl,ere	pd	cor	3	def	1,325-1,600	o	gr	jn-nv	ja-dc	Korn.361,362,377, Wong.72	g,s	sk,km
Symphysodontella borii Dix.	pl,cuc, ere	pd	cor,ram	3	egf	1,325	s,m	gr	jl-dc	ja-dc	Maxw.B138	g,s	dp,km
Meteoriaceae *Aerobryidium filamentosum* (Hook.) Fleisch.	pl,cuc/ mit,hor	pd	epi	3	egf	1,685	s,m	gr	sp-dc	ja-dc	San.95,106,131,139,149	g,s	dp
Aerobryopsis longissima (Dozy & Molk.) Fleisch.	pl	pd	cor	3	egf	1,325	s,m	gr	?	ja-dc	Wong.70	g	km
Floribundaria sparsa (Mitt.) Broth. var. *sparsa*	pl,cuc, ere	pd	cor	3	egf	1325-2,685	s,m	gr	sp-dc	ja-dc	k71,San.129/153	g,s	km,dp
Floribundaria walkeri (Ren. *et* Chard) Broth.	pl	pd	cor	3	def	1,600	o	gr	?	jn-sp	Korn.331,332	g	sk
Meteorium miquelianum (C. Muell.) Fleisch. *ex* Broth. subsp. *miquelianum*	pl,cuc, inc	pd	cor	3	def	1,600	o	gr	jn-nv	ja-dc	Korn.351-360,376	g,s	sk
Meteoriopsis reclinata (C. Muell.) Fleisch.	pl,cuc, ere	pd	ept	3	egf	1,685	s,m	gr	sp-dc	ja-dc	San.106,147,159	g,s	dp
Meteoriopsis squarrosa (Hook.) Fleisch. var. *longicuspis* Nog.	pl	pd	cor	3	def,egf	1,425-1,600	o	gr	?	ja-dc	Korn.407, Maxw. 1	g	sk,dt
Papillaria feae Fleisch.	pl	pd	cor	3	def	1,600	o	gr	?	ja-dc	Korn.363-367,379	g	sk
Papillaria fuscenscens (Hook.) Jaeg.	pl,cuc, ere	pd	epi	3	egf	1,685	s,m	gr	ag-dc	ja-dc	San.92,94,104,134	g,s	dp

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Papillaria semitorta (C. Muell.) Jaeg.	pl	pd	cor	3	egf	1,425	s,m	gr	?	ja-dc	Maxw. 3	g	dt
Neckeraceae *Calyptothecium himantocladioides* Bartrum	pl	pd	cor	3	egf	1,350-1,425	s,m	gr	?	ja-dc	Prin. 146, Maxw.173(9)	g	km,dt
Homaliodendron microdendron (Mont.) Fleisch.	pl	pd	epl	3	mxf,egf	730-1,360	s,m	gr	?	ja-dc	Prom.5,10,Korn.92,93,183	g	mt
Homaliodendron obtusatum (Mitt.) Gang.	pl	pd	cor,ram	3	mxf	730	s,m	gr	?	ja-dc	Prom.35,Maxw.B194	g	mt
Neckera himalayana Mitt.	pl	pd	ram	3	egf	2,500	s,m	gr	?	ja-dc	San.0515	g	ak
Neckeropsis exerta (Hook. *ex* Schwaegr.) Broth.	pl,cuc/ mit,ere	pd	cor,ram	2	mxf	730	s,m	gr	sp-dc	ja-dc	Prin.29,Prom.33	g,s	mt
Pinnatella alopecuroides (Hook.) Fleisch.	pl	pd	cor	3	def	1,600	o	gr	?	ja-dc	Korn.368,369,381	g	sk
Hookeriaceae *Actinodontium rhaphidostegium* (C. Muell.) Bosch & Lac.	pl,mit, inc/ hor	pd	epi	3	egf	1,685	s,m	gr	sp-dc	ja-dc	San.146	g,s	dp
Hookeriopsis utacamundiana (Mont.) Broth.	pl,mit, hor	pd	cor,lig	2	egf	1,350-2,500	s,m	gr	ag-nv	ja-dc	Korn.166,Maxw.B66,100 ,San.057/2	g,s	ck,dp,ak
Symphyodontaceae *Symphyodon asper* (Mitt.) Jaeg.	pl,cuc, ere	pd	cor,ram	2	egf	2,500	s,m	gr	jl-oc	ja-dc	San.056	g,s	kp
Hypopterygiaceae *Cyathophorella adiantum* (Griff.) Fleisch.	pl	pd	epi,cor	3	egf	1,200-1,685	s,m	gr	?	ja-dc	San.105,151,4301,Maxw .B114,Wong.& Korn.1	g, bf	dp,js
Cyathophorella hookeriana (Griff.) Fleisch.	pl	pd	cor,ram	3	egf	2,552	s,m	gr	?	ja-dc	Wong.708	g	ak

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Hypopterygium flavolimbatum C. Muell.	pl	pd	cor	2	egf	1,375	s,m	gr	?	ja-dc	Maxw. 4	g	dt
Hypopterygium tenellum C. Muell.	pl	pd	epl,cor	3	egf	1,360	s,m	gr	?	ja-dc	Korn.15,94,188	g	ck
Leskeaceae *Claopodium prionophyllum* (C. Muell.) Broth.	pl	pd	epl	4	mxf	730	s,m	gr	?	ja-dc	Korn.6,25,96,98,161Prom.15	g	ck,mt
Thuidiaceae *Thuidium glaucinum* (Mitt.) Bosch & Lac.	pl,cuc, hor	pd	epi	3	egf	1,685	s,m	gr	sp-dc	ja-dc	San.110	g,s	dp
Thuidium plumulosum (Dozy & Molk.) Dozy & Molk.	pl,cuc, hor	pe	cor,ram	4	mxf,egf	50-1,355	s,m	gr	ag-dc	ja-dc	Prom.rin6,43,54,72, Polb.7,25,54,75, Prom.18,51,52, Man.222,322,325, 340,341,Korn.133,164, San.204,Maxw.B75,153	g,s	mt,so, dp,kk,ms
Thuidium venustulum Bosch	pl,cuc, ere	pd	epi	3	egf	1,685	s,m	gr	oc-dc	ja-dc	San.195	g,s	dp
Brachytheciaceae *Brachythecium buchananii* (Hook.) Jaeg.	pl,inc	pd	ept	3	egf	1,520	s,m	gr	?	ja-dc	San.275	g	dp
Eurhynchium celebicum (Sande Lac.) Bartram	pl	pd	epl	3	egf	1,355	s,m	gr	ag-nv	ja-dc	Korn.1,11,23,44,99,103, 155	g	ck
Rhynchostegium aff. *psilopodium* Igna. & Hatt.	pl,cuc, inc/hor	pd	lig	3	dof	500	s,m	sh	ag-dc	ja-dc	Maxw.B162	g,s	my
Entodontaceae *Entodon curvatus* (Griff.) Jaeg.	pl,cuc, ere,imc	pd	epl	3	egf	1,685	s,m	gr	jl-dc	ja-dc	San.191,221	g,s	dp
Entodon macrocarpus (Hedw.) Mitt.	pl,cuc, ere	pd	cor	3	egf	1,350	s,m	gr	jl-dc	ja-dc	Maxw.B140,155,187	g,s	dt,dn
Entodon macropodus (Hedw.) C. Muell.	pl,cuc, ere	pd	epi,cor, ram	3	mxf,egf	1,050-1,800	s,m	ls,gr	jl-dc	ja-dc	Allen176,Maxw.B119	g,s	cd,kj

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Entodon plicatus C. Muell	pl,cuc, ere	pd	epi	3	egf	1,685	s,m	gr	sp-dc	ja-dc	San.144,Maxw.B170	g,s	dp,dt
Entodon sp.	pl,cuc, ere	pd	cor	3	bb/df,egf	900-1,000	s	ls,gr	jl-dc	ja-dc	Maxw.B106,151	g,s	db,js
Erythrodontium julaceum (Schwaegr.) Par.	pl,cuc, ere	pd	cor,ram, lig	4	dof,mxf, egf	730-850	o,m,d	gr	jl-nv	ja-dc	Prin.73,88,Maxw.B77,141,182	g,s	mt,td,ky,ms
Trachyphyllum inflexum (Harv.) Gepp.	pl,cuc, inc	pd	cor	3	dof,mxf	570	o,s,m	ls	ag-dc	ja-dc	Allen65	g,s	cd
Trachyphyllum sp.	pl	pd	cor,ram	2	mxf	730	s,m	gr	?	ja-dc	Prin.37,52,56	g	mt
Plagiotheciaceae *Plagiothecium neckeroideum* B. S. G.	pl	pd	ram	3	egf	2,500	s,m	gr	?	ja-dc	San.058	g	ak
Stereophyllum decorum (Mitt.) Wijk. & Margad.	pl,ere	pd	epl	2	mxf	730	o,d	gr	sp-dc	ja-dc	Prin.3	g,s	mt
Stereophyllum sp.	pl,cuc, inc	pd	cor	3	egf	1,000	s,m	gr	sp-dc	ja-dc	Maxw.B163	g,s	dt
Sematophyllaceae *Acroporium diminutum* (Brid.) Fleisch.	pl,cuc, inc	pd	epi	3	egf	1,685	s,m	gr	oc-dc	ja-dc	San.113,124	g,s	dp
Chionostomum rostratum (Griff.) C. Muell.	pl	pd	cor	3	egf	1,325	s,m	gr	?	ja-dc	Wong.75	g	km
Clastobryella merrilli (Broth.) Fleisch.	pl	pd	cor	3	egf	1,325	s,m	gr	?	ja-dc	Wong.77	g	km
Gammiella pterogonoides (Griff.) Broth.	pl	pd	cor	3	egf	1,325	s,m	gr	?	ja-dc	Wong.78	g	km

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Gammiella tonkinense (Broth. & Par.) B. C. Tan	pl	pd	cor	3	def	1,325-1,600	o,s,m	gr	?	ja-dc	Korn.405,406,Wong.79	g	sk,km
Heterophyllium affine (Hook.) Fleisch.	pl,cuc, inc	pd	cor,ram	3	dof	850	o,m	gr	jl-nv	ja-dc	Maxw.B64	g,s	so
Pseudotrismegistria undulata (Broth. & Yas.) Akiyama & Tsubota	pl	pd	cor	4	egf	2,556	s,m	gr	?	ja-dc	Wong.742,San.0511/1	g	ak
Radulina hamata (Dozy & Molk.) W. R. Buck & B. C. Tan	pl,cuc, inc	pd	cor	3	egf	1,360	s,m	gr	sp-dc	ja-dc	Korn.8,55	g,s	ck
Taxithelium nepalense (Schweagr.) Broth.	pl, cuc, inc	pd	epl, cor,lig	3	mxf,bb/ df	730	s,m,o,d	gr	jn-nv	ja-dc	Polb.8,38,62,Maxw.B17 3 (5),177	g,s	mt,mk,dt
Taxithelium oblongifolium (Sull. & Lesq.) Z. Iwats.	pl,cuc, hor	pd	cor,ram	3	mxf	730-850	s,m	gr	jl-nv	ja-dc	Prin.51,Prom.48,Man.12 4,127,241,246,300,311	g,s	mt,so
Taxithelium pavulum (Broth. & Par.) Broth.	pl,cuc, pen	pd	epi	3	egf	1,685	s,m	gr	oc-dc	ja-dc	Prom.38	g,s	dp
Trichosteleum bistrummosum (C. Muell.) Jaeg.	pl,cuc, inc	pd	cor,ram	3	mxf	730	s,m	gr	jl-nv	ja-dc	San.246	g,s	mt
Trichosteleum stigmosum Mitt.	pl,cuc, inc	pd	cor	3	egf	15	s,m	sl	?	ja-dc	Maxw.B189	g,s	kb
Sematophyllum phoenicum (C. Muell.) Fleisch.	pl	pd	cor	3	egf	1,325	s,m	gr	?	ja-dc	Wong.80	g	km
Sematophyllum subhumile (C. Muell.) Fleisch.	pl	pd	epl,cor, ram	3	mxf,egf	850-1,685	o,d,s,m	gr	sp-dc	ja-dc	Man.124,241,246,300,31 1, Korn.217,219,San.158	g,s	so,ck, dp
Wijkia sercularis (Mitt.) Crum.	pl	pd	cor	3	egf	1,325	s,m	gr	?	ja-dc	Wong.81	g	km
Hypnaceae *Ectropothecium dealbatum* (Reinw. & Hornsch.) Jaeg.	pl,cuc, hor	pd	ept,lig	3	mxf,egf	800-1,010	s,m	gr	jl-dc	ja-dc	San.209, Maxw.B 150	g,s	dp,db

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Ectropothecium monumentorum (Dub.) Jaeg.	pl,cuc, inc/hor	pd	cor,epl	3	def	1600-1,685	o,s,m	gr	ag-dc	ja-dc	Korn.327,328,329,330,383, San.122, Maxw.B185	g,s	sk,dp
Hypnum plumaeforme Wilson	pl,cuc, inc	pd	epl	3	dof,egf	525-1360	o,d,s,m	gr	sp-dc	ja-dc	Korn.230	g,s	ck,na
Hypnum sp.	pl,cuc, hor,pen	pd	cor	3	egf	755	s,m	ss	sp-dc	ja-dc	Maxw. B176	g,s	ky
Isopterygium albescens (Hook.) Jaeg. var. *smallii* (Sull. & Lesq.) Z. Iwats.	pl	pd	cor	3	egf	1,325	s,m	gr	?	ja-dc	Wong.67	g	km
Isopterygium bancanum (Sande Lac.) Jaeg.	pl,cuc, pen	pd	cor	3	egf	1,360	s,m	gr	ag-nv	ja-dc	Korn.237	g,s	ck
Isopterygium distichaceum (Mitt.) Jaeg.	pl	pe	epl	3	mxf	730	o,m	gr	?	ja-dc	Polb.5,48,76, Makt.9	g	mt
Isopterygium lignicola (Mitt.) Jaeg.	pl,cuc, hor	pd	epi	3	dof	350	o,d	gr	ag-dc	ja-dc	San.198	g,s	dp
Isopterygium minutirameum (C. Muell.) Jaeg.	pl,cuc, inc	pd	ept	3	mxf,egf	1,580	o,m	ls	ag-dc	ja-dc	Allen57	s	cd
Isopterygium serrulatum Fleisch.	pl	pd	ter, epl	3	mxf	730	s,m	gr	?	ja-dc	Prin.16		mt
Isopterygium tenerum (Schwaegr.) Mitt.	pl	pe	cor,ram	2	mxf	730	s,m	gr	?	ja-dc	Prom.17	g,bf	mt
Isopterygium sp.	pl,cuc, inc	pd	cor,lig	4	egf	800-1,125	s,m	ss,gr	ag-dc	ja-dc	Maxw.B84,181	g,s	ky,dp
Vesicularia dubyana(C. Muell) Broth.	pl	pd	ter	3	da,def	1,400	o,m	gr	?	ja-dc	Prin. 149	g	ppl

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Vesicularia montagnei (Schimp.) Broth.	pl	pd	epl	3	egf	1,355	s,m	gr	?	ja-dc	Korn.21,23	g	ck
Hylocomiaceae *Macrothamnium macrocarpum* (Reinw. & Honsch.) Fleisch.	pl,cuc, hor	pd	cor,ram	3	mxf,egf	730-1,685	s,m	gr	ag-nv	ja-dc	Prin.90,San.120, 128,148,223,225,245,247	g,s	mt,dp
Polytrichaceae *Atrichum yakusiamensis* (Hor.) Miz.	ac	pd	ter,epl	3	mxf	730	s,m	gr	?	ja-dc	Prin.25,30	g	mt
Atrichum crispum (Jam.) Sull. & Lesq.	ac,cuc, ere	pd	ter	3	def,egf	1,150	o,m	gr	ag-dc	ja-dc	Maxw.B96	g,s	msl
Pogonatum neesii (C. Muell.) Dozy	ac,mit, ere	pd	ter	4	mxf,egf, da	500-1,825	o,d,h	gr	ag-nv	ja-dc	Prin.31, Polb.24,53,61,83,San.114,190,200,215,951Petr.460,Maxw.B47,55,57,86,95,108,115,118,127,134,139,145,147157,Char.56,Schw.2	g,s	mt,dp,ma,ppl,bhf,dh,dn,js,sl,msl, dlnp,akh,ck,rs,ak
Pogonatum proliferum (Griff.) Mitt.	ac,mit, ere	pd	ter	4	egf	2,500	s,m	gr	jl-dc	ja-dc	Wong.740	g,s	kp
Pogonatum c.f. *subtortile* (C. Muell.) Jaeg.	ac,mit, ere/inc	pd	ept	3	egf	1,685	s,m	gr	sp-dc	ja-dc	San.116	g,s	dp
Hepaticopsida Lepidoziaceae *Bazzania javanica* (Sde. & Lac.) Schiff.	sl	pe	cor	3	egf	2,556	s,m	gr	?	ja-dc	Wong.725	g	ak
Bazzania tridens (Reinw., Blume & Nees) Trevis	sl	a	ter, cor	4	mxf,def	730-1,600	o,s,m	gr	?	ja-dc	Prin.122, Polb.28,69, Korn.409,Man.3,311	g	mt,sk, so
Telaranea sp.	sl	pe	epl,cor	3	egf	2,500	s,m	gr	?	ja-dc	Wong.789	g	kp
Trichocalea tomentella (Eheh.) Dum.	sl	pe	ram	4	egf	2,500	s,m	gr	?	ja-dc	San.052	g	ak

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Herbataceae *Herbatus* sp.	sl	pe	cor	3	egf	2,500	s,m	gr	?	ja-dc	San.051	g	ak
Calypogeiaceae *Calypogeia arguta* Nees & Mont.	sl,ere	a	ter	3	mxf	850	s,m	gr	dc-ja	ja-dc	Man.42,331,334,338	g,s	so
Geocalycaceae *Heteroscyphus argutus* (Nees) Schiff.	sl	a	ter,epl	3	mxf,egf	730-1,360	s,m	gr	?	jn-oc	Prin.96,Prom.37,Man.22, 66,81,128, 202, Korn.50,52	g	mt,so,ck
Heteroscyphus coalitus (Hook.) Schiff.	sl	a	epl	2	mxf	730-830	s,m	gr	?	jn-oc	Prom.11,Man.23,34,71,78,91,156	g	mt,so
Heteroscyphus zollongeri (Gott.) Schiff.	sl	a	ter,epl	3	mxf,egf	730-1,360	s,m	gr	?	ja-dc	Prin.17,28,35,39,95,Polb.14,33,77,Prom.13,47,50, 67,Man.10,40,128, 251,313,Korn.3,11,22,30,32	g	mt,so,ck
Lophocolea morobaena Piippo.	sl,ere	a	ter,epl	4	mxf	730-830	s,m	gr	jl-oc	my-dc	Prin.18,97,Prom.12,27,Man.19,85,90, 115,126,225,Korn.157	g,s	mt,so, ck
Lophocolea minor Nees	sl	a	ter	2	mxf	730-830	s,m	gr	?	my-sp	Prin.98, Polb.25,54, Prom.73,Man.23,256	g	mt,so
Jungermanniaceae *Jungermannia tetragona* Lindenb.	sl,ere	a	ter	4	mxf	730	s,m	gr	my-oc	my-dc	Prin.34,50,101	g,s	mt
Jungermannia truncata Nees	sl,ere	a	ter	4	mxf	730-850	s,m	gr	my-oc	my-dc	Prin.102,Polb.49,Man.97,103,131, 183,196,227,279,288	g,s	mt,so
Notoscyphus paroicus Schiff.	sl,ere	a	ter	5	mxf	730	o,m	gr	jl-nv	ap-dc	Polb.36	g,s	mt
Plagiochilaceae *Plagiochila* sp.	sl	a	epl,cor	3	mxf	730-830	s,m	gr	?	my-oc	Prin.107,Man.58	g	mt,so
Plagiochila junghuhniana Sande Lac.	sl	pe	epl	3	mxf	730	s,m	gr	?	ja-dc	Prom.14,30,53,54,55,65	g	mt
Plagiochila parvifolia Lindenb.	sl	pd	epl,cor	3	def	1,360-1,600	o	gr	?	ja-dc	Korn.81,370,371,384	g	sk,ck

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Plagiochila sciophila Nees	sl	pd	epl,cor	3	egf	1,355	s,m	gr	?	ja-dc	Korn.11,26	g	ck
Plagiochila semidecurrens (Lehm. & Lindenb.) Lindenb.	sl	pd	cor	3	def	1,600	o	gr	?	ja-dc	Korn.408	g	sk
Cephaloziaceae *Cephalozia siamensis* N. Kitag.	sl	a	ter	1	mxf	730-850	s,m	gr	?	my-sp	Prin.33,100,Man.191,198	g	mt,so
Cephaloziellaceae *Cephaloziella stephanii* Schiff. *ex* Douin	sl,ere	a	ter	2	mxf	850	s,m	gr	oc-dc	my-dc	Man.156,171,,272	g,s	so
Cylindrocolea tagawae (N. Kitag.) R. M. Schust.	sl	a	ter	2	mxf	850	s,m	gr	?	my-dc	Man.32,159,183	g	so
Porellaceae *Porella acutifolia* (Lehm. & Lindenb.) Trevis	sl	a	epl	2	mxf	730	s,m	gr	?	my-nv	Prin.106	g	mt
Porella acutifolia (Lehm. & Lindenb.) Trev. ssp. *latior* Hatt.	sl	a	epl	3	mxf,egf	730-1,360	s,m	gr	?	my-dc	Prom.68,Man.113,122,Korn.83	g	mt,so,ck
Porella acutifolia (Lehm. & Lindenb.) Trev. ssp. *tosana* (Stephani) S. Hatt.	sl	a	epl	2	mxf	850	s,m	gr	?	ja-dc	Man.114,123,258	g	so
Porella plumosa (Mitt.) Hatt.	sl	a	epl	2	mxf	730	s,m	gr	?	my-dc	Prom.69	g	mt
Frullaniaceae *Frullania ericoides* (Nee *ex* Mart.) Mont.	sl	pd	epl,cor, ram	3	mxf	730-850	o,d	gr	?	ja-dc	Polb.46,74,Man.49,224	g	mt,so
Frullania galeta (Reinw., Nees, & Bl.) Dumort.	sl	pd	cor	3	egf	1,400	s,m	gr	?	ja-dc	Korn.54,106,174,224	g	ck

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Frullania gemmulosa S. Hatt. & Thaithong	sl	pd	cor	3	egf	1,400	s,m	gr	?	ja-dc	Korn.254	g	ck
Frullania muscicola Steph.	sl	pd	cor	3	def	1,355-1,600	o	gr	?	jn-sp	Korn.57,58,79,80,105,120,132	g	sk,ck
Frullania nepalensis (Spruce) Lehm. & Lindenb.	sl	pd	cor	3	def	1,600	o	gr	?	jn-oc	Korn.333-338,378,387	g	sk
Frullania wallichiana Mitt.	sl	pd	cor	3	def	1,600	o	gr	?	jn-sp	Korn.340	g	sk
Frullania meyeniana Lindeb.	sl	pd	cor,ram	3	mxf	850	o,d	gr	?	ja-dc	Man.262,283	g	so
Frullania sp.	sl	pd	cor,ram	3	egf	1,610	s,m	gr	?	ja-dc	Maxw. B74	g	dp
Lejeuneaceae *Acrolejeunea fertilis* (Reinw., Bl., & Nees) Spruce *ex* Steph.	sl	pd	cor,ram	3	mxf	730-890	s,m	gr	?	ja-dc	Prin.1,119,129, Polb.2,19,26,68,Man.16, 43,61,62,99,100,106,205 ,262	g	mt,so
Archilejeunea planiuscula (Mitt.) Steph.	sl,ere	pd	cor,ram	3	mxf	730	s,m	gr	?	ja-dc	Prin.19,124	g,s	mt
Cheilolejeanea intertexta (Lindenb.) Steph.	sl	pd	cor,ram	3	mxf	730-830	s,m	gr	?	ja-dc	Prin.112,133,Man.56,66, 317	g	mt,so
Cheilolejeanea obtusilobula (S. Hatt.) Mitzut.	sl	pd	cor,ram	3	mxf	730	s,m	gr	?	ja-dc	Prin.121,126	g	mt
Cololejeunea yakusimensis (S. Hatt.) S. Hatt.	sl	pd	epl,cor, ram,epp	4	mxf	730	o,s,m,d, h	gr	?	ja-dc	Prin.66, Polb.29,70	g	mt
Cololejeunea lanciloba Steph.	sl	pe	epl,cor, ram	3	mxf,egf	830-1,300	o,d,s,m	gr	?	ja-dc	Man.24,65,78,94,107,155,193,224,287,Korn.141, 149,270,172 ,228	g	so,ck
Cololejeunea spinosa (Horik.) Pande´ & R. N. Misra	sl	pe	epp	2	egf	1,300	s,m	gr	?	ja-dc	Korn.158,172	g	ck

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Lejeunea flava (Sw.) Nees	sl	pd	cor	3	def	1,360-1,600	o	gr	?	ja-dc	Korn.42,63,66,82,106,403,404	g	sk,ck
Lejeunea punctiformis Taylor	sl	pd	cor,ram	3	mxf	850	o,d	gr	?	ja-dc	Man.24,65,78,94,107,155,193,224,287	g	so
Lejeunea cf. obscula Mitt.	sl	a	epl	2	mxf	730	s,m	gr	?	my-dc	Prom.70	g	mt
Lejeunea tuberculosa Steph.	sl	pd	cor	3	mxf	730	s	gr	?	ja-dc	Prin.105,120,125,129,130,132	g	mt
Leptolejeunea elliptica (Lehm. & Lindenb.) Schiff.	sl	a	epp	2	egf	1,355	s,m	gr	?	ja-dc	Korn.151	g	ck
Lopholejeunea ceylanica Steph.	sl	a	epi	3	egf	1,566	s,m	gr	?	ja-dc	Korn.441	g	hs
Lopholejeunea nigricans (Lindenberg) Schiff.	sl	a	epi	3	egf	1,586	s,m	gr	?	ja-dc	Korn.449	g	hs
Mastigolejeunea indica Steph.	sl,ere	pd	epl,cor, ram	3	mxf	730-850	s,m	gr	ag-nv	ja-dc	Prin.116,117,118,131,134, Man.115,154,204,223,327	g,s	mt,so
Mastigolejeunea ligulata (Lehm. & Lindenb.) Schiff.	sl	pd	epi	3	mxf	573	o,d	gr	?	ja-dc	Korn.456	g	pd
Mastigolejeunea repleta (Taylor) Evans.	sl,ere	pd	epl,cor, ram	3	mxf	730	s,m	gr	ag-dc	ja-dc	Prin40,115,127,130, Polb.56,57,86	g,s	mt
Ptycanthus striatus (Lehm. & Lindenb.) Nees	sl	a	epl	2	mxf,egf	730-1,400	s,m	gr	?	my-dc	Prom.71,Korn.78,San.05 11/2	g	mt,ck,ak
Schiffneriolejeunea sp.	sl	pd	epi	3	egf	1,566	s,m	gr	?	ja-dc	Korn.448	g	hs
Spruceanthus polymorphus (Sande Lac.) Verd.	sl	pd	cor,ram	3	mxf,egf	730-1,355	s,m	gr	?	ja-dc	Prom.16,20,32,Korn.133,186	g	mt,ck

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Spruceanthus semirepandus (Nees) Verd.	sl	pd	cor	3	def	1,600	o	gr	?	ja-dc	Korn.372,375,380,398,435-438,444,446	g	sk,hs
Pleuroziaceae *Pleurozia* sp.	sl	pd	cor	4	egf	2,500	s,m	gr	jl-oc	ja-dc	San.0514	g,s	kp
Fossombroniaceae *Fossombronia cristula* Austin	sl,ere	a	ter	3	mxf	730-850	s,m	gr	my-oc	my-oc	Prin.99,Man.112,118,198,201,215	g,s	mt,so
Fossombronia pusilla (L.) Nees	sl,ere	a	ter	4	egf	1,685	s,m	gr	jn-oc	my-dc	Man.081	g,s	dp
Pallaviciniaceae *Pallavicinia lyellii* (Hook.) Carruth.	th	a	epl	2	mxf	730-830	s,m	gr	?	ja-dc	Prom.74,Man.98,137	g	mt,so
Aneuraceae *Aneura* sp.	th	a	cor	3	egf	1,500	s,m	gr	?	ja-dc	Maxw.B59	g	ppl
Aneura pinguis (L.) Dumort.	th	a	ter	3	mxf, da	1,250	s,m	gr	?	ja-dc	QSBG6	g	QSBG
Riccardia bipinnatifida (Colenso) Hewson	th, ere	a	ter,epl	3	mxf	730-810	s,m	gr	?	ap-sp	Prin.114, Prom.7,Man.98,147,159,274,316	g,s	mt,so
Riccardia platyclada Schiff.	th	a	ter	3	mxf	730-810	s,m	gr	sp-dc	my-nv	Prin.94,Man.78,114,143,251	g,s	mt,so
Metzgeriaceae *Metzgeria* sp.	th	a	cor,ram	3	egf	1,685-2,500	s,m	gr	?	ja-dc	San.0510,0512	g	kp,dp
Pelliaceae *Pellia* sp.	th	a	ter	3	egf	1,685	s,m	gr	jl-ag	jn-oc	San.0513	g,s	dp
Aytoniaceae *Asterella blumeana* (Nees) Pande´, K. P. Srivast., & Sultan	th	a	ter,epl	4	mxf,egf	730-1,360	s,m	gr	my-sp	ap-sp	Polb.56,Korn.145,203,214,250,252	g,s	mt,ck
Asterella sp.	th	a	ter	3	dof,mxf, egf	350-1,610	o,m	gr	?	ja-dc	Tunr.10,Char.57,Maxw.B62,63,72,76,87,101,112	g,s	mhy,dp,cd, ck,dp,km, mhf,mm,st
Targioniaceae *Targionia hypophylla* L.	th	a	epl	2,4	egf	1,300-1,375	s,m	gr	?	my-dc	Korn.86,245	g,cs	ck, dt

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Species	Habit	Aped	Life-mode	Abun-dance	Habitat	Eleva1tion (m)	Micro-habitat	Bed-rock	Sporophyte month	Gametophyte month	Collector number	Stage	Location
Marchantiaceae *Dumortiera hirsuta* (Sw.) Nees	th	a	sub,epl, ter	2	mxf,egf	830-1,360	s,m	gr	?	ja-dc	Man.97,137,179,273,326 ,Korn.18,33,37,72,101,1 91,247,Maxw.B73,107,1 59,175	g	so,ck,dh, ky,js,cd
Marchantia sp.	th	a	ter	3	dof,bb/ df,egf,de f	550-1,457	s,m	gr	?	ja-dc	Maxw.B46,52,85,89,91,9 7,110,116,133	g	ck,dma ,bnh,cd, ppl,sf,dl,st
Cyathodiaceae *Cyathodium* sp.	th	a	ter,epl	4	erb	350	s,m	gr	?	jl-nv	Prin.145	g	cmu
Ricciaceae *Riccia fluitans* L.	th	a	flt,emr, sub, rhe,ter	3	mxf	730	o,s,m,c	gr	jn-dc	ja-dc	Prin.19,113	g,cs	mt
Riccia sp.	th	a	ter	3	dof	75	o,m	ss	?	ja-dc	Maxw.B121,183	g	mk
Anthocerotopsida Anthocerotaceae *Anthoceros subtilis* Steph.	th,ere	a	ter	2	mxf	850	o	gr	ag-nv	ja-dc	Man. 188,227	g,s	so
Anthoceros sp.	th,ere	a	ter	3	bb/df, mxf	600-1,575	s,m	gr	jn-sp	my-dc	Maxw.B61,78,88,103,10 5,113,117,122	g,s	cd,kbk,hk,j s,ck,dsl,bd, st
Phaeoceros laevis (L.) Prosk.	th,ere	a	epl,ter	2	mxf,def	730-1,350	o,m	gr	jl-nv	my-dc	Korn.146,204,206,207,M axw.B152,174	g,s	mt,ck,dh, sl
Phaeoceros laevis (L.) Prosk. subsp. *carolinianus* (Mich.) Prosk.	th, ere	a	ter	3	egf	1,150	o,s,m	ss	ag-dc	my-ja	Maxw.B190	g,s	nk
Phaeoceros sp.	th,ere	a	ter	3	bb/df	975	s,m	gr	ag-oc	my-dc	Palee173	g,s	dk
Dendrocerotaceae *Megaceros fragellaris* (Mitt.) Steph.	th	a	emr,sub	3	mxf	730-810	s,m	gr	?	ja-dc	Prom.42,44,64, Man.96,132,136,326	g	mt,so
Notothyladaceae *Notothylas javanica* (Sande Lac.) Gott.	th,hor	a	ter	3	mxf	850	o,s	gr	sp-nv	my-dc	Man. 189,228	g,s	so
Notothylas orbicularis (Schwein.) Sull.	th,hor	a	ter	2	mxf	850	o,s	gr	ag-nv	my-dc	Man. 190,229	g,s	so
Notothylas sp.	th	a	epl	3	mxf,egf	1,400	o,m	gr	?	ja-dc	Korn.147,151	g	ck

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Meaning of Abbreviations

HABIT: **Gametophyte:** sl stem-like and leaf-like th thallus ac arocarpous pl pleurocarpous

Sprophyte: **calyptra:** cam campanulate cuc cucullate mit mitrate

capsule: ere erect inc inclined hor horizontal pen pendulous im immerged

APED: a annual pe perennial evergreen pd perennial deciduous ped perennial evergreen-deciduous

LIFE_MODE: aqu aquatic ept epiterrestial epi epiphyte epl epilithic

flt floating ter tericolous cor corticolous rup rupicolous cul cultivated

emr emerged lit litter ram ramicolous nat naturalised

sub submerged epp epiphyllous int introduced

rhe rheophyte lig lignicolous

ABUNDANCE: 0 Probably extirpated

1 Down to a few individuals, in danger of extirpation

2 Rare

3 Medium abundance

4 Common, but not abundant

5 Abundant

HABITAT:

dof	deciduous dipterocarp-oak seasonal hardwood forest
bb/df	bamboo+deciduous seasonal forest
do/pine	pine+ deciduous dipterocarp forest
mxf	mixed evergreen+deciduous seasonal hardwood forest
eg/bb	primary evergreen+bamboo seasonal hardwood forest
eg/pine	primary evergreen+pine seasonal hardwood forest
egf	primary evergreen seasonal hardwood forest
def	degraded evergreen forest
da	disturbed areas, roadsides
sg	secondary growth
gra	grassland
be	beaches
agr	agricultural areas
urb	urban

MICROHABITAT: o open s shaded d dry m moist c cool h hot

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BEDROCK: gr granite ls limestone qz quartzite sh shale ss sandstone ms metamorphic sandstone

SPOROPHYTE MONTHS: ja fb mr ap my jn jl ag sp oc nv dc = January - December

GAMETOPHYTE MONTHS: ja fb mr ap my jn jl ag sp oc nv dc = January - December

STAGE: g gametophyte s sporophyte cs cleistocarpous sporophyte gm gemmae bf brood filament

Collectors: **Allen** D. Allen

Char. P. Charoenchai

Korn. S. Kornochalert

Makt. P. Maktrairut

Man. S. Manachit

Maxw. J. F. Maxwell

Pale P. Pale

Petr. O. Petrmitr

Polb. M. Polboonsri

Prin. N. Printarakul

Prom. P. Prompa

San. K. Santanachote

Schw. P. Schwendinger

Teps. A. Tepsiriumnouy

Tunr. M. Tunruttanakul

Watt. S. Wongwattanaphaibool

Wong. K. Wongkuna

Collecting Localities

ak Doi Ang Ka, Doi Inthanon National Park, Jawm Tong District, Chiang Mai Province

akh Ang Kahng, Fang District, Chiang Mai Province

bd Bong Duat Hot Spring, Mae Dtang District, Chiang Mai Province

bhf Bahng Hin Fohn, Mae Jam District, Chiang Mai Province

bnh Ban Nawng Hoy (village), Mae Rim District, Chiang Mai Province

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bsk Ban Saen Kum (village), Sahn Bah Dtong District, Chiang Mai Province

cd Doi Chiang Dao National Park and Wildlife Sanctuary, Chiang Dao District, Chiang Mai Province

ck Kuhn Chang Kian village, Doi Sutep-Pui National Park, Muang District, Chiang Mai Province

cmu Chiang Mai University, Muang District, Chiang Mai Province

db Doi Pah Baw, Bahng Mah Pah District, Mae Hawng Sawn Province

dg Doi Giah, Mae Fa Luang District, Chiang Mai Province

dh Doi Bahng Mah Hahn (Akha) village, Mae Fa Luang District, Chiang Rai Province

dhl Doi Hoa Loh, Mae Jam District, Chiang Mai Province and Khun Yuam District, Mae Hawng Sawm Province

di Doi Intanon, Doi Intanon National Park, Jawm Tong District, Chiang Mai Province

dk Doi Khun Dthan National Park, Mae Tah District, Lampoon Province

dl Doi Langka Luang, Kuhn Jae National Park, Chiang Mai Province

dlnp Doi Luang National Park, Wahng Nua District, Lampang Province and Pan District Chiang Rai Province

dma Doi Mawn Angget, Sa Meung District, Chiang Mai Province

dn Doi Mawn Ngaw, Mae Dtang District, Chiang Mai Province

dp Doi-Pui, Doi Sutep-Pui National Park, Muang District, Chiang Mai Province

dsl Doi Sahng Liang, Mae Dtang District, Chiang Mai Province

dt Doi Dtung (Tung), Mae Sai District, Chiang Rai Province

hk Huay Keaw (Gayo) water Falls, Doi Sutep-Pui National Park, Muang District, Chiang Mai Province

hs Doi Hua Sua**,** Doi Inthanon National Park, Jawm Tong District, Chiang Mai Province

js Jae Sawn National Park, Muang Bahn District, Lampang Province

kb Emerald Pool, Klong Tawm District, Krabi Province

kbk Kan Bauk village, Yebyu Township, Tawer District, Tenasserim Division, Myanmar (Burma)

kj Kuhn Jae National Park, Wieng Bah Bao District, Chiang Rai Province

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kk Kao Pra Bahng Kram Wildlife Sanctuary, Klong Tawm District, Krabi Province

km Huay Kawk (Kog) Ma, Doi Sutep-Pui National Park, Muang District, Chiang Mai Province

kp Kew (Giew) Mae Pan (Bahn), Doi Intanon National Park, Jawm Tong District, Chiang Mai Province

ky Kao Yai National Park, Nakorn Ratchasima Province and Nakorn Nayok Province

ma Mae Rah Ah watershed, Om Koi District, Chiang Mai Province

mk Mae Kong river, Sambour District, Kratie Province, Cambodia

ml Doi Mawn Lawng**,** Doi Sutep-Pui National Park, Mae Rim District, Chiang Mai Province

mm Mae Sa Mai, Mae Rim District, Chiang Mai Provice

mt Montatahn Falls, Doi Sutep-Pui National Park, Muang District, Chiang Mai Province

mhf Mae Ha Falls, Hang Dong District, Chiang Mai Province

mhy Mae Hai Ya, Muang District, Chiang Mai Province

ms Mae Sa Falls, Mae Rim District, Chiang Mai Province

msl Doi Mae Sa Long, Mae Chan District, Chiang Mai Province

my Mae Yom National Park, Song District, Prae Province

na Nakai Plateau, Nakai District, Savannaket Province, Laos

nk Nong Khao Klang (Karen) village, Muang District, Mae Hong Sawn Province

nl Nam Dtok Huay Sai Laung Falls, Doi Inthanon National Park, Jawm Tong District, Chiang Mai Province

nn Nam Dtok Ngao Falls, Nam Dtok Ngao National Park, Ranong Province

pd Pha Dang National Park, Chiang Dao District, Chiang Mai Province

php Phu Pan National Park, Sakon Nakorn Province

pk Phu Hin Rong Kla, Phu Hin Rong Kla Naional Park, Pitsanulok Province

pn Pah Ngaem limestone, Mae Wang District, Chiang Mai Province

png Pah Ngeub, Muang District, Chiang Mai Province

pp Phanom Pencha National Park, Krabi Province

ppl Puping Palace, Muang District, Chiang Mai Province

QSBG Queen Srikit's Botanic Garden, Mae Rim District, Chiang Mai Province

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rs Ru See Cave, Muang District, Chiang Mai Province

td Tahm Dahgadan, Hang Dong District, Chiang Mai Province

sf Siripum Falls, Doi Intanon National Park, Jawm Tong District, Chiang Mai Province

sk San Ku (Gu), Doi Sutep-Pui National Park, Muang District, Chiang Mai Province

sl Summit of Doi Lohn, Muang Bahn District, Lampang Province and Mae Awn District, Chiang Mai Province

so Sirindhorn Observatory, Doi Sutep-Pui National Park, Muang District, Chiang Mai Province

st Doi Sutep Temple, Muang District, Chiang Mai Province

wh Wat (temple) Fai Hin, Muang District, Chiang Mai Province

wk Wat (temple) Chang Kian, Muang District, Chiang Mai Province